REPUBLIC OF SOUTH SUDAN

NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN (2018-2027)

MINISTRY OF ENVIRONMENT AND FORESTRY

2018

Convention on Biological Diversity

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2011-2020 United Nations Decade on Biodiversity

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United Nations Environment Programme
P.O. Box 30552, Nairobi, KENYA
Tel: +254 (0)20 762 1234
Fax: +254 (0)20 762 3927
E-mail: uneppub@unep.org
Web: http://www.unep.org

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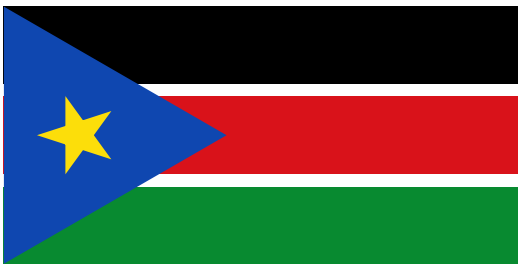

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FOREWORD

The South Sudan National Biodiversity Strategy and Action Plan (NBSAP South Sudan) represents a major step forward towards fulfilling the sustainable development goals enshrined in the Transitional National Constitution 2011 and the Vision 2040. At the same time, this NBSAP is a crucial step forward towards fulfilment of the commitment of the Government of the Republic of South Sudan (GRSS) towards the United Nations Convention on Biological Diversity (CBD) to which the country acceded on the 17 February 2014.

The South Sudan NBSAP has been developed as the principle instrument for undertaking biodiversity management and conservation in the country, and as a framework for optimally integrating the management of the country's vast biodiversity resources into national economic prosperity and social welfare targets of the Vision 2040. While, the NBSAP is divided into seven strategic objectives, a wider three-dimensional focus emerges from the document comprising of establishment of coordination and capacity development, implementation of biodiversity management actions and resource mobilisation, and knowledge and information management. Under the coordination and capacity development function, the first two strategies of the NBSAP are to: develop a stakeholder co-ordination framework for national and subnational biodiversity management and to strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country. The focus on implementation covers three strategic objectives to: reduce negative impacts and enhance positive impacts on biodiversity; strengthen capacity for and conduct resource assessments, spatial, ecological and land use planning and benchmarking of the value of biodiversity; and restore degraded lands and promote access to and benefit sharing of biodiversity and ecosystem services including genetic resources and their associated traditional knowledge. The third focus of the strategy and action plan is built on two strategic objectives: to develop and implement a resource mobilisation strategy for biodiversity conservation and management; and to establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan. Altogether the strategy sets 24 targets for implementation of the seven strategic objectives of the NBSAP.

The South Sudan's NBSAP was developed through a wide consultation process spread over an -18month period. Three national consultation workshops, three state-level consultation workshops and a national validation workshop provided the basis for the data and information used. Seven thematic groups based on the seven strategic objectives of the NBSAP, which were agreed uponin the second national consultation workshop held in June 2017, supported the NBSAP consultants in the authorship of this document. The GRSS was also supported by the Technical Team at the Ministry of Environment and Forestry and the United Nations Environment in South Sudan. On behalf of the Government of South Sudan, I hereby invite all our national and international partners and stakeholders to support and implement this strategy and action plan.

Hon. Josephine Napwon Cosmas
Minister of Environment and Forestry

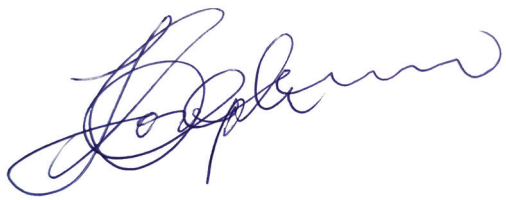
PREFACE

The Ministry of Environment and Forestry on behalf of the Government of the Republic of South Sudan with support from the Global Environment Facility (GEF), UN Environment (UNEP) and several national and subnational stakeholders has developed this first National Biodiversity Strategy and Action Plan (NBSAP). The South Sudan NBSAP was developed to address both the critical biodiversity and ecosystem conservation challenges in the country and to meet the Government's obligations after the country became a party to the United Nations Convention on Biological Diversity (CBD) in February 2014.

The Republic of South Sudan is a young country which only became independent in 2011. The early years of state formation are dedicated to building institutional and technical capacity to address all challenges that the country faces. One of the most important concerns within the country is addressing the growing biodiversity management challenges associated with oil exploration, production and development and armed conflict, which has disrupted normal socioeconomic activities and increased poaching of animals in national parks and wildlife reserves, illegal and uncontrolled deforestation for timber and wood fuel production, and conflict between crop farmers and livestock keepers over shared lands for crop and livestock grazing. Although during the transitional period after 2011, and in the period after the Comprehensive Peace Agreement (CPA) in 2005 the country made efforts to establish a legislative policy and enforcement structure, a lot of the processes are not complete yet. For the GRSS, therefore, the NBSAP will be used to support the organising process and to put in place enabling conditions for achieving biodiversity management.

The South Sudan's NBSAP will be used to mobilise national and subnational stakeholders to support and undertake biodiversity management activities. The principles adopted within the spirit of the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992, from which the CBD emerged include, the precautionary principle, the polluter pays principle and the user pays principle, among others from Agenda 21. They will support fast tracking of biodiversity management espoused in the NBSAP for South Sudan.

On behalf of all the GRSS, the ministries, departments and agencies, state governments, non-governmental stakeholders, participants from the Council of States of South Sudan and the Transitional National Legislative Assembly I would like to thank the Global Environment Facility (GEF) and UN Environment (UNEP) for the support received. We look forward to implementing this important strategy and action plan for the sustainable management and conservation of biodiversity in South Sudan.



Joseph Africano Bartel
Under Secretary for Environment,
Ministry of Environment and Forestry

ACKNOWLEDGEMENTS

The Development of the First National Biodiversity Strategy and Action Plan (NBSAP) for South Sudan would not have been possible without the contributions of the representatives from the government line ministries, commissions and agencies. The ministries acknowledged include the; Ministry of Water Resources and Irrigation, Ministry of Labour and Public Service, Ministry of Justice, Ministry of Roads and Bridges, Ministry of Culture, Youth and Sports, Ministry of Finance and Planning, Ministry of General Education and Instruction, Ministry of Trade, Industry and East African Community Affairs, Ministry of Transport, Ministry of Agriculture and Food Security, Ministry of Petroleum, Ministry of Environment and Forestry, Ministry of Wildlife Conservation and Tourism, and Ministry of Mining, and Ministry of Energy and Dams.

We also extend gratitude to public agencies that provided important input into the NBSAP. The agencies include ; the National Bureau of Statistics, Nile Petroleum Company, South Sudan Customs, Juba City Council, South Sudan Meteorological Department, National Petroleum and Gas Commission, National Petroleum and Gas Corporation and South Sudan Meteorological Department.

Gratitude is extended to the legislature, the National Legislative Assembly and the South Sudan Council of States for their active participation in the discussions for the NBSAP. The guidance provided was critical to completion of this national strategy and Action document.

The development of the NBSAP South Sudan also benefited from participation and input of international and national non-governmental organisations. Specifically; Wildlife Conservation Society (WCS), South Sudan General Farmers Union, South Sudan Development Organization (SSDO), Norwegian Peoples Aid (NPA), Juba Christian Centre, SoS Sahel South Sudan, Community Empowerment Progress Organisation (CEPO), Assistance Mission for Africa (AMA) Centre for Remote Evangelism, and South Sudan Nature Conservation Organisation (SSNCO). The MEF acknowledges and extends gratitude for the participation of the following academic institutions; Upper Nile University, University of Juba, and the Farmers Training Institute. The participation in analysis and specific contributions to sections of the plan enhanced the quality of the final outcome.

Special gratitude is extended to the international, bilateral and multilateral partners key among them was UN EnvironmentProgramme (UNEP) South Sudan Country Office which provided the overall technical and implementation support during the preparation of this NBSAP.

Mr. Paul Lado Demetry
National Focal Point
Convention on Biological Diversity

PROJECT TEAM

Ministry of Environment and Forestry (MoEF)

Mr. Joseph Africano Bartel, Undersecretary of Environment
Mr. Joseph Lam Achaye, Director General, Wetlands and Biodiversity
Mr. David Batali Oliver, Director General for Environmental Planning and Sustainable Development/ GEF National Operational Focal Point
Mr. Paul Lado Demetry, Director for Biodiversity-CBD-Focal Point
Mr. Payai Manyok John, Deputy Director of Climate Change & UNFCCC National Focal Point
Mr. Lwanga Tiba Charles, Biodiversity Database Manager/ CBD Desk Officer

United Nations Environment Programme (UNEP)

Mr. Arshad Khan, Country Programme Manager
Mr. Martin Dramani, Programme Specialist

The Experts - Greenbelt Consult Limited

Dr. Bob Humphrey Ogwang, Managing Director and Lead Consultant
Mr. Moses Masiga, Consultant
Mr. Junior Musinguzi, Consultant for Clearing House Mechanism (CHM)

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ACRONYMS

AEZ	Agro-Ecological Zone
AfDB	African Development Bank
AIS	Alien Invasive Species
BCM	Billion Cubic Metres
CAR	Central African Republic
CBD	Convention on Biological Diversity
CFR	Central Forest Reserve
CHM	Clearing House Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on Migratory Species
DRC	Democratic Republic of Congo
EIA	Environmental Impact Assessment
ETOA	Environmental Threats and Opportunities Assessment
FAO	United Nations Food and Agriculture Organisation
GMO	Genetically Modified Organisms
GNI	Gross National Income
GRSS	Government of the Republic of South Sudan
IBA	Important Bird Area
ICSS	Interim Constitution of South Sudan
IDP	Internally Displaced People
IGAD	International Governmental Authority on Development
IRG	International Resources Group
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
IUCN	International Union for the Conservation of Nature
LRA	Lord's Resistance Army

ACRONYMS

MSY	Maximum Sustainable Yield
MWCT	Ministry of Wildlife Conservation and Tourism
NBS	National Bureau of Statistics
NBSAP	National Biodiversity Strategy and Action Plan
NGOs	Non-Governmental Organisations
PA/ NPs	Protected Area/ National Parks
PFR	Provincial Forest Reserve
PGR	Plant Genetic Resources
SPLA	Sudan's Peoples Liberation Army
SSLC	South Sudan Lands Commission
UNCCD	United Nations Convention on Combating Desertification
UNDP	United Nations Development Programme
UNEP	UN Environment
UNFCCC	United Nations Framework Convention on Climate Change
WCS	Wildlife Conservation Society
WHC	World Heritage Convention
ODA	Overseas Development Assistance
NRRD	Natural Resources and Rural Development
GNI	Gross National Income
BRAC	Building Resources Across Communities
ACORD	Agency for Cooperation and Research in Development
SNV	Netherlands Development Organisation
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SBI	Subsidiary Body on Implementation
COP	Conference of Parties

EXECUTIVE SUMMARY

The National Biodiversity Strategy and Action Plan (NBSAP) of South Sudan is an expression of the intention of the Government and people of the country to integrate biodiversity concerns into public (national and subnational), private, and community policies, plans, programmes and projects. The NBSAP is also a fulfilment of the commitment of the Government of South Sudan when it acceded to the United Nations Convention on Biological Diversity (CBD) on 17 February 2014 and became the 94th Party to the global treaty on biodiversity and sustainable development.

South Sudan envisions a NBSAP that establishes a strong framework for biodiversity conservation and contributes to economic prosperity and enhanced quality of life for all. The Vision of NBSAP for South Sudan is to establish a strong framework for biodiversity conservation that contributes to economic prosperity and enhanced quality of life while the goal is to develop and maintain an operational framework for conservation of biodiversity; sustainable use of biodiversity; fair and equitable sharing of the benefits arising from their utilisation.

Implementation of the above strategic objectives of the NBSAP is envisaged to address the general threats and emerging issues for biodiversity management in South Sudan highlighted in the NBSAP which include:

(i)	Weak and Inadequate Coordination Mechanisms between the Central Government and States Governments as well as poor resource allocation and accountability which are significant challenges to institutional capacity and forest governance.
(ii)	High rates of water resource pollution from point sources of oil production and development, wastewater from industry, hotels and domestic sources, and non-point sources from solid waste collected in surrounding areas.
(iii)	A high deforestation and forest degradation rate. Due to fragility of the forest ecosystems which suffered varying levels of degradation through uncontrolled fires, uncontrolled grazing, and over harvesting, between 1973 and 2006, on average South Sudan lost 2 percent of its forests to deforestation each year.
(iv)	The existence of poor forest governance of forest resources poses grave danger for forest management in the country. While the Government has made efforts to restore order in exploitation of forest resources throughout the country, illegal exploitation is still common. In some cases, forests are still being destroyed by militia groups. Under the decentralisation system of governance, overlaps exist among central government institutions in the states.
(v)	On a community level, the continued traditional use of bush fires is a major threat to forests and tree growing throughout South Sudan. The fires are used for land preparation under shifting cultivation, for hunting and for rejuvenation of grazing areas.
(vi)	Wood fuel principally charcoal and firewood are the mainsources of the energy in the country. Firewood and charcoal are the dominant sources for energy supply in the country. Alternatives such as hydro-electric power, wind and solar power and gas are not well developed or promoted in the country.

(vii)	The technological development in South Sudan continues to be slow. In the urban areas, petroleum and diesel generators are the main source of electricity. Simple mobile technologies for conducting transactions by phone and access to technology are quite limited. Therefore, transmission of information, and conducting transactions is curtailed. These limitations also limit dissemination of information and knowledge including knowledge on biodiversity management. Other barriers include poor road networks, poor transport infrastructure and poor access to international markets.
(viii)	Uncertainty over long-term land tenure emerged because of the status of South Sudan as a new country. Even though the 2009 Land Act provides for community lands to be designated for, among other reasons, forestry purposes. Land ownership in the new country of South Sudan remains to be resolved, and it calls for fresh common understanding between Central Government, State Governments, local governments, and communities.
(ix)	Gender Inequality is another concern, particularly as South Sudan is only developing the institutions mechanisms for governance. In traditional households women are usually the primary food providers for their families. Despite their critical role in the management of natural resources, women and young people have limited property rights that ensure their access to land and forests. Women and young people have comparatively few employment opportunities in the collection, production, and sale of timber, wood, charcoal and other forest products. This gender disparity in access to and utilisation of natural resources from forests and elsewhere is a major contributor to the rising poverty among women
(x)	Prolonged periods of war have promoted illegal activities of poaching and endangering of both wildlife managers and the wildlife itself. During periods of armed conflict, civilian communities and combatants alike fed on wildlife and other natural resources for survival, which in several areas resulted in uncontrolled hunting and over-exploitation during the extended periods of war. During the war combatants on all sides left anti-personnel and land mines and other unexploded ordinances in some of South Sudan's protected areas. This presents a hindrance for rehabilitation, research, tourism and other wildlife management activities.
(xi)	Deterioration of Management Capacity. The impact of the war years, in effect meant that there was no protected area management. Existing infrastructure that was there before the war in wildlife protected areas was left in ruins. Conservation personnel were not trained and there was total lack of conservation education programs. Management capacity is in the early recovery phases. There is a need for strong support to improve this management capacity and develop management plans for the protected areas.
(xii)	Habitat Destruction and Fragmentation. Habitat destruction and fragmentation from farming and deforestation is the key cause of biodiversity loss in South Sudan. Increased shifting agriculture causes large-scale land use changes across the region particularly in the Savanna.
(xiii)	Park encroachment and degradation by livestock and other human activities. Livestock is present in most of the legally protected areas irrespective of their legal status. Keeping livestock in the Parks create competition for water and fodder, leading to land degradation through burning and overgrazing and facilitating poaching. The added risk of conflict between protected area managers and the pastoralists and poachers who may be heavily armed also reduces efficacy of the PA management system.
(xiv)	Viability and Rehabilitation of PAs. The lack of strategic and financial planning for wildlife PAs means that many of South Sudan's wildlife PAs do not generate any revenue to cover some of the costs needed to adequately protect some key wildlife areas, examples include the Sudd wetlands.

(xv)	Community Participation. Communities still consider wildlife as an 'open access' or 'free-for-all' resource, which inevitably results in over-exploitation. Management strategies that address the issue of wildlife outside PAs such as community-based conservation and collaboration with state and local governments need to be developed and implemented.
(xvi)	Poverty. The World Bank South Sudan Poverty Profile (2015) indicated that poverty in the country had increased to 66 percent from 51 percent in 2009. The poverty profile was based on a survey conducted in Northern Bahr el Ghazal, Western Bahr el Ghazal, Western Equatoria, Central Equatoria and Eastern Equatoria and Lakes. The strong increase in poverty is due to two combined shocks; armed conflict since December 2013 resulted in displacement of at least 25 percent of the population. A large number of the displaced were forced to leave their complete livelihoods behind; and the drop in oil led to a -10fold depreciation of the parallel market exchange rate and large annual inflation of 52 percent in July 2015.
(xvii)	Inadequate legal, institutional and administration capacities for biodiversity management as well as limited government budgetary allocation and inadequate coordination amongst institutions and other stakeholders with respect to biodiversity management, laws, policies and programmes.
(xviii)	Increasing population growth with resulting agricultural expansion, overgrazing and deforestation, increased poverty and huge infrastructure and developmental activities can significantly cause biodiversity loss e.g. roads crossing wildlife corridors and migratory routes.
(xix)	Inadequate land use planning - resulting in environmental degradation as manifested in widespread pollution by unmanaged oil and extractive industries, exploitation and exploration activities; and increasing loss of biodiversity due to over-exploitation of natural forests and inadequate environmental management and sanitation in urban environment.
(xx)	Inadequate public awareness on environmental policies, laws and environmental protection and management in general. Failure to recognise the value and importance of fragile ecosystems and protected areas.
(xxi)	Inadequate decentralisation and devolution of biodiversity management to the lowest levels of government within the framework of the decentralised governance system.
(xxii)	Insufficiency of data – all the biodiversity institutions have noted the lack of enough data on South Sudan biodiversity. Most of the available data on the larger animals is limited, but even more deficient on plant, avifauna, reptiles, amphibians, fisheries and microbes.
(xxiii)	Replacement of local crop varieties with introduced commercial varieties leading to neglect of traditional varieties including crop relatives and landraces.

Alongside the main threats to biodiversity management are the new and emerging issues addressed in the NBSAP. These include:

(i)	Delays in completing the legislative reforms initiated after independence in 2011 means that the country is not prepared to manage its biodiversity. The management of protected areas, forests, and environmental management exist on laws adopted under the Comprehensive Peace Agreement (CPA). There is clear inadequacy in the legislative, regulatory and institutional structures to adequately manage environmental compliance, deforestation and poaching, among others.
(ii)	Climate change. Key among the threats to biodiversity and National Parks is climate variability, and its longer-term cousin global warming. The future is difficult to predict but there may be significant changes in the rainfall and river flow patterns that will affect the biological diversity. Climate change may increase phenomena such as fire, drought and flood severity and/or aggravate the existing threats to the ecosystems or individual species.

(iii)	Regional and International Cooperation. The Convention on Biological Diversity (CBD), the UN Convention to Combat Desertification (UNCCD), the UN Framework Convention on Climate Change (UNFCCC), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Migratory Species (CMS) and others including regional and bilateral agreements, are relevant to the national biodiversity related policies. Following independence, there is a need for South Sudan to seek membership of the relevant treaties and protocols and integrate their provisions into both policy and implementation strategies.
(iv)	Transboundary Wildlife Management. A number of South Sudan's wildlife PAs lie at the borders of neighbouring countries. Wildlife also migrates across those borders. South Sudan has signed a memorandum of understanding with Uganda for transboundary or 'peace park' management in four protected areas. There are plans to undertake measures to reach similar agreements with Ethiopia, Kenya, CAR and the DRC. Transboundary wildlife management efforts are an important mechanism to build trust and cooperation between South Sudan and its neighbours, for preventing conflicts over natural resources, sharing skills and resources, learning from different countries' experiences, and managing wildlife on a landscape scale where it crosses international boundaries.
(v)	Oil Exploration and mining impacts. Large-scale and small-scale developments such as petroleum and mining may also have a significant impact on biodiversity through both direct impacts such as pollution of water sources and destruction of habitats (in the case of large-scale mineral extraction), as well as through corollary impacts such as the development of roads, pipelines, and mining camps and settlements. All these impacts need to be carefully reviewed, planned, and mitigated, with clear monitoring and enforcement mechanisms put in place, if mining and petroleum development are not to threaten South Sudan's unique biodiversity.
(vi)	Post Conflict Infrastructure Development. Developments such as roads are being constructed as peace returns to South Sudan; some of which pass through National Parks while others cross important wildlife corridors. These if not controlled e.g. by undertaking environmental and social impact assessments could in future negatively affect wildlife protection in the country.
(vii)	Threats from biotechnology development, use and other risks to agricultural biodiversity. Modern agriculture relies on use of improved cultivars, but some farmers have retained their varieties and this form of in-situ on-farm conservation needs to be strengthened. The local communities are custodians of a lot of indigenous knowledge on plant genetic resources (PGR). Potential threats to PGR in South Sudan include the following: replacement of local crop varieties by introduced commercial varieties; loss or neglect of traditional varieties, including crop wild relatives and landraces e.g. millet, wild medicinal plants and local fruits and vegetables; loss of other indigenous species found in cultivated areas as well as increasing problems of invasive crop weeds; introduction of new varieties in preference to indigenous species; genetic erosion of indigenous plant genetic resources due to changes in land use; and risks to genetic diversity from climate change that leads to drought, diseases, pests, and famine.
(viii)	Alien Invasive Species. These are species whose introduction and/or spread outside their natural habitats, past or present distribution threatens biological diversity.

The strategic objectives for the NBSAP of South Sudan are:

(i)	Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan
(ii)	To strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country

(iii)	Reduce Negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms
(iv)	Strengthen capacity for and conduct resource assessments, spatial, ecological and land use planning and benchmarking of the value of biodiversity in South Sudan to support sustainable use and management of biodiversity in South Sudan
(v)	Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas of South Sudan
(vi)	Develop and implement a resource mobilisation strategy for biodiversity conservation and management in South Sudan
(vii)	Establish knowledge and information management systems and create awareness of biodiversity conservation in South Sudan

NBSAP South Sudan has 24 targets that are outlined below.

SO1: Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan	1. By 2018, NBSAP will be adopted and be effectively implemented, with a comprehensive National biodiversity coordination framework in place 2. Biodiversity values will be mainstreamed into the National Development Plans and Budget Framework papers, and for State and County Development Plans. 3. By 2025, an integrated national biodiversity monitoring, assessment and reporting system will be established.
SO2: To strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country	4. By 2025, National Government and State Governments will have reviewed relevant legislation, policies and programs to maximise synergies with the NBSAP. 5. By 2025, have prepared legislation and ratified and/or acceded to the Nagoya Protocol, Cartagena and other biodiversity-related conventions (Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on Wetlands of International Importance, especially as Waterfowl Habitats (RAMSAR), World Heritage Convention (WHC), International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and International Plant Protection Convention (IPPC). 6. By 2020, National Strategy on Invasive Alien Species will be developed and under implementation.
SO3: Reduce Negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms	7. By 2022, biodiversity-inclusive environmental impact assessment (EIA) and Environmental Audits, and Strategic Environment Assessment (SEA) will be strengthened. 8. By 2022, commitment of states and the elaboration of a National Policy, ensuring the continuous and updated diagnosis of species and genetic resources and effectiveness of Action Plans for Prevention, Contention and Control of loss of biodiversity at species and genetic level in the country will be achieved. 9. By 2022, incentives and subsidies harmful to biodiversity will have been identified and reformed, and controls related to biodiversity will have been enhanced. 10. By 2022, rate of loss of natural habitats (forests, wetlands, water resource catchments) will be reduced by at least %50.

SO4: Strengthen capacity for and conduct resource assessments, spatial, ecological and land use planning and benchmarking of the value of biodiversity in South Sudan to support sustainable use and management of biodiversity	11. By 2022, resource assessments, spatial, of biodiversity ecological and land use planning of the value of biodiversity in South Sudan will be completed. 12. By 2026, national plan on ecosystem management, land use and their benchmarked value for sustainable use and management will be integrated into the National Development Plan.
SO5: Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas of South Sudan	13. By 2024, a programme for effective management of protected areas (PA) and PA current network will be developed and will be under implementation. 14. By 2023, national collaborative resource management programme for PAs, wetlands and water resource catchments will be developed and under implementation. 15. By 2024, programme for restoration of degraded wetlands, including the Sudd, will be developed and under implementation. 16. By 2024, programme for restoration of degraded forest areas, will be developed and under implementation. 17. By 2023, national programme for rehabilitation of degraded farmlands will be developed and under implementation.
SO6: Develop and implement a resource mobilization strategy for biodiversity conservation and management in South Sudan	18. By 2022, a natural resource mobilisation strategy for biodiversity management will be developed and under implementation. 19. By 2024, at least %50 of the required budget for the NBSAP, generated from diverse sources, will be made available for its implementation.
SO7: Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan	20. By 2022, programme for environmental education in the society for improved awareness of population on biological diversity and ecosystem services will be under implementation. 21. By 2020, role of the scientific research and professional institutions, NGO sector and media, including improvement of scientific technologies will be strengthened. 22. By 2022, significant increase in the contribution of scientifically based information into biodiversity decision making processes and management interventions will be achieved. 23. By 2020, biodiversity information system and capacity of Clearing House Mechanism (CHM) will be developed. 24. By 2025, national inventory on genetic diversity of species of cultivated plants, farm animals and wild relatives, with the view to safeguard the genetic diversity of priority species of high socioeconomic value will be completed.

IMPLEMENTATION AND RESOURCE MOBILISATION

The national coordination provides guidance on which institutions and how the implementation of the NBSAP will be coordinated. The national coordination structure was developed through a stakeholder consultation process with support of ministries, departments and state governments, as well as input from non-government organisations, and academic institutions. The core coordination ministries for the NBSAP under the leadership of the Ministry of Environment and forestry are the Ministry of Wildlife, Conservation and Tourism, the Ministry of Agriculture and Food security, the Ministry of Livestock and Fisheries, the Ministry of Water Resources and Irrigation and the Ministry of Finance and Planning. The State Governments will play a strong role in the implementation of the NBSAP at subnational level.

The resource mobilisation strategy for the NBSAP of South Sudan will be jointly coordinated by the Ministry of Environment and Forestry (MEF) and the Ministry of Finance and Planning (MF &P). The core coordination structure will mirror the NBSAP coordination structure with commitments from all cabinet ministries as follows.

The NBSAP development process has proposed a financial outlay of 118,150,000$. The estimate was simplistic cash flow projections based on discussions with stakeholders engaged in the NBSAP development. A more refined assessment of financial requirements, mobilisation, policy legislation and institutional arrangements has been proposed in the NBSAP. The NBSAP will be implemented between 2018 and 2027. A monitoring and evaluation framework is also provided in this document.

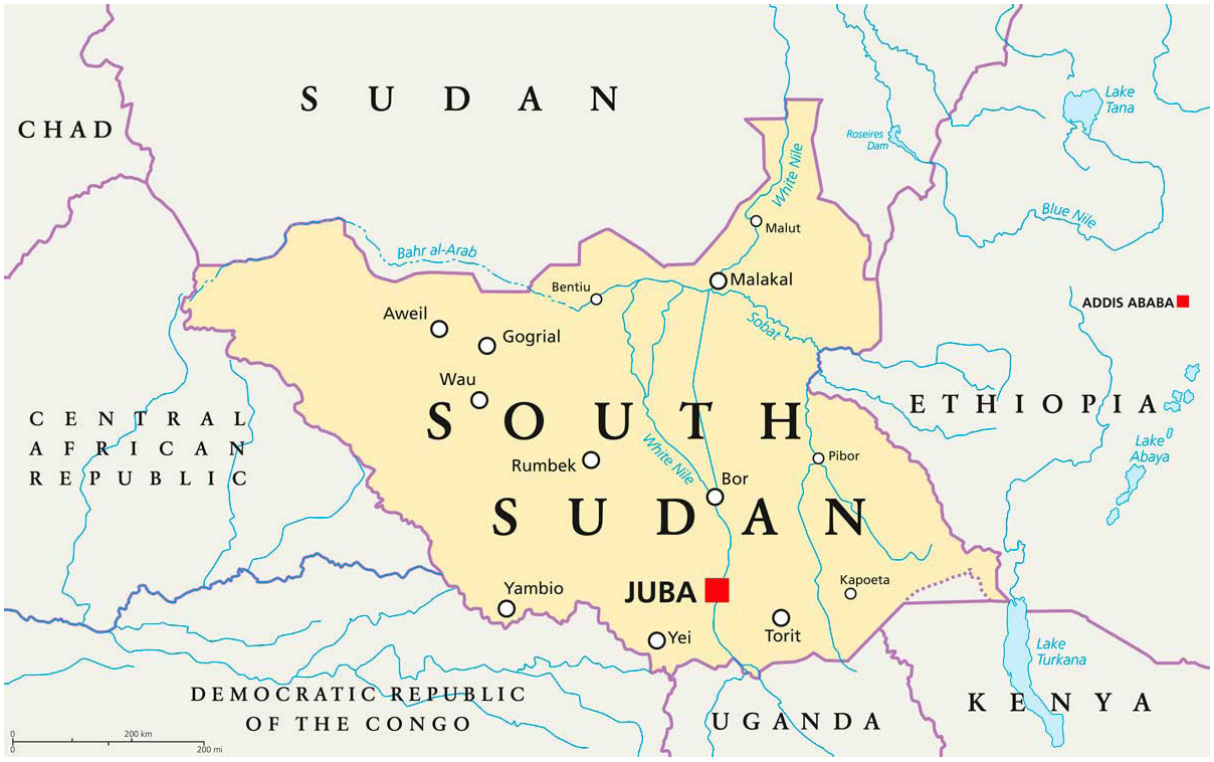
1

INTRODUCTION

1.1. BACKGROUND

The Republic of South Sudan is the world's newest nation and Africa's 55thcountry. South Sudan is a land locked country that is bordered by Ethiopia to the east, Kenya to the southeast, Uganda to the south, the Democratic Republic of Congo (DRC) to the southwest, the Central African

Republic (CAR) to the west, and Sudan to the north (Figure 1).



Source: Infoplease

Located in both Eastern Africa and North Africa, South Sudan has a land area of 644,329 km2 , a population currently estimated at about 12 million and average number of people estimated at 13 people/km2 making South Sudan one of the least densely populated countries in sub-Saharan Africa. South Sudan is divided into 10 historical states, which are Northern Bahr el Ghazal, Western Bahr el Ghazal, Western Equatoria, Central Equatoria, Eastern Equatoria, Lakes, Warrap, Unity, Upper Nile and Jonglei (Figure 2). At the subnational level, states are further sub-divided into counties, counties into Payams and Payams into Bomas (AfDB 2013).

A Presidential Decreee issued on the 14 January 2017 increased the number of federal states to 32. An earlier Presidential Decree had increased the number of states to 28 states in 2015 from the 10 states at independence in 2011. Nonetheless, many development programmes are still aligned to the 10 states agreed under the Comprehensive Peace Agreement (Table 1).
The Comprehensive Peace Agreement is a series of six agreements reached between the Government of Sudan and the Sudan People's Liberation Movement (SPLM), the political organ of the South during the Second Civil War, between 2002 and 2004. In chronological order, the Agreements are: the Protocol of Machakos, 20 July 2002; the Protocol of security arrangements, 25 September 2003; the Protocol of wealth-sharing, 7 January 2004; the Protocol of the resolution of conflict in southern Kordofan/Nuba Mountains and the Blue Nile States, 26 May 2004; and the Protocol on the resolution of conflict in Abyie, 26 May 2004 (Snyder 2013).

Table 1: List of 32 States decreed in January 2017

(A) Greater Equatoria (9 states)	Counties
1. Imatong State (Torit)	Ayaci, Geria, Ikwoto, Imehejek, Kidepo Valley, Lafon, Lopit West, Magwi, Pageri, Torit, Torit East and Torit West Counties
2. Kapoeta State (Kapoeta)	Kapoeta North, Kapoeta East, Kapoeta South, Budi Counties
3. Maridi State (Maridi)	Landili, Maridi, Kozi, Mambe, Ibba, Nabanga and Maruko Counties
4. Amadi State (Mundri)	Mvolo, Mundri West and Mundri East counties
5. Gbudwe State (Yambio)	Mopoi, Ri-Yubu, Naandi, Bangazagino, Basukangbi, Sakure, Bangasu, Nzara, Ezo, Tombura, Nagero, and Yambio Counties
6. Tambura State (Tambura)	Tambura and Nagero Counties
7. Jubek State (Juba)	Lodu, Luri, Mangala, Gondokoro, Rejaf, Wonduruba, Lobonok, Bungu, Ganji (Ganzi), Dollo, Rokon, Lyria and Oponi Counties
8. Terekeka State (Terekeka)	Terekeka, Jemeza, Gwor, Tali and Tigor Counties
9. Yei River State (Yei)	Yei, Lainya, Morobo and Kajo-Keji Ngepo, Kindi, Otogo, Tore, Wuji, Yei River and Kupera Counties
(B) Greater Bahr el Ghazal (10 states)	
1. Wau State (Wau)	Kuarjina, Roc Roc, Marial Bai, Odechy, Kangi, Busalia, Bagari, and Baili Counties
2. Aweil State (Aweil)	Buonchai, Ajak, Kongdek, Ajuet, Chimel, Mayom Wel, Barmayen, and Aroyo Counties
3. Lol State (Raja)	Eri, Gomjuer West, Gomjuer East, Korok West, Korok East, Kuru, Majakbai, Marialbai, Malual North, Malual Centre, and Ringi Counties
4. Aweil East State (Wanjok)	Wunlung, Malualbaai, Warguet, Yargot, Madhol, Mangok, Baac, and Mangar-Tong Counties
5. Twic State (Mayen-Abun) –	Akoc, Panyoc, Wunrok, Ajak, Turalei, and Aweng Counties
6. Gogrial State (Kuacjok) –	Awan Pajook, Awan Chan, Awan Riau, Aguok West, Aguok Centre, Aguok North, Aguok South, Kuac South, Kuac North, Apuk North, Apuk East, Apuk West and Apuk South Counties
7. Tonj State (Tonj) –	Lou Ariik, Konggor, Akop, Lou Paher, Rualbet, Warrap, Manloor, Kirik, Pagol, Luanyjang South, Luanyjang North, Luanyjang Centre, Luanyjang East, Ananatak, Manyang-Ngok, Wanhalel and Thiet Counties
8. Eastern Lake State (Yirol) —	Awerial North, Malek (Ramciel), Yirol Centre, Yirol North, Aluakluak, Ngop, Awerial South, Lou, Abang, Yirol East (Adior) and Madbar counties
9. Western Lake State (Rumbek) —	Rumbek, Eastern Bhar Naam, Wulu, Western Bhar Naam, Malueth, Malek, Aloor, Bhargel, and Amongping Counties
10. Gok State (Cueibet)	Cueibet, Abiriu, Duony, Waat, Anyar Nguan, and Malou-Pech Counties

(C) Greater Upper Nile (13 states)	
1. Northern Liech State (Bentiu)	Mayom, Koch, Rubkona and Guit counties
2. Southern Liech State (Leer)	Mayendit, Leer and Panyijiar counties
3. Ruweng State (Panriang)	Panriang and Abiemnhom counties
4. Jonglei State (Bor)	Duk, Bor and Twic East counties
5. Western Nile State (Kodok)	Kodok, Manyo and Panyikang counties
6. Northern Upper Nile State (Renk)	Renk, Maban and Melut counties
7. Central Upper Nile State (Malakal)	Akoka, Pigi, Baliet and Panyikang counties
8. Fangak State (Ayod)	Ayod, and Fangak counties
9. Bieh State (Waat)	Uror and Nyirol counties
10. Akobo State (Akobo)	Akobo County
11. Maiwut State (Maiwut)	Longuchuk, Maiwut and Koma counties.
12. Latjor State (Nasir)	Ulang and Nasir counties.
13. Boma State (Pibor)	Pochalla, and Pibor counties

Source: GRSS (2017)

1.2. ECONOMIC AND SOCIOECONOMIC STATUS

1.2.1. OVERVIEW OF THE ECONOMY

South Sudan began life as an independent country with significant oil resources, abundant arable land and a unifying narrative of independence. With the signing of the CPA in 2005 that ended the five decades of war, South Sudan experienced relative peace between 2005 and when the country became an independent state in 2011 and up to the start of 2013 when armed conflict re-emerged in the form of civil conflict between different armed factions and the Central Government.

The oil sector is the largest contributor to GDP (AfDB 2014). In 2010 oil accounted for 60 percent of GDP. Oil revenues also accounted for almost 98 percent of public expenditure over the years. In the non-oil sector, subsistence agriculture, forestry and fisheries account for 14.5 percent; government services, 9.1 percent; trade, hotels and restaurants, 5.9 percent; manufacturing and mining, 3.6 percent; transport and communication, 3 percent; construction, 2.2 percent and other services, 2 percent.

Despite its great resource wealth, its population is one of the most deprived, with extremely poor social indicators and dramatic gender disparities. Outside a few oil enclaves, South Sudan remains a relatively undeveloped subsistence economy. Oil revenues are also associated with poor governance and corruption, which have started to affect the population's perceptions of their state and threaten to undermine its legitimacy. The rural economy in South Sudan is still largely dependent on the agriculture sector. South Sudan has a huge but largely unrealised agricultural potential. Both cultivated areas and yields are extremely low. About 63 percent of the total land area in the country is covered by trees and shrubs, while cropland accounts for merely 4 percent (FAO 2009). The areas with high to medium agricultural potential due to favourable natural conditions for crop production account for 53 percent of total land area. Reaching the level of average crop yields observed in neighbouring East African countries could easily triple agricultural production.

The government budget is facing a huge shortfall caused by the sharp decline in oil revenues. The challenges of the civil conflict are compounded by enormous economic and fiscal problems. South Sudan is heavily oil-dependent and over 95 percent of the government revenues in previous fiscal years (AfDB 2016). Oil production in 15-2014 was 40 percent lower than projected in November 2013. In addition to the sharp fall in production, there has been a collapse of international oil prices, declining from close to 110 US dollars (USD) per barrel in July 2014 to less than 35 USD per barrel in January 2016. The drop in oil revenues has led to a sharp reduction in the government's revenues, preventing investment in development activities. Government net oil-revenue forecast for the 16-2015 fiscal year is only 17 percent of the previous year. In the last few years, GDP growth has been very erratic, driven by conflict and fluctuations in oil prices. The African Development Bank estimates that after experiencing a 15.9 percent increase in 2014, growth is expected to experience a decline of 5.3- percent in 2015. The predictions are a small recovery in 2016 with a 0.7 percent growth rate, and a revival in 2017 with a 8.8 percent growth rate. However, the realisation of the forecast will depend on the recovery of oil prices and the implementation of the peace agreement.

1.2.2. MACRO ECONOMIC PERFORMANCE

The Ministry of Finance and Planning estimates that South Sudan's Gross National Income (GNI) per capita in US dollars has fallen by around 70 percent since independence (MF & P 2016). Year on year inflation was around 73 percent for August 2016, and the South Sudan Pound (SSP) has lost close to 80 percent of its value against the US dollar over the year leading up to August 2016. The current macroeconomic environment in South Sudan indicates considerable difficulty. The global crash in oil prices combined with ongoing security threats have resulted in a large decline in South Sudan's GNI. The poor oil prices have been compounded by continued civil conflict and political instability. A steep decline in oil production and a sharp drop in oil prices have caused large shortfalls in foreign exchange receipts and government revenue. Continued high government spending led to massive fiscal deficits that were either monetized or financed through accumulation of arrears.

Real GDP growth is estimated to have declined by 18.8 percent in the two years through 16/2015 (July-June) and annual inflation rose to about 550 percent in September 2016 (Table 2). However, with the recent tightening of policies, inflation declined to about 370 percent in January and monthly price changes have been in single digits in recent months. The conflict and the collapse in oil prices have led to closure of oil fields and lack of maintenance and investments, which in turn have resulted in dwindling production. South Sudan's effective average oil export price declined from 98 USD per barrel in 14-2013 to about 33 USD per barrel in 16-2015. Meanwhile, daily production has fallen by about 40 percent of the level produced immediately before the conflict. The conflict, poor rainfall and decline in oil activity also weakened the non-oil sector, including food crop production. Non-oil GDP declined by an estimated 17 percent over the last two years. Moreover, real domestic income adjusted for terms of trade declined by an estimated 35 percent since 2013.

Table 2: Selected economic indicators

Macro-economic indicators	2013-14	2014-15	2015-16	2016-17 Proj.
Output and Prices				
Real GDP growth (%)	39.3	-12.8	-6.9	-10.5
Oil production (millions of barrels per year)	66.8	57.8	53.1	43.4
Inflation, average (%)	-5.6	14.8	158.7	336.2
South Sudan's oil price (US dollars per barrel)	97.8	62.4	34.7	41.4
Central government finances				
Revenue and grants (% GDP)	26.4	28.6	29.0	34.4
of which: grants (% GDP)	0.0	8.3	0.4	0.9
of which: oil revenues (% of GDP)	24.1	16.7	22.0	29.5
Expenditure (% GDP)	28.1	37.2	38.4	36.3
Current	24.5	34.7	33.0	33.7
of which: Payments to Sudan (% of GDP)	6.2	5.9	7.9	17.2
Capital	3.6	2.4	5.4	2.6
errors and omissions	1.1	6.0	-1.8	-0.5
change in arrears	0.0	0.0	23.2	0.0
Fiscal balance (% GDP)2	-2.9	-14.6	-30.8	-1.3

Source: Ministry of Finance (2017)

1.2.3. SOCIOECONOMIC STATUS OF SOUTH SUDAN

South Sudan includes 10 states and a population of about 10.3 million people, although in 2016 the population was estimated at approximately 12.34 million (SSNBS 2016). Approximately 78 percent of all households earn their livelihood from farming, fishing, pastoralism or a mix of the three. Farming is predominantly rain-fed, and farmers cultivate their small plots with handheld tools. Some common agricultural products include pineapple, cotton, groundnuts, sorghum, millet, wheat, cotton, sweet potatoes, mangoes, pawpaw, sugarcane, cassava and sesame. Pastoralists hold approximately 8 million cattle in aggregate, and, in addition, there are millions of poultry, goats, pigs, horses, donkeys and sheep. Sedentary farming is on the rise, which has reduced the amount of grazing land available for pastoralists (Ghougassian 2012).

The country has a very young population, with 16 percent under the age of five-years-old, 32 percent under the age of 10-years-old, 51 percent under the age of 18-years-old and 72 percent under the age of 30.3-years-old (NBS 2017). The population is largely rural with 83% residing in rural areas. The average number of people per household is 6.5. The largest household size is in Unity State with an average of 7.8 people in each household, followed by Upper Nile and Lakes states with an average household size of 7.6 people. The states with the lowest average household size in South Sudan are Western Bahr Al Ghazal State with 5.4 and Western Equatoria with 5.5 (NBS 2017).

South Sudan contains many tribal groups (with more than 200 ethnic groups) and uses many more languages than Sudan. The major ethnic groups present are the Dinka at more than 1 million (approximately 15 percent combined), the Nuer (approximately 10 percent), the Bari, and the Azande. The Shilluk constitute a historically influential state along the White Nile, and their language is closely related to Dinka and Nuer. The South Sudanese practise mainly indigenous traditional beliefs, although some practise Christianity as a result of Christian missionary efforts (Moilinga 2017 – See Annex VI; NBS 2017).

Only 27 percent of the population 15-years-old and above is literate. In 2009 (NBS 2009) there were 129 students per classroom. The literacy rate for males is 40 percent compared to 16 percent for females. The infant mortality rate is 105 (per 1,000 live births), the maternal mortality rate is 2,054 (per 100,000 live births) and only 17 percent of children were fully immunised. Fifty five percent of the population has access to improved sources of drinking water but 38 percent of the population has to walk for more than 30 minutes one way to collect drinking water. Eighty percent of the population does not have access to toilet facilities. Meanwhile, 15 percent of households own a phone (59 percent in urban areas compared to 8 percent in rural areas).

Since independence in 2011, the political landscape in South Sudan has continued to be dominated by both internal and external threats to sustainable peace and stability. In December 2013, the country descended into protracted strife which has heightened uncertainty in the country. The parties to the conflict finally signed a peace agreement in August 2015 but timely implementation is a significant challenge. The conflict comes at a huge humanitarian cost. As of November 2015, over 2.2 million people, an increase of 200,000 since the beginning of 2015, have been displaced. Over 1.6 million people have been displaced internally while over 616,000 people have fled to neighbouring states. Severe food insecurity is expected to affect 4.6 million people this year, compared to 3.8 million last year, at the height of the lean season. The incidence of poverty has worsened from 44.7 percent in 2011 to more than 57 percent in 2015 (AfDB 2016).

1.3 INTEGRATION OF BIODIVERSITY MANAGEMENT AT NATIONAL LEVEL

1.3.1. THE CONVENTION ON BIOLOGICAL DIVERSITY

In 1992 at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, three international instruments were agreed to contribute to sustainable development goals under a global instrument referred to as the Agenda 21. The three Multilateral Environmental Agreements –MEAs commonly referred to as the Rio Conventions (Rio) are the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC) and the United Nations Convention on Combating Desertification (UNCCD).

While the UNFCCC and UNCCD are focused on minimising the impacts of climate change and adaptation, and combatting desertification and supporting sustainable land management, the objectives of the CBD are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources, including by appropriate access to genetic resources and appropriate transfer of relevant technologies, taking into account all rights over those resources and technologies and by appropriate funding.

The National Biodiversity Strategy and Action Plan (NBSAP) is developed as the core instrument for implementation of the CBD at a national level. The mechanisms for implementation of the CBD also comprise of the National Report on Biodiversity Management, Financial Resources and Mechanisms, the Clearing House Mechanisms (CHM), the Bio-Trade Initiative and Lifeweb financing for Protected Areas. The NBSAP is a process by which countries can plan to address the threats to their biodiversity.

NBSAP is a principal instrument for the implementation of the United Nations Convention on Biological Diversity both at a national and at a global level. The NBSAP contributes to the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Targets. The rationale for development of the NBSAP is derived from Article 6 of the CBD. Article 6 on General Measures for Conservation and Sustainable Use states that each Contracting Party shall, in accordance with its particular conditions and capabilities: (i) develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity among others; and (ii) integrate as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. National Reports are derived from Article 26 of the Convention which states that the objective of national reporting is to provide information on measures taken for the implementation of the Convention and the effectiveness of these measures. Achieving the objectives of the Convention on Biological Diversity, and the 2010 target requires cooperation and coordination with a wide range of other conventions, institutions and processes.

The Convention on Biological Diversity acknowledges that substantial investments are required to conserve biological diversity, and that the provision of new and additional financial resources and appropriate access to relevant technologies can be expected to make a substantial difference in the world's ability to address the loss of biological diversity.
The CHM seeks to support the Convention's thematic and cross-cutting programmes of work by promoting cooperation, exchanging information and developing a network of partners. The Biosafety Clearing-House (BCH) is an information exchange mechanism that provides open and easy access to key information about Living Modified Organisms, in accordance with the Cartagena Protocol on Biosafety while the LifeWeb for Financing Protected Areas seeks to strengthen financing for protected areas to conserve biodiversity, secure livelihoods and address climate change, through implementation of the Convention's Programme of Work on Protected

Areas (PoWPA).

1.3.2. CBD CONVENTION PROTOCOLS

There are three convention protocols; the Cartagena Protocol on biosafety, the Nagoya Protocol on Access, Fair and Equitable Sharing of benefits of genetic resources and the Nagoya – Kuala Lumpur Supplementary Protocol on liability and redress to the Cartagena Protocol on Biosafety. The Cartagena Protocol on Biosafety to the Convention on Biological Diversity is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, also taking into account risks to human health. It was adopted on 29 January 2000 and came into force on 11 September 2003.

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity is an international agreement which aims at sharing the benefits arising from the utilisation of genetic resources in a fair and equitable way. It came into force on 12 October 2014, 90 days after the deposit date of the fiftieth instrument of ratification.

On 15 October 2010 an international agreement, known as the Nagoya – Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety, was finalised and adopted in Nagoya, Japan, at the fifth meeting of the Conference of the Parties serving as the meeting of the Parties to the Protocol. The Supplementary Protocol adopts an administrative approach to addressing response measures in the event of damage or enough likelihood of damage to the conservation and sustainable use of biological diversity resulting from living modified organisms that find their origin in transboundary movements. Like its parent treaty, the Cartagena Protocol on Biosafety, the Nagoya – Kuala Lumpur Supplementary Protocol seeks to prevent damage and further confidence-building measures in the development and application of modern biotechnology. It advances the enabling environment for deriving maximum benefit from the potential of living modified organisms by providing rules for redress or response measures in the event something goes wrong and biodiversity suffers or is likely to suffer from damage.

1.3.3. CBD CONVENTION BODIES

The CBD convention bodies are the Conference of Parties, the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), the Subsidiary Body on Implementation (SBI) and the Working Group on Article 8(j).
The Conference of the Parties is the governing body of the Convention and advances implementation of the Convention through the decisions it takes at its periodic meetings. The Conference of the Parties by consensus, agrees upon and adopts rules of procedure for itself and for any subsidiary body it may establish, as well as financial rules governing the funding of the Secretariat. At each ordinary meeting it adopts a budget for the financial period until the next ordinary meeting. To date the Conference of the Parties has held 12 ordinary meetings and one extraordinary meeting. From 1994 to 1996, the Conference of the Parties held its ordinary meetings annually and since 2000 the meetings are held every two years.
The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) was established under Article 25 of the CBD. As a subsidiary body of the COP, SBSTTA is to report regularly to the COP on all aspects of its work. SBSTTA comprises of government representatives competent in the relevant field of expertise and its functions include: providing assessments of the status of biological diversity; providing assessments of the types of measures taken in accordance with the provisions of the Convention; and responding to questions that the COP may put to the body.

In 2014, the Conference of the Parties established the Subsidiary Body on Implementation (SBI) to replace the Adhoc Open-ended Working Group on Review of Implementation of the Convention, with the terms of reference contained in the annex to decision XII/26. The four functions and core areas of work of SBI consist of: (a) review of progress in implementation; (b) strategic actions to enhance implementation; (c) strengthening means of implementation; and (d) operations of the convention and the Protocols. The Bureau of the Conference of the Parties serves as the Bureau of the Subsidiary Body on Implementation.

Working Group on Article 8(j) emerged out of the CBD's recognition of the dependency of indigenous and local communities on biological diversity and the unique role of indigenous and local communities in biodiversity conservation. In Article 8(j) of the Convention, Parties have undertaken to respect, preserve and maintain the knowledge, innovations and practices of indigenous and local communities relevant for the conservation of biological diversity and to promote their wider application with the approval of knowledge holders and to encourage equitable sharing of benefits arising out of the use of biological diversity. Furthermore, because of its relevance to the work of the Convention, considerations relating to the traditional knowledge of indigenous and local communities are also being incorporated in all the programmes of work under the Convention including the NBSAP.

1.3.4. STRATEGIC PLAN FOR BIODIVERSITY 2011-2020, INCLUDING AICHI BIODIVERSITY TARGETS

The mission of the Convention's new plan for biodiversity management is to "take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilisation of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are effectively implemented, and decision-making is based on sound science and the precautionary approach." The Strategic Plan consists of five strategic goals, including twenty Aichi Biodiversity Targets.

Strategic Goal A: *Underlying causes of biodiversity loss by mainstreaming biodiversity across both the Government and society.*

1. By 2020 at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

2. By 2020 at the latest, biodiversity values have been integrated into national and local development, poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate and reporting systems.
3. By 2020 at the latest, incentives, including subsidies harmful to biodiversity are eliminated, phased out or reformed in order to minimise or avoid negative impacts. Positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socioeconomic conditions.

4. By 2020 at the latest, Governments, businesses and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of using natural resources well within safe ecological limits.

Strategic Goal B: *Reduce direct pressures on biodiversity and promote sustainable use*

5. By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero. Degradation and fragmentation is significantly reduced.

6. By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

7. By 2020 areas under agriculture, aquaculture and forestry are managed sustainably ensuring conservation of biodiversity.

8. By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

9. By 2020, invasive alien species and pathways are identified and prioritised.Priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment.

10. By 2015, the multiple anthropogenic pressures on coral reefs and other vulnerable ecosystems impacted by climate change or ocean acidification are minimised, so as to maintain their integrity and functioning.

Strategic Goal C: *Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*

11. By 2020, at least 17 percent of terrestrial and inland water and 10 percent of coastal and marine areas , especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures and integrated into the wider landscapes and seascapes.

12. By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

13. By 2020, the genetic diversity of cultivated plants, farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimising genetic erosion and safeguarding their genetic diversity.

Strategic Goal D: *Enhance the benefits to all from biodiversity and ecosystem services.*

14. By 2020, ecosystems that provide essential services, including services related to water, and those that contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.

15. By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least

15 percent of degraded ecosystems, thereby contributing to climate change mitigation, adaptation and to combating desertification.

16. By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their utilisation is in force, operational and consistent with national legislation.

Strategic Goal E: *Enhance implementation through participatory planning, knowledge management and capacity building*

17. By 2015, each Party has developed, adopted as a policy instrument and has begun implementing an effective, participatory and updated national biodiversity strategy and action plan.

18. By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

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, transferred and applied.

20. By 2020 at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.

1.3.5. COOPERATION AND PARTNERSHIPS

Achieving the objectives of the Convention on Biological Diversity requires cooperation and coordination with a wide range of other conventions, institutions and processes. The Conference of the Parties has consistently recognised the need for collaboration and adopting decisions on cooperation at each of its meetings. In light of this mandate, the Convention on Biological Diversity has developed partnerships with a number of conventions, organisations and initiatives. These are listed in the CBD's cooperation and partners fall under the following categories:

The Rio Conventions

The three Rio Conventions—on Biodiversity, Climate Change and Desertification are intrinsically, operating in the same ecosystems and addressing interdependent issues. The implementation of the NBSAP will have considerable interlinkage with the two other Rio Conventions.

Biodiversity-related Conventions

Seven international conventions focus on biodiversity issues: the Convention on Biological Diversity (year of entry into force: 1993), the Convention on Conservation of Migratory Species, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (1975), the International Treaty on Plant Genetic Resources for Food and Agriculture (2004), the Ramsar Convention on Wetlands (1971), the World Heritage Convention (1972) and the International Plant Protection Convention (1952). Each of the biodiversity-related conventions works to implement actions at a national, regional and international level in order to reach shared goals of conservation and sustainable use. In meeting their objectives, the conventions have developed a number

of complementary approaches (site, species, genetic resources and/or ecosystem-based) and operational tools (e.g., programmes of work, trade permits and certificates, multilateral systems for access and benefit-sharing, regional agreements, site listings and funds).

Consortium of Scientific Partners on Biodiversity

The Consortium of Scientific Partners on Biodiversity is a network of mostly national-level technical and scientific agencies with globally relevant contributions to the CBD and associated protocols. Its founding Memorandum of Understanding states that members will promote the effective implementation of the Convention and its Protocols through the organisation of activities on policy, scientific and technical issues. Members share the below characteristics: scientifically/ technically competent to address the Aichi Targets; proven track record of contributing to the CBD and with other institutions and Parties at regional, sub-regional or global levels; and supported by and providing technical support to their respective national governments.

Other Relevant Conventions

Besides the Rio Conventions and the Biodiversity-related conventions, there are several other conventions and agreements that support the CBD's objectives. Other conventions that cooperate with the CBD include: (i) The Convention on the Conservation of European Wildlife and Natural Habitat (Bern Convention); (ii) Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena, 1983) and its Protocols, including the Protocol Concerning Specially Protected Areas and Wildlife (SPAW); (iii) The Mediterranean Action Plan (Barcelona Convention); and (iv) Regional Seas Convention.

Organisations and Stakeholders

The objectives of the CBD are of direct relevance to other organisations and stakeholder groups. These bodies can play a crucial role in implementing the provisions of the CBD, either directly through their own activities and research, or indirectly by helping to build capacity within governments and other institutions to better meet their CBD commitments. Relevant organisations and stakeholders can also help shape CBD processes and policies by contributing information and expertise to meetings. A list of relevant organisation and stakeholder group partners will shortly be made available, organised by: the United Nations and other intergovernmental organisations; Non-governmental organisations and civil society; Indigenous organisations; Scientific and technical assessment bodies; Industry and the private sector; and Children and youth organisations.

South-South Cooperation

South-South Cooperation describes the exchange of resources, technology and knowledge between developing countries and is being promoted as an essential cross-cutting mechanism designed to deliver capacity building and technology support activities in developing countries and regions of the South. South-South cooperation can also be identified as a complement to North-South cooperation to enhance technical, financial, scientific and technological exchanges and innovations for development.

1.4. INDIGENOUS PEOPLES OF SOUTH SUDAN

1.4.1. INDIGENOUS PEOPLES OF SOUTH SUDAN

Indigenous people sometimes are called tribal people and these are the first people inhabiting an area or a territory before other groups. They are best defined by using several criteria some of which are as follows,

I. Are the decedents of the original people who first inhabited an area

II. Are ecosystem people, such as shifting or permanent cultivators, hunters and gathers, fishers and/or handcraft makers who adopt a multi-use strategy of appropriation of nature
III. Practie small scale, labour-intensive forms of rural production which produce little surplus and has low energy needs
IV. Who organise their life at the level of community and make decisions on a consensus basis
V. Share a common language, moral values, beliefs and relationships to a particular territory

Pursuant to the above definition/description of indigenous people, the total number of indigenous people in South Sudan is 64 and they speak 64 languages. These are broadly categorised into Nilotic, Nilo Hamitic and the South Western Sudanic groups

Nilotic group: Includes the Dinka, Nuer, Shilluk, Murle, Kachiopo, Jie, Anyuak, Acholi, Maban, Kuma, Lou (Jur), Bango, Bai, Ndogo, Gulu, Endri, Forgee, Chod (Jur), Khara, Ngorgule, Forugi, Siri, Benga, Agar, Pakam, Gok, Ciec, Aliap, Hopi, Guere, Atuot, Apaak, Lango, Pari, Otuho and Ajaa.

Nilo-Hamitic group: Includes the Bari, Mundari, Kakwa, Pojulu, Nyangwara, Kuku, Latuko, Lokoya, Toposa, Buya, Lopit, Kuku, Kakwa, Nyabgwara, Tennet, Lopit and Didinga.
South-Western Sudanic group: Includes Kresh, Balanda, Banda, Ndogo, Zande, Madi, Olubo, Murus, Mundu, Baka, Avukaya and Makaraka.

Table 3: Distribution of indigenous people of South Sudan in different ecological zones

Ecological zones					
	Semi-arid	Low rainfall woodland savannah	High rainfall woodland savanna	River and flood region	Mountain vegetation
No. of ethnic groups	2	1	37	10	6

1.4.2 INDIGENOUS KNOWLEDGE

Indigenous knowledge refers to the knowledge and skills developed outside formal education systems and is widely identified with indigenous people. It is the outcome of continuous experimentations, innovations and adaptation that enable communities to survive.

Because indigenous knowledge is handed from generation to generation by word of mouth, it is not easily accessible and has not been stored in a systematic manner. Thus, as indigenous people become more integrated into western society and economic systems, indigenous and/or traditional knowledge practices are being lost.

Such traditional knowledge/indigenous knowledge is important because it provides the basis for problem-solving for indigenous people/local communities specifically the poor ones in South Sudan. It also represents an important component of knowledge on development issues in South Sudan.

The indigenous people and especially the rural communities in South Sudan have rich indigenous knowledge/traditional knowledge. Although it is poorly documented it is very obvious such as the way they consume both domestic and wild plants for various purposes such as food, treatment, and land use practices such as traditional farming, hunting, fishing, wild and domesticated plant gathering.

1.4.2.1. TRADITIONAL KNOWLEDGE OF FOOD PLANTS

Since the dawn of history, man has been in close relationship with his surroundings and environment. Foraging for wild plant and animal resources was the mode of his first subsistence strategy. He has undergone various changes during his evolutionary and social history from hunting and gathering phases to modern times after the implementation of agriculture (Table 4).

Even nowadays, especially in developing countries like South Sudan food shortages, gaps and/or famine still occur due to wars, environmental disasters (such as floods, droughts, climate change etc.) and lack of physical, human and institutional capacities. Thus, wild plant food still play a substantial contribution especially in the human diet of the rural population in South Sudan.

Table 4: Agricultural crops planted by traditional people of South Sudan

S/N	Agricultural Plants	Types/ No. of Spp.	Distributions in ecological zones					Traditional use
			I	II	III	IV	V	
1	Cereal crops	5	2	2	4	2	3	Edible grains
2	Food grain legumes	5	1	3	5	1	5	Edible pulse grains
3	Root crops	5		1	4		5	Edible roots
4	Sugar crops	2	1	1	1	1		Chewing sugar canes
5	Oil crops	5	1	3	4	4	4	Edible oil seeds
6	Vegetable crops	14	11	14	9	9	11	Edible vegetables, fruits, salad and condiment
7	Fruit producing crops	15	6	6	15	9	15	Edible fruits
8	Beverages and spices producing crops	3			3		3	Edible leaves and seeds
Total types of crops grown		72						

Table 5: Indigenous wild plants eaten by the traditional people of South Sudan

S/N	Wild edible plants	Types/ No. of Spp.	Distributions in ecological zones					Traditional use
			I	II	III	IV	V	
1	Wild grass with edible grains	10	5	4	3	3		Edible grains
2	Wild plants/ herbs used as vegetables	10	10	10	10	10	10	Edible fruits and leaves
3	Wild trees/shrubs with edible fruits, seeds, leaves, tubers, etc.	52	4	10	43	12	6	Edible fruits, sprouts, seeds, leaves, etc.
Total types of crops grown		72						

Table 6 shows the comparisons of domesticated and wild food plants in South Sudan. The domesticated and wild food plants were distinguished based on data collated on seven characteristics including quality, supply, storage, processing and marketability, among others.

Table 6: Comparison between domesticated and wild food plants

S/N	Characterisation	Domesticated food plants	Wild food plants
1	Availability of data and reliable information for measuring the contribution to the rural economy	Available	Limited
2	Plant productivity	Generally high	Generally low
3	Marketability of products	Guaranteed for most products	Not guaranteed except with few products
4	Supply of products	Regular	Irregular
5	Quality standard	Mostly available	Mostly not available
6	Storage and processing technologies	Developed for most products	Not developed for most products
7	Availability of substitutes	Readily available	Not really available

1.4.2.2. PROMOTION AND PROTECTION OF DOMESTICATED AND WILD FOOD CROPS

Based on the above identified constraints which limit the utilisation of the wild crops, the following steps have been suggested as strategies to promote the utilisation of so many wild food crops occurring in South Sudan. Firstly, identify and document what already exists; e.g. the identified wild food plants, their distribution, biology and utilisation by the people of South Sudan. Secondly, involve and encourage the South Sudanese in research to provide a better understanding of the importance of wild food plants. Thirdly, implement capacity building, e.g. language, naming of plants and identifying who else should be involved. Fourthly, educate, disseminate and raise awareness among the community, leaders and researchers to ensure that we move beyond a report to positive action. Fifthly, develop policy and legal framework and sixthly, apply and practise using models and practical examples.

1.4.3. TRADITIONAL KNOWLEDGE OF MEDICINAL PLANTS

Plants that possess therapeutic properties or exert beneficial pharmacological effects on the animal and human body are generally designated as medicinal plants. The history of the use of medicinal plants for alleviating diseases originates from the activities of the most primitive man of the remote past. Our ancestors were forced to use any natural substances that they could find to ease their sufferings caused by acute and chronic illnesses, physical discomforts, wounds, injuries and even terminal illnesses. Since ancient times, plants with therapeutic properties have occupied an important place in disease treatment practises. Thus, they serve as important therapeutic agents as well as important raw materials for the manufacturing of traditional and modern medicines. They are rich sources of bioactive compounds and therfore serve as important raw materials for drug production.

1.4.3.1. STATUS OF TRADITIONAL MEDICINAL PLANTS IN SOUTH SUDAN

In South Sudan there is a sizable amount of different types of woody plants and herbs which have been being used as medicinal materials since time immemorial. There has never been any systematic phytochemical inventory of these medicinal plants, and so it is quite possible that many of such potential medicinal plants may exist in the country still remaining unexplored and waiting to be assessed (Table 7).

Unfortunately, these valuable assets are likely to be depleted rapidly because of apparent unsustainable exploitation, which could be attributed to the growing population in the country, destruction of medicinal plants habitats by converting forests and other lands into agricultural lands and settlements or the illicit cutting of trees for firewood and charcoal making around big towns.

Table 7: Wild and cultivated medicinal plants utilised by traditional people of South Sudan

S/N	Medicinal plants	Types/ No. of Spp.	Distributions in ecological zones					Traditional use
			I	II	III	IV	V	
1	Wild medicinal plants	51	7	21	37	25	3	Different plant parts
2	Planted medicinal plants	21	10	16	16	10	8	Different plant parts
Total types of medicinal plants		72						

1.4.3.2. COMPARING TRADITIONAL MEDICINAL PLANTS AND MODERN MEDICINES

The usage of traditional medicinal plants is developed by specific societies thus its usage is unique to a specific culture and society. It is used in treating the illnesses and injuries of people within that society. The usage of these traditional medicinal plants is essentially a tacit knowledge, that is not easily coded. Therefore, its relevance, reliability, functionality and effectiveness cannot be granted. While this is an important area for primary health care especially in developing countries, its area of application appears to be limited. It requires development and research which should involve examination and testing the relevance, effectiveness, functionality and reliability of these so call medicinal plants.

Modern medicine is a well-founded scientific discipline based on a very huge accumulated knowledge of studies supported with extensive experience and research that has produced results that are both well tested and statistically confirmed reliable. Modern medicine is therefore internationally recognised and accepted and can be applied worldwide. It is reliable, relevant, functional and effective in treatments for human illnesses and/or injuries.

1.4.3.3. POSSIBLE DANGERS FROM TRADITIONAL MEDICINAL KNOWLEDGE

There are many poisonous plants containing alkaloids that can cause adverse effects when ingested. Accidental ingestions can be responsible for fatal poisonings. When people pick edible wild plants, it is crucial that the plants are correctly identified because many of them are similar in appearance to poisonous plants. Every year at different seasons such misidentification mistakes could result in poisoning accidents.

In addition, many edible plants have poisonous parts. It is important to learn how to identify poisonous plants that grow in the wild, yards and neighbourhoods. We should only eat plants that we can positively identify and plants that we know are safe to eat. It is suggested to be cautious when picking wild plants. Other incidents of poisoning by medicinal plants include overdoses, contact with poisons plants, and wrong preparation of medicinal plants.

When medicinal plants are overdosed, incorrectly used or used regularly over a long period of time, some plants that possess "harmful effects" have the potential to induce adverse effects. Some medicinal plants are known to be toxic at high doses and others may have potentially adverse effects under some conditions. Just as with many foods and pharmaceuticals, there is a possibility of allergic reactions.

1.4.3.4. PROMOTION AND PROTECTION OF MEDICINAL PLANTS

This is possible through the following steps,

1. *Identifying species that need priority attention:* It is necessary to identify species that are endangered or likely to become endangered in each region and initiate programs to mitigate the threats.

2. *Prioritising conservation areas:* Prioritising large areas for conservation should consider two main factors: The importance of biodiversity in each region and speed of urbanisation or economic change. Problems of resource management of medicinal plants exist in densely populated and rapidly urbanising regions and it is here that reaching a balance between human needs and medicinal plant resources is most urgent. Urban centres provide markets for traditional medicine but also accelerate change in land use in the neighbouring districts.

3. *Riding on existing strengths:* There is need to strengthen cultural practices that ensure sustainable management. With cultural change, there is increased entry into the cash economy and rising unemployment.

4. *Re-examining current policies and legal frameworks.* Regarding policies and legal frameworks, there is a need for a general assessment of existing policies and legislation relating to medicinal plants and natural resources with specific focuses on access, ownership, protection of community rights and conservation so that any flaws in current policies and legislation are addressed.

5. *Intensifying research and providing up-to-date data for decision-making.* Very few research activities have been carried out to address the conservation and sustainable use of medicinal plant genetic resources.

6. *Supporting cultivation/domestication and sustainable harvesting.* Cultivation as an alternative to over-exploitation of scarce traditional medicinal plants is important.
7. *Enhancing cooperation and networking.* There is a need for increased collaboration

with and within traditional healers in order to exchange ideas. Better cooperation and coordination between local communities, local researchers, national governments, and international bodies are needed to design and implement sustainable in-situ and ex-situ conservation strategies.

8. *Creating awareness:* There is need for awareness among harvesters and importers on threats posed by their actions and the need for sustainable harvesting.

1.4.4. TRADITIONAL KNOWLEDGE OF DOMESTICATED/LIVESTOCK AND WILD EDIBLE ANIMALS

1.4.4.1. STATUS OF DOMESTICATED ANIMALS/LIVESTOCK IN SOUTH SUDAN

South Sudanese communities have a long tradition in livestock rearing. The Nilotics ethnic groups (Dinka, Nuer and Shilluk) and the Nilo-Hamites groups (Murle, Toposa, Mundari and Boya) who inhabit the flood plains and slopes of the South Eastern hills and mountains keep large herds/flocks of cattle, sheep and goats. Other tribes such as the Bari, Lulubo, Lokoya, etc. in Equatoria and Jur In Baher el Ghazal regions who practise subsistence agriculture also possess a few herds of cattle, sheep and goats. Backyard poultry farming is a common practice by most traditional South Sudanese.

The livestock of South Sudan are either known by the name of their geographical habitat or after the tribe who possess them. For example, Nilotic longhorn Zebu/cattle, these are owned by the Nilotic (Dinka, Nuer, and Shilluk). The short horn Zebu cattle are known by various names such as Mongalla cattle or mountainous cattle. Similarly the sheep and goats are known as Nilotic sheep, Nilotic goats or mountainous goats.

1.4.4.2 . ROMOTION AND PROTECTION OF EDIBLE DOMESTICATED ANIMALS/ LIVESTOCK

The conservation of local breeds of animal genetic resources and/or new conservation projects firstly requires a statement of the conservation objectives, which among others often include the following,

I. Adaptability to the environment: The preservation of breeds that are adapted to specific environments is a priority if the objective of conservation is, for example, to have animals that can cope with future production systems that provide uncontrolled environmental conditions for animal breeding.

II. Economic importance: This is the most common parameter used today to justify the conservation of a local breed. It depends on currently important characteristics (for example: high fertility, high rate of feed conversion, high quality of products, disease resistance, etc.).

III. Uniqueness of one or more characters: Some breeds may be given priority in order to achieve specific conservation objectives due to their behavioural, phenotypic or physiological characteristics.

IV. Historical and cultural value: This value is difficult to quantify but it is particularly important in societies where agriculture and animal husbandry have radically changed. This value can generate income if properly exploited as a tourist resource.

V. Genetic uniqueness: Saving genetically distinct breeds is important to preserve the different gene combinations that characterise them, and which are manifested through characters that could prove useful in the future.

1.4.5. INDIGENOUS AND TRADITIONAL KNOWLEDGE AND WILDLIFE IN SOUTH SUDAN

There are some areas in South Sudan where livestock cannot be reared because these areas are infested with the tsetse fly or the inhabitants are traditionally non livestock herders. These areas include almost the whole of western Equatoria, western Bahr el Ghazal and the Imatong Mountains. Therefore, the consumption of game meat as a source of animal protein by the inhabitants of these areas is high. However, the Dinka and Nuer tribes hunt fish to supplement their diet in the dry season due to the low production of milk during this period. The following table shows the types of the wildlife animals hunted for, their game meat and /or other purposes.

Table 8: Wild edible animals by traditional people of South Sudan

S/N	Mammals	Types/ No. of Spp.	Distributions in ecological zones					Traditional use
			I	II	III	IV	V	
Total types of medicinal plants		86	34	49	60	32	38	

1.4.6. TRADITIONAL LAND USE SYSTEMS

South Sudan's total land area is 619,745 km2 more than half of which is estimated to be suitable for agriculture. Natural forests and woodlands cover 29 percent of the total land area. Rate of deforestation is estimated at 2 percent. There are currently six national parks and 13 game reserves in South Sudan, covering 11 percent of the land area (90,755 km2 (UNDP 2012a; GoSS 2011a; GoSS 2011b; GoSS 2011c; FAO 2010).

South Sudan has a population of about 10.3 million people made up of 64 ethnic groups/tribes. Approximately 78 percent of all households earn their livelihood from farming, pastoralism or a mix of both. Farming is predominantly rained, and farmers cultivate their small plots with handheld tools. Some common agricultural products include pineapple, cotton, groundnuts, sorghum, millet, wheat, cotton, sweet potatoes, mangoes, pawpaw, sugarcane, cassava and sesame. Pastoralists hold approximately 8 million cattle in aggregate, and in addition, there are millions of poultry, goats, pigs, horses, donkeys and sheep.

1.4.6.2. TRADITIONAL LAND USE SYSTEMS IN SOUTH SUDAN

Shifting cultivation. This type of cultivation dominates the crop production systems in high rainfall woodland savanna, particularly in the green belt zone. The system is characterised by the cleaning of natural vegetation and burning it after drying towards the end of the dry season. Agricultural crops are then grown for several years e.g. 3-10 until the soil is exhausted or weed growth is so intense that yields of agricultural crops drop. At this point the area is abandoned again with or without the intention of coming back for a period of time ranging from 3-4 years until re-colonisation by indigenous plants has restored the soil fertility again.

In shifting cultivation, the farmer often moves his homestead/family to the new cultivation site such as those among Azande, Avukaya, Mundu, and Baka. In these areas the population of rural areas is low and the interval of recuperation under natural vegetation is long enough. Therefore some benefits of these systems include: (i) A fairly effective way of preserving soil fertility in the absence of improved agricultural techniques such as manuring; and (ii) The burning of the cleared area which sterilises the soil by destroying weed seeds, spores of fungal diseases and eggs of insect pests, which may otherwise affect the crops after emergence.

The disadvantages of this system include: (i) It is usually harmful to natural vegetation as it prevents the succession to higher vegetative classes, especially if the closed forest is cleared for cultivation. From there an invasion of tall grasses follows, which are burnt every year and this could cause permanent substitution of the closed forest; (ii) It also sometimes exhausts the soil and so subsequent regeneration of the forest is difficult, especially if the fallow period is reduced due to an increase in land demand; and (iii) It does cause damage if it is practised on steep slopes or the headwaters of streams since, after a few years of cultivation under this method it often causes soil erosion and thus renders land virtually useless.
The solution to the current practice is that shifting cultivation should not be practised in all forests and nature reserves, except when it is an improved fallow/taungya system i.e. indigenous trees are planted when the area is going to be abandoned. This modification of shifting cultivation can be very useful in biodiversity conservation and maintenance.

Rotational cropping. This cultivation system is characterised by clearing an area of a land by cutting down all trees and burning them after drying towards the end of the dry season. After cultivating this piece of land for 2-3 years and when the crop yields drop, the farmer leaves this area and takes another one with or without the intention of coming back to cultivate this land after some years. Here the homestead remains stationary and the cultivation sites are rotated as with Latuka, Lokoya. This system is associated with low population density and unlimited supply of land. The advantages and disadvantages of this cultivation system are similar to the shifting cultivation mentioned above.

Mixing cropping. This is the general cropping partner adapted by almost all farmers in all ecological zones of South Sudan, except where shifting cultivation dominates in the green belt. The system entails that different crops are planted and mixed in the same piece of land without specific spacing and systematic arrangement. Such multiple cropping is dominant in the green belt where the growing season is extended.
The advantages of this cropping system include better use of environmental resources; control of sheet erosion; insurance against bad weather (drought), pests and diseases; and fixing of nitrogen by legumes. The way mixing cropping is being practised in South Sudan, it requires adjustments to ensure optimum plant densities and better production. The adjustments proposed are: the mixtures should be planned in such a way that the components of the association do not interfere or retard the growth of each other; and the components should be specifically spaced and arranged to produce population densities that can produce better yields per unit area. The advantage is in a form of risk spreading: if one crop fails others may do well and partly compensate for the failure. The fact that traditionally no pure breeds of a crop are used but always mixtures of varieties are, works in the same direction.
Crop plantation. This is the planting of annual and/or perennial crops in a pure form. In South Sudan only cotton, tobacco, sometimes sweet potatoes, rice and in some cases, groundnuts are planted in pure stands.

Tobacco: Growing of tobacco was introduced to South Sudan in 1965. This crop had been adopted by small-holder producers in Kejo-keji, Yei, Maridi, Kerepi, and Magwi. Shortly after the introduction of tobacco, their operationalisation came to an end due to the 17 years of the Anyanya war. After the Addis Ababa agreement, in 1974 tobacco was reintroduced by the National Tobacco Company (NTC) in the same areas mentioned above except in Maridi. Unlike the previous requirement for small-holders to produce green leaf and to cure in central barns built by the company, the NTC requested individual farmer groups to construct their curing barns. This greatly reduced the number of small-holders willing to adapt the crop because of its intensive labour requirements.

Groundnuts: This crop is widely grown in South Sudan, it is one of the main relish crops for the inhabitants of the greenbelt zone. It is also an important grown crop throughout the areas

of ironstone and central hills zone. It is grown on the colluvial plains inhabited by the Dinka, Moru, Mundari and Nyagwara groups. In the flood plains it is grown as main crops on the high grounds whereas in the southern parts of the drier northern Upper Nile it is grown by small-holder farmers. In the mountains and hills zone of Eastern Equatoria the groundnuts are grown on the sandy and often eroded loam soils below the villages.

Sweet Potatoes: Sweet potatoes are grown on a more limited scale in the green belt zone and in the ironstone and central hills zones. These crops are planted in gardens around the homesteads.

Cotton: This crop used to be grown in Zande and Acholi lands during the colonial era to supply the Nzara scheme. However, the planting of this crop has stopped because of marketing problems and because its planting, weeding and harvesting coincide with that of the main food crops.

Rice: The upland rice is grown on a more limited scale in the green belt.
Forest harvesting
Collection of wild plant products. A large number of plant types in each of the ecological zones are being used by the indigenous /traditional people of South Sudan. Many trees, shrubs and herbs have edible leaves, fruits, seeds, tubers, or gum. Many of these wild plants still play important roles in the nutrition of the traditional people, especially during drought or shortages of other food. These plant products often provide variation and add important vitamins and minerals to an otherwise deficient nutrition.

Many plants of different types are also being used in traditional medicine and many others supply building materials, firewood, ropes or material for weaving baskets and many other uses for the traditional people of South Sudan. This knowledge is an important part of the culture and it is in danger of disappearing when formal school education replaces traditional education.

The current population and density of South Sudan is still low and therefore, the use of plant parts cannot possibly damage the vegetation. However, when population density increases in the future, such utilisation of the environment can be destructive to the natural vegetation and so these useful plants must be taken care of by sparing them when land is being cleared for cultivation and also planting them or promoting their growth through better management.

Hunting of wildlife
In South Sudan fire is an important tool in traditional hunting. It is used to drive animals into nets or towards hunters waiting with spears or bow and arrow. It can also be used to create favourable grazing conditions in the dry season for herbivores that can then be easily shot. For trapping or catching animalsit is essential to have good knowledge of their behaviour. Snares, traps, nets and pits are used especially in heavy forests. If spears and bow and arrows are used these tend to be smaller than the ones used in more open savanna country. Certain plants and the cocoons of a beetle can be used as arrow poison.

While human population remains small, traditional hunting does not seriously affect most game animals. But the introduction of firearms and poaching for special products (ivory, rhino horns) has changed the situation considerably.

Grazing and browsing
Grazing and browsing by domestic and wildlife animals have important effects on natural vegetation. Damage by wildlife species usually confined to a few palatable plant species, e.g. browsing by Bushbuck slows down the regeneration of Daniellia oliveri. Afzilia africana and *Kkaya senegalensis.*
Different types of livestock vary in the damage they do to natural vegetation by grazing and

browsing. Goats are the worst, in that they can graze basically any species of tree, or shrub and grass if hungry enough, and they prefer woody vegetation to grass or herbs. Therefore, where there is heavy goat grazing regeneration of a forest, this is impossible unless the animals are excluded.

Sheep and cattle prefer to eat grass and herbs rather than woody vegetation, though they also feed on the flowers and pods of many trees. These animals specially if in excessive number do damage by baring the surface of the soil and trampling on it causing the soil to become hard and impermeable. They are best kept out of areas with regeneration less than one year old but thereafter limited grazing by cattle and sheep may help the woody plants by reducing grass competition and the danger of fire.

2

STATUS AND IMPORTANCE OF BIODIVERSITY

2.1. INTRODUCTION

«Biological diversity» means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes that they are part of; this includes diversity within species, between species and of ecosystems. While the country has continued to experience a civil war armed conflict in many areas, South Sudan contains areas of globally significant habitats and wildlife populations. South Sudan contains one of the largest intact savanna and woodland ecosystems remaining in Africa, the Sudd being the largest wetland in Africa (UNDP 2011).

2.2. BIODIVERSITY IN ECOSYSTEMS

2.2.1. LAND COVER CLASSES BY STATE

The Land Cover Atlas of the Republic of South Sudan provides information on the land cover distribution by administrative zones. The dataset was created using the FAO/ Global Land Cover Network (GLCN) methodology and tools. Main data sources include satellite imagery from SPOT (Satellite on Earth high resolution) and Global Land Survey (GLS) Landsat, existing Afri-cover land cover database and ancillary data. The 43 original land cover classes were aggregated into seven generalised classes. The seven aggregated classes were: (i) Agriculture land; (ii) Forest lands; (iii) Wood lands and bush lands; (iv) Grasslands; (v) Urban areas; (vi) Bare Rocks and Soil; and (vii) Water bodies (FAO 2011).

The largest land cover in the country are bush lands (shrub lands) covering 26 million ha closely followed by forests and wood lands, which cover 21.3 million ha (Table 3). Cultivated lands cover only 4 percent of the land area in the country; however, a lot of the bush lands are considered recoverable for agriculture. Grasslands are the third largest land cover at 15 million ha while water bodies cover a smaller 463,641 ha or 0.7 percent of the land cover. The area of urban areas is quite small at only 34,190 ha but it is expected to grow exponential once security and stability is restored in the country.

The land cover of South Sudan is characterised in Table 9. It comprises of bush lands, forests and woodlands as the largest land covers followed by grasslands while agricultural lands are a distant fourth largest land cover. Together, bush lands (39.5%) and forest and woodlands (32 percent) make up more than 70 percent of the surface cover, grasslands make up 22.8 percent while agricultural lands make up only 4.2 percent of surface cover of South Sudan (FAO 2011). The potential for expansion of agricultural lands, and forested lands is large. Water bodies make up only 0.7 percent of surface cover of the country even though it is the fifth largest system in the country. Therefore, water scarcity particularly in areas further away from the Rile Nile catchment is significant.

Table 9: Aggregate land cover (in hectares)

State	Agricultural lands	Forests and woodlands	Bush lands	Grasslands	Urban areas	Bare lands	Water bodies	Total area
Central Equatorial	381,319	1,579,929	1,790,141	608,580	8,399	10,190	12,010	4,390,569
Eastern Equatorial	113,470	1,082,624	3,916,004	2,277,351	952	2874	32,262	7,425,537
Jonglei	318,658	1,554,901	7,546,217	2,837,251	942	864	101,214	12,360,047
Lakes	184,241	1,564,445	1,698,524	920,276	1,766	18,238	20,018	4,407,508

State	Agricultural lands	Forests and woodlands	Bush lands	Grasslands	Urban areas	Bare lands	Water bodies	Total area
Northern Bahr El Gazal State	242,158	1,577,372	500,126	567,891	1,196	1,764	91,373	2,981,879
Unity	126,871	196,030	1,934,868	1,488,220	6,387	2,310	34,319	3,789,005
Upper Nile	485,833	998,466	3,045,912	3,249,108	7,854	13,180	34,360	7,834,713
Warrap	448,399	764,630	1,922,541	1,295,033	1,412	15,180	8,136	4,445,331
Western Bahr El Gazal	134,745	7,643,670	1,607,242	803,222	3,525	36,116	112,246	10,340,766
West Equatoria	341,532	4,373,605	2,077,592	1,021,064	1,757	78,713	17,703	7,911,966
Aggregate (Ha)	2,777,226	21,335,672	26,039,167	15,067,996	34,190	179,429	463,641	65,887,321

Source: Adapted from FAO 2011

2.2.2. FOREST ECOSYSTEMS

Forests cover about 30 percent of the country while shrubs account for about 39 percent. Western Bahr el Ghazal and Western Equatoria together own 56 percent of the total forest cover (Jonglei, Eastern Equatoria and Upper Nile accounting for about 58 percent of shrubs (FAO 2011)). Forests in South Sudan are categorised into savannah woodlands, which cover most of the country and montane forests found in localised areas (IRG 2007; Africa Forest Forum 2011). Savanna woodland is sub-divided into two sub-categories: low rainfall savannas covering a small part of the country in the northern part of Upper Nile state and high rainfall savannas covering most of the rest of the country. High rainfall savanna covers most of South Sudan with the exception of the floodplain around the Nile River and the montane region.

2.2.2.1. MONTANE FORESTS

These are found on the Imatong Mountains, Jebel Gumbiri, Dongotona and the Acholis in the south-eastern parts of the country, in Eastern Equatoria state. The highest peak on the mountains is Mt Kinyetti at an altitude of 3,187m ASL on the Imatong. Besides being classified as one of the biodiversity hotspots in Africa, it is also the largest continuous closed canopy forest in South Sudan (Moukaddem 2011). There is a great variation in vegetation cover within short distances in the Imatong Mountains. The montane forests (Imatong, Dindinga and Dongotona) contain Podocarpus milanjianus, the only source of coniferous timber in the country. Vegetation zones follow a gradient up the mountain. The Podocarpus belt starts at an altitude of 5,500 ft ASL but at this altitude, there is more of the African Olive (Olea hochstetteri) and Syzygium (IRG 2007). The proportion of Podocarpus increases at higher elevations and at about 9,000 ft, it forms almost pure stands in sheltered places and then tapers into stunted Podocarpus belt mixed with Dombeya. This is followed by a belt of large bamboo (30 ft in height by 3 ft in width) Arundinaria alpina (Jackson, undated). The bamboo trees are very large in size and can be good for commercial purposes. Near the top of Mt Kinyeti in the Imatong Mountains, temperate plants such as violets (Viola abyssinica steud.), Lady's mantle (Alchemilla sp), anemones (Anemone thompsonia) and forget-me-not (Myosotis spp) are found (IRG 2007).

In the Imatong Mountains, local farming communities continued to move up the slopes opening up land for cultivation and reaching an altitude of 2,300 m (7,500 ft) ASL. This has created a problem with soil erosion as forests are cleared for agriculture.

Extraction of timber, especially the high value Podocarpus, at the higher altitudes and mahogany at the lower elevations is leading to serious deforestation. Encroachment for agriculture is also another major threat at the lower altitudes in the lowland forest zone. The Dongotona for

example lost two-thirds of its forest cover between 1986 to 2011 and is likely to be cleared of all vegetation by 2020 (Moukaddem 2011). Analysis of satellite imagery from 1973 to 2010 revealed that this vegetation type is rapidly disappearing in the Imatong Mountains; Dongotona and Didinga will also be affected in the same way.

2.2.2.2. SAVANNA WOODLAND

This is the largest ecological region in South Sudan and is divided into; the low rainfall woodland savanna, which is found in the Upper Nile state, and the high rainfall savanna woodlands. The low rainfall savanna covers about 2.9 percent of the total land area of the country while the high rainfall savanna occupies 52.6 percent (Africa Forest Forum 2011).

Common large mammals of the woodland savanna include the elephant (Loxodonta africana and Loxodanta cyclotis), hippopotamus (Hippopotamus amphibious), waterbuck (Kobus defasa), bushbuck, oribi, duiker, Uganda kob (Kobu skob), warthog (Phacocoerus ethiopicus), hartebeest (Alcelaphus sp.), giant eland (Tragelaphus derbianus), buffalo (Syncerus caffer), and various species of primates. A rich diversity of avifauna, reptiles, amphibians, and invertebrates are also found in the savanna woodlands.

The Protected Areas (PAs) in the woodland savannas are Southern, Nimule and Lantoto National Parks (NPs) and Ashana, Chelkou, Boro, Juba and Numatina Game reserves (UNDP 2009). Woodland savannas are mainly found in equatorial, Upper Nile and Bahr el Ghazal where rainfall ranges from 900-1,300 mm. Species recorded in this forest type in Western Bahr el Ghazal in 1984 included Vuba (Isoberlinia doka), mahogany (Khaya senegalensis), Bu (Daniellia oliveri), Pai (Afzelia africana), Abu suruj (Prosopsis africana), Abu Suruj Dakar (Amblygonocarpus andogensia), Abino (Burkea Africana), Darot (Terminalia avicinnioides) and Abu Habil (Lannea kerstingii) Poulin and Ltee, (1984 in IRG 2007). In 2007 during the field assessment for the Environmental Threats and Opportunities Assessment (ETOA), the natural forests in Western Bahr el Ghazal were reported to be intact (they were not affected by the civil war) while mahogany was being harvested in Northern Bahr el Ghazal (IRG 2007).

2.2.2.3 . SAVANNA WOODLAND RECENTLY DERIVED FROM RAIN FOREST

This sub-type is much localised and occurs in higher rainfall areas (>1300mm) along the Congo border and some small patches of rainforest in other areas. These are high rainfall forests (i.e., rainforests) that have undergone a phase shift due to human-influenced degradation over the years. The dominant species are Celtis zenkeri, Chrysophyllum albidum, Mildbraediodendron excelsum and Holoptelea grandis (Ibrahim and Badi 2006). Other common species are Terminalia glaucescens, Albizia zygia, Combretum binderianum, Bridelia scleroneuroides, Dombeya quinqueseta (Ibrahim and Badi 2006 in IRG 2007).

2.2.3. WETLAND ECOSYSTEMS

2.2.3.1. THE SUDD AND OTHER PERMANENT SWAMPS

The Sudd wetland is located in the lower reaches of Bahr el Jebel in South Sudan. The Sudd is one of the largest tropical wetlands in the world and covers approximately 57,000 km2. But the size varies based on the river flows from its catchment and rainfall (IRG 2007). The largest area of the Sudd is found along the Bahr el Ghazal, where the Bahr el Jebel and Bahr el Zeraf in the Upper Nile and Jonglei come together. The Southernmost limits of the permanent wetland in the Sudd are Mongalla-Gemeiza depressions, which is also the wettest (USAID 2014). The ecosystems that make up the Sudd wetland include open waters, submerged vegetation, floating

fringe vegetation, seasonally inundated woodlands, rain-fed and river-fed grasslands and flood plain scrubland (IRG 2007). About 50 percent of the 2.9 billion m³ (BCM) of water that flows into the Sudd wetland is lost through evaporation.

The sudd functions as a giant hydrological regulator of the entire Nile River Basin System. The central core of the Sudd swamp is dominated by papyrus sedge (*Cyperus papyrus*), which is bordered by cattails (*Typha dominiguensis*), the dominant vegetation that covers about 75 percent of the total swamp. The Sudd is an important habitat for biodiversity and was declared a Ramsar site number 1622 on 5 June 2006. The Sudd is also listed as an Important Bird Area (IBA) by Birdlife International with over 470 documented species. There are over 350 plant species that have been identified in the Sudd region, but only one endemic plant species has been recorded, the swamp grass (*Suddia sagitifolia*), belonging to the genus Poaceae. The papyrus sedge (*Cyperus papyrus*) threatened elsewhere by pollution and flood control flourishes in the pristine Sudd wetlands (IRG 2007). Important plant species in the Sudd also include the hippo grass (*Vossia cuspidate*) located in the permanent swamps that surround the deep open waters. These wetlands are important habitats for the endangered shoebill stork. *Echinochloa stagnina*, E. *pyramidalis* and *Oryza longistimanta* surround the seasonally flooded grasslands. At the edge of the wetland is the grass species, *Hyparrhenia rufa*.

The Sudd and other permanent swamps are important habitats for invertebrate zooplankton (abundant and high species diversity), but the zoobenthos mainly comprises of Oligochaetes. About 100 species of fish have been recorded from the Sudd; 31 siluroids, 16 characoids, 14 cyprinoids, 11 mormyrids, 8 cichlids and 7 cyprinodontids. Many species leave the rivers and move onto flood plains to spawn as the flood rises and return to the permanent watercourses when the flood recedes (Howell et al.1988; Hughes and Hughes 1992). The most numerous species are; *Alestes dentex, Auchenoglanis biscutatus, Chelaethiops bibie, Citharinus. Distichodus rostratus, Eutropis nniloticus, Heterotis niloticus, Hydrocynus forskalli, Labeo niloticus, Lates niloticus, Micralestes ocutidens, Mormyruns cashive, Oreochromis nilotics, Synodontis frontosus, Aplocheilichthys spp, Epiplatys spp., Gymnarchus niloticus, and Polyoterus bichir*, which are associated with the *Papyrus* and Typha swamps.

Frogs are abundant and there are several snake species in the swamps; *Crocodylus niloticus* is also widespread. The Sudd is important for migratory birds and has a high diversity of *avifauna* such as *Anas acuta, A.clypeata, A.crecca, A.penelope, A.querquedula, Anthus cervinus, Circus macrourus, C.pygargus, Glareola nordmanni, Larus fuscus, Limosa, Philomachus pugnax, Tringa glareola, T. nebularia, T. ochropus and T. stagnatilis*. Numerous weavers, warblers, flycatchers (including *Alseonax aquatica*), kingfishers, ducks, herons, ibises, egrets, stocks (including *Balaeniceps rex*), kites, crows, and vultures (such as *Necrosyrtes monachus*) are also present. Large mammals found in this type of wetland include; *Alcelaphus buselaphus*, *Damaliscus korrigum, D.lunatus, Hippopotamus amphibious, Hippotragus equinus, Kobus ellipsiprymnus, K.megaceros, Loxodonta Africana, Panthera pardus, Redunca* and *Syncerus caffer.*

2.2.3.2. PROTECTION AND CONSERVATION STATUS

There are three Government institutions responsible for safeguarding the Sudd Wetland. These are the Ministry of Environment and Forestry, whose priority work programs include the development of policy and regulatory framework for wetlands and biodiversity management, The Ministry of Wildlife Conservation and Tourism responsible for the three protected areas situated within the Sudd namely; Shambe National Park (100,000 ha) for the preservation and protection of endangered northern race of the white rhino (*Ceratotherium simum cottoni*), Zeraf (675,000 ha) is a traditional hunting reserve for Nile lechwe, Fanyikang (504 km2) and Mongalla (7,500 ha) game reserves for the protection of migratory antelopes.

2.2.4. AGRO-ECOSYSTEMS

While the total area of South Sudan was reported to be 658,842 km2 (FAO 2011), in the Agriculture Sector Policy Framework (ASPF 2012) only 3.8 percent of the land area is cultivated for production of food and agricultural raw materials. Much of this area is cultivated periodically rather than continuously. Many subsistence farmers practise some form of shifting cultivation without the use of fertilisers, pesticides and herbicides. According to the World Bank (2007), the actual area cultivated in any one year in South Sudan ranges from a minimum of 1 percent to a maximum of 2 percent of the total land area; that is, from about 0.65 million to 1.3 million hectares.

South Sudan has a tropical climate with wet and dry seasons. Most of the country receives 750–1,000mm of rainfall annually although the south and west receives slightly more (1,000–1,500mm). Areas of the north and southeastern regions receive less (500–750mm) dropping to less than 500 mm in the extreme southeast. Seven broad agro ecological zones are usually recognised. From northwest to southeast: (i) the Ironstone Plateau (most of Bahr el Ghazal, west of the River Nile) with lateritic soils; (ii) The Central Hills, along the Nile to the north of the Green Belt; (iii) The Green Belt, (southern parts of Eastern Equatoria, Central Equatoria and the western parts of Western Equatoria), which has two rainy seasons and the most fertile arable land in South Sudan; (iv) The Imatong mountains along the Uganda border; (v) The Flood Plains including the Sudd a vast area of swamp; (vi) The Nile–Sobat Corridor along the banks of the River Sobat, which flows from Ethiopia and receives numerous tributaries before draining into the Nile; and (vii) A semi desert area in the extreme southeast. The risk of food insecurity is greatest in those areas in which there is a high risk of production failure. The poorest households have limited opportunities to obtain income and the greatest difficulties in accessing markets (Figure 3). The following zones identified are considered to be at greatest risk of food insecurity.

Greater Bahr-el-Ghazal Sorghum and Cattle (SSD7): This is a predominantly agro pastoral economy occupying a flood plain. Continuous leaching and loss of soil nutrients leads to reduced crop yields. While floods result in poor crop performance and in an increased risk of livestock loss from disease. The livelihood system is also characterised by overgrazing and high levels of cattle rustling. This is exacerbated by over exploitation of the natural resources, especially fish, wild foods and bush products, communal conflicts over water and grazing and the presence of Internally Displaced People (IDP) due to political conflicts along the border with Sudan. Rural to urban migration has also deprived households of productive labour.

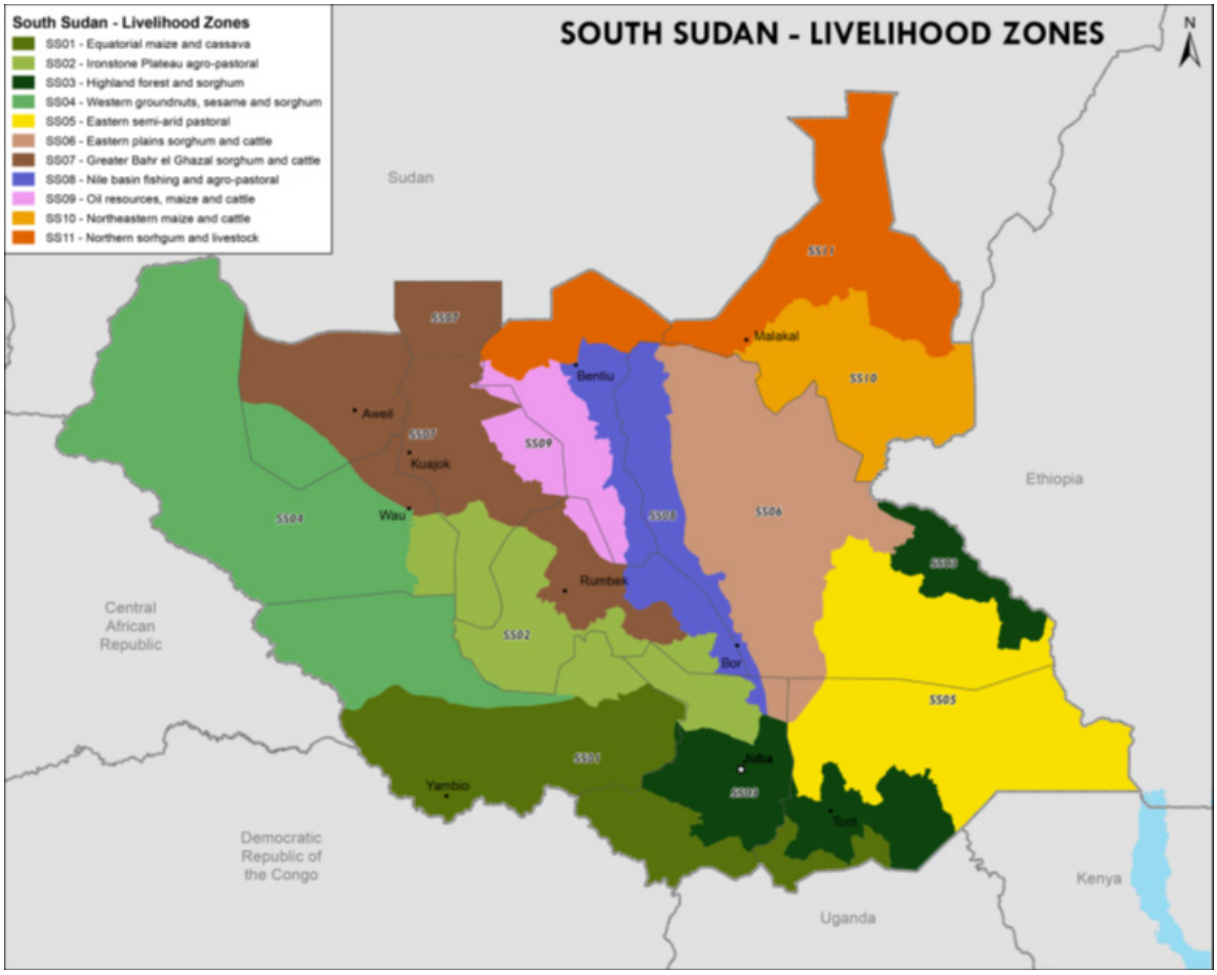
Eastern Semi-Arid Pastoral (SSD5): Mainly a semi-arid livestock rearing area, with limited crop production, this zone is prone to prolonged drought, livestock losses from diseases and raiding as well as resource and political conflict. Multiple and frequent hazards combined with low household resilience, a heavy reliance on markets for food and difficulty with market access expose inhabitants to a high risk of food insecurity.

Eastern Plain Sorghum and Cattle (SSD6): This zone is predominantly an agro-pastoral area, with some seasonal fishing and it is highly prone to floods, livestock and human diseases, crop pests, cattle raiding and conflict combined with low resilience due to recurring losses of crops and livestock as well as limited market access, which exposes inhabitants to higher risk levels of food insecurity.

Northern Sorghum and Livestock (SSD11): Livelihoods in this zone depend chiefly on sorghum production and rearing goats. Rainfall in the area is among the lowest and most unreliable within the country. Frequent drought and crop failure, cattle raiding, political instability and insecurity, and changes in market conditions due to its location along the border with Sudan, expose inhabitants to food insecurity.

Nile River Fishing and Agro-pastoral (SSD8): This zone is predominantly an agro-pastoral farming and fishing zone along the Nile River. It is the least food insecure area among the five main zones. However, it is prone to flooding, particularly in low lying areas. This can result in limited access to wild foods (fish and water lilies), crop destruction, particularly the short-term variety of Sorghum which is known for its low resistance to flood water, and increases in other crop pests and livestock diseases, especially among goats and sheep.

Figure 3: Livelihood zones of South Sudan



Source: FewsNet 2013

2.2.5. AQUATIC ECOSYSTEMS

South Sudan's major water resources are the White Nile, its tributaries and aquifers. An estimated 28 billion cubic meters representing 30 percent of the flow of Nile water passes through South Sudan to Sudan and on to Egypt. The country has three major river basins, Bahr el-Ghazal, Bahr el Jebel and River Sobat (together with 23 sub-basins). River Sobat, which is formed by the confluence of the Baro, Pibor and Akobo rivers, discharges about 14 billion m3 per annum into the White Nile. The Bahr el Jebel basin discharges about 30 billion m3 per annum, but only 14 billion m3 per annum passes into Lake No. The Bahr el Ghazal basin, which discharges about 12 billion m3 per annum and loses 11.4 billion m3 per annum of its flow to the Sudd wetland leaving only 0.6 billion m3 to flow into Lake No. Hence, the average discharge of the White Nile at Malakal is 28 billion m3 per annum. About 50 percent of the flow into the White Nile is lost in the wetlands of South Sudan, primarily due to evaporation and transpiration (GRSS 2013).

South Sudan's surface water sources include perennial rivers, lakes and wetland areas, as well as seasonal pools and ponds, rivers, torrents, streams and extensive floodplains (known locally as toich), and river cataracts, falls and rapids. The White Nile is the dominant geographic feature in South Sudan, flowing across the country. South Sudan is also home to the world's largest swamp, the Sudd, which covers 57, 000 km2. The swamps, floodplains and grassland contain over 350 species of plants, 100 species of fish, 470 bird species, over 10 species of mammals and a range of reptiles and amphibians (GRSS 2011; GRSS 2013).

The White Nile and its many tributaries provide access to almost unlimited sources of water, which service the land, enabling it to support diverse vegetation and crops. Since most people rely on agriculture and livestock to sustain their livelihoods, access to water is an important factor. Access constraints relate less to total quantity than to distribution patterns over the year, including dry spells in the wet season. As a result, the availability of water is a source of conflict between different pastoralist ethnic groups. In recent years (especially after the CPA), intra- and inter-ethnic fighting has become widespread and frequent, particularly among pastoralist groups and between pastoralists and fishermen, due to increases in the size of livestock populations competing for the same sources of water (GRSS 2011; USAID 2010).

Although South Sudan has sufficient freshwater resources to supply drinking water and sanitation access, it is hampered by the lack of extraction and infrastructure that would supply the sparsely populated country. Roughly 47 percent of people outside of main towns have access to a clean water supply mainly from boreholes provided by NGOs during the war and only 6–7 percent have adequate sanitation facilities. It is not uncommon for rural women and children to spend most of their day collecting water (GWI 2011).

South Sudan has a very rich and vibrant fishery which has continued to expand over the years. A thriving capture fishery takes place in its major rivers (the most prominent of which is the Nile), as well as in the expansive wetlands which are concentrated on the vast Sudd swamps that lie between Malakal in Upper Nile State and Bor in Jongolei State stretching between 6o north and 9o 30' north, and spanning from 30o west to 32o east. South Sudan's capture fishery may be categorised into subsistence and commercial fisheries with the former being both the largest and most important fishery. Currently, the total production is in the order of 143,000 tonnes from multispecies fishery stocks valued at about 510 million USD (FAO 2014). The fisheries sector is of further significant importance to the socioeconomics of the country as an estimated 17.3 percent of the population in some way directly depend on the capture fishery alone. The fisheries sector falls under the Natural Resources and Rural Development sector.
Aquaculture is currently nascent in South Sudan though it has been determined to have great potential. A few subsistence earthen ponds are currently in existence, most of them having been constructed with funding from or in partnership with development partners and non-governmental organisations.

2.2.6. GRASSLAND ECOSYSTEMS

Grasslands account for about 23 percent of the land cover, with Upper Nile, Jonglei, Eastern Equatoria and Unity states accounting for about two-thirds of the grasslands in the country. Six out of the 11 livelihoods zones of the country have the dominant grassland area. The 11 livelihood zones of the country are: Equatorial Maize and Cassava (Livelihood Zone 1); Iron Stone Plateau Agro-pastoral (Livelihood Zone 2); High Land Forest and Sorghum (Livelihood Zone 3); Western Groundnuts, Sesame and Sorghum (Livelihood Zone 4); Eastern Semi-arid Pastoral (Livelihood Zone 5); Eastern Plain Sorghum and Cattle (Livelihood Zone 6); Greater Bahr El Ghazal Sorghum and Cattle (Livelihood Zone 7); Nile Basin Fishing and Agro Pastoral (Livelihood Zone 8); Oil Resources, Cattle and Maize (Livelihood Zone 9); North Eastern Cattle and Maize (Livelihood Zone 10); and the Northern Sorghum and Livestock (Livelihood Zone 11).

The six livelihoods zones critically linked to the grasslands are: The High land forest and Sorghum (Livelihood Zone 3), which is located along the mountain ranges of the Greater Equatorial region and the border of Ethiopia. Its topography is characterised by highlands and foothills with a mixture of forest, bush shrubs and grasslands; the Western groundnuts, Sesame and Sorghum (Livelihood zone 4) is mainly located in Western Bahr el Ghazal and some parts of Western Equatoria State and is characterised by highlands, foothills and parts of the Ironstone Plateau. Vegetation in the area is a mixture of forest and grasslands with mahogany and bamboo trees; in the Eastern semi-arid pastoral (livelihood zone 5) that is mainly located within Eastern Equatoria and parts of Jonglei State. It is a vast plain which stretches towards the foothills of the mountainous ranges near the Ethiopian border. The vegetation is characterised by dense thickets, bush shrubs and savanna grasslands, which are more suitable for rearing livestock than growing crops. The Eastern semi-arid pastoral zone is home to Boma National Park, one of the main tourist attractions of this area. The dominant production system of this zone is pastoralism, with very limited crop production.

The other grasslands land dominated zones are the Oil Resources, Cattle and Maize (Livelihood zone 9), which lies in the western flood plain of the Nile, bounded by permanent swamps which link rivers and lakes, including the river Naam and Lakes Pooltocha and Rubkona. Vegetation is characterised by a combination of forest, bush, shrub and grasslands; the North Eastern Cattle and Maize (Livelihood zone 10) that is located in Upper Nile State, along the Nile's eastern flood plain, covering Nasir County and extending southwards along the River Sobat and its tributaries and northwest from Nasir to Melut. The zone is characterised by grasslands, forests and swamp; and the Northern Sorghum and Livestock (Livelihood zone 11) located along the border with Sudan in Upper Nile and Unity States. It is dominated by flat plains with low lying areas, which aid the flow of the rivers Namm and Nang towards the south into the Sobat River. The zone is covered with grasslands, scanty shrubs, thorns, Balanites, bushes and other hardy plants and patches of forest.

While many of the grasslands are shared with other ecosystems and the inhabitants of these zones are agro-pastoralists (zone 9, 10, 11), other grasslands (Zone 5 and Zone 3) are largely for pastoral activities and/or national parks and wildlife reserves and are used as a habitat for wildlife.

2.2.7. SEMI-DESERT

The semi-desert areas of South Sudan are located in the extreme southeast of the country and around the Ilemi Triangle in Eastern Equatoria state (IRG 2007). Low rainfall, averaging 300 to 500 mm annually, favours the growth of patches of short open grasslands with acacia bushland. Ground cover is generally poor, depending on annual rainfall which is unpredictable. Wildlife found in this region excludes Oryx (Oryx beisa), Grant's gazelle (Gazelle grantii) and dikdik (Madoqui Kirkii). No PAs in this region have been designated for protection. However, the presence of Oryx, an endangered species, has been confined in recent surveys by WCS making the region important to conserve.

2.3. STATUS OF BIODIVERSITY AT THE SPECIES LEVEL

2.3.1. MAMMALIAN FAUNA

South Sudan has one of the largest antelope migrations in the world (the white eared kob, tiang and Mongalla gazelle), which has an invaluable biodiversity on a global scale. In addition, the Sudd wetlands, rich in biodiversity are also found in South Sudan. They support a wide diversity of wildlife species that include the threatened hippopotamus (Hippotamus amphibius), the near-threatened sitatunga (Tragelaphus spekki), the endemic Nile lechwe (Kobus megaceros), and globally endangered species such as the elephant (Loxodonta africana) and leopard (Panthera pardus). It is also used as a dry season refuge by the huge migratory species populations of the white-eared kob (Kobus kob leucotis), endemic to South Sudan and the tiang (Damaliscus lunatus tiang). Others include the Mongalla gazelle, the Nile crocodile (Crocodylus niloticus) considered the largest wild population in the world, supported by the large size and remoteness of the Sudd; the African rock python (Python sebae), other species of snakes and amphibians (Lovell-Hoare and Lovell-Hoare 2013). The Nile Lechwe population is estimated to be 4,300 (Lovell-Hoare and Lovell-Hoare 2013).

2.3.2. AVIFAUNA BIODIVERSITY

South Sudan is rich in birdlife with close to 800 species recorded. Over 470 bird species have been recorded in the Sudd region alone, thus distinguishing it as an IBA by BirdLife International (UNEP 2007). It also supports over 20,000 water birds throughout the year and is a wintering ground for migratory birds from Europe. The Sudd floodplains support the largest population of the shoebill stork (Balaenice psrex) in Africa, with an estimated population of 5,000 (GRSS and UNDP 2011; Riak undated). Other species include the white stork (Ciconia ciconia), black tern (Chlidonias nigra), and saddle billed stork (Ephippiorhynchus senegalensis). Threatened and endangered species supported by the Sudd include: the white pelican (Pelecanus onocrotalus), which uses the Sudd as a wintering site, and the black-crowned crane (Balearica pavonina) categorised as "vulnerable" by IUCN is also found in the Sudd. Howel et al, 1985 in IRG, 2007 state that the Sudd wetland supports about 300,000 open billed storks (Anastomus lamelligerus), 100,000 cattle egrets (Bubulcus ibis), 100,000 spur-wing geese (Plectropterus gambensis), and more than 20,000 black crowned cranes (Balearica pavonina). About 1.7 million glossy ibis (Plegadis falcinellus) are found in the Sudd (Riak undated).

2.3.3. REPTILES

South Sudan has a rich variety of reptile diversity. Even though the majority are small and unlikely to be encountered through casual observation, there are many larger and better-known types. The large reptiles of South Sudan include the Nile crocodile (Crocodylus niloticus), tortoises particularly the leopard tortoise (Geochelone pardalis) and the African Spurred tortoise (Geochelone sulcata). The Nile crocodile is a huge beast with a maximum length of 5m and can weigh up to 1000 kg. They are found in rivers and wetlands and are abundant in the Sudd. A third species of tortoises likely to be enoutered in marshy areas is the marsh terrapine (Pelomedusa subrufa). The numbers of Nile crocodiles have been significantly reduced by hunting and persecution (Lovell-Hoare and Lovell-Hoare 2013).

Snakes, lizards and geckos are also common reptiles in South Sudan. The snakes include the African rock python (Python sebae), which may exceed 5m in length. It prefers savanna and scrub habitats and preys on game birds, monkeys and small antelopes. The black mamba (Dendroaspis polylesis) is Africa's largest and most feared venomous snake, which often exceeds 3 m in length, while the savannas of South Sudan also contain Egyptian cobras (Naja haje), and black necked spitting cobras (N. nigricollis). Other venomous snakes include the

boom slang (Dispholidus typus) and the puff adder (Bitis arietans). Lizards are quite numerous, but the most populous types are the Nile monitor lizard (Varanus niloticus), and species of the agama lizards (Agamidae). The most common chameleones are the flap-necked chameleones (Chamaeleo dilepis). The dominant gecko species is the tropical house gecko (Hemidactylus mabonia) (Lovell-Hoare and Lovell-Hoare 2013).

2.3.4. FISHERIES

The Sudd, described as an inland delta (Brown and Sidahmed 2009) has a diversity of habitats and is rich in nutrients that make it ideal for aquatic life including fisheries. It is thought to host the largest freshwater fish populations in South Sudan (Lomuro 2012). This is estimated to be in the range of 100,000 to 300,000 metric tonnes per year, based on a combined water surface area of 90,000 km2 of the River Nile (AfDB 2013). Over 100 species of fish that include 31 siluroids, 16 characoids, 14 cyprimoids, 11 mormyrids, eight cichlids and seven cyprimoditids have been recorded in the Sudd alone (IRG 2007). Eight dwarf fish species of the Nile are endemic to the Sudd wetlands. These include: Cromeria nilotica, Nannaethiops unitaeniatus, Barbus stigmatopygus, Chelaethiops bibie, Andersonia leptura, Aplocheilichthys loati, Epiplatys marnoi and Electris nanus. Others such as Clarias, Polypterus and Protopterus spp, found in the Sudd are amphibious and they aestivate in the mud during the dry season. An annual fish called Nothobranchus that spends the dry season in the egg stage is found in the drier reaches of the Sudd (Riak, undated). Fourteen percent of households living in the Sudd region along the Nile and its tributaries have fishing as a livelihood activity (NBS 2012 in AfDB 2013). The fisheries industry supports livelihoods of some of the Nilotic groups especially those who do not own cattle. The potential for commercial fisheries is high but is yet to be exploited fully (AfDB 2013).

2.3.5. FLORA

South Sudan has a variety of habitats rich in plant life. These include the montane forests, woodlands and wooded grasslands. Over 350 species of plants have been recorded in the Sudd region alone, common among them being sedges and grasses found in other African wetlands (UNEP 2007). Only one endemic plant species, Suddia sagitifolia, is found in the Sudd. Suddia is a rare genus belonging to the Poaceae family. In addition, Cyperus papyrus, Vossia cuspidate, and Typha spp. that are important habitats for the endangered Shoebill stork are found in the permanent swamps that surround the open deep waters. Cyperus papyrus has been reported as being locally threatened in other wetlands in South Sudan by pollution and flood control (GRSS and UNDP 2011; Riak, Undated). The montane forests are also a biodiversity hotspot and have a diversity unrivalled elsewhere in the country (Jackson, undated). The woodlands of South Sudan are also rich in high value timber trees such as mahogany. Maybe you can expand the list of floral species by looking at the plants found in the different ezological zones in South Sudan.

2.3.6. BIODIVERSITY IN PROTECTED AREAS

The Protected Area (PA) system of South Sudan covers about 10.4 percent of the terrestrial areas of the country, which is higher than the African average estimated at 9 percent (UNDP 2009). According to UNDP (2009), the primary function for establishing the PA network was to conserve populations of wildlife and big game rather than ecosystems or major ecological functions such as migrations. Although the system is not inclusive of all the important habitats in the country, a wide range of critical habitats/ecosystems are included in the network. Fourteen of these PAs are located in woodland and tree savanna habitats; three are in lowland forests, and one in wetlands. In total, the PA network has five NPs and 14 game reserves. Four of the PAs (Southern, Boma, Bandingilo, Nimule, Shambe and Lantoto) make up 80 percent of the entire PA system (UNDP 2009).

The PA system has a high diversity of animals, habitats, and birdlife and the numbers they harbour are also significant. While some of the PAs are still intact as observed in recent surveys such as in Bandingilo NP, in others, such as in Ashana Game Reserve, limited sightings of wildlife species and high levels of woodlands degradation has been observed (GRSS and UNDP 2011). Management of most of the PAs is largely non-existent or very limited with inadequate personnel, administrative infrastructure such as offices, accommodation for personnel, road network/ tourism circuit roads and finances (Seme, 2014, personal communication). However, since 2007 management has slightly improved in some PAs such as Boma, Badingilo and Nimule NPs. With funding from USAID through WCS and the Ministry of Wildlife Conservation and Tourism (MWCT) some management activity has been restored in Bandingilo and Boma NPs.

Thirteen of the PAs (Ashana, Boro, Chelkou, Zeraf/Fanyikang, Kidepo, Meshra, Mbarizunga, Numatina, Shambe and Bire Kpatues) fall under IUCN Category (VI) whose main aim is to protect habitats but also allow sustainable use of natural resources in parts of the PA. Five of the PAs (Boma, Nimule, Southern, Bandingilo, Lantoto) are in Category (II), which confers on them NP status and aims to conserve large natural or near natural ecological process and species that provide a foundation for other activities such as cultural, spiritual, educational, scientific and tourism opportunities. Only one PA (Bengangai) is in category (IV) set aside mainly to protect specific species, the Bongo antelope (*Boecerus eurocerus*) and the remnant lowland forest habitats still intact in South Sudan *(Table 10).*

Plans are underway to expand the PA network to include the montane forests, some of the corridors for the migratory white eared kob/tiang as well as to expand Bandigilo NP to encompass Juba Game reserve. Zeraf Game reserve is also proposed for expansion southwards (UNDP 2009).

Table 10: Status and size of Protected Areas in South Sudan

Name and year protected*	Conservation status with IaUCN category	Habitat	Area in km2	State
Ashana (1939)	Game reserve (VI)	Woodland and tree savanna	900	Northern Bahr el Ghazal
Bandingilo* (1986)	National park (II)	Grassland and woodland savanna	16,500 (recently proposed >18,000)	Central & Eastern Equatoria
Bengangai (1939)	Game reserve (IV)	Lowland forest, woodland and open glades	170	Western Equatoria
Boma* (1986)	National park (II)	Woodland savanna, grassland & riverine woodland	20,000	Jongolei E
Baro*	Game reserve (VI)	Woodland and tree savanna	1,500	Western Bahr el Ghazal
Chelkou (1939)	Game reserve (VI)	Woodland and tree savanna	5,500	Western & southern Bahr Gel Ghazal
Zeraf (which also incorporates Fanyikang GR, 1939)	Game reserve (VI)	Wetlands, toich grassland, wooded savanna and floodplains	8,000	Jongolei E, Upper Nile, Unity

Name and year protected*	Conservation status with IaUCN category	Habitat	Area in km^2	State
Juba (1939)	Game reserve (VI)	Woodland & wooded savanna	200	Central Equatoria
Kidepo (1975)	Game reserve (VI)	Woodland & wooded savanna	1,200	Eastern Equatoria
Lantoto*	National park (II)	Woodland, forest and open glades	760	Central Equatoria
Meshra*	Game reserve (VI)	Woodland, wooded savanna	4,500	Warrap, Lakes
Mbarizunga (1939)	Game reserve (VI)	Lowland forest, woodland and open glades	10	Western Equatoria
Mongalla (1939, now in Bandingilo NP)	Game reserve (VI)	Woodland savanna, grassland and floodplains	75	Central Equatoria
Nimule (1954)	National park (II)	Wooded savanna, Nile River	200	Eastern & Central Equatoria
Numatina (1939)	Game reserve (VI)	Woodland and wooded savanna	2,100	Western Bahr el Ghazal
Shambe (1985)	National Park (VI)	Woodland & wooded savanna, grassland and floodplains	620	Lakes
Southern (1939)	National park (II)	Woodland and wooded savanna, bush land, small grasslands, riverine woodland, inselbergs	22,000	Lakes, Warrap, Western Equatoria, Western Bahr el Ghazal
Bire Kpatuos (1939)	Game reserve (VI)	Lowland forest, woodland and open glades	5	Western Equatoria
Badingaru (1939) (Incorporated into Bandingilo NP)	Game reserve (VI)	Grassland, woodland and wooded savanna	805	Central & Eastern Equatoria

*many of the PAs were created before South Sudan came into existence

Source: IUCN, 2009 in UNDP, 2009.

2.3.7. ENDANGERED, THREATENED, AND RARE SPECIES

South Sudan is home to several species of mammals, birds and plants that are endangered, threatened, or rare (Table 11). These include the Nile lechwe (Kobus megaceros) and eight dwarf species of fish (Cromeria nilotica, Nannaethiops unitaeniatus, Barbus stigmatopygus, Chelaethiops bibie, Andersonia leptura, Aplocheilichthys loati, Epiplatys marnoi and Electris nanus). Several plant species are endemic in the afro-montane forests and some may not even have been identified yet (IRG 2007). The Sudd wetland is home to one endemic plant species: Suddia sagitifolia (IUCN 2013).

Table 11: Endangered, Threatened, and Rare Species in South Sudan

Name	Status	Name	Status
Elephant (*Loxodonta africana*)	Vulnerable	Shoebill stork (*Balaeniceps rex*)	Vulnerable
Mongalla gazelle (*Gazella rufifrons albonotata*)	Vulnerable	Black-crowned crane (*Balearica pavonina*)	Vulnerable
Panthera pardus	Near Threatened	Beisa Oryx (*oryx Beisa*)	Near Threatened
Eastern Chimpanzee	Endangered	Rhinoceros (*Diceros bicornis*)	Critically Endangered
Wild dog (*Lycaon pictus*)	Endangered	*Giraffe camelopardalis*	Threatened
Hippopotamus amphibiuos	Vulnerable		

Source: IUCN Redlist (2013)

2.4 . STATUS, AND TRENDS OF GENETIC DIVERSITY

Genetic diversity is commonly reported with respect to agricultural landscapes. In South Sudan genetic characterisation of populations in both wild and domestic species is currently almost non-existent.

2.4.1. PLANT GENETIC RESOURCES

Plant genetic resources range from little known indigenous wild fruits and vegetables, pastures and forages, medicinal plants, indigenous staples like millet and sorghum to introduced crops such as maize. Table 12 presents a list of some indigenous species.

Table 12: List of some useful indigenous species in South Sudan

Category	Scientific name	Common name	Local name
Fruits	Balanities aegytiaca	Desert date, Soapberry tree	Thou
	Butyrospernum paradoxum	Shea butter nut Shea butter nut tree	Raak
	Diospyros mesphilliformis	Jackal berry, African ebony, Monkey guava	Cum
	Ziziphus sp.	Buffalo thorn, Indian plum; Christ's thorn	Lang
	Capparis decidua		Ajuet
	Boscia senegalensis	Shepherd's tree	Akondok
	Caparis sp		Riath
Oils	Cadaba farinose	Oil leaf	Raak
	Corchorus sp.	Jute, Jews Mallow, Bush okra	Ayaak
	Ipomea sp.	Bindweed	Apaat
Indigenous Crops with High Potential to be Cash Crops	Diospyros mesphilliformis	Jackal berry, African ebony Monkey guava	Cum
	Ziziphus sp.	Buffalo thorn, Indian plum, Christ's thorn	Lang
	Balanities aegytiaca	Desert date, Soapberry tree	Thou

Source: USAID 1999

2.4.2. ANIMAL GENETIC RESOURCES

South Sudan has a large livestock population comprising of a range of indigenous and improved breeds many of which are adapted to the country's environmental conditions and vegetation. Exotic and crossbreeds are however becoming increasingly popular. There is some concern that indigenous breeds may be undermined as the demand for high-yielding breeds increases.
The long-term viability of animal agriculture in South Sudan will depend on the genetic variability of the indigenous animals being reared. If this genetic base is eroded as breeds developed for intensive management regimes replace the indigenous breeds, then viability of the livestock sector will be negatively affected (GRSS 2015). The profile of animal genetic resources for South Sudan is still held in the records maintained with the Government of Sudan and the articulation of the detail of the animal genetic resources will be one of the undertakings of the NBSAP implementation.

2.5. CONTRIBUTION OF BIODIVERSITY TO THE NATIONAL ECONOMY

While specific and comprehensive collation and assessment of biodiversity to the national economy has not been established, the individual contribution of ecosystems and biodiversity is illustrative of the importance of biodiversity to the economy. Biodiversity impacts on the socioeconomic development of South Sudan and therefore contributes directly to the livelihoods of communities and people within the country.

2.5.1. FOREST RESOURCE CONTRIBUTIONS

Forests are a source of significant income for people, communities, State Governments, and the Central Government. However, like in other countries, the full contribution of forest resources to the national economy is usually undervalued. For example, the contribution of forest resources to the country's gross domestic product (GDP) remains low because many important services that forests provide are not valued and many forest products such as charcoal are traded in the informal sector. Furthermore, corruption leads to further revenue losses (GRSS 2016).

While the contribution of forest resources to the country's GDP is unknown, South Sudan is well endowed with a diverse natural forest and woodlands with an estimated total area of 191,667 km2, or about 30 percent of total land area. Along the southern border, the tropical moist forests on the hills, mountains, and Nile-Congo watershed represent some of the richest concentrations of biodiversity in the continent. These moist forests, which exist in the Imotong and Acholi Ranges, Didinga and Dongotono mountains spread over an area of 25,000 km2 and contain valuable commercial products including cabinet-grade timber trees (Forest Policy 2012).

Forest plantation activities have been pursued for various purposes - stabilisation of soil erosion, production of commercial wood, etc. Before the war, it was estimated that South Sudan had plantations covering 187,850 ha. These comprised of irrigated Acacia nilotica (*Sunt*) plantations along the banks of the River Nile, plantations of high commercial value indigenous species such as *Khaya senegalensis* and *Khaya grandiflora* (concentrated in the greater Bahr-el-Ghazal area), eucalyptus plantations and teak (*Tectona grandis*) plantations spreading over most States.

Some of the opportunities in the forestry sector include timber, saw logs, poles, bamboos, and woody lianas from natural and plantation forests. Not long ago, a limited number of logging concessions were given out to companies with business interest for teak timber exports for ship building, which fetch a price of over $300-400/m3on the international market.

The tropical moist forests lying in areas of high rainfall along the southern border and Nile–Congo watershed represent some of the richest concentrations of biodiversity in the country and contain valuable commercial products including cabinet-grade timber species.

There are substantial teak plantations established from 1930s onward which have matured and reached the age to deliver significant production. Based on high demand for premium quality

timber such as teak and mahogany, improved management and production is likely to generate substantial additional foreign exchange to supplement oil revenue for the country providing an important source of economic diversification. According to some conservative estimates less than 2,500 m3 of teak has been exported annually in recent years. It is estimated that teak plantations alone can generate over $100 million per year, and mahogany in natural forest reserves could be a source of substantial hard currency as well (Forest Policy 2012).

Non-wood forest products include shea nut (locally known as *lulu*) fruits, fibres, grasses, honey, oils, resins, gums, sand, gravel, and forest soils. Many non-timber forest products are harvested for local use and to some extent for commercial trade. This includes *lulu*, which grows abundantly in South Sudan. Currently, shea nut butter oil is in high demand worldwide although only about 0.2 percent of South Sudan's total shea nut production is currently exported, the majority is consumed locally (Forest Policy 2012). Gum acacia could also constitute a major export product for South Sudan. Many local villagers in the country are unaware of the economic value. In 2008, South Sudan was the fourth largest producer of gum acacia in the world after Sudan, Chad, and Nigeria.

Honey is another forest product, which has high potential for exportation providing another business opportunity to local communities. During the war, honey was exported to various destinations including neighbouring countries and such exports should be supported and expanded. At the local community level, forests provide critical resources and often safety nets for rural communities as they rely heavily on forests and trees for shelter, food, medicine, and income. Forests also have religious, social, and cultural significance.

2.5.2. CONTRIBUTIONS OF WILDLIFE AND TOURISM

Wildlife's significance in South Sudan is at the prospective foundation for a new national tourism industry built upon the great migrations and vast wildernesses of the country, as well as a source of protein to rural communities, many of whom have hunted wildlife for many years. Neighbouring countries such as Kenya and Tanzania have capitalised on the abundance and diversity of large mammals to develop tourism industries that generate hundreds of thousands of jobs and more than 1 billion USD in annual national income. Wildlife tourism may be a key economic option at both national and local scales and will depend upon the stewardship and recovery of South Sudan's wildlife resources. Wildlife also contributes to other values such as game meat for local communities especially during drought and war, trophies (although related activities are usually illegal), aesthetic value which is also very important and others including game sporting.

2.5.3. CONTRIBUTION OF FISHERIES

Fisheries in South Sudan are concentrated on the country's large river systems including River Nile and its tributaries as well as the vast wetland complex of the Sudd besides several lakes. Limited current data is available regarding the status of fisheries in South Sudan and many local groups of fishermen were displaced and trade disrupted during the civil war, although the Fisheries Policy describes a large number (approximately 60) of commercially exploitable species from areas such as the Sudd (FAO 2014).

In South Sudan 1.7 million people depend directly on fisheries for their livelihood, food security or income. The fishery produces about 140,000 tonnes/year. The majority (56 percent) of this fish is dried or smoked whilst the rest is eaten fresh, either in the fishing communities where it is caught or sent to the nearby towns. The potential sustainable yield from wild fisheries is estimated in the order of 200,000 tonnes/year) worth about 800 million USD at 2013 Juba prices. Consumption of fish in South Sudan is about 17kg/person/year. The numbers of fishers is around 220,000. Most of these are subsistence with possibly 12,000 commercial fishers, though nearly all of the commercial fishers have alternative sources of income (FAO 2014).

Currently there is no management of the wild fishery, no routine data collection, the biology of many of the target fish in the catch is unknown, there is no control on gears used or destructive fishing methods, and the fishery is an open entry one.

This combination is most undesirable and unless changed will lead to overfishing in a relatively short time. This will result in declining catches, lower incomes in rural areas, reduction of protein in the diet of the population and an increase in imports.

Significant areas near the larger towns and some lakes are already over fished. There is little value addition. Fish is processed in fishing camps and villages by smoking or drying (56 percent of the catch) or sold fresh and as a whole. Opportunities for increasing the value of the catch exist, simply by shifting from smoking and drying fish to producing fish chilled on ice which receives a higher price. There is a limited opportunity for producing value added fish products for local consumption and perhaps for export in the future.

There is no room for large-scale industrialisation of capture fisheries or for an emphasis on greatly increasing production. The fishery will expand naturally as all unregulated fisheries do with time beyond the maximum sustainable yield (MSY) unless controlled.

The emphasis of development of the capture fisheries will have to be to: protect nutrition, employment and incomes through co-management of the resources with the users of the resources so as to ensure the fishery is exploited sustainably and increase incomes and employment from the fishery by increasing the value of the catch by improvements in processing and marketing.

In terms of aquaculture, it should be emphasised that despite several years of efforts by FAO, NGOs and other donors aquaculture is still undeveloped. There are technical problems with site selection, skills, feeds, fingerlings for stocking, harvesting and general husbandry. The potential however is great. The climate is very suitable in the Greenbelt Livelihood Zone, which has gravity fed streams, many suitable sites with clay soils, year-round surface water and strong local markets for aquaculture products.

Subsistence ponds could improve local nutrition; small-scale commercial fish farming in clusters around towns promises to improve nutrition as well as employment and incomes; and large-scale intensive commercial fish farming has the potential to transform the economic landscape in large areas of the country. There may also be potential for cage culture in some areas of the Nile-Sobat Rivers Livelihood Zone.

2.5.4. CONTRIBUTION OF WATER RESOURCES

Water is linked in fundamental and critical ways to agriculture, livestock, wildlife conservation, and fisheries. All these sectors rely on water resources and so changes in the availability and distribution of water can have profound ecological and economic implications. Water is a key component of broader environmental quality, which shapes and impacts human health and livelihoods in basic ways. Water quality can be impacted severely by industrial sectors such as mining and petroleum development as well as both mechanised and small-scale agriculture, livestock and tourism developments.

Fisheries are inherently closely linked to the use and management of water as well as land-based or industrial activities which impact water quality, including agriculture (through pesticides and fertiliser run-off), livestock and petroleum and mining developments. Environmental measures that safeguard water quality are critical to the development of sustainable fisheries, including the safety and quality of fish in a given body of water.
Water is a key determinant of land use patterns including the spatial distribution of agriculture, livestock and wildlife, and the provision of water supplies can quickly alter the balance between

these overlapping or competing resource uses in ways that change ecosystems and potentially lead to conflict. Water is also an important source of renewable energy (hydropower) and recreational benefits such as sports (swimming pools) and for aquaculture development.

2.5.5. CONTRIBUTIONS OF AGRICULTURE

Only 3.8 percent of the total land in South Sudan is under crops, while tree land or Savannagrassland covers the greatest area (62.6 percent) (AfDB 2013; Tizikara and Leju-Lugor 2012). The main crops cultivated are sorghum, maize, cassava, groundnuts, sesame, pearl and finger millets, beans, peas, sweet potato and rice. Sorghum is the staple food and is widely grown throughout the entire country. Usually sorghum is grown with other crops, like groundnuts, sesame, cowpeas, beans, and pumpkins. Maize is grown mainly in the Greater Equatoria Region especially in the Greenbelt Zone. Farmers in the northern part of the country have also recently began to grow maize since sorghum, their main crop is increasingly being severely damaged by birds; farmers choose maize because it is damaged less by birds. Cassava is mainly grown in the Greater Equatoria Region especially in the Western Equatoria State. Groundnuts are a very important crop for farmers as both food and cash crops are widely grown.

Currently, over 70 percent of South Sudan's raw agricultural and processed food products are imported from the neighbouring countries of Uganda, Kenya, Sudan and Ethiopia. South Sudan's national food security is at risk and is to a larger extent vulnerable to external dynamics and imperatives. In the absence of its own food producing capacity, shortcomings prompted by political, climatological and economic factors in these countries may have grave consequences on the food situation in South Sudan. However, with favourable policies, enough investment and the application of appropriate technology, South Sudan's large areas of arable land could support competitive, productive rain-fed and irrigated agriculture, producing food for local consumption and exportation and thereby contributing to economic growth and prosperity. This would, to a greater extent improve the socioeconomic conditions of most South Sudanese.

2.5.6. CONTRIBUTION OF LIVESTOCK AND ANIMAL RESOURCES

South Sudan is located in a region with the greatest concentration of livestock resources in Africa. No livestock census has been carried out recently in South Sudan, but the population of livestock including cattle, sheep, goats, and donkeys may exceed 20 million (National Environment Protection and Sustainable Development policy 2014). Livestock is thus a critical pillar of the rural economy and food security of the population as well as presenting a range of opportunities for economic growth and development through commercial opportunities and investments. Moreover, this region is a gateway to the Middle East and northern Africa which are home to the largest live animal trade in the world. The trade is composed of both formal and informal markets that find livestock moving through South Sudan into surrounding countries. The sector is predominately comprised of pastoral and agro-pastoral livestock production systems whose contribution to the economy is significant but challenging to measure since it contributes both socially and economically.

The livestock industry is very poorly developed in modern production terms. However, there is great potential for this industry to improve food security, livelihood and income generation, and economic transformation with industrial growth, exports and job creation leading to significant increases in GDP.

Currently most hides and skins are not collected and are treated as a waste product with minimal intervention, the value can be obtained, and revenue generated. In poultry, due to the short generation times simple interventions can lead to improved nutritional status and fast income generation. Likewise, the adoption of new technology in the honey industry can significantly improve. Livestock also plays an important role in agriculture in South Sudan in the form of ox ploughing which enables farmers to cultivate larger acreages than with hand cultivation. Other traditional values of livestock include for prestige, traditional marriages and compensations when needed.

3

TRENDS AND THREATS

3.1. TRENDS AND THREATS TO FOREST ECOSYSTEMS

3.1.1. TRENDS IN FOREST ECOSYSTEMS

The southern areas of the country especially Western Bahr El Ghazal, Northern Bahr El Ghazal, and Western and Central Equatoria – have vast areas of closed to open tree woody vegetation (Africa Forest Forum 2011). It is estimated that natural forests and woodlands cover a total of 207,422 km2 or about 33 percent of the total land area of South Sudan (AfDB 2013).

Table 13: Cover of forests and other woodlots vegetation in South Sudan and annual loss of forest cover

Area	Forest (ha*)	Other woodland (ha)	Annual loss(ha)	Annual %age loss
Bahr el Ghazal	14,048,291	4,829,122	113,958	0.6
Upper Nile	15,165,707	6,333,033	76,192	0.35
Equatoria	14,256,099	3,356,184	87,480	0.50

Source: GRSS and UNDP, 2011

Table 14: Gazetted forest reserves

Central Equatoria Forest Reserves		Upper Nile, Jongolei and Unity States Forest Reserves	
	Ha		Ha
Mongalla	459	Zar-zur C.R	1,568
Girikidi	8,368	Tawfigia	957
Kadule	136	Atar C.R	96
Lulubo North	4,357	Sobat (A)	63
Lulubo South	4,127	(Lokitiri) Sobat (B)	1,305
Jebel Korok (Juba)	101	Sobat (C)	1,687
Kajo keji West	1,886	Malakal	101
Kagelu	933	Khor-wol	5,179
Korobe	2,045	Renk C.R	95
Loka West	21,881	Abu Khries	1,358
Momory	89	Ahmed Agaha	503
Kajiko South	5,398	Kodok C.R	50
Kajiko North	4,725	Wad Akona	254
Green Belt Yei	126	Goz-Rom	95
Rajaf East	4	Khor Tumbak	9,104
Total	54,634	Diel	103
Khash	4,880	1,975	
Torit town	265	Nakdiar PR	10,965
Katire teak	13	Bir	24,075
Imeila	1,275	Bong PR	3,135

Central Equatoria Forest Reserves		Upper Nile, Jonglei and Unity States Forest Reserves	
	Ha		Ha
Imatong/Gilo	123,090	Total	62,666
Vukadi	30	Western Bahr el Ghazal Forest Reserves	
Kereppi	202	Nyin-Akok	3,433
Pajok	23	Khor-Grinty	3,352
Lerwa	71	Tonj No.1	1,305
Shakole	990	Kuajena	4,398
Magwi	6	Khor-Abong	4,810
Palwar	74	Nyalero	7,000
Total	126,038	Dokorongo	1,659
Namatina	610,236	246,916	
Asanza.C.	201	Gette	2,140
Yabongo.C	341	Ngohalima &Akanda	4,307
Yatta.C.	7,890	Wau town	1,202
Nzara	4,054	Pongo Nuer	1,295
Magada	2,251	Gette extension	1,942
Yabua	4,123	Total	283,760
Mbari-zunga	8,052		
Simbi	7,162	Karich	5,402
Ringasi	2,711	Pacong	1,995
Nangondi	0	Palual	5,740
Marangu	5,483	Rumbek town	888
Azza	713	Cumcok & Mayen Atot	506
Zaria	16,903	Malek	3,318
Embe	3,346	Total	17,848
Maridi town	160	Northern Bahr el Gazal Forest Reserves	
Zumbi	5,978	Nyala	12,948
Bangangai	0	Pongo Aweil	12,948
Riwa- 1	0	Total	25,896
Riwa- 2	0		
Total	69,368		

Source: USAID/ETOA, 2007

3.1.2. THREATS TO FOREST ECOSYSTEMS

1. Illegal logging of indigenous species, especially mahogany (Khaya senegalensesis and K. grandifolia) is increasing but the regional impact of this illegal activity is not yet well documented. Return of South Sudanese refugees has spurred logging to supply local markets for building material. This accelerated unregulated and often-illegal logging could cause serious environmental degradation and threaten the habitats of chimpanzee and other forest wildlife species in the important transboundary landscape.

2. Deterioration in the food security status due to drought has created conflicts in some local communities.

3. The historic larger conflict between the Government of Sudan (GOS) and the Sudan People's Liberation Army (SPLA) as well as the cross-border activity of the Lord's Resistance Army (LRA) resulted in displacement of many communities and exacerbated and increased the number of inter and intra ethnic conflicts over natural resources in various parts of South Sudan.

4. Future threats to forested areas could come from the revival of commercial farming in the region including coffee plantations in the Aloma Plateau, palm tree plantation in the Yambio and Nzara areas and tea and coffee plantations around the Upper Talanga, Katire and Gilo areas near the Imatong Mountains.

3.2. TRENDS AND THREATS TO PROTECTED AREAS

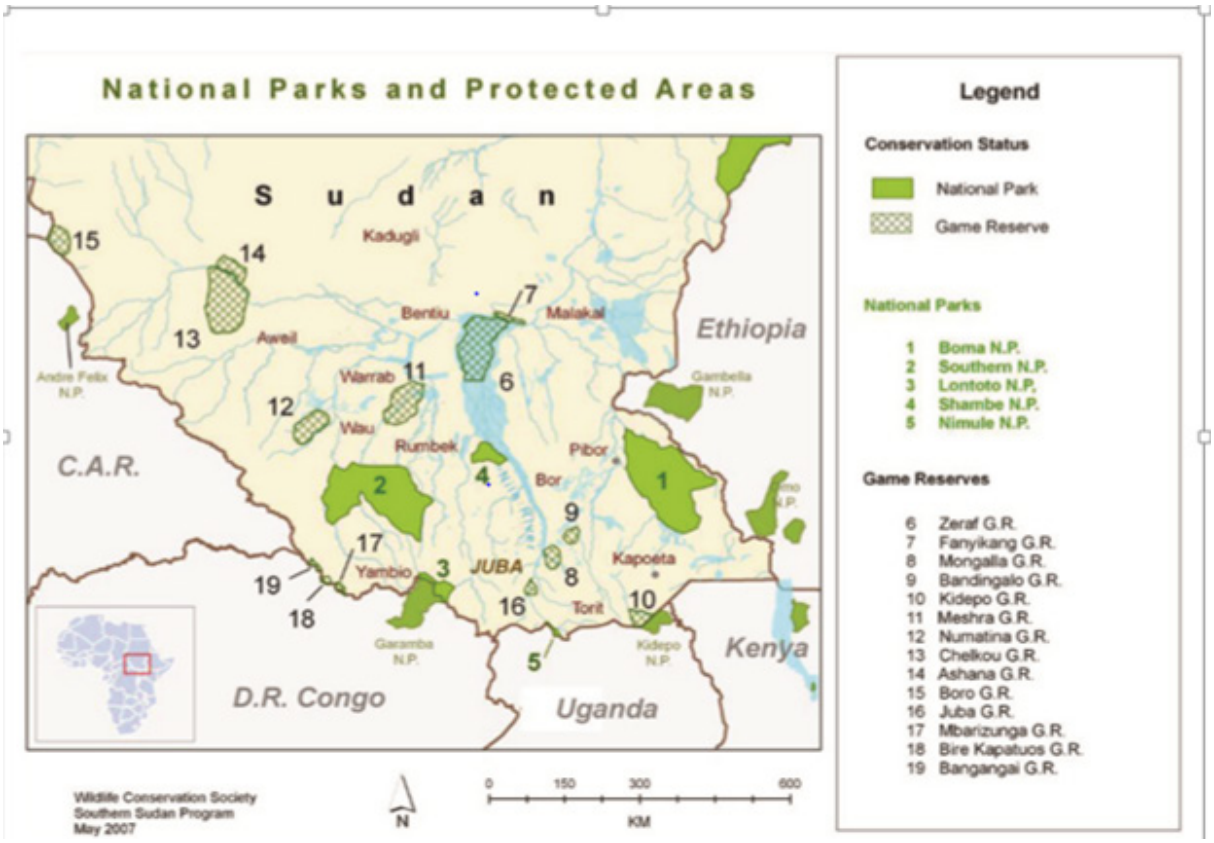
3.2.1. TRENDS IN PROTECTED AREAS

Despite 25 years of civil war, South Sudan still possesses a tremendous ecological heritage with one of the highest diversities of large mammals and largest intact habitats than any African country.

In South Sudan wildlife migrations extend across very large areas that have relatively low human population densities making these areas particularly important for conservation. Several globally rare and endangered species (e.g., elephants, white-eared kob, tiang, eland) exhibit large-scale seasonal movements and migrations in the region ranging far beyond the boundaries of protected areas (see Figure 4) across community dominated zones, extractive industry concessions and international borders.

Just as wildlife range through this transboundary landscape in search of resources so too, do local people who move seasonally to find pasture and water for their cattle and to hunt and gather; both wildlife and people move in and out of protected areas and across international borders. The location and timing of these movements is largely determined by rainfall patterns that vary over annual and decadal time frames.

Figure 4: Protected areas of South Sudan and neighbouring countries



Source: USAID/ETOA, 2007

The landscapes that span the international boundary between South Sudan and Uganda support a globally exceptional biodiversity. As such, they offer enormous potential as peace parks that would help protect the region's irreplaceable biodiversity and help increase security in what has been a highly volatile and dangerous region for years.

Four sets of abutting protected areas and their buffer zones (Figure 4) have been identified as possible "Conservation Landscapes for Peace" and a formal Memorandum of Understanding for transboundary cooperation was signed by the Governments of South Sudan and Uganda:

- Kidepo Landscape; Including Kidepo Game Reserve, Didinga and Dongotono mountains in South Sudan and the Kidepo Valley National Park, Nyangea-Napore, Morungole, Zulia and Rom Forest Reserves and Karenga Community Wildlife Reserve in Uganda.

- Imatong Massif Peace Landscape; Including the Imatong Mountains in South Sudan and Agoro Agu Forest Reserve in Uganda.

- Otzi-Nimule Landscape; including Nimule National Park in South Sudan and Otzi and Ara Forest Reserves in Uganda.

- Mt. Kei-Aloma Plateau Landscape: Comprising of Aloma plateau (including Ewatoka Mountain) in South Sudan and Mt. Kei Forest Reserve in Uganda.

3.2.2. THREATS TO PROTECTED AREAS

The following key factors pose major threats to the conservation and sustainable management of wildlife in forested and savanna-protected areas in South Sudan's transboundary areas:

1. The Civil War and continuing insecurity has seen a proliferation of firearms among the communities in the region. This has facilitated illegal indiscriminate hunting, contributing to the depletion of wildlife populations. It has also meant that conflicts over access to land and water have become appallingly violent and lethal. Just north of this trans-boundary region, recent clashes between pastoralist groups have left hundreds dead or wounded.

2. A lack of livelihood options for internally displaced people (IDP) and returning refugees has resulted in an overdependence on natural resources as a source of income, causing a rapid spread of unsustainable trade in game meat across the region.

3. The sale of endangered species such as chimpanzees as pets is a growing concern in South Sudan.

4. Unsustainable Hunting. As South Sudanese refugees and IDPs return, traditional rights to access natural resources are being contended with causing increasing and often lethal conflicts. The proliferation of arms allows hunters to kill more wildlife with less effort. In the context of insecure tenure, wildlife has become an open access resource and well-armed hunters are rapidly depleting even relatively abundant wildlife populations.

   The GRSS has recently declared a five-year moratorium on all hunting to allow wildlife populations to recover. While technically justified for many endangered wildlife species and in areas where wildlife has been depleted, a total ban will be difficult and contentious for the GRSS to implement where local communities depend on wildlife as a source of protein and income.

5. Livestock grazing pressure. Livestock grazing pressure, access to water and the transmission of wildlife-livestock diseases (e.g., bovine TB, rabies, rinderpest, cooties) are important factors affecting local wildlife, livestock and human communities as well as natural resource management. These factors need to be assessed in and around the protected areas and proposed to potential conservation areas. Understanding livestock-wildlife interaction is key to designing management interventions to reduce pressures, disease transmission and conflict over contended resources.

   Ebola haemorrhagic fever is also a potential threat to wildlife and human health given its history of occurrence in the area; the most recent outbreak was recorded in 2004 in the Yambio region.

6. Unsustainable agriculture and encroachment. Livestock and wildlife conflict (grazing, water, disease). Traditionally, many of the inhabitants of Equatoria (the Eastern, Central and Western Equatoria States) were agriculturalists that practised subsistence farming. Land use patterns have been greatly affected by conflict and population displacement in many parts of the project region. Insecurity has reduced local access to some traditionally occupied areas and the influx of displaced South Sudanese pastoralists with their cattle is increasing land use pressures in areas not previously occupied.

   Given this, there is a need to assess and undertake spatial planning of agricultural development that helps minimise poor rural farmers' encroachment into intact wildlife habitats while ensuring their access to land and markets and avoiding conflicts with well-armed livestock owners and herders.

7. *Lack of information for planning and management.* Up-to-date information on human livelihoods, resource use, impact of conflict, inter-tribal conflict over natural resources, habitat status and distribution and abundance of remaining wildlife populations is needed for strategy and management plan development and the creation and redefinition of protected areas. Baseline assessments and surveys of wildlife populations and human livelihoods in existing and potential protected areas are necessary to assess conservation threats, determine conservation interventions and identify sustainable livelihood options for natural resource dependent rural families.

   Assessing and building management strategies based on traditional community conservation and use systems will be key to understanding and reducing conflict over natural resources and pressures on wildlife populations. Support from constituencies for community-based wildlife management will need to be developed to control access, halt unsustainable commercial hunting, manage immigration into ecologically sensitive areas and ensure that local resources benefit local people.

8. *Low technical, financial and administrative capacity.* State level consultations conducted for the NBSAP South Sudan showed the dire nature of capacity for implementation, the lack of office space, equipment, staff, resources to pay or conduct field activities, among others.

   The Government of South Sudan needs to build management capacity in order to be able to implement effective protection and management of the Protected Area network and to become an effective transboundary conservation partner with neighbouring countries. Personnel need to be identified, trained and provided the means to put that training to work. Soldiers need to be retrained to fill gaps in GRSS environmental agency staff rosters, and mechanisms put in place to ensure that GRSS efforts on the ground are disciplined, performance-based and well integrated with local communities. If natural resources are to be sustainably managed, livelihoods secured and peace ensconced, a robust constituency to promote the conservation of natural resources in protected areas and surrounding human occupied landscapes must be developed among local authorities, communities and government officials. WCS has begun this process of training and capacity building in partnership with GRSS, and with the vital support of USAID.

9. *Limited integration of conservation in natural resource management regulations and planning.* Even with relative stability, South Sudan is generally experiencing rapidly growing interest from extractive industries such as timber, oil, and hunting. Regulating and enforcing access to natural resources is critical to prevent unsustainable commercial hunting and immigration in response to commercial activities and secure access and use of rights for local communities.

10. *Transboundary Insecurity.* Many of the most important conservation areas of South Sudan occur on the borders with the Republic of Uganda, Democratic Republic of Congo, Ethiopia and Kenya. Cross-boundary cooperation in the management of these areas is crucial; especially because, as road networks are repaired or extended, these areas become more exposed to transboundary poaching, illegal logging and other unsustainable activities. Cattle-raiding and inter-tribal conflict across the borders directly impact local communities and the management of protected areas in South Sudan

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    The establishment of peace parks or cross-boundary protected areas with sound collaborative management strategies is necessary to curb cross-boundary illegal activities, conserve common resources, promote inter-governmental cooperation and secure local livelihoods.

3.3. TRENDS AND THREATS TO WETLANDS AND SWAMPS (INCLUDING THE SUDD)

3.3.1. TRENDS IN WETLANDS

Permanent wetlands and swamps make up approximately 5 percent of the total area of South Sudan, while a much greater area, both north and south, is seasonally flooded. The largest wetland is the Sudd, which is formed by the White Nile in very flat topography between the towns of Bor and Malakal, covering more than 57,000 km^2. The Sudd flood plains is the second largest wetland in Africa and was designated as a Ramsar Site on 5th June 2006.

The Sudd comprises of multiple channels, lakes and swamps, with a maze of thick emerging aquatic vegetation. The central core of the Sudd swamps is formed by the giant sedge *Cyperus papyrus*. This is bordered by Typha dominiguensis, the dominant vegetation that covers about three-quarters of the total swamp. The Sudd swamps have been shown to support a wealth of small and juvenile fish (Hickley and Bailey1986) with rich and diverse macro-invertebrate fauna. The Sudd swamps not only offer considerable socioeconomic livelihood opportunities for agricultural, pastoral and fishing communities in the area, but the flood plains are also a rich habitat for flora and fauna such as fish, mammals, birds, reptiles, amphibians and other rare species. The wetlands are essentially undeveloped and represent a safe haven for wildlife, including migratory birds. Hydrological and ecological functions of these wetlands such as water quality improvement and food provision both contribute to ensuring ecological and sociocultural stability in the region.

Major mammalian species inhabiting the Sudd include threatened species like hippopotamus, near-threatened species like sitatunga (*Tragelaphus spekei*) and mostly endemic species like the Nile lechwe. It is also frequented by elephants, buffaloes and several other species of large mammals. The region is rich with resident and migratory birdlife, many of which feed on submerged vegetation in shallow waters, invertebrates and on fish or their fry (Hickley and Bailey, 1986).

However, the future of the Sudd wetlands as well as local livelihoods could be negatively affected and the Government of South Sudan should renew efforts to construct the Jonglei Canal. The Sudd is an important source of surface water that needs to be protected in order to safeguard the ecosystem and sustainable livelihoods.

Protected Areas in the Sudd include the newly gazetted Ramsar Site as well as Lake No and Lake Ambadi conservation areas. The Sudd wetland, as a Ramsar site, is an ecosystem that is globally recognised as a hotspot for biodiversity.

3.3.2. CURRENT THREATS TO THE SUDD AND OTHER WETLANDS INCLUDE THE FOLLOWING:

1. *Encroachment of wetlands* due to extended demand for grazing and agriculture, this wetland conversion and destruction is common in the Sudd and similar wetlands.

2. *Pollution of wetlands and eutrophication* as a result of either spillage during oil exploration or overuse of agrochemicals in large agricultural farms.

3. *Siltation of wetlands* due to poor methods of farming around wetlands resulting from massive erosion into the wetland.

4. *Spread of invasive species:* The most widely distributed invasive alien species especially in the Nile basin are the water hyacinth (*Eichhornia crassipes*), purple nutsedge (*Cyperus rotundus*), common carp (*Cyprinus carpio*) and Mozambique tilapia (*Oreochromis mossambicus*) (NBI 2012). Of particular concern is the Sudd Wetland situated in the lower reaches of both Bahr el-Jebel and Bahr-el Ghazal. It is home to numerous endemic fish, bird, mammal and plant species and was recently declared a Ramsar Site of international importance. It is also an important source of water for domestic use, livestock and wildlife and a potential future source of tourism revenue. With the infestation of invasive alien plant species, this wealth and diversity could be affected. Water hyacinth (*Eichornia crassipes*) now forms an almost ubiquitous floating fringe to river channels and lakes in the Sudd swamps.

5. *Drainage of wetlands e.g. plans to complete construction of the Jonglei Canal* – In the Sudd and Bahr el Ghazal wetlands, water stagnates, and a high proportion evaporates. However, the evaporated water is not lost from the system as it is partly recycled in the form of rain and it contributes to an increase of the air moisture index, which results in a reduction of evaporation in the dry season. Draining part of the Sudd swamps in order to increase the quantity of water available for hydropower and irrigation downstream would therefore have a negative effect on the weather conditions in South Sudan. Apart from this, a dramatic impact can be expected on wildlife, livestock and fish, as dry season feed supply for wildlife and livestock will decrease due to reduced flooding, and wet season spawning areas for many fish species will also decrease.

6. *Potential negative impact of infrastructure development:* Proper environmental and socioeconomic impact assessments need to be carried out prior to implementation of major projects such as hydropower plants, road construction and other activities that alter the natural wetlands. There is need to ensure that adverse impacts on wildlife populations and habitats are adequately evaluated and mitigated. It is important for the wildlife sector to work with other sectors, and relevant environmental authorities (e.g. the Ministry of Environment, Ministry of Water and Irrigation) to ensure adequate safeguards are put in place, for example the construction of Jongolei Canal, which would adversely affect migratory wildlife species.

7. Add oil exploration activities as one the most dangerous negative threat to Sudd and other wetlands.

3.4. TRENDS AND THREATS TO AQUATIC ECOSYSTEMS

3.4.1. TRENDS IN AQUATIC ECOSYSTEMS

The most important environmental issues that are likely to affect both surface and subsurface water resources in South Sudan is the expected post-water construction of large hydroelectric dams and other related development schemes. For example, construction of the Jonglei Canal or dykes along the River Nile. Such schemes would divert and affect changes in the water flow regime and irreversibly or partially destroy downstream ecosystems. Contamination of river or subsurface water by discharged pollutants, wastewater and oil spilled from the wrecked or sunken river transport ferries is also inevitable.

Major causes of surface water pollution include discharge of untreated effluent and solid waste from urban areas (including small industries such as hotels, breweries, tanneries and abattoirs), discharge of wastewater produced from agriculture, mining and oil drilling activities and pollution of waterways by river barges. Incidences of groundwater pollution have also been reported with

negative impacts on drinking water quality in urban areas like in the case of digging pit latrines close to water sources. As such water resource development needs to be carefully integrated with environmental management and an Environment Impact Assessment (EIA) will be required to ensure that the developments that are undertaken do not adversely affect the environment. Recycling of industrial wastewater will be encouraged as well as investment in appropriate technology that promotes a clean environment. Measures will need to be put in place in order to ensure that the discharge of effluents from industries is effectively regulated by a competent authority.

3.4.2. THREATS TO AQUATIC ECOSYSTEMS

The threats faced in the management of freshwater ecosystems in South Sudan are the following:

A. Lack of coherent policy framework to guide water sector development: The need to establish policy and legislative frameworks to guide water sector development has been recognised.

B. Inadequate sector institutional arrangements: There is a need to review and clarify the functions of water sector institutions, and the roles and responsibilities of sector organisations in relation to policy objectives.

C. Low levels of access to basic water supply and sanitation services: The majority of the population lacks access to a reliable supply of safe water, and even fewer have access to basic sanitation facilities. Providing access to poor and vulnerable groups is a huge challenge.

D. Underdevelopment of available water resources compared with neighbouring countries: Sustainable development and use of water resources is essential as a basis for future economic growth. Providing services to remote and dispersed rural populations is especially difficult.

E. Limited participation by water users in sectoral development processes: Lack of user participation in planning, management and financing of water resource management and development undermines sustainability.

F. Sustainability of water infrastructure: Much of the existing infrastructure is no longer functional and operation and maintenance systems are extremely weak or absent altogether.

G. Growing environmental concerns: These include increased degradation and pollution of surface and groundwater resources and environmental problems associated with water resource development.

H. Management and mitigation of water related disasters: Frequent flood and drought events impact negatively on food security, agricultural productivity and economic growth.

I. Water use conflicts: There is a need to strengthen mechanisms for solving disputes over access to water, which is often a source of conflict, especially at local level.

J. Management of trans-boundary waters: The transboundary nature of the Nile waters necessitates the development of effective measures for regional and international cooperation.

K. Limited human resources and weak organisational capacity: Protracted conflict has resulted in the breakdown of organisational structures and a shortage of core technical and administrative skills.

L. Lack of a clear financial strategy: In order to attract investment required for effective management of water resources and delivery of sustainable water supply and sanitation services.

3.5. TRENDS AND THREATS TO AGRO-ECOSYSTEMS

3.5.1. TRENDS IN AGRO-ECOSYSTEMS

According to a 2009 Land cover analysis conducted by the United Nations Food and Agricultural Organisation (UN FAO), Western Flood Plains, which covers parts of Northern Bahr el Ghazal, Warrap, Unity and Lakes states, is the most important livelihood zone, providing 34.2 percent of national cropland and 24.2 percent of national cropland mixed with grass and trees.

The Western flood plain has the highest ratio of cropland over total land, as cropland and cropland mixed with grasses/trees account for 8.5 and 5.4 percent of zonal territorial area, respectively. Greenbelt (spanning parts of Western Equatoria, Central Equatoria and Eastern Equatoria) and Eastern Flood Plains (encompassing Upper Nile and parts of Jongolei) are the two other major crop producing regions, accounting for 17.6 percent and 26.2 percent of national cropland, and 25.7 percent and 14.6 percent of the country's land mixed crops with grasses/trees respectively. Both zones also have a high ratio of cropland to total land as lands with crops and crops mixed with grasses/trees account for 11.4 percent of total land in Greenbelt and 6.8 percent of total land in Eastern Flood Plains.

In total, these three agricultural zones provide 78 percent of national cropland and 64.6 percent of national cropland mixed with grass/tree, but only covers about 47 percent of national territorial area (FAO 2009).

3.5.2. THREATS TO AGRO-ECOSYSTEMS

There are widespread communal conflicts causing human and livestock displacement and disruption of crop production activities. The situation was exacerbated by delayed onset of rainfall around May 2012 and compounded by quelea birds, which destroyed cereal crops. The most significant impact was a near-total crop failure in parts of Jongolei, Unity, Upper Nile and Northern Bahr el Ghazal states, particularly of the long-term sorghum variety and reduced availability of food in regional markets.

Other external factors, which affected national food security, included cross-border political conflicts and disputes with Sudan, which led to a trade embargo and an abrupt pullout of traders from Sudan. The subsequent effects included a shortfall of oil revenue and scarcity of staple foods and other basic commodities, triggering an increase in fuel prices and exceptionally high staple food prices in the country. The GRSS responded with stringent austerity measures that culminated in a lack of basic social services such as healthcare among the rural population.

Large-scale riverine and localised flooding – especially in areas where soil types and topography have high water retention capacity (such as Upper Nile State) – affected food production, while also limiting physical access to markets. Other factors, which exacerbated floods, included poor road construction and narrow culverts, blocking floodwaters in areas such as Lake and Unity States. The aftermath of the floods was characterised by disease outbreaks such as East Coast fever and anthrax, which killed large herds of cattle. This led to lack of livestock sales, loss of income and reduced household ability to buy food.

The overall food security situation worsened due to political insurgency and relatively moderate drought conditions within other parts of the country. The major production risks commonly reported in the field were drought, livestock diseases and periodic conflicts with other pastoral groups. The heavy dependence of livelihoods on livestock and trade for staple foods makes them vulnerable to interruptions in market access particularly during the seasonal livestock movement, when there is less milk and animal blood for consumption for people who do not move with the animals and in drought years leading to falling livestock prices. The zone experiences frequent food shortages.

3.6. TRENDS AND THREATS TO SPECIES BIODIVERSITY

The country's wide range of habitats supports a very rich diversity of both animals and plant species. Some of which are endemic fauna species in the country, to include the Nile lechwe, Hoogstral's Striped Grass Mouse, Nile Sitatunga and a recently discovered African climbing mouse Dendromus ruppi. South Sudan is known to be the only country in Africa with both species of eland the common eland (Taurotragus oryx) and the Derby's (Giant) Eland (Taurotragus derbianus).

A highlight for South Sudan is the wildlife migrations across the eastern grassland savannas and floodplains of Jongolei and Eastern Equatoria States that stretch into the neighbouring Gambela region of Ethiopia. The white-eared kob, tiang, Mongalla gazelle and Bohor reedbuck represent one of the greatest animal migrations and wildlife spectacles of the world. This is an invaluable natural resource for South Sudan and the rest of the world and could in the future be a major tourist attraction once stability returns to the country. The world's population stronghold of the Shoebill and Black-crowned crane occur in the Sudd wetland. While South Sudan shares many of its fauna species with its neighbours to the south and west, other species like the Nile lechwe and the White-eared kob are endemic to South Sudan and Ethiopia. South Sudan is also thought to be the centre of Giraffe evolution.

In terms of management, the level of protection provided to game reserves and national parks appears to be minimal; and available evidence points to a massive drop in the numbers of large wildlife due to poaching. The most reliable evidence comes from Boma National Park, which was surveyed three times, twice in 1980 (in the dry and wet seasons) and once in 2011 (UNEP 2007nr). As shown in Table 6, the wildlife populations of some species recorded in 2001 had dropped dramatically including Lelwel hartebeest, waterbuck zebra, giraffe, oryx; although others were still in significant numbers such as the White-eared kob, Mongalla gazelle, tiang, buffalo and the elephant.

The fact that viable populations of several species of wildlife still existed in Boma in 2001 is important for the future of wildlife and protected areas in South Sudan. A key figure to note is the cattle count, which portrays the level of encroachment into the park by pastoralists (Table 15).

Table 15: Comparison of population estimates of larger ungulates in the years 1980, 2001 and 2007 in Boma National Park

Species	1980 count (wet season)	1980 Count (dry season)	2001 Count (wet season)	2007 Count (Dry Season)
White-eared kob	680,716	849,355	176,120	753,373
Lesser eland, Giant eland	2,612	7,839	21,000	395
Roan antelope	2,059	3,085	1,960	864
Mongalla gazelle	5,933	2,167	280	278,633
Tiang	116,373	25,442	Not seen	155,460

Lelwel hartebeest	8,556	47,148	5,600	1,185
Zebra	24,078	29,460	Not seen	Not seen (3 seen on reccee)
Buffalo	2,965	11,179	Not seen	10,178
Giraffe	4,605	9,028	Not seen	404
Waterbuck	620	2,462	Not seen	177
Grant's gazelle	1,222	1,811	Not seen	2,540
Elephant	1,763	2,179	Not seen	6,850
Lesser kudu	654	170	Not seen	318
Oryx	1,534	396	Not seen	664
Cattle	7,056	93,815	7,980	989,889
Goats				149,451

Source: (UNEP 2007)

In terms of tourism, South Sudan's vast wildlife resources, especially of rare animal and bird species are the centre of attraction that would be the basis for a vibrant tourism industry. Field surveys by the Wildlife Conservation Society are currently producing and updating data on the wildlife sector in South Sudan's protected areas. Many of the species of large wildlife that attracted tourists, such as elephants, giraffes and rhinoceros, were hunted for food during the war, causing large reductions in their populations. However, some species, such as the white ear kob, is still available in great numbers during migration. Many rare species of birds also either live in or migrate through South Sudan and they are an attraction for ornithologists.

The faunal species endemic to South Sudan include; reptiles like the Torit Gracile Blind Snake Letheobia toritensis and the Mount Kinyeti Chameleon; freshwater fish such as Barbus tongaensis and *Labeo tongaensis*; and butterflies like *Chloroselas taposana,* and *Lepidochrysops nigritia,* among others.

Imatong Forest is a major biodiversity hotspot supporting over 2,000 vascular plant and 500 bird species and is one of the largest intact Podocarpus forests in Africa. Among the vascular plant species restricted to South Sudan are Aloe diolii, Aloe macleayi, a cycad (*Encephalartos mackenziei*), *Chlorophytum superpositum*, *Scilla chlorantha,* and *Panicum bambusiculme*. Wild Arabica coffee grows in the forests of the Boma Plateau and Imatong Forest.

Birds are quite common and include some charismatic species such as the Shoebill, Black-Crowned Crane, Spurwing Goose, Open Bill Stork and others. It is very probable that high numbers of migratory birds are also present during the period November – March. There are however no data to enable an assessment of the current status of birds in South Sudan.

Fisheries in South Sudan are concentrated on the country's large river systems including River Nile and its tributaries as well as the vast wetland complex of the Sudd, beside several lakes. There is very limited data available regarding the status of fisheries in South Sudan, and many local groups of fishermen were displaced, and trade was disrupted during the civil war. Over 100 species of fish have been reported from this Sudd area, of which Distichodus spp., Gymnachus spp., Hetrotis spp., Citharinus spp., Clarias spp., Lates niloticus, tilapias and catfishes form the bulk of the catches. The fish potential in the Sudd region has been estimated at 75,000 tonnes/year, while the reported fish landings do not exceed 32,000 tonnes/year (FAO 2008). The locals (Nilotic and other tribes) are well known for their traditional fishing skills. However, their currently low level fish production is attributed to two factors. Firstly, the high density of macrophytes that impede navigation, and, secondly, the long-lasting Civil War, with associated social disturbances and insecurity situations. The prevailing fishing gear is mainly hook-and-line, long-line, gillnets, seines, cast nets, traps and spear fishery.

In South Sudan, some 1.7 million people depend directly on fisheries for their livelihood, food security or income. Currently, the fishery produces about 140,000 tonnes/year of which a sizeable proportion is lost along the distribution chain due to lack of preservation, processing, and transportation facilities. If the above bottlenecks are overcome, it is certain that the fisheries resource base of South Sudan would contribute significantly towards food security and poverty eradication.

Much of the fish catch (56 percent) is dried or smoked while the fishing communities where it is caught or sent to nearby towns eat the rest fresh. The potential sustainable yield from wild fisheries is estimated to be in the order of 200,000 tonnes/year from South Sudan's water bodies which is worth about 800 million USD at 2013 Juba prices. Consumption of fish in South Sudan is about 17kg/person/year. The number of fishermen is around 220,000, most of these being subsistence fishers, with possibly 12,000 "commercial" fishers, although nearly all the "commercial" fishers have alternative sources of income.

Fish are an important component of ecosystems and a source of food for many species of wildlife (birds, reptiles) and they contribute significantly to both aquatic and terrestrial biodiversity. Fisheries thus have links to the development of tourism in South Sudan, including through the potential promotion of recreational fishing for species such as the Nile perch, which is popular in places such as Lake Victoria.

Fisheries are inherently closely linked to the use and management of water, as well as land-based or industrial activities which impact water quality, including agriculture (through pesticides and fertiliser run-off), livestock, and petroleum and mining developments.

Consequently, the environmental measures that safeguard water quality are critical to sustainable fisheries development, including the safety and quality of fish in a given body of water. Consequently, forest management, through its role in providing water catchment areas and controlling sedimentation and erosionalso has an important linkage with fisheries management.

For governments, the key issue to be tackled is the lack of skills, coordination and finance within the administrations involved in fisheries. Currently most government bodies involved in fisheries are not sufficiently active, and do not contribute to the good management nor development of fisheries in South Sudan. Until this lack of capacity is addressed, it will be difficult for the government to carry out its role, and bring in necessary legal and regulatory management measures, as recognised in its own policies and strategies.

The private sector is quite capable of improving production and post-harvest in fisheries by itself without government assistance (but necessarily under government regulatory supervision). The private sector however faces several challenges, the greatest amongst them being poor transport and communications, the high cost of energy and utilities, the lack of skills and informal taxation. All of these could be alleviated by direct government intervention.

Major cross cutting issues not only affecting fisheries are also important, such as general health provision, education in fishing communities and poor security. For example, the looming HIV epidemic is a hidden threat to fisheries and will hit the sector badly unless action is taken quickly. The threats to the stability of fisheries resources in South Sudan mean that fish production is constrained by: seasonal floods, high cost of fishing gear, no control of fishing gear, destructive fishing methods, the fact that wild fishery is open access, poor handling, inadequate storage facilities, marketing dynamics, insecurity in some fishing areas (tribal conflicts over fishing areas), construction of large hydroelectric dams and other related development schemes like the construction of the Jonglei Canal or dykes along the River Nile; such schemes would divert

and (affect) changes in the water flow regime and irreversibly or partially destroy downstream ecosystems, and contamination of water by discharged pollutants, wastewater and oil spilled from the wrecked or sunken river transport ferries.

Major causes of surface water pollution include discharge of untreated effluent and solid waste from urban areas (including small industries such as hotels, breweries, tanneries and abattoirs), discharge of wastewater produced from agriculture, mining and oil drilling activities and pollution of waterways by river barges.

In areas where fishing is impeded in natural water bodies, the establishment of artificial ponds may provide an alternative. However, the most pressing environmental and conservation concerns in the fisheries sector relate to the following: (i) pollution of water bodies by many pollutants (including by oil, wastewater from hotels, non-point sources from floods etc.); (ii) over abstraction or diversion of river courses; (iii) high nutrient loading and siltation due to changing land use in the catchment areas; (iv) destruction of wetland habitat; and (v) biodiversity loss due to invasive species.

3.7. TRENDS AND THREATS TO GENETIC DIVERSITY

3.7.1. TRENDS AND THREATS TO PLANT GENETIC RESOURCES

The loss of genetic diversity may be rapid in South Sudan and many species may be declining particularly for plant variety even if they are not yet extinct without any documented information. Some of the world's rare and indigenous crop varieties such as finger millet and sorghum are an important part of the traditional South Sudanese farming systems .

Of more immediate importance is the loss of genetic diversity within domestic crop species, which South Sudan may prioritise in its effort to combat food insecurity in the country. With the expansion of agriculture, genetic erosion brought about by genetic uniformity (higher yields but increased vulnerability to pests and adverse climatic conditions) in commercial crops largely driven by market forces is likely to be the next problem that the country may face.

Genetically modified organisms (GMOs), which include genetically modified seeds and other planting material, including animal species, are globally promoted by Multinational Corporations with promises of enhancing productivity and therefore solving food insecurity as well as increasing the competitiveness of some cash crops and forestry products.

However, the biggest fear is the introduction of terminator seeds, which compels the user of such improved seeds to perpetually depend on the company holding the licence for seed production. It will therefore be important to constantly and carefully weigh the merits and demerits of crop, animal or forest product adoption of these genetically modified materials.

South Sudan has a wealth of diverse genetic resources that are important for maintaining an efficient and sustainable farming industry, as they allow for the development of varieties and breeds to cope with new demands and climatic changes. This genetic diversity has been maintained in South Sudan thanks to the long tradition of conserving seeds. Any hasty move towards modernisation could result in genetic erosion. Local landraces/species can be replaced by new varieties and species, which can easily be lost through environmental degradation and desertification.

3.7.2. TRENDS AND THREATS TO ANIMAL GENETIC RESOURCES

South Sudan has a large livestock population comprising of a range of indigenous and improved breeds, many of which are adapted to the country's environmental conditions and vegetation. However, exotic and crossbreeds are becoming increasingly popular. There is some concern that indigenous breeds may be undermined as the demand for high-yielding breeds increases.

Threats to animal genetic resources: These may be categorised under 11 sections as follows:

1. Inadequate articulation of the opportunities within the livestock subsector:

- *Lack of authoritative data on the size of the subsector:* fundamental to shaping strategies and under girding arguments for increased and substantial investment in the subsector is a need for definitive estimates of its size and structure. Reliable data is needed to emphasise the importance and potential of the subsector for food security, improvement of livelihoods and incomes, and for increasing the economic base and export revenues. Lack of reliable data has undermined planning, coordination, delivery of services and investment at all levels of government and between sector actors.

- Lack of appreciation of the value and opportunities of subsistence traditional livestock keeping systems that are the foundation of the South Sudan livestock subsector: this is a pervading narrative that is evident in policy, at a political level, among some implementers and within communities at a grassroots level.

- This narrative has not factored in the innovativeness and resilience of pastoral and agro-pastoral livestock keepers that utilise marginal resources and that have maintained a large livestock resource despite the challenges during the protracted period of conflict and marginalisation.

- The potential of the livestock subsector, which is comparable to that of other countries in the region can only be realised through institution of policies and strategies that are aligned to the existing livestock sector resource.

- *Poor integration of crop and livestock production:* the linkages between the livestock and crop-subsectors are not noted leading to missed opportunities for integrated approaches, such as using draught power to increase crop production; livestock assets for cash to fund inputs for cropping; and, crop residues, milling by products, and forages and fodder for feed. There is a weak response by the subsector to the growing domestic demand within urban and peri-urban centers, a gap being filled by imports.

2. Structural constraints that are impeding the growth of the livestock subsector include:

- Inadequate road infrastructure and other means of transportation that are not aligned tothe needs of the subsector, increasing transaction costs and vulnerability to insecurity, raiding and disease.

- Unclear and incomplete constitutional, legal, policy and regulatory frameworks for land tenure that have resulted in inconsistencies and conflicts in the interpretation and implementation of land tenure. This has adversely affected availability of land for livestock production, mobility, migration, marketing and processing in both rural and urban areas.

- Conflict and insecurity including cattle raiding/rustling have disrupted livestock activities, resulting in loss of human life and livestock; displacement of communities; disrupting of access to and utilisation of key grazing and water resources; reducing access to stock

routes for production, marketing and trade. Insecurity has negatively impacted livestock populations and dynamics. In some counties this has affected livelihoods, and increased food insecurity and poverty.

- Inadequate Information and Communications Technology (ICT) and mobile telephone connectivity: given the size of the country and the poor road network and means of transport, ICT and mobile telephones are critical for coordinating both public and private sector activities and for securing and reducing the cost of financial transactions based on the models of mobile money within the Horn of Africa region.

3. *Incomplete policy, legal and regulatory frameworks:* There is lack of a comprehensive policy framework, policies and lead institutions/authorities to allow the development of the subsector and its components such as the dairy, meat, poultry, honey and hides and skins industries.

   A comprehensive legal and regulatory framework that is tailored for South Sudan is lacking; there is a need to review and update the existing acts/bills for relevance and to institute mechanisms for their enforcement.

4. *A poorly resourced and poorly coordinated public sector unable to deliver services:* the national, state and county public sector structures lack adequate staff (numbers and capacity) to properly carry out their mandated roles and responsibilities; the most serious gaps are within the technical ranks and at the implementation levels in states and counties. Coordination including separation of duties, mechanisms for collaboration, facilitation and communication are lacking or poorly resourced, with conflicts of interest evident in some cases. There is poor coordination between the Government and other actors.

5. *Low production and productivity, and seasonality of production:* the subsector is dominated by subsistence producers who rely on indigenous breeds, knowledge and technologies, weak animal health services and resource management approaches; they are vulnerable to droughts and floods. There is scope for making initial substantial gains in filling the large production and productivity gaps through improved animal health services and by using low-level technologies already in existence in the region and by organisation of producers. There is also scope for diversifying both the species and production systems to utilise a broader range of resources and strategies.
6. *Low processing capability and value addition, poor commodity development and high wastage:* production for subsistence means that there is low integration into value chains, with as much as 60 percent of production being consumed directly by households. Only minimal processing and value addition is undertaken, with low recognition and development of potential commodities (such as hides and skins and bees wax), which leads to high wastage of existing resources.

   The capacity to enforce sanitary and food hygiene standards is limited. There is poor coordination between subsector value chain actors, which allows middlemen to increase costs to consumers. There is poor capacity to run enterprises as businesses and an inability to respond to market opportunities.

7. *Inadequate market infrastructure:* long distances to markets result in high transport costs and increased vulnerability to insecurity; inadequate facilities for meeting livestock (grazing/feeding, watering, holding ground) and human needs; and market structures (such as middlemen, long turnaround time etc.) that reduce profits for upstream actors. There is strong competition in some states from cheaper products from regional and global actors. Raw commodities are exported to neighbouring countries that are used in their processing industries and often re-exported for higher profits to more lucrative markets.

8. *Minimum investment in the livestock subsector:* generally, there is low investment in the subsector by the Government (both budget expenditure, and for service delivery). There are limited national institutional financial services targeting the subsector even for commercial actors, who mostly finance their own enterprises, or receive grants, in-kind resources/subsidies from government and NGO projects.

   Similarly, there are limited mechanisms for accessing financial opportunities available within the region. However, foreign (non-South Sudanese) businesses can access credit elsewhere, which places South Sudanese businesses at a disadvantage.

9. *Inadequate attention to appropriate natural resource management:* institutional arrangements and coordination mechanisms to address natural resource issues are lacking. These issues include water for production; rangeland development; droughts and flooding; drought and conflict early warning; natural resource-based conflicts over land and other resources; protection of key production and trade migration routes; and shared transboundary resources.

10. *Inadequate and non-standardised university training in animal production and animal health/veterinary sciences:* There is significant variation among the four public universities offering courses. Other than the Juba University and John Garang Memorial University of Science and Technology, there is limited capacity for practical training (laboratory and field), field placements and thesis writing.

    There is low funding from the Government, including research funding, and limited teaching staff. There is limited collaboration with regional universities and consortiums and no linkages to existing technologies, information and resources for research. Only one public training centre exists (Marial Lou) for technical skills development where technicians, animal health and animal production auxiliaries can be trained; these people are critical in the delivery of front-line services at the county level.

11. *Limited research and development and extension*: There are no dedicated public livestock research facilities and only limited research conducted by universities. Consequently, there are no well-tested and adapted technological packages specific to South Sudan. There are very limited extension services that are uncoordinated. Farmers and other stakeholders rely on NGO's, limited radio broadcasts, farmer-to-farmer information, and the Internet for information. Often the information is not appropriate or is incomplete and not timely.

Table 16: Area and share of total land by aggregated types of land use

	Area (in 1000 ha)	Share of total land (%)		Area (in 1000 ha)	Share of total land (%)
A; By 18 types of land use categories			By 8 aggregated categories		
Rain fed crop	2379.3	3.7	Cropland	2477.7	3.8
Irrigated crop	32.1	0.0	Grass with crop	325.1	0.5
Rice on flood land	6.0	0.0	Trees with crop	1707.3	2.6
Fruit crop	0.1	0.0	Grass	9633.8	14.9
Tree crop, plantation	6.2	0.0	Shrub and tree	40526.9	62.6
Rain fed crop on post flood land	25.4	0.0	Trees, shrubs, other vegetation on flood land	9497.6	14.7
Rain fed crop on temporary flood land	28.5	0.0	Water and Rock	482.7	0.7
Grass with crop	325.1	0.5	Urban	37.0	0.1
Shrub with crop	4.3	0.0	Total	64688.3	100.0
Shrub or tree with crop	1703.0	2.6			
Grass	9633.8	14.9			
Shrub	20506.6	31.7			
Tree with shrub	17694.9	27.4			
Woodland with shrub	2325.4	3.6			
Tree, shrub, vegetation on flood land	9497.6	14.7			
Water	350.1	0.5			
Rock	132.6	0.2			
Urban	37.0	0.1			
Total	64688.3	100.0			

Source: FAO (2009).

4

NEW AND EMERGING ISSUES TO ECOSYSTEMS AND BIOLOGICAL RESOURCES

4.1. BARRIERS TO EFFECTIVE BIODIVERSITY MANAGEMENT

4.1. BARRIERS TO EFFECTIVE BIODIVERSITY MANAGEMENT

South Sudan has immense natural resources that remain virtually untapped. This provides potential for the Government to address pressing developmental challenges if well and sustainably managed. Given the fact that the country has experienced more conflict than peace since Sudan attained independence in 1956, the country's biological diversity is under threat from a number of sources, man-made and natural. Some of the threats to specific ecosystems and biodiversity are briefly described below.

Poor forest governance and lack of agreement regarding ownership of forest resources: Forest resources were plundered by armies from the north and, later, they were then exploited to support war efforts. Through the war periods, there was total disregard for good forest governance. Although the new government has made commendable efforts to restore order in exploitation of forest resources throughout the country, illegal exploitation is still common. In some cases, forests are still being destroyed by militia groups.

Under the decentralisation system of governance, overlaps exist among central government institutions in the states.

Illegal forest cutting is still on-going despite the end of the war. It is usually done by individuals and some groups under the eyes of the Government agencies are responsible.

Weak and inadequate coordination mechanisms between the central government and state governments: Weak and inadequate coordination mechanisms between South Sudan Government and the State Governments of programme implementation, resource allocation, and accountability are significant challenges to institutional capacity and forest governance. The State Director General of Agriculture who is responsible for forestry services, reports only to the State Minister of Agriculture without a copy to the South Sudan Director General of Forestry. Under the decentralised system of governance, overlaps exist among responsible officers at the centre and in the States. Communication and accountability between South Sudan institution and the State institutions also constitute another challenge. For example, the Minister of Agriculture at the State level is answerable to the state Governor who reports directly to the President.

Some forestry programmes are implemented by NGOs and local communities with the financial support of development partners, but the linkage and coordination between the Ministry of Agriculture and Forestry and the former, are not well integrated. In addition, the private sector also participates in forestry industry activities through establishment of plantations, timber processing and sales. However, poor communication and inadequate consultations on levies and taxes among stakeholders have a negative impact on forest management and investment.

Prior to the CPA, ownership and management of plantation forest resources were clearly defined. The gazetted natural forests were owned by both the Central Government and Provincial Governments. By 2007, the Forest Policy Framework for South Sudan provided that Central Forest Reserves (CFRs) were to be owned by the Central Government (GRSS), while Provincial Forest Reserves (PFRs) were to be owned by the State Governments. Currently, RSS has taken ownership of CFRs on behalf of all the people of South Sudan and manage them in partnership with State Governments and other stakeholders. The State Governments will take ownership of PFRs on behalf of all people of the State.

Forest Fires: Traditional use of bush fires is a major threat to forests and tree growing throughout South Sudan. The fires are used for land preparation under shifting cultivation, for hunting, and for rejuvenation of grazing areas. Forest fires also originate from lightning, smokers, and honey collectors. Sometimes, communities deliberately set forest fires out of discontent with policies and regulations. Prevention and control of bush fires therefore requires full engagement of local communities.

Charcoal and fuel wood: Fuel wood and charcoal make up approximately 80 percent of the country's energy supply due to a lack of alternative sources of energy such as electricity, wind and solar power, and gas. As a result, charcoal making is an attractive economic activity as more people become involved in charcoal production, accelerating the depletion of trees. There is also growing demand for fuel wood for brick making.

Limited investment and technology: Forest-based industries (saw milling, wood-based panels, furniture, and joinery manufacture) are significant sources of off-farm employment. Consequently, South Sudan's forestry sector can support a significant and sustainable wealth-creating export industry if well managed.

Currently, investment in the forestry and timber trade is limited. Major constraints limiting investment in the forestry industry include lack of access to capital and high taxation rates, fees, and transport charges. It is estimated that timber-related taxes, fees, and transport costs constitute 71 percent of the total costs of production and processing of timber, and teak. In addition, there are market barriers which discourage investment in the industry. These include poor road networks and transport infrastructure and poor access to international markets. Other constraints include obsolete machinery and equipment, shortage of skilled labour, and landmines that have yet to be cleared.

Improvement of forestry and forest products requires the adoption of improved technology. Currently, there is a low level of technology in South Sudan's forestry sector. For example, availability of harvesting and processing equipment and machinery to convert logs into high value-added products is limited. Research capacity for developing forest technologies such as tree species, timber, wood and non-wood forest products is also limited. Technologies for low energy use for cooking and in brick making are still not widespread.

Linkages with Land: Administration and management of the forestry sector require coordination with the policies, laws, and institutions governing land. The 2009 Land Act provides for community lands to be designated for, among other reasons, such as forestry purposes. Land ownership in the new country of South Sudan is still to be resolved, and it calls for fresh common understanding between RSS, State Governments, local governments, and communities, particularly as it relates to CFRs and SFRs.

The ongoing development of a new land policy and law creates uncertainty around forest and land ownership; hence this will cause serious limitation to any investment in forestry development. Land reforms are particularly critical to forest sector development strategies and plans. In some cases, like the planned large-scale forest land concessions, land reform becomes a prerequisite. The effect of the ambiguity regarding the current policy and legal framework governing land is that NFRs and other public forests have been under siege of claims by various stakeholders.

Gender inequality: While degradation of the forest ecosystem has had an impact on communities in general, women have suffered more than their male counterparts. In traditional African households, women are usually the primary food providers for their families. Women fetch

forest products such as firewood, leafy vegetables, fruits, roots, and tubers. Despite their critical role in the management of natural resources, women have limited property rights that ensure their access to land and forests. Women have comparatively few employment opportunities in the collection, production, and sale of timber, wood, charcoal, and other forest products. This gender disparity in access to and utilisation of natural resources from forests and elsewhere is a major contributor to the rising poverty among women.

Extended periods of war promoted illegal activities: South Sudan has experienced more than 40 years of war between 1972-1955 and 2005-1983, periods of great struggle during which significant shifts in sources of livelihoods occurred. Civilian communities and combatants alike fed on wildlife and other natural resources for survival, which in several areas resulted in uncontrolled hunting and over-exploitation during the extended periods of war. Many of the wildlife personnel fought alongside the army while others sought refuge. During this period, there was lack of conservation law enforcement in government-controlled areas while in areas controlled by SPLA there was some law enforcement. The extended periods of war also resulted in the proliferation of small arms and extensive trade in bush meat.

During the war, combatants on all sides left anti-personnel, land mines and other unexploded ordinances within some of South Sudan's protected areas. This presents a hindrance for rehabilitation, research, tourism and other wildlife management activities. Despite the ongoing disarmament process, there are still firearms in the hands of local communities. Furthermore, the availability of small arms is leading to the accelerated poaching of wildlife populations and poses a threat to security. In order to progress with significant conservation and management activities, it is necessary to remove all illegal arms and unexploded ordinances.

Deterioration of management capacity: The Government body charged with the responsibility for wildlife management deteriorated during the war, which in effect meant that there was no protected area management. Furthermore, the little existing infrastructure that was there before the war in wildlife protected areas was left in ruins. Conservation personnel were not trained and there was a total lack of conservation education programmes. Management capacity has slowly started to recover in the six years since the CPA but remains in its early stages of recovery. There is need for strong support to improve this management capacity and development of management plans for the protected areas.

Habitat destruction and fragmentation: Habitat destruction and fragmentation from farming and deforestation is the root cause of most biodiversity loss in South Sudan. The intensification of shifting agriculture is causing large-scale land use changes across the region particularly in the savanna. An additional issue is the impact of ongoing and planned development like creation or rehabilitation of rural trunk roads. This is of particular concern for the Jonglei state, where the new road cuts directly across the migration route of the white-eared kob.

Park encroachment and degradation: Livestock is present in most of the legally protected areas irrespective of their legal status. Keeping livestock in the parks creates competition for water and fodder, leading to land degradation through burning and overgrazing and facilitating poaching. Another risk is the confrontation between the pastoralists and poachers with the wildlife forces that may be heavily armed. In addition, the presence of livestock in the protected areas may facilitate the spread of diseases and disease vectors. Currently there is an outbreak of foot and mouth disease among the warthogs. Modern non-confrontational approaches entailing the community engagement will be required if the wildlife sector in South Sudan is to avoid gun battles between locals and rangers.

Commercial poaching and bush meat: The readily available firearms have been the most significant factor in the reduction of wildlife in South Sudan. Uncontrolled and unsustainable levels of hunting have devastated wildlife populations and caused the local eradication of many species including the elephant, rhino, buffalo, giraffe, eland and zebra.

Commercially oriented poaching for non-meat products such as ivory, skins and live animals for pets was historically a major industry but is now reduced although still high due to a steep drop in the targeted wildlife populations.

Bush meat is common in South Sudan as often it is a fall-back source of food in times of crop and livestock failure and also during armed conflict.

Viability and rehabilitation of PAs: The viability and condition of South Sudan's wildlife PAs needs to be assessed and where necessary, changes in the status of these areas need to be undertaken. While the current PA network is very expansive, certain PA designations and extents do not adequately protect some key wildlife areas. Some examples include the Sudd wetlands and the Boma-Badingilo-Sudd antelope migration corridors. Other areas have been entirely settled or altered by people during the intervening years of war and no longer provide significant conservation value. Yet other important areas are unprotected and should be proposed as new PAs, such as the Loelle Zone in Eastern Equatoria. Therefore, in general, MWCT needs to rationalise its wildlife PA system based on adequate assessments of the current status of different areas and management and conservation priorities.

Poaching (illegal hunting) and wildlife law enforcement: Poaching is currently widespread in the parks. Some poachers cross into the Republic of South Sudan (RSS) from the neighbouring countries. The target animals range from large to medium sized mammals. The prime species are elephants targeted for bush meat and ivory while, hippos, Uganda kob, oribi and bushbuck are targeted mainly for bush meat. Poaching is rampant due to limited wildlife law enforcement capacity, a lack of awareness of wildlife law among the public and enforcement bodies, continuing insecurity in some areas, an abundance of firearms, a history of open access wildlife use, and generally limited application of the rule of law at this point in time. In addition, a growing commercial bush meat trade represents an escalating threat to wildlife. Bringing wildlife use under control through collaboration with different enforcement bodies, including police, judiciary, and military, in coordination with neighbouring countries, which will be critical to laying the basis for sustainable management measures in South Sudan.

In addition, there is an emerging concern on the trafficking of live animals and wildlife products such as rhino horns, ostrich eggs, elephant tusks, etc. The trafficked animals and animal products are transported across borders and linked to illegal international value chains.

Human-wildlife conflict: Human-wildlife conflict is widespread in National Parks in South Sudan. The common animals in conflict with local people are mostly elephants, hippos and crocodiles. There are incidences of crocodiles killing people cattle and goats, as well as incidences of hippos and elephants raiding people's food crops, especially maize

Community participation: Wildlife in South Sudan is found both inside and outside of PAs, especially for migratory species. During the war, communities and soldiers alike used wildlife as a source of subsistence. Communities still consider wildlife as an 'open access' or 'free-for-all' resource, which inevitably results in over-exploitation. There is a need for management to account for local communities' livelihoods, cultural and economic interests and create incentives that enable conservation to take place outside of protected areas. Management strategies that address the issue of wildlife outside PAs such as community-based conservation and collaboration with state and local governments need to be developed and implemented.

Land use planning: Previously, integration of land use plans has never been carried out for South Sudan. Following independence, it is now important to consider wildlife resources in the overall land use planning process in order to maintain biodiversity of wildlife resources for the establishment of a tourism industry and the broader economic growth of the country.

At present there is a range of existing and planned land allocations and natural resource concessions for activities such as petroleum development, mining, and agriculture. As wildlife resources also occur outside of PAs there is an urgent need to work together with other Government authorities, including those in extractive resource sectors as well as authorities governing land, environment, forestry and agriculture, and animal resources, to develop harmonised approaches to natural resource management that mitigate negative impacts of other sectors, particularly extractive industries. Concession arrangements will need to be harmonised with wildlife conservation requirements if sustainable wildlife management measures are to be effectively planned and implemented.

Government planning and budgeting: Policy and decision-makers need to recognise the importance of wildlife to the people and the economy of South Sudan and its financial implications. While expenditures for sectors such as health, education and defence require more attention and higher priority in budget allocation, there is a need to include the wildlife sector as one of the key sectors justifying adequate budget allocations in order for conservation activities to be undertaken. A well-protected wildlife resource is essential for developing the eco-tourism sector.

Conservation financing: Funding based on annual budgets presented to the Ministry of Finance is inadequate and not sustainable. Alternative financing strategies that provide sustainable sources of funding for the Wildlife Authority are required to assist towards the path of sustainable conservation financing.

Human resource capacity: Management of National Parks is inadequate due to several factors: the most important being adequately trained staff. Most of the current staff have a strong military background as most of them were transferred from SPLA with limited skills in Park management.

The MWCT/SSWS faces shortage of trained personnel in the field of wildlife science/management, ecotourism and environmental management. Some of the trained South Sudanese are still in the Diaspora. Other trained personnel have sought engagements with sectors other than wildlife and many wildlife and forestry graduates are without work. Therefore, it is necessary to train the existing personnel and encourage other qualified people to return and join the MWCT. The MWCT has made some progress in recruiting a few graduates. The wildlife training centres (e.g. Boma Wildlife Training Centre and Nimule Training Centre) and South Sudan universities, especially the University of Juba, which has a Department of Wildlife Science, should be actively involved in the training of wildlife personnel in all relevant fields. The capacity development effort should also be extended to communities (pastoralists, farmers and anglers) living in or around protected areas to improve their skills in the protection of wildlife and poverty alleviation.

Integrating livestock and wildlife: Because of the preponderance of pastoralist land use in parts of South Sudan, integrating livestock and wildlife is an important issue for the wildlife sector. Activities in the livestock industry can have adverse effects on wildlife, particularly where intensive livestock development involves landscape modifications such as construction of fences or modification of water sources. Over-grazing has already occurred in certain locales of South Sudan, resulting in habitat degradation, impairment of water quality and destruction of aquatic habitats. Aggregation of livestock and wildlife in areas with shared resources greatly enhances the chance of disease transmission between them.

People living in Protected Areas: There are communities living in enclaves within some gazetted and other proposed PAs. In some cases, these communities existed before the gazettement of the PAs, hence the residence is legal and ought to be respected. However, since such communities live in close proximity to wildlife and within PAs, it is necessary to forge a special relationship between wildlife authorities and the communities. Furthermore, the populations of such communities living within PAs or critical migratory corridors are expected to increase over time, which may increase impacts on the environment. Human-wildlife conflicts are likely to increase with such growth in human populations and their activities within PAs, if adequate planning and mitigation measures are not put in place in advance. Accordingly, the Government of South Sudan intends to issue guidelines for appropriate action and develop specific policy approaches for managing certain PAs as multiple-use areas with resident communities participating in conservation of such areas. There are some communities in PAs who are willing to be resettled outside the PAs. The Government should facilitate the resettlement and provision of basic services for such resettled communities. Fishing by fish poisoning by natives in seasonal rivers. Also using explosives to bomb water bodies devastates the entire aquatic environment. Hasty tempering with the ecosystems such as the elimination of the indigenous 'water hycinity' and their replacement with the exotic species should be avoided.

International cooperation: The Convention on Biological Diversity (CBD), the UN Convention to Combat Desertification (UNCCD), the UN Framework Convention on Climate Change (UNFCCC), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Migratory Species (CMS) and others including regional and bilateral agreements, are relevant to the national wildlife policy. Following independence, there is a need for South Sudan to seek membership of the relevant treaties and protocols and integrate their provisions into both policy and implementation strategies. International cooperation also provides opportunities for South Sudan to obtain various forms of support from other countries in its efforts to develop its wildlife management capacity.

Cultural heritage and traditional knowledge: Cultural beliefs among the Zande of Western Equatoria and the Shilluk of Upper Nile have helped in the preservation of the Bongo and Nile lechwe, the Shilluk and Zande respectively. Among certain communities in South Sudan, it is considered taboo to kill certain animal species and this of course helps in their conservation and sustainable use. Therefore, it is valuable to retain the cultural value of wildlife and create an awareness of past and traditional knowledge in the general public.

Participation of women: Women in South Sudanese societies take a very active role in activities such as fishing, collection of wild fruits and vegetables and ensuring food security at the household level. Consequently, the involvement of women in development is very important and therefore women should be encouraged to take a more active role in conservation activities at all levels.

Unregulated large-scale bush fires: As mentioned above, unregulated fires are common in forest and national parks and they usually originate from lightning, smokers, and honey collectors. Hunting game animals by encircling them with fire, forcing them into difficult terrains, and then killing them in large numbers. Sometimes, communities deliberately set forest fires out of discontent with policies and regulations. These can be very detrimental to wildlife.

Post conflict infrastructure development: Developments such as roads are being constructed as peace returns to South Sudan; some of which pass through National Parks while others cross important wildlife corridors. If not controlled e.g. by undertaking environmental and social impact assessments these could negatively affect wildlife conservation in the country in the future.

Threats to livestock and animal resources: Cattle are extremely important culturally and economically to the semi-nomadic cultures of South Sudan such as the Dinka, Nuer, and Mundari, Toposa and Murle. No livestock census has been carried out recently in South Sudan, but the population of livestock including cattle, sheep, goats, and donkeys, may exceed 20 million (Table 8). The majority of livestock kept in South Sudan is largely made up of indigenous breeds. In the long term these breeds could be negatively impacted in several ways including:

Poverty: Large proportions of South Sudanese live below the poverty line and are ignorant to the importance of conserving biodiversity. With such communities, it is usually the best animals that are sold off for slaughter or sacrificed during difficult times thus leaving inferior ones to form the economic base. The ability of the owners to cope with the socioeconomic demands continues to dwindle as they dispose of more animals without replenishment capacity.

Introduction of new breeds/varieties: The long-term viability of animal agriculture in South Sudan will depend on the genetic variability of the indigenous animals being reared. If this genetic base is eroded as breeds developed for intensive management regimes replace the indigenous breeds, then viability of the livestock sector will be negatively affected.

4.2. EMERGING AND NEW ISSUES

Cumulative impact of delays to complete the policy, legislative and institutional reforms initiated at independence in 2011: Delays in completing the legislative reforms initiated after independence in 2011 means that the country is not prepared to manage its biodiversity. The management of protected areas, forests, and environmental management exist on laws adopted under the Comprehensive Peace Agreement (CPA). There is clear inadequacy in the legislative, regulatory and institutional structures to adequately manage environmental compliance, deforestation and poaching, among others. Optimal biodiversity outcomes will only be obtained when a clear legislative, regulatory and institutional structure has been established and actions at both national and state level are coordinated.

Transboundary wildlife management: Several of South Sudan's wildlife PAs lie at the borders with neighbouring countries. Wildlife also migrates across those borders. South Sudan has signed a memorandum of understanding with Uganda for transboundary or 'peace park' management in four protected areas. There are plans to undertake measures to reach similar agreements with Ethiopia, Kenya, CAR, the DRC and Sudan. Transboundary wildlife management efforts are an important mechanism to build trust and cooperation between South Sudan and its neighbours, for preventing conflicts over natural resources, sharing skills and resources, learning from different countries' experiences, and managing wildlife at the landscape-scale where it crosses international boundaries.

Agricultural Biodiversity in South Sudan - threats from biotechnology: South Sudan farming communities grow a wide range of crops. The main crops cultivated are sorghum, maize, cassava, groundnuts, sesame, pearl and finger millet, beans, peas, sweet potato and rice. Sorghum is the staple food and is widely grown throughout the entire country. Modern agriculture emphasises the use of improved cultivars but some farmers have retained their varieties and this form of in-situ on-farm conservation needs to be strengthened. The local communities are custodians of a lot of indigenous knowledge on plant genetic resources (PGR) but documentation of this knowledge as well as inventories of the under exploited plants and location maps for further exploration are poorly developed in the country.

Potential threats to PGR in South Sudan include: replacement of local crop varieties by introduced commercial varieties; loss or neglect of traditional varieties, including crop wild relatives and landraces e.g. millet, wild medicinal plants and local fruits and vegetables; loss of other indigenous species found in cultivated areas as well as increasing problems of invasive crop weeds; introduction of new varieties in preference to indigenous species; genetic erosion of indigenous plant genetic resources due to changes in land use; and climatic change, leading to drought, diseases, pests and famine.

Two clear emerging threats deserve special mention namely: large scale agriculture and the introduction of genetically modified crops. The emerging large, mechanised monoculture has the potential to adversely affect agricultural biodiversity, ecosystem functions and traditional farming cultures. Traditional indigenous crops may be replaced by exotic crops which may not be continuously adapted to South conditions. Contamination from overuse of agrochemicals, such as N-fertilisers and polychlorinated biphenyl (PCB) based-pesticides, may directly affect food and water quality as well as accelerate the production of nitrous oxide, one of the greenhouse gases. Improper land preparation and crop cultivation may increase the rate of soil erosion, causing silting of aquatic ecosystems and would affect the reproduction functions of some plant and animal species. Meanwhile, horizontal expansion of agricultural land may destroy the natural habitats of some flora and fauna species .

Genetically modified organisms (GMOs), which include genetically modified seeds and other planting material, are globally promoted by Multinational Corporations with promises of enhancing productivity and therefore solving food insecurity as well as increasing the competitiveness of some cash crops and forestry products. However, the biggest fear is the introduction of terminator seeds, which compels the user of such improved seeds to perpetually depend on the company holding the licence for seed production. It will therefore be important to constantly and carefully weigh the merits and demerits of crop, animal or forest product adoption of this genetically modified material. South Sudan has a wealth of diverse genetic resources that are important for maintaining an efficient and a sustainable farming industry, as these allow development of varieties and breeds to cope with new demand and climate changes. This genetic diversity has been maintained in South Sudan thanks to the long tradition of conserving seeds. Any hasty move towards modernisation could result in genetic erosion. Local landraces/species can be replaced by new varieties/species and lost through environmental degradation and desertification.

Oil exploration, development and mining, and the fall in oil prices: Much of South Sudan's immediate future and prospects as an independent nation will be determined by the policies and management practices put in place in its petroleum sector. Oil has been a key resource underlying the long years of Civil War, and petroleum currently provides 98 percent of GRSS revenue. Petroleum development is therefore positioned to provide much of the financing that the Government requires to invest in infrastructure, social services and development activities in general.

But petroleum is an industry with a poor development track record, particularly in sub-Saharan Africa. There is no country in sub-Saharan Africa that has used oil wealth to catalyse wider social and economic transformation, and in fact most countries in Africa with oil wealth have been case studies in civil conflict, authoritarian or corrupt governance and widespread underdevelopment. South Sudan is further disadvantaged by its reliance on the north for infrastructure needed to export oil to the coast and by the potential for future instability around control of oilfields in border regions. The management of the petroleum sector will be amongst the foremost challenges facing the Government and will be a test for policy and implementation.

Petroleum impacts on nearly all other environmental and natural resource sectors by virtue of the potential for petroleum exploitation to result in some, and often a great deal of, pollution of land and waterways. This can impact forests, water bodies and fisheries, agriculture and livestock and wildlife and tourism. If not carefully managed through mitigation measures at the design stage, and high calibre monitoring and enforcement efforts at all scales throughout the production process, there is a high potential for petroleum development in South Sudan to have negative impacts on other natural resource sectors and on rural livelihoods and development opportunities, irrespective of the macro-economic potential of the petroleum industry.

Climate change: South Sudan lies within semi-arid zones in the north and southeast. These zones experience the highest risk of climate change, characterised by erratic rains, floods and droughts. This results in poor crop production, pests and diseases for crops and livestock, among others. The high climate variability and the low adaptive capacity for the majority of the population will lead to more indirect impacts on biodiversity. Climate change may increase phenomena such as fire, drought and flood severity and/or aggravate the already existing threats to the ecosystems or individual species. The poor performance of produced resources of crops and livestock will lead to excessive pressure on the biodiversity of wildlife, forest and wetlands among others.

Climate change threatens the existence of these livestocks as well as the livelihoods of pastoralist communities due to the loss of pasture lands and reduced access to water resources. This has further resulted in deadly conflicts among the pastoralist communities that have claimed many lives. Therefore, the impacts of climate change also cause national security issues.

Alien invasive species: There is a heavy infestation of invasive alien plant species, of the Sudd wetlands. Water hyacinth (Eichornia crassipes) now forms an almost ubiquitous floating fringe to river channels and lakes in the Sudd swamps. The Ministry of Environment and Forestry, which is responsible for water hyacinth control (and other invasive plant species) is only monitoring infestations and lacks capacity to respond to the spread of the species. There are concerns that invasive species could also infest the grasslands and woodlands as considerable unregulated cross border movement occurs since South Sudan is a corridor to East, Central and North Africa.

Increasing impacts from occurrence of floods and droughts: Since 2009-10, South Sudan has experienced increasing impacts from climate related incidents of flooding and droughts. The East African drought of 2011 resulted in famine, loss of life and loss of livelihoods in South Sudan. In addition, flooding in July–August 2014 resulted in deaths, displacement of over 40,000 people, destruction of property and a widespread malaria epidemic. In September 2015, flooding displaced 2,000–3,000 households. In the Jonglei State one of the main agricultural and fisheries production sources, floods cause disruptions for three to four months in the year because most of Bor and its counties lie in the flood plains of the River Nile and the Ethiopian Highlands.

Increased number of states from 10 to 32: In both 2015 and early 2017, by Presidential Decree the GRSS increased the number of states first to 28 and then to 32. The result has been a considerable disruption of public administration and service delivery. Several natural resources and rural development offices, particularly the Directorate on Environment at a state level have reported a lack of staff to implement programmes. With a decline in government revenues due to the fall in oil prices the revenue available for public administration has dwindled and many public staff at subnational levels and communities rely on the intervention of aid agencies to implement the routine activities due to the absence of facilities and equipment.

Re-emergence of armed conflict: Re-emergence of armed conflict especially in 2013 led to the destruction of infrastructure, disruption of economic activities and displacement of people, including technical officers at the State and County and other subnational levels. A lot of the agricultural land is unfarmed, while in most of the States those who are able to farm do so alongside while bearing arms to protect them from possible raiders. The long-term cessation of armed conflict and disarmament is required for effective implementation of biodiversity management policies.

Challenges for gender and women in the new nation: Customary law continues to govern the use of natural resources in South Sudan, with each ethnic group applying its own laws relating to land and land rights within its own territory. However, customary rules are not equitable and restrict women's access to land and property. The current legislation recognises the importance of customary institutions as well as their inability to protect women's access, control and ownership of land. While the legal framework provides a solid foundation, efforts need to be made to clarify roles and responsibilities of the Government and customary institutions when rights overlap, and to provide guidance on how to bridge the gap between a customary framework that restricts women's rights, and the new legal framework that puts women on equal footing with men.

Indigenous communities, knowledge and integration into biodiversity management: Generally, across all the 11 livelihood zones of South Sudan people practised indigenous knowledge alongside modern knowledge from education and research. Anecdotal discussions held during NBSAP consultation showed that many communities still rely on herbs and traditional medicines for treatment of malaria and cholera among others. Similarly, plant genetic resources range from little known indigenous wild fruits and vegetables pastures and forages, medicinal plants, indigenous staples like millet and sorghum to introduced crops such as maize. The common factor reported was the withholding of knowledge by elders with the knowledge passed on from one generation to another by word of mouth and mentoring. The NBSAP will consider potential of traditional knowledge to contribute to improved livelihoods, while also pursuing establishment of knowledge management systems to preserve this traditional knowledge.

Energy sector demand, supply issues and infrastructure development: South Sudan is also endowed with potential hydropower sites all situated on the White Nile River estimated at up-to 3,000 MW, which if exploited would provide energy needs and security for the country. The poor regulatory structure, particularly implementation of Environmental Impact Assessments, Environmental Audits and Strategic Environment Assessments means that severe impacts of energy infrastructure development could be missed. The consequences for livelihoods that are highly dependent on the water resources in rural areas (i.e. water resources cover less than 1 percent of land cover) could be severe. With its abundant natural forests, South Sudan aims to declare approximately 20 percent of its natural forests as reserve forests to protect it from deforestation. Biomass is the major source of energy for rural populations while charcoal and firewood are the main sources of domestic energy. Moreover, the absence of public administration in many counties means that deforestation policies may be difficult to enforce.

4.3. Emerging issues from discussion

1. The institutional structure for environment management has been weakened by a loss of staff to other states and the lack of a budget for environment management.

2. The state has an environment policy as evidence of effort to strengthen environment management and create the appropriate structure.

3. The 2013 war put a halt to the progress that had been made on the environmental policy, as well as engagement with external partners to support the ministry.

4. The Environmental Directorate in the Ministry of Health and Environment would still be the main means for coordination of biodiversity management in the state.

5. There are two clear opportunities for the state in the early phases of NBSAP implementation – developing the institutional structure for environment management, and awareness creation on the NBSAP.

6. The state may also be helpful in promoting the component of introducing the Nagoya Protocol on Access and Benefit Sharing (ABS).

5

BACKGROUND TO THE NBSAP

5.1. CURRENT POLICIES AND LAWS GOVERNING NATURAL RESOURCES

Since the signing of the Comprehensive Peace Agreement (CPA 2005) and the subsequent independence on 9 July 2011, the Government of the Republic of South Sudan has developed laws and policies governing Natural Resources (land, water, forestry, etc.) along with establishment of institutions aimed at restoring peace and stability. Institutions such as the Statutory and Customary Courts and the Lands Commissions were established at the three levels of governments to respond to legal matters including disputes over water point, grazing land, wildlife, fishing points and forestry which are common in CES. Below are some of the reviewed existing laws, policies and acts on Natural Resource Management.

5.1.1. THE TRANSITIONAL CONSTITUTION OF THE REPUBLIC OF SOUTH SUDAN, 2011

Independent in 2011, the National Legislative Assembly of the Republic of South Sudan amended the Interim Constitution of Southern Sudan from 2005. It was adopted and thereafter referred to as the "Transitional Constitution of the Republic of South Sudan, 2011," and shall be the supreme law by which the independent and sovereign South Sudan shall be governed during the Transitional Period, and shall undertake to abide by, respect and defend it.

Under Article 14 "The Environment" the Transitional Constitution states in part (1) that every person or community shall have the right to a clean and healthy environment. While in part (2) it states that every person shall have the obligation to protect the environment for the benefit of present and future generations. And, in part (3) every person shall have the right to have the environment protected for the benefit of present and future generations, through appropriate legislative action and other measures that: (a) prevent pollution and ecological degradation; (b) promote conservation; and (c) secure ecologically sustainable development and use of natural resources while promoting rational economic and social development so as to protect genetic stability and bio-diversity. Also, in Part (4) it states that all levels of government shall develop energy policies that will ensure that the basic needs of the people are met while protecting and preserving the environment. Therefore, this NBSAP is in sync with the expectations of the current constitution of the Republic of South Sudan.

5.1.2. NATIONAL BIODIVERSITY LEGISLATION

5.1.2.1 PENDING LEGISLATION AND POLICIES

Many of the key national legislations for biodiversity management in South Sudan are still in the form of Bills before the National Legislative Assembly. The Bills include: The National Environmental Protection Bill 2013; The Draft Wildlife Bill 2013 and the Wildlife Conservation and Protected Areas Bill 2015; The Water Bill 2013; and the Forests Bill 2009. The Draft Policies include: The Draft National Environment Policy 2013; and the South Sudan Wildlife Conservation and Protected Area Policy (Draft of June 2012);

The Environmental Protection Bill 2013 is a key pending legislation that aims to protect the Environment in South Sudan and to promote ecologically sustainable development that improves the quality of life. It grants the right to a decent environment to every person and the concomitant right to bring an action to enforce that right if it is threatened as a result of an activity or an omission. The Bill if enacted into law will empower the Ministry of Environment and Forestry to supervise and co-ordinate all matters relating to the environment and to be the principal Instrument of Government in the implementation of all policies relating to the environment including biodiversity. This will include stock taking of the natural resources in the country and their utilisation and conservation; examining land use patterns to determine their impact on the quality and quantity of natural resources, and; carrying out surveys which will assist in the proper management and conservation of the environment. This means establishing

an Environmental Information Centre that will undertake an inventory of South Sudan's biological diversity and ecosystems as a priority for the Ministry.

The Wildlife Conservation and Protected Areas Bill 2015: The Bill covers all matters concerned with Wildlife Conservation, the establishment and management of protected areas and the sustainable management and conservation of South Sudan's natural heritage and wildlife for the benefit of its citizens.

The Draft Wildlife Bill 2013 establishes an autonomous South Sudan Wildlife Service (SSWS) as proposed by the Constitution with a board of trustees and headed by a Director-General both appointed by the President. One of its key functions will be coordination with other relevant authorities of all issues affecting wildlife management including issues of security, infrastructure, private investment and land use planning. This will be done by ensuring the enforcement and implementation of the law with respect to the use of wildlife, the management of protected areas and other uses of natural resources.

The Forests Bill 2009 is meant to operationalise the Forestry Policy covering all matters concerned with all forests and woodlands and all forest reserves in the country. The Forests Bill provides for a governance structure for all the forests in the country, national sustainable forest management standards, certification systems and schemes, and private and voluntary standards; procedures and decision-making processes, and; complaint and appeal mechanisms.

The Water Bill 2013: provides for the protection of water sources from pollution, erosion or any other adverse effects by creating Protected Zones within a catchment draining to, or above any water facility forming part of a water supply or any catchment, lake, reservoir, aquifer, wetland, spring, or any other source of water (section 34). The Bill aims to develop procedures for prioritising allocation of water resources for different social, economic and environmental uses, efficiency, system reliability and environmental sustainability principles. It also aims to conserve available water resources, to manage water quality and to prevent pollution of ground and surface waters; manage floods and droughts and mitigate water-related disasters, and; establish appropriate management structures including mechanisms for inter-sectoral coordination and stakeholder participation.

The goal of the Draft National Environment Policy 2013 is to ensure the protection, conservation and sustainable use of the natural resources of South Sudan without compromising the tenets of inter-generational equity. This includes maintaining the balance between the environment and development needs through sustainable use of the natural resource base; creating public awareness for the importance of protecting the environment; and providing the basis for formulation of biodiversity and ecosystem protection, and management policies, laws and guidelines.

The South Sudan Wildlife Conservation and Protected Area Policy (Draft of June 2012) envisions an effective and professional Wildlife Service that will guide the sustainable management and utilisation of natural resources, including land, water, fauna and flora for the benefit and enjoyment of the people of South Sudan. It provides for the formulation of legal frameworks to rationalise the protected area system, wildlife utilisation and benefit sharing. It also recognises and addresses the following:

5.1.2.2. CURRENT POLICIES AND LEGISLATION

The Land Policy

According to the CPA peace process, Sudan and South Sudan recognised the need to develop land policy, legislation, functioning institutions and supporting services related to land resources. The CPA mandated the establishment of the National Land Commission (NLC) and the South Sudan Land Commission (SSLC) to develop land policies and draft legislation in order to clarify and strengthen land administrative systems and the rights of landholders.

The Transitional Constitution of 2011 states that all land in South Sudan is owned by the people of South Sudan and charges the Government with regulating land tenure, land use and exercise of rights to land. The constitution classifies land as public, community or private land, and requires the GRSS to recognise customary land rights when exercising the Government's rights to land and other natural resources. The constitution does not clarify the extent to which customary rights can limit government's rights but does require that all levels of government incorporate customary rights and practices into their policies and strategies. As a result, the Land Act (2009), the Local Government Act (2009) and the Investment Promotion Act (2009) were developed to establish the institutions and mechanisms of governance that would address pressure points and fill vacuums created by conflict, uneven development and lack of transparency and accountability in resource governance (GRSS 2011).

The three laws mentioned above established the fundamental framework for the fair and transparent administration of land rights in South Sudan. For example, the Land Act regulates land tenure and equally recognises rights to customary, public and private tenure; the Local Government Act defines primary responsibilities of local government and traditional government authorities in the regulation and management of land, which includes charging customary institutions with particular responsibilities for administering community land rights.

On the other hand; the Investment Promotion Act establishes procedures for facilitating access to land for private investment, including by foreign investors, in ways that balance the interests of both current right holders and investors. Although a framework has been developed, government officials have a poor understanding of the laws and lack the capacity to interpret and carry them out. There is also a lack of awareness by the population, which further impedes progress (GRSS 2011).

The SSLC also developed a draft Land Policy that strengthens the rights of land holders, communities and citizens within the new framework and guidelines established by the Land Act (2009). It emphasises the importance of access to land as a "social right," a feature of many customary land tenure systems that allows community members to access land irrespective of wealth or economic status (Deng and Mittal 2011).

The Customary laws have governed the use of land in South Sudan for centuries, with each ethnic group applying its own laws relating to land and land rights within its own territory. Land laws enacted by governments in Khartoum throughout the colonial and post-colonial periods do not appear to have seriously affected customary tenure systems in the south. Thus, overall, customary laws and practices remain largely intact. Although they vary from community to community, customary institutions and traditional mechanisms continue to govern the access, use and allocation of land (USAID 2010).

In line with the above, some of the highlights of the Land Act, 2009 of South Sudan are as follows: Section 58 states that community Land may be registered in the name of: (i) A Community, or a family, in accordance with the customary practice applicable; (ii) A clan or a family in accordance with the customary practices applicable; and (iii) A community association and a traditional

leader in trust for the community and with the consent of the members of the community'. Section 63 provides that: Activities to be carried out by the investors on communal land shall reflect an important interest of the community or people living in the locality; the project shall contribute economically and socially to the development of the local community; the concerned national and state government institutions including investment authorities will consult with the communities concerned on any decision related to the land that the project intends to acquire and the view of the community will be duly taken into consideration.

Section 69 provides that: 'Individuals, communities and organisations will protect land in order to keep it in a productive condition in which problems such as land degradation are adequately managed in accordance with the provisions of Article 44 of the ICSS'. Consultation with the local authorities, traditional leaders and other levels of the Government in South Sudan is thus very important. During this process all the stakeholders have a role to play.

The Water Policy

In December 2007, the GRSS adopted the South Sudan Water Policy, which states that access to sufficient water of an acceptable quality and quantity to meet basic human needs is a human right. The policy provides that: the right to water shall be given the highest priority in the development of water resources; rural communities shall participate in the development and management of water schemes; and the involvement of NGOs and the private sector in water projects shall be encouraged. Apart from customary laws governing access to grazing and fishing grounds for communal use at a local level, currently there is no formal system for allocating water resources for different social and economic purposes in the country.

Forestry law and policy

The current legal framework for forest management in South Sudan consists of: the CPA; the Interim National Constitution; the Interim Constitution of South Sudan; a number of laws at the national level enacted prior to the signing of the CPA (including the Forestry Commission Act) (2004), the Forestry Training Centre Act (2004) and the Timber Utilization and Management Act (2003); ministerial decrees and orders; and customary law.

In Forestry Act 1986 (Laws of the Sudan): 'All gazetted National Forestry Reserve and those that are in the pipeline shall be directly owned and managed by the National Forestry Corporation of the Government of Sudan. This act proved to be weak and no longer reflect the current reality in South Sudan because the law is outdated and geared toward a "command and control" approach, with little reliance on civil society as a partner in forest resource management and biodiversity conservation. Authorities with jurisdiction to manage and protect biological resources (including forest resources) require an up-to-date legal framework to enforce and prosecute illegal activities (GRSS 2011c; GRSS 2010; TerrAfrica 2010; USAID 2007).

In October 2007, the Ministry of Agriculture and Forestry (MAF) produced a policy statement document that reads:

- Under Section 5.3.2 Number 3, the MAF will undertake and build-up databases on plantation and natural forestry by conducting forestry surveys, inventories, and gazette new forest lands.
- Under Section 5.3.2 Number 4, GRSS will assume responsibility of all National Reserve Forests in South Sudan and will ensure that they are protected and managed sustainably.

However, some progress has been made so far. In August 2010, the GRSS approved a new Forest Policy that provides guiding principles and strategies to address sector constraints and challenges to ensure the optimal contribution of forestry resources towards sustainable growth

and development of the country. Community land is defined by the Land Act (2009) to include forestland that has been held, managed or used by a specific community.

Other related acts to forestry management include: South Sudan Financial Management and Accountability Act, which was passed in December 2011, with the aim of strengthening the process of accountability and ensuring transparency in resource management.

The Environment Protection Act 2001

The current legislation for Environment Protection is the pre-independence Environment Protection Act 2001. This is the principal legislative policy framework of former Sudan that provides uniform rules of substance and procedures on protection of the environment and use of natural resources. The Act also provides definitions and clarifications regarding natural resource management, pollutants and sources of pollution, and endorses the 'Polluter Pays' principle. Section 4 sets forth the environmental objectives of the Sudan as follows:

- Protection and preservation of the natural environment, or the basic elements and the social and cultural systems thereof, in achievement of safety and sustainable development for the benefit of future generations;
- promoting the environment and sustainable use of the natural resources, for the purpose of sustainable development;
- linking the issues of environment and development; ascertaining the responsibility of the competent authority for protection of the environment, and promoting the need for achieving such protection; and
- establishing the role of the competent authority and the organs belonging thereto and enforcing their roles.

Recently the Ministry of Environment, GRSS has developed a draft Environmental Policy and Environmental Bill (2010) that, if enacted, will provide guidance on sustainable management of environmental resources.

Wildlife Conservation and National Parks Act, 2003

The current legislation for Wildlife Conservation and Tourism is the pre-independence Wildlife Conservation and National Parks Act 2003. GRSS has maintained pre-CPA Acts that provided for the protection of wildlife and associated habitat in designated National Park Areas. The following are some of the extracts from the acts:

Section 14 states that 'except with the written authorisation of the Director General, of which authorisation shall be given only in the interest of the proper management and development of the national park: it is unlawful to;

- Obstruct, divert or pollute any river, pool, lake or other points of water;
- Perform any act or engage in any other activity likely to destroy, endanger or disturb wildlife in the national park or to destroy, shelter or alter its natural habitat and environment'

Section 15 states that: 'except with the written authorisation of the Director General or officer in charge of the national park concerned, and subject to the conditions of any such authorisation, no person shall bring into the national park any weapon, ammunitions, explosives, traps, snare or poison, or be in possession of any such articles within the National Park'.

Local Government Act 2009

This Act stipulates the following:

- Section 19 (2) States that 'the traditional leaders shall represent their people in developing legislatures on natural resource management.
- Section 19 (3) states that 'The Boma shall be the main domain of the traditional authority where traditional leaders perform their administration and customary function.
- Section 19 (4) states that 'in the Town Council, the traditional authority shall perform its administrative and customary functions within the quarter council, and the local government act 2009 also defines the traditional authority, customary law and the authority of traditional chiefs in South Sudan.

- Article 174 (1) (ICSS) sates that 'the institution status and role of traditional authority, according to customary law, are recognied under this Constitution' and 'The Legislation of the states shall provide for the role of traditional authority as an institution at local government level on matters affecting local communities'.
- Article 174 (3) (ICSS): states that 'The courts shall apply customary laws to the Constitution and the law'.
- Article 175 (2) (ICSS) states that 'Legislation at the South Sudan and States level shall provide for the establishment, composition, function and duties of the Councils of Traditional Authority Leaders'.
- Article 180 (4) (ICSS) states that 'All lands traditionally and historically held or used by local communities or their members shall be defined, managed and protected by law in South Sudan'.

Fisheries Policy

The Fisheries Policy (2006 – 2011) was developed after the signing of the CPA by the MARF to provide guidelines, support the fishing structures to better coordinate and harmonise the sector mandate and to implement the plan of action to achieve sustainable development. However, due to inadequate institutional capacity and limited financial resources the policy has not been fully implemented.

Additional General Policies for Agriculture and Forestry (2010)

In order to achieve food security through transforming the subsistence agriculture system to a surplus production system well connected to markets and to guarantee households access to food, the ministry had developed policies related to natural resource management. These include the following:

- Declaration of self-reliant food policy for South Sudan.
- Mobilisation, organisation and empowerment of local farmers, cattle owners, fishermen and entrepreneurs for active and effective participation in agricultural reform and food self-sufficiency program.
- Immediate allocation of at least 10 percent of the oil revenue for agriculture, forestry, fisheries and livestock development.
- Investment in agricultural research and extension services.

- Improvement of farmers' and entrepreneurs' access to improve agriculture and livestock inputs (technology, seeds, veterinary medicines etc.), services (extension, microfinance, information) and markets such as feeder roads, transport, storage systems and information.
- Development of rural and agriculture market infrastructure and services.
- Promotion of investment in the agriculture and livestock sector by exemption of agriculture inputs and outputs from taxes.
- Promotion of water management and agriculture production under irrigation systems.
- Promotion of private sector and foreign investment in agricultural sector.
- Promotion of environmental protection and conservation by enacting laws and encouragement of good agriculture and livestock production practices.

Minerals law and policy

The Interim constitution of South Sudan states that all levels of government will protect and ensure the sustainable management and utilisation of minerals, including oil. GRSS recently signed the Petroleum Act (2012). The Act states that ownership of petroleum is vested in the people and to be managed by the Government for their benefit. The Act also emphasises maximum petroleum recovery within a framework that seeks to ensure the safety, security and protection of the environment, and requires transparency, accountability and ethical behaviour on the part of both licensees and the Government (SSIS 2012).

The Mining Act of 2012 provides a framework for the management of the mining sector consistent with international standards, including licencing, environmental protection guidelines and the use of technology to ensure as much mineral resources as possible are recovered from the ground. It also provides for Community Development Agreements for mining licences and environment and social provisions.

The Petroleum Act 2012

The Petroleum Act is relevant because of the increasing adverse environmental impacts associated with petroleum development in the country on the one hand, and the potential to use funds generated from petroleum sales and taxes for biodiversity management on the other hand: Oil exploration is carried out mainly in the central flood plains of Jonglei, Lakes and Upper Nile States which are also endowed with vast natural resources including forests, livestock, wildlife and aquatic resources. The Petroleum Act provides that a SEIA to be undertaken by that the oil contractor or licensee in compliance with international standards to determine any present environmental and social damage, establish the costs of repair and compensation and determine any other areas of concern.

While the petroleum industry in the country has expressed a desire for environmental compliance, the Ministry of Petroleum and Mining is still developing policies and measures to safeguard the environment and govern the oil and mining sector to include EIA, environmental sensitivity atlas, multi-institutional monitoring, hazardous waste management, restoration of drilling and campsites, and oil spill contingency plans.

5.2. STAKEHOLDER ANALYSIS

5.2.1. GOVERNMENT STRUCTURE

The Government of South Sudan is a three-tier structure composed of the Executive, the Judiciary and the Legislature. The Transitional Constitution outlines the composition of the Executive and the powers and competencies of the Executive. Article 97 to Article 107 of the Transitional Constitution describes the President of South Sudan in all pertinent aspects ranging from eligibility for the office, nomination, tenure of office, functions, immunity, to the appointment of the Vice President, as well as the Presidential Advisors. Article 108 to Article 121 of the Transitional Constitution describes the South Sudan Council of Ministers.

The National Legislature is composed of the National Legislative Assembly and the Council of States. The National Legislative Assembly has a total of 322 members. The Council of States has a total of 50 members. The establishment, composition, powers and functions of the South Sudan legislature are described from Articles 54 to 94 of the Transitional Constitution of South Sudan.

Article 122 to Article 134 of the Transitional Constitution of South Sudan describes the judiciary of South Sudan. The Chief Justice, as the head of the Judiciary, shall be responsible for the administration of the Judiciary. The Judiciary shall be structured as follows: (a) the Supreme Court; (b) Courts of Appeal; (c) High Courts; (d) County Courts; and (e) other courts or tribunals as deemed necessary to be established in accordance with the provisions of this Constitution and the law. The Judiciary shall be independent of the executive and the legislature.

According to the Transitional Constitution, Article 47 and 166. Article 47 South Sudan shall have a decentralised government system with the following levels: (i) the National level which shall exercise authority in respect of the people and states in South Sudan; (ii) the State level which shall exercise authority within a state and render public service through the level closest to the people; and the Local Government level within the state, which shall be the closest level to the people. The Local Government shall comprise of three tiers of government; the County, City, Municipal and Town Councils; the Payam and Block Councils as coordinative administrative units; and the Boma and Quarter Councils as the basic administrative units. Rural Councils, which are councils established in rural settlements, or in areas whose economies are predominantly agricultural, pastoral or mixed with a strong base of traditional administration and cultural practices, which constitutes a council. The County Council, a corporate body, is subdivided into Payam and Boma Councils. Urban Councils which are established in urban or cosmopolitan areas where more than 60 percent of economic activities are non-agricultural with considerable levels of urban infrastructure and public utilities. Urban Councils are classified as: City Councils, Municipal Councils, and Town Councils. Industrial Councils are councils established in industrial areas which may have either or both characteristics of an Urban or Rural Council.

5.2.2. TRADITIONAL AUTHORITIES

Traditional leadership which is rooted in the culture, customs and history of the people, is a major aspect of Governance in South Sudan. Article 174 of the Constitution provides for the institution of Traditional Authority. Section 113 of the Local Government Act 2009 states the types of Traditional Authority in South Sudan which are kingdoms and chiefdoms. Section 115 outlines the composition of decentralised chiefdoms inclusive of Paramount Chief, Head Chief and Executive Chief.

Traditional authorities still play an important role in South Sudanese society and should not be overlooked. The traditional system often has three levels: local chiefs, paramount chiefs and king/sultan. Traditional authorities play a role in various fields such as social-related legal issues. They

also enforce traditional regulations on resource use. Examples include the obligation to return any small fish caught to the water, regulations for the use of forest fires, and the protection of certain wildlife and tree species such as the ostrich and the Balanites tree. Traditional authorities collect fines from trespassers and taxes from resource users, such as pastoralists using their territory for livestock grazing.

5.2.3. PRIVATE SECTOR

International and national private investors and entrepreneurs form an essential developmental pillar in South Sudan's economy and future prospects. The wealth of natural resources in the country has attracted the attention of an array of sectors, such as oil, agriculture, construction, hydropower and tourism. More will certainly follow, considering the growing global demand for resources.

Generally, investors and entrepreneurs focus on the break-even of their investments and the generation of profits in relation to financial risks, rather than on sustainability. Investors and entrepreneurs usually target maximum profit and expansion of their own activity. Often, they are not concerned about the costs of their business borne by other sectors or individuals. This is considered to be the responsibility of the Government. Mechanisms to promote responsible entrepreneurship such as certification and codes of conduct, which urge companies to comply with social and environmental norms, have not yet been developed for the private sector of South Sudan.

5.2.4. INTERNALLY DISPLACED PERSONS (IDPS AND RETURNEES)

South Sudan has suffered armed conflict for over 40 years and this has often lead to internal displacement of people as well as people who flee the country seeking refuge in neighbouring countries such as the Democratic Republic of Congo, Uganda and Kenya. Upon their return, most returnees were received in camps spread as much as possible across South Sudan. The Government and international organisations provide food and other facilities such as water, health clinics and schools. Camps are usually located near state or county capitals offering employment to some of the returnees. At present, on a community level, a distinction can be made between people who (a) did not move during the war (residents), (b) people who left their homes and came back to their villages after the war, and (c) those that left and temporarily returned to South Sudan but settled elsewhere, temporarily or permanently.

5.2.5. FISHERS AND FISHING COMMUNITIES

Fishing is not very developed in South Sudan and it is not associated to specific tribes. Generally, it is believed that fish as a resource is underutilised in South Sudan. Simple fishing techniques are used, such as gillnets, throw nets and hooks. Women in the north are using baskets to catch fish in stagnating pools. Fish traps and related fish dams which are being used in neighbouring countries are not being used in South Sudan.

On the Nile and in the Sudd wetlands fishers from Sudan operate with fast boats. Fishers are not licenced and not taxed, but fish retailers are taxed when selling fish on the market. In Nyamlel, there is a fishers' association which has established a social security system based on the regular contributions of members.

5.2.6. CROP FARMERS OR CULTIVATORS

Most of the rural population practise cultivation. In the northern part of the country, sorghum, sesame and groundnuts are the principal crops. Many farmers have little access to inputs such as improved seeds, fertiliser and pesticides. Micro credit systems have not yet been developed. Farmers reported they are suffering from a changing climate. In the last decade, the rainy season has started late and for several years the planting of crops has begun one to two months later than in the past. In addition, rainy seasons also tend to be shorter and sometimes interrupted, which results in an early harvest before crops are fully grown. Adapting to climate change could be achieved by establishing small dams to improve irrigation and by promoting animal traction to prepare land for cultivation, which would enable a quicker response to rainfall than if it is done by manual labour.

5.2.7. LIVESTOCK KEEPERS

Livestock-rearing may be categorised according to three systems: (a) nomadic, based largely on herding of cattle, camels, sheep and goats in the semi-arid north (e.g. Misseriya); (b) semi-nomadic agro-pastoralism, combining the herding of cattle and some sheep with cultivation (Dinka, Nuer); and (c) a sedentary system, where cattle and small livestock are reared in close proximity to villages (UNEP 2007).

The number of cattle is high, and rangelands are considered to be overstocked. The production of livestock products (milk, butter, meat and hides), however, is low. Livestock is mainly perceived as a store of value by many livestock keepers, particularly the nomadic and seminomadic. For example, during an interview, two herdsmen with 10 cattle coming from the cattle market in Aweil and going to their village beyond Marial Bai, declared that they just bought this herd because they received money from a relative, and they did not want to keep the amount in cash.

5.2.8. URBAN POPULATION

The urban population consists of a diversity of different socioeconomic categories, among which the principal groups are (a) people working for the Government, (b) small business entrepreneurs, (c) labourers, (d) people without jobs and (e) IDP and returnees, who often have no land and no job, but many of them create or find more or less temporary occupations such as charcoal burning (men) or growing and selling vegetables (men and women). Usually there is also an elite, related to the Government or private sector (or both).

Urban people require resources such as water, fuel and food. On average they have more to spend than rural people and hence the level of consumption is generally higher. Moreover, consumption is not so much determined by the availability of resources, but more by the level of income in relation to commodity prices.

5.2.9. LOCAL NGOS AND CBOS

A few non-governmental organisations operating in South Sudan participated in the NBSAP development process. They included South Sudan General Farmers Union, Juba Christian Centre, SoS Sahel South Sudan, Community Empowerment Progress Organisation, Assistance Mission for Africa (AMA) and Centre for Remote Evangelism. In general, national/local NGOs in South Sudan have limited capacity to set conservation action, conduct research in biological conservation, and develop and implement awareness on biodiversity conservation messages. In many cases, the NGOs rely on messages developed by international NGOs and funding partners. A survey conducted by Birdlife International with support from the Critical Ecosystem Partnership Fund (CEPF) for Eritrea and South Sudan found that there were considerable capacity needs to enable NGOs to support biodiversity conservation. These gaps were in the areas of; conservation project design and management, human resource development, sustainability

strategy and diversification of financial resources, monitoring and evaluation, and networking and communication (Birdlife International 2015).

5.2.10 INTERNATIONAL NGOS AND DONORS

A large spectrum of international organisations (both inter-governmental and non-governmental) are present in South Sudan, many of whom started their operations following the signing of the CPA or even more recently. Presently, many service gaps are filled by these organisations. These organisations focus very much on meeting primary needs such as food, health and shelter of IDPs, as well as on capacity building to enable the different government agencies to fulfil their tasks. The risk of emphasising capacity building without assuring a clear link with policy implementation and service delivery is that all government staff's capacity is absorbed by learning rather than doing. Moreover, coordination is required to avoid conflicting approaches and duplication of work.

6

PRIORITIES AND TARGETS OF THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN

6.1. BACKGROUND

South Sudan acceded to the United Nations Convention on Biological Diversity on the 17 February 2014. South Sudan became the 194th Party to the global treaty on biodiversity and sustainable development. The CBD entered into force for South Sudan on 18 May 2014.

Article 6 of the Convention on General Measures for Conservation and Sustainable Use states that each Contracting Party shall, in accordance with its conditions and capabilities:
Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity, among others. The article also calls on the parties on the convention to integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies. Article 6 creates an obligation for national biodiversity planning. The related action plans will constitute the sequence of steps to be taken to meet these goals.

The NBSAP is a process by which countries can plan to address the threats to their biodiversity. The NBSAP is the principal instrument for the implementation of the Convention on Biological Diversity both at the national and global level. The NBSAP contributes to the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Targets. Therefore, the NBSAP development is a multi-stakeholder process, with other stakeholders being brought into its development as early as possible.

The Convention requires countries to prepare a national biodiversity strategy, but also to ensure that the strategy contains elements that are incorporated into the planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity - 'mainstreaming' – all relevant sectors of government, the private sector, UN, NGOs and civil society working together to implement the strategy.

Article 26 calls for Parties to the CBD to present, through their national reports, information on measures which have been taken for the implementation of the provisions of the Convention and their effectiveness in meeting the objectives of the Convention.

Article 10(a) encourages Parties to integrate consideration of the conservation and sustainable use of biological resources into national decision-making.

The NBSAP can be used to facilitate more coherent and effective implementation of the biodiversity-related conventions:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- The Convention on the Conservation of Migratory Species of Wild Animals (CMS);
- The Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (RAMSAR);
- The World Heritage Convention (WHC); and
- The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).

The NBSAP must address all three objectives of the Convention; conservation of biodiversity, sustainable use of the components of biodiversity, fair and equitable sharing of the benefits deriving from the utilisation of biodiversity. The NBSAP highlights, the contribution of biodiversity and ecosystem services to human well-being, including having the basics for a good life, health, good social relations, security and freedom of choice and action; and poverty eradication, and national development as well as economic, social, cultural and other values of biodiversity. It should also seek to maintain this fundamental contribution.

6.2. GUIDING PRINCIPLES FOR THE DEVELOPMENT OF NBSAP, THE VISION AND GOAL

6.2.1. GUIDING PRINCIPLES FOR THE NBSAP OF SOUTH SUDAN

There are six overall principles that guide the implementation of the NBSAP for South Sudan. They are as follows:

1. Principle of preventive action

The NBSAP South Sudan adopts the Principle of Preventive Action so that conservation of biodiversity is better achieved by preventing environmental harm than by endeavouring to remedy or compensate for such harm.

2. Precautionary principle

The NBSAP South Sudan adopts the Precautionary Principle. Where there is a threat of significant reduction or loss of biodiversity, lack of complete scientific certainty should not be used as a reason for postponing cost-effective measures to avoid or minimise such a threat.

3. Public participation and public access to information and justice in environmental matters

The public should have access to environmental information and the right to participate in the environmental decision-making process and to have that participation taken into account in the decision-making process.

4. Ecosystem approach

An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organisation, which encompass the essential structure, processes, functions and interaction between organisms and their environment.

5. Contribute to poverty reduction and economic development

Biodiversity management in South Sudan will purposely contribute to poverty reduction and economic development aspirations outlined in the South Sudan Development Plan alongside other development policies.

6. Governance

The NBSAP implementation will contribute to building increased accountability in the public management of biodiversity resources and accountability at subnational, national and global levels on the contributions made by the Republic of South Sudan.

The Vision:

The Vision of NBSAP for South Sudan is establishing a strong framework for biodiversity conservation that contributes to economic prosperity and enhanced quality of life.

The Goal:

The goal of NBSAP is a well-developed institutional and operational framework for sustainable biodiversity conservation and utilisation in South Sudan.

6.2.2. STRATEGIC OBJECTIVES OF THE NBSAP FOR SOUTH SUDAN

The strategic objectives of the NBSAP for South Sudan are:

1. Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan
2. Strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country
3. Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms
4. Strengthen capacity forand conduct resource assessments, spatial, ecological and land use planning and benchmarking of the value of biodiversity in South Sudan to support sustainable use and management of biodiversity in South Sudan
5. Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas of South Sudan
6. Develop and implement a resource mobilisation strategy for biodiversity conservation and management in South Sudan
7. Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan

Table 17 shows the linkage between the NBSAP Strategic Objectives and the Aichi Targets, and Sustainable Development Goals (SDGs). There is strong linkage with SGDs 17, 16, 15 and 14 and 12 on partnership and innovation, strong institutional capacity, and life on earth, life below water and responsible consumption and production, respectively.

Table 17: Linking strategic objectives of NBSAP to the Strategic Plan for Biodiversity, its Aichi targets and the Sustainable Development Goals

No	Strategic Objective of NBSAP2	Linkage to Goals of strategic plan for biodiversity 2020-2011	Linkage to the Aichi targets	Linkage to SDGs
1	Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan	goal A and E	Aichi targets 2 ,1 and 17	SDG 16 Strong Institutions SDG 17 Partnership for Goals
2	Strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country	goal A	Aichi targets 2 and 3	SDG 16 Strong Institutions
3	Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms	goal B	Aichi targets 5 and 6	SDG 16 Strong Institutions SDG 15 Life on Earth SDG 14 Life below water SDG 13 Climate Action SDG 10 Reduced inequality
4	Strengthen capacity for and conduct resource assessments, spatial, ecological and land use planning and benchmarking of the value of biodiversity in South Sudan to support sustainable use and management of biodiversity	goal A and C	Aichi Targets ,11 ,2 13 ,12	SDG 16 Strong Institutions SDG 12 Responsible Consumption and production
5	Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas	goal A, B and D	Aichi Targets ,5 ,2 15 ,14	SDG 15 Life on Earth SDG 14 Life below water
6	Develop and implement a resource mobilisation strategy for biodiversity conservation and management	goal A and E	Aichi targets,4 ,2 20,	SDG 16 Strong Institutions SDG 9 Innovation
7	Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan	Linked to strategic goal C, D, and E	Aichi targets ,12 18 ,17 ,16 ,13	SDG 17 Partnership for Goals SDG 9 Innovation

6.3. BIODIVERSITY STRATEGIC OBJECTIVES AND TARGETS: OUTPUTS, INDICATORS AND INSTITUTIONAL RESPONSIBILITY

6.3.1. STRATEGY TO DEVELOP A STAKEHOLDER CO-ORDINATION FRAMEWORK FOR NATIONAL AND SUBNATIONAL BIODIVERSITY MANAGEMENT IN SOUTH SUDAN

6.3.1.1 The Strategy

Strategic Objective 1: To Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan.

In order to fulfil this objective and address the underlying causes of biodiversity loss, the following targets were committed for implementation of the NBSAP:

1. By 2018, the NBSAP will have been adopted and effectively implemented, and a comprehensive national biodiversity coordination framework will be in place.
2. Biodiversity values will have been mainstreamed into the National Economic Development Plans and Budget Framework Papers, and for State Development Plans.
3. By 2025, an integrated national biodiversity monitoring, assessment and reporting system will have been established.

The Government of the Republic of South Sudan (GRSS) is subdivided into eight sectors comprising of Accountability, Economic function, Wealth, Natural Resources and Rural Development, Public Administration, Rule of Law, Security and Social and Humanitarian Affairs. The core functions of biodiversity management are performed under the Natural Resources and Rural Development Sector (NRRD). The NRRD sector is composed of the Ministries of Wildlife Conservation and Tourism (MWCT), Environment and Forestry (MEF), Livestock and Fisheries (MLF), Agriculture and Food Security (MAFS), Water Resources and Irrigation (MWRI), and Petroleum and Mining (MPM). The first five ministries undertake activities that directly lead to management of biodiversity while the MPM is generally engaged in activities that would considerably harm biodiversity and its contribution to biodiversity management largely through compliance to biodiversity management standards, regulations and laws.

Under the current structure, coordination for biodiversity management is under the MEF. However, the assignment of current and future focal points for biodiversity related international agreements and protocols is spread to the other NRRD ministries with the exception of MPM.

The proposed coordination structure for NBSAP South Sudan will also include the following ministries of GRSS; Finance and Planning (MF&P), Justice and Constitutional Affairs (MJCA), Labour and Public Service and Human Resource Development (MLPS & HRD), Foreign Affairs and International Cooperation (MFAIC), Gender, Child And Social Welfare (MGC &SW) , Parliamentary Affairs (MPA) and Ministry of Information.

At a subnational level, the State Government structure differentiates significantly. The Ministry of Agriculture and Forestry covers Agriculture, Food Security, Livestock Management, Fisheries Management and Forestry Management. The Environmental Management functions are held under the Ministry of Health and Environment. The institutional structure at subnational level is poorly developed and has suffered considerable disruption due to the armed conflict.

The NBSAP coordination framework will be led by the MoEF at a national level. The MoEF will be supported by the MWCT, MLF, MAFS, MWRI and MJCA. The structure will also include the MLPS & HRD, MFA, MGC & SW and MPA. The biodiversity management structure will rely on the lead agency approach where Sectors, Ministries and Agencies, including Civil Society Organisations (CSOs), and private sector are represented to the National Biodiversity Technical Committee (NBTC). The instruments for the NBTC will be developed as part of the commencement activities for implementation of the NBSAP. At the subnational level, the current structure, where the Environmental Directorate in the Ministry of Health provides coordination will be mentioned. However, the Ministry of Wildlife Conservation and Tourism (MWCT) and the Ministry of Environment and Forestry (MEF) will provide strong support.

6.3.1.2. ACTION PLAN FOR DEVELOPING A STAKEHOLDER CO-ORDINATION FRAMEWORK FOR NATIONAL AND SUBNATIONAL BIODIVERSITY MANAGEMENT IN SOUTH SUDAN

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO1: Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan							
a) By 2018, the NBSAP will have been adopted and effectively implemented, and a comprehensive National biodiversity coordination framework will be in place	Adoption of NBSAP by Council of Ministers	Cabinet Paper for NBSAP developed. Working meetings National Biodiversity Technical Committee.	• Adoption of cabinet paper by MEF	• South Sudan does not have an enabling instrument for implementation of the Goals of strategic plan for biodiversity 2020-2011.	MEF	Ministry of Cabinet Affairs; Office of President;	30,000
		Approval of cluster of cabinet. Working meetings of cluster of Cabinet.	• Resolution of Council of Ministers				
		Prepare cabinet paper and seek approval of cabinet. Participation in Council of Ministers Agenda.	• A National Biodiversity Policy Framework in place				
	Adoption of Institutional Coordination Framework for NBSAP by Minister for Environment and Forestry	Participatory refinement of coordination framework. Joint State Government workshops for NBSAP stakeholder. National working meetings NBSAP stakeholder meetings for State Governments	• A Final draft NBSAP coordination framework paper for cabinet approval		MEF	Ministry of Federal Affairs 32 State Governments National Biodiversity Technical Committee	20,000
		Prepare instrument for approval of Minister/Under Secretary of MEF. Working meetings National Biodiversity Technical Committee	• Resolution of Council of Ministers				
Sub-total							**50,000**

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO1: Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan							
b) Biodiversity values will be mainstreamed into the National Economic Development Plans and Budget Framework papers, and for State and County Development Plans.	Situation analysis of status integration of biodiversity value.	National policy and regulatory review for status of biodiversity values in planning and decision making. Review will cover government, non-governmental organisations and the private sector	• Report on national policy and regulatory review • Synthesis reports for government, non-governmental organisations and the private sector	• No system for integration of biodiversity values into the national economic development processes. • Baseline physical resource assessment conducted by the United States Agency for International Development (USAID) and WCS have not been used for national planning.	Ministry of Environment and Forestry (MEF) National Bureau of Statistics (NBS)	Ministry of Finance and Economic Planning (MFEP) Ministry of Agriculture and Food Security (MAFS) Ministry of Livestock and Fisheries s (MoLF)	350,000$
		Documentation of local attributions of biodiversity at community level based on indigenous knowledge and practice as well as practices learned from other communities	• State level reports, video files,				
		Establish knowledge and capacity gaps on biodiversity values across government, non-governmental organisations and the private sector	• Knowledge and capacity assessment reports (government, non-governmental organisations and the private sector)				
	Biodiversity and ecosystem valuation integrated into a natural capital accounting framework undertaken	Establish national scope of extent of biodiversity and natural capital accounting required	• National natural capital accounting scoping report				
		Design the national biodiversity accounts system	• National natural capital accounting design report and templates				
		Establish the baseline for general equilibrium modelling with which the biodiversity natural capital accounts can be aligned. In the absence of the Social Accounting Matrix (SAM) and/or input-output tables a SAM will be developed as part of the undertaking using available National Accounts.	• National Social Accounting Matrix (SAM), and/or input-output tables • National CGE model for integration of biodiversity modelling data				

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO1: Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan							
a) Biodiversity values will be mainstreamed into the National Economic Development Plans and Budget Framework papers, and for State and County Development Plans.	Biodiversity and ecosystem valuation integrated into a natural capital accounting framework undertaken	Build capacity of local actors including national statistics bureau and national ministries and agencies to support the development of the national biodiversity accounts Conduct the national biodiversity accounting and analysis	• National and local Government Staff engaged in data collection, collation and analysis	• However, at the state level, physical planning systems are used for planning land use.	Ministry of Wildlife Conservation and Tourism (MWCT)	Ministry of Energy, Dams, Water Resources and Irrigation (MEWI),	650,000$
		Develop guidance for mainstreaming biodiversity values into national policies and strategies and conduct capacity building for mainstreaming	• A national guideline for mainstreaming biodiversity values developed • National and state level staff trained				
		Undertake mainstreaming biodiversity values into national policies and strategies	• Government plans & projects mainstreamed for biodiversity values				
c) By 2025, an integrated national biodiversity monitoring, assessment and reporting system will have been established.	Establishment of the integrated national biodiversity monitoring, assessment and reporting system.	• Forming a technical working group for the integrated national biodiversity monitoring, assessment and reporting system	• Instrument of technical and minutes of meetings and decisions taken	A national biodiversity database at the MEF and Land use descriptions. Spatial data base of National Parks, game reserves and demarcated areas by state at the Ministry of Wildlife Conservation and Tourism (MWCT)	MEF NBS	MFEP MLFI MEWI MAFS	500,000$
		• Develop a guidance on integrated national biodiversity monitoring, assessment and reporting system	• Draft documents				
		• Conduct capacity building including establishment of databases and/or enhancement of database capacity, and technical capacity at national and state levels	• Endorsement of the framework for establishment of the integrated system				
		• Increased knowledge and skills of National and State level government staff, NGO and private sector in biodiversity management	• Capacity built for writing project proposals				
		• NBSAP monitoring, evaluation and reporting secretariat established and functioning	• Secretariat offices operational				
		• Monitoring, and evaluation systems piloted	• Annual monitoring & evaluation reports				
Sub-total budget $							**1,550,000**

6.3.2. STRATEGY TO STRENGTHEN POLICY, LEGISLATIVE AND INSTITUTIONAL CAPACITY

6.3.2.1. STRATEGY

Strategic Objective 2: Strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.

In order to fulfil this objective and address the underlying causes of biodiversity loss, the following targets will be achieved:

4. By 2022, National Government and State Governments will have reviewed relevant legislation, policies and programmes to maximise synergies with the NBSAP.
5. By 2022, prepare the legislation and establish the conditions for ratification and/or accession and implementation of the Nagoya Protocol, Cartagena and other biodiversity-related conventions (Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (RAMSAR), World Heritage Convention (WHC), International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and International Plant Protection Convention (IPPC).
6. By 2020, the National Strategy on Invasive Alien Species will be fully implemented, with the participation and full consultation of the public.

The convention on biological diversity, the primary convention implemented with support of the NBSAP, is built on four goals. Two of these goals addressed through the strategic objectives are: the convention's leadership role in international biodiversity issues. The convention plays a major role in selling the agenda among biodiversity-related conventions and organisations. The Conference of Parties (to the CBD) promotes policy coherence at a global level by inviting other international instruments and processes to integrate; and parties have improved financial, human, scientific, technical and technological capacity to implement the convention.

Implementation of the CBD at national level, through the NBSAP, requires parties to have access to sufficient financial, human, scientific, technical and technological resources. The focus of strategic objective 2 is towards technical and technological capacity at national level.

In addition to being a new nation, South Sudan is still grabbling with armed conflict, early growth of institutions and geo-political space. For instance, to enhance social services, access to new markets were created. However, creation of new states also meant spreading out of already thin human resources on ground. Therefore, several states do not have staff to support biodiversity management activities. The 2013 armed conflict that affected most of the country damaged infrastructure and led to a rise of development partner apathy about the risk associated with development investments in the country. The initial progress made after the signing of the Comprehensive Peace Agreement (CPA), and establishment of structures of the Republic were severally affected.

Therefore, the strategy on strengthening policy, legislative and institutional capacity, additionally seeks to support gap analysis of human, technical and technological capacity, and to initiate and implement actions for establishment of the needed capacity.

6.3.2.2. ACTION PLAN FOR STRENGTHENING POLICY, LEGISLATIVE AND INSTITUTIONAL CAPACITY FOR BIODIVERSITY CONSERVATION AND MANAGEMENT FOR ALL ACTORS IN THE COUNTRY

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO2: Strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.							
By 2022, National Government and State Governments will have reviewed relevant legislation, policies and programmes to maximise synergies with the NBSAP.	• National Government (State) reviewed relevant legislation, policies and programmes on biodiversity management. For synergies and gaps in relation to NBSAP	• Formation of biodiversity review committee for national and state level reviews • Conduct review of national laws, regulations and orders with support of external experts • Review of subnational ordinances and by-laws • Complete write up of review reports and make decisions on enhancing regulatory synergies. • Regular review of the decision passed by the committee.	• At least %80 of all legislation and policy documents will have been reviewed. • Regulatory reforms offer the best opportunity for synergies to maximise benefits of biodiversity management	A combination of pre-CPA and post-CPA transitional legislation for environmental protection, wildlife conservation, local government, forestry, water and fisheries policy. The policies require considerable review regarding the Multilateral Environmental Agreements.	MEF MWCT MAFS	MFEP Ministry of Livestock and Fisheries (MLF) Ministry of Energy and Dams (MED) Ministry of Water Resources and Irrigation (MWRI) Ministry of Humanitarian Affairs and Disaster Management (MHADM)	250,000$
	• Assess and build capacity for regulatory enhancement to enhance synergies	• Technical, technological, and human resource capacity • Develop Guidance for capacity building • Conduct and make write ups of capacity building on alignment of NBSAP implementation with legislative, regulatory and policy documents	• Assessment report • Guidance for capacity building • Capacity building reports, and legislative, regulatory and policy documents that have been reviewed				

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO2: Strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.							
By 2022, prepare the legislation and establish the conditions for ratification and/ or accession and implementation of the Nagoya Protocol, Cartagena and other biodiversity-related conventions (Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on the Conservation of Migratory Species of Wild Animals (CMS), Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (RAMSAR), World Heritage Convention (WHC), International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and International Plant Protection Convention (IPPC).	• Layout necessary conditions for preparation of legislation.	• The country has to accede to the Nagoya Protocol. • Reification of the Protocol. • Implementation of the Protocol	• Government endorsed Instrument of accession to ABS Nagoya Protocol	South Sudan has not yet development instruments for ABS Nagoya Protocol as well as instruments for CITES, CMS, RAMSAR Convention, WHC, ITPGRFA, and IPPC			400,000$
	• Alignment of relevant policies, programmes undertaken. • Layout necessary conditions for preparation of legislation for all other biodiversity related conventions	• Review the ABS Regulations and incorporate relevant elements of the Nagoya Protocol • Review Regulations and seek Government endorsement to incorporate relevant elements of the CITES • Review Regulations and seek Government endorsement to incorporate relevant elements of the Convention on the CMS • Review Regulations and seek Government endorsement to incorporate relevant elements of the RAMSAR Convention • Review Regulations and seek Government endorsement to incorporate relevant elements of the WHC • Review Regulations and seek Government endorsement to incorporate relevant elements of the ITPGRFA • Review Regulations and seek Government endorsement to incorporate relevant elements of IPPC	• National ABS Regulations and/or guidelines including essential elements of the Nagoya Protocol. Relevant plans, projects initiated • All other biodiversity related conventions Government endorsed Instrument of accession				
	• National consultant process undertaken on ratification and accession to biodiversity conventions/ agreement	• Submit the revised ABS Regulations to Cabinet for approval • Submit proposed regulations of CITES for cabinet approval • Submit proposed regulations of CMS for cabinet approval • Submit proposed regulations of RAMSAR for cabinet approval • Submit proposed regulations of WHC for cabinet approval	• Revised ABS Regulations submitted to Cabinet for consideration and/or approval • Revised regulations of CITES submitted to Cabinet for consideration and/or approval • Revised regulations of CMS submitted to Cabinet for consideration and/or approval • Revised regulations of RAMSAR submitted to Cabinet for consideration and/or approval	None of the following is in place: Instruments typically require adoption of cabinet paper by the responsible ministries Resolution of Council of Ministers	MEF MWCT MAFS	MFEP MLF MED MWRI MHADM	100,000$

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO2: Strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.							
		• Submit proposed regulations of ITPGRFA for cabinet approval • Submit proposed regulations of IPPC for cabinet approval.	• Revised regulations of WHC submitted to Cabinet for approval • Revised regulations of ITPGRFA submitted to Cabinet for consideration and/or approval • Revised regulations of IPPC submitted to Cabinet for consideration and/or approval	Transmission of the National Instruments to the responsible conventions, secretariats Participation in trips and negotiation of South Sudan's position			
		• Promote and regulate bioprospecting and bio-trade activities for the benefit of the population	• Both bioprospecting and bio-trade are regulated for the benefit of the population				150,000$

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO2: Strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.							
By 2020, the National Strategy on Invasive Alien Species is fully implemented, with the participation and	• Strategy on Invasive Alien Species is achieved through stakeholder consultations	• Formulation of guidelines for National Strategy on Invasive Alien Species • Engagement of multi- stakeholders in implementation • Develop Monitoring and Evaluation mechanism	• National guidelines on invasive species in place • Adequate measures to contain alien invasive species in vulnerable ecosystems are in place • An inventory of alien invasive species	Pre-CPA legislation on forestry and wildlife management supported IAS activities. No post CPA regulation and capacity on management of IAS exists	MEF MWCT MAFS	MFEP MLF MED MWRI MHADM	$250,000
	• Focal point designated. • National IAS strategy developed	• Identify and designate a Focal Point for invasive species • IAS inventory conducted • Develop strategy and action plan • Carry out stakeholder's consultation	• Strategy in place, meetings held, survey documents in place				
	• Capacity for implementation of IAS strategy assessed	• Technical, technological, and human resource capacity • Conduct and make write ups of capacity building on alignment of NBSAP implementation with legislative, regulatory and policy documents	• Assessment report • Guidance for capacity building				
	• Capacity building conducted	Conduct capacity building on implementation of IAS across the country, especially at subnational level	• Capacity building reports				
	• Implementation of IAS strategy	• IAS strategy implementation, based on development guidelines, and capacity built for stakeholders at national and subnational levels	• Reduced incidence of IAS at field level • Reduce import or transfer as IAS into country				
Sub-total budget $							**1,150,000**

6.3.3. STRATEGY FOR REDUCING NEGATIVE IMPACTS AND ENHANCING POSITIVE IMPACTS ON BIODIVERSITY

6.3.3.1 STRATEGY

Strategic Objective 3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.

In order to fulfil this objective and address the underlying causes of biodiversity loss, the following targets will be implemented:

8. Strengthen biodiversity-inclusive environmental impact assessment (EIA) and Environmental Audits, and Strategic Environment Assessment (SEA).
9. Commitment of states and the elaboration of a National Policy, ensuring the continuous and updated diagnosis of species and genetic resources and effectiveness of Action Plans for Prevention, Contention and Control of loss of biodiversity at species and genetic level in the country.
10. By 2020, incentives and subsidies harmful to biodiversity will have been identified and reformed, and controls related to biodiversity will have been enhanced.
11. By 2020, the rate of loss of natural habitats (forests, wetlands, water resources catchments, mountains) is reduced by at least 50 percent (in comparison with the 2016 rate) and, as much as possible, brought close to zero, and degradation and fragmentation is reduced.

South Sudan may not have achieved much so far under this target. However, as the country moves out of insecurity and instability, it will be necessary to test various schemes of incentives in order to identify and promote best practices which are suitable for the country.

Article 6 of the CBD on "General Measures for Conservation and Sustainable Use" states that each Contracting Party shall, in accordance with its particular conditions and capabilities: (a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned; and (b) Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.

Article 10 of the Convention provides clarity on the "Sustainable Use of Components of Biological Diversity". The article states that each Contracting Party shall, as far as possible and as appropriate: (a) Integrate consideration of the conservation and sustainable use of biological resources into national decision-making; (b) Adopt measures relating to the use of biological resources to avoid or minimise adverse impacts on biological diversity; (c) Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements; (d) Support local populations to develop and implement remedial action in degraded areas where biological diversity has been reduced; and (e) Encourage cooperation between its governmental authorities and its private sector in developing methods for sustainable use of biological resources.

In the case of South Sudan, as a new nation, an enormous responsibility is laid on the implementation of NBSAP South Sudan and all other environment and sustainable development related strategies in the country to ensure that the nation's natural capital, especially the biodiversity is sustainably used. The Strategy and Action Plan outline the proposals for reducing negative impacts and enhancing positive impacts of biodiversity conservation and use in the country.

6.3.3.2 ACTION PLAN FOR REDUCING NEGATIVE IMPACTS AND ENHANCING POSITIVE IMPACTS ON BIODIVERSITY

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.							
Strengthen biodiversity-inclusive environmental impact assessment (EIA) and Environmental Audits, and Strategic Environment Assessment (SEA)	• Situation analysis on environmental compliance for biodiversity management conducted	• Conduct situation analysis of the status of biodiversity management in environmental impact assessment, environmental audit • Conduct situation analysis on the status of strategic environmental assessments	• Established projects abide by the EIA • Establishment of EIA committees Consultations with the various environmental experts	EIA and compliance generally led by international agencies and not national government agencies	MEF	MLF MED MWRI MHADM MWCT MAFS State Governments University of Juba Academia CSOs	$250,000
	• Capacity assessment for integration of biodiversity management into EIA, Environment Audit and SEA conducted	• Assessment of capacity for comprehensive integration of biodiversity management in environmental compliance instruments of SEA, EIA, and audits	• Capacity assessment report • Synthesis report on capacity needs for integration of biodiversity management in environment compliance	Very low practice of EIA especially in private sector			$250,000
	• Instruments/ guidance for biodiversity inclusive ESIA, Environmental audit and SEA developed	• Develop guidelines and accompanying instruments (policy instruments) for strengthening biodiversity management compliance in SEA, EIA and audits	• Guidelines and instruments for strengthening biodiversity management compliance in SEA, EIA and audits	There are government rules that need to be supported with clear regulations and guidelines	MEF	MLF MED MWRI MHADM MWCT MAFS	$200,000
	• Implementation of capacity strengthening of biodiversity inclusive environmental compliance and enforcement	• Establish a baseline of biodiversity management compliance • Build human resource capacity to implement environmental compliance with biodiversity management	• Baseline reports • Records of training and capacity built • Number of staff with capacity biodiversity integration in compliance	The University of Juba has a programme training practitioners. However,		MLF MED MWRI MHADM	

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.							
		• Enhance capacity for training at university and environmental management institutions on biodiversity management in environmental compliance • Monitor the level of biodiversity management in environmental compliance instruments or reports	• University and training programmes on biodiversity integration in compliance • Reports on progress of integration of biodiversity management in compliance	field experience is very little and mentoring and creation of associations to maintain quality needed	MEF	MWCT MAFS State Governments University of Juba	$2,500,000
Commitment of states and the elaboration of a National Policy, ensuring the continuous and updated diagnosis of species and genetic resources and effectiveness of Action Plans for Prevention, Contention and Control of loss of biodiversity at species and genetic level in the country	• Development of action plan for Prevention, Contention and Control of loss of biodiversity at species and genetic level	• Conduct taxonomy (classification) of species. • Identify Action plans for Prevention, Contention and Control	• Number of research initiatives on underutilised taxa undertaken	Since the CPA there has not been adequate investment in species and genetic resources management	MAFS MWCT MEF	MLF MWRI MHADM	500,000$
	• Capacity building for state and national officials for implementation of action plan	• Develop guidelines for implementation of action plan	• A guidelines document for the action plan		MWCT MAFS MEF	MLF MWRI MHADM	$1,200,000
		• Implementation of action plan at national level	• Annual monitoring and five year evaluation reports				
		• Implementation of action plan at state level					
	• Support establishment of genetic banks (germ plasm) and research for plant species	• Establish genetic resources databank for South Sudan	• At least one national genetic resources databank established				
		• Undertake operational activities for gene bank including acquisition of genetic materials from field storage	• Annual monitoring and five year evaluation reports				
		• Establishment of community genetic resource centres	• At least one operational community genetic resource centre per state				
	• Support establishment of sanctuaries for rehabilitation of rescued species, and restoration to the wild	• Establish wildlife sanctuaries (public-private-partnerships) for rescued wildlife especially chimpanzees and birds	• At least one operational wildlife sanctuary		MEF MWCT	MEF MLF MWRI MHADM	$500,000

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.							
By 2020, incentives and subsidies harmful to biodiversity will have been identified and reformed, and controls related to biodiversity will have been enhanced	• National diagnostic study of policies, regulations, and practices to identify incentives used for biodiversity management across public, private, non-governmental and community categories	• Establishment of a technical working group on the revise and reform of harmful incentives, while promoting positive incentives	• An instrument for creation of working group • Minutes from technical working group	Since the CPA there has not been adequate investment in species and genetic resource management	MEF	MLF MED MWRI MHADM MWCT MAFS State Govern – ments University of Juba	$250,000
		• Revise and reform harmful incentives, while promoting positive incentives	• Report on proposed review, revision and reform of harmful incentives.				
		• Undertake capacity assessment for the review, revise and reform of harmful incentives, while promoting positive incentives	• A capacity assessment report				
	• National action to revise and reform harmful incentives, while promoting positive incentives developed, including a nationalincentives guidelines for biodiversity management	• Establish guidelines for revise and reform harmful incentives, while promoting positive incentives	• Guidelines document on review, revision and reform of harmful incentives, while promoting positive ones	Since the CPA there has not been adequate investment in species and genetic resource management	MWCT MAFS MEF	MFEP MLF MWRI MHADM	$500,000
		• Review, reform and revise all revise harmful incentives, while promoting positive incentives	• Number of harmful incentives reviewed, revised and/or reformed				
		• Implement national action plan and guidelines for review, revision, and reform harmful incentives, while promoting positive incentives	• Annual monitoring reports • Fiveyear evaluation reports				
	• Support efforts to harness modern biotechnology for socioeconomic development while ensuring adequate safeguards for human health and existing biodiversity	• Assess national capacity in Biotechnology and Biosafety and enhance the availability	• Report of national capacity in Biotechnology and Biosafety				
		• Exchange of information on Biotechnology and Biosafety. Information and awareness at national and state level.	• Number and effectiveness of information and awareness activities at national and state level				
		• Enhance regulatory performance and compliance including EIA of the National Biosafety Committee and the Institutional Biosafety Committees	• Amount of training conducted on integration of Biotechnology and Biosafety in EIA, customs activities, among others	• Since the CPA there has not been adequate investment in species and genetic resource management	MWCT MAFS MEF	MLF MWRI MHADM	$1,500,000

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.							
		• Establish a strong and effective monitoring system for Biotechnology use and application	• Availability of knowledge and equipment for monitoring Biotechnology (environment compliance, customs, among others)				
		• Develop and implement mechanisms for sharing costs and benefits of Biotechnology, promotion of trade in Biotechnology products, and integration of Biotechnology values into macroeconomic frameworks	• Number of mechanisms developed • Annual monitoring reports, and bi-annual evaluation reports				
		• Establish a mechanism(s) for continuous Human and Infrastructural Resource Capacity Development, deployment and retention	• Annual monitoring reports, and bi-annual evaluation reports on Human and Infrastructural Resource Capacity Development, deployment & retention				
By 2020, the rate of loss of natural habitats (forests, wetlands, water resources catchments) will be reduced by at least %50 (in comparison with the 2016 rate) and, as much as possible, brought close to zero, and degradation and fragmentation will be reduced.	• Baseline assessment of the status of forest resources in South Sudan undertaken and drivers for forest, wetland and water resources degradation and/or restoration	• Undertake national forestry inventory using ground trothing and spatial analysis	• National status of forestry resources and inventory report and spreadsheets, and spatial data in maps and digital files	Whereas there are considerable efforts at state level, continued civil strife, and low public resource allocations means that considerable habitat degradation is occulting	MWCT MEF	MLF MWRI MHADM MAFS State Govern-ments	$750,000
		• Undertake national wetland inventory using ground trothing and spatial analysis	• National wetland inventory report				
		• Undertake national water resources assessment and inventory using ground trothing and spatial analysis	• National water resources inventory report				
		• Analysis undertaken on drivers and synthesis of key actions for restoration and/or conservation of forest, wetland and water resources	• Synthesis report on drivers and synthesis of key actions for restoration and/or conservation of forest, wetland and water resources				

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.							
	• Drivers of degradation of forests, wetlands and water resources reduced and/or taken away through policy, community and individual actions	• Strengthen regulations against deforestation and degradation of forests, wetlands and water resources	• Revised regulations on deforestation and degradation of forests • Revised regulations on wetlands degradation and/or conservation • Revised regulations on water resources degradation and/or conservation	The major drivers seem to be the lack of alternative livelihoods and that has been highlighted alongside security in pockets of the country	MWCT MEF	MLF MWRI MHADM MAFS State Govern-ments	$1,800,000
		• Implementation of REDD+ actions in South Sudan and other actions to reduce deforestation and degradation	• REDD+ and other actions monitoring reports (annual) and bi-annual evaluation reports				
		• Support implementation of regulations on wetland use and conservation in South Sudan	• Annual monitoring and bi-annual evaluation reports				
		• Support implementation of regulations on water resource use and conservation in South Sudan	• Annual monitoring and bi-annual evaluation reports				
Sub-total budget $							**9,950,000**

6.3.4. STRATEGY TO STRENGTHEN CAPACITY FOR AND CONDUCT RESOURCE ASSESSMENTS AND ECOLOGICAL AND LAND USE PLANNING

6.3.4.1. THE STRATEGY

Strategic Objective 4: Strengthen capacity for and conduct resource assessments, spatial, ecological and land use planning and benchmarking of the value of biodiversity in South Sudan to support sustainable use and management of biodiversity in South Sudan In order to fulfil this objective and address the underlying causes of biodiversity loss, the following targets will be implemented:

7. By 2022, resource assessments, spatial, of biodiversity ecological and land use planning and benchmarking of the value in South Sudan
8. By 2026, National Plan with ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity in South Sudan will have been integrated into the National Development Plan for South Sudan

The focus of the strategy on strengthening capacity for and conducting resource assessments and ecological and land use planning generally lies in Articles 7 and 14 of the convention. Under Article 7 on "Identification and Monitoring" South Sudan as a party will build capacity and establish mechanisms and procedures, particularly for the purposes of Articles 8 (In Situ Conservation) to 10 (Sustainable Use of Components of Biodiversity) to: (a) Identify components of biological diversity important for its conservation and sustainable use; (b) Monitor, through sampling and other techniques, the components of biological diversity identified, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use; (c) Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques; and (d) Maintain and organise, by any mechanism data, derived from identification and monitoring activities.

In addition, as stated under Article 14 of the CBD, South Sudan will develop capacity and undertake measures on "Impact Assessment and Minimiing Adverse Impacts" including: (a) Introduce appropriate procedures requiring environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding or minimising such effects and, where appropriate, allow for public participation in such procedures; (b) Introduce appropriate arrangements to ensure that the environmental consequences of its programmes and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account; (c) Promote, on the basis of reciprocity, notification, the exchange of information and consultation on activities under their jurisdiction or control which are likely to significantly and adversely affect the biological diversity of other States or areas beyond the limits of national jurisdiction, by encouraging the conclusion of bilateral, regional or multilateral arrangements, as appropriate; (d) In the case of imminent or grave danger or damage, originating under its jurisdiction or control, to biological diversity within the area under jurisdiction of other States or in areas beyond the limits of national jurisdiction, immediately notify the potentially affected States of such danger or damage, as well as initiate action to prevent or minimise such danger or damage; and (e) Promote national arrangements for emergency responses to activities or events, whether caused naturally or otherwise, which present a grave and imminent danger to biological diversity and encourage international cooperation to supplement such national efforts and, where appropriate and agreed by the States or regional economic integration organisations concerned, establish joint contingency plans. In a complementary manner, the Convention states that the Conference of the Parties shall examine, on the basis of studies to be carried out, the issue of liability and redress, including restoration and compensation, for damage to biological diversity, except where such liability is a purely internal matter.
NBSAP South Sudan places considerable emphasis on developing capacity for resource assessments and planning in South Sudan. The low capacity of resource assessment and biodiversity planning at strategic and project level was a key stakeholder concern and it is addressed in this NBSAP report.

6.3.4.1 ACTION PLAN FOR STRENGTHENING CAPACITY FOR AND CONDUCTING RESOURCE ASSESSMENTS, SPATIAL, ECOLOGICAL AND LAND USE PLANNING

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO4: Strengthen capacity and conduct resource assessments, spatial, ecological and land use planning and benchmarking of the value of biodiversity in South Sudan to support sustainable use and management of biodiversity in South Sudan							
By 2022, resource assessments, spatial, of biodiversity ecological and land use planning and benchmarking of the value in South Sudan	• Capacity assessment and capacity building for spatial, of biodiversity ecological and land use planning for biodiversity management conducted	• Capacity needs assessment for conducting spatial, ecological and land use planning and benchmarking of the value	• Capacity needs assessment reports. Field visit reports	The last biodiversity resource assessment was conducted prior to the CPA. Even though there have been scoped assessments by WCS and USAID.	MWCT MEF	MLF MWRI MHADM MAFS State Governments	$6,000,000
		• Develop guidance and manuals on how to conduct spatial, ecological and land use planning and benchmarking	• Manuals and guidance documents				
		• Capacity building for spatial, of biodiversity ecological and land use planning for biodiversity management	• Annual monitoring and bi-annual evaluation reports				
By 2026, National Plan with ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity in South Sudan will have been integrated into National Development Plan for South Sudan	• National Plan with ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity in South Sudan developed	• Develop National Plan with ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity	• National Plan for ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity document	Generally national and state plans are developed based on information provided by the National Statistics Bureau. However, the data is limited to land use maps and estimates of agricultural productivity. The land use maps have not been updated since 2010.	MWCT MEF	MLF MWRI MHADM MAFS State Governments	$1,200,000
		• Disseminate National Plan with ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity	• Number of dissemination materials and reports on activities conducted including field visits to ascertain.				
	• Plan for ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity integrated into National Development Plan	• Conduct state level activities for integration of National Plan into State development plans, policies and programmes	• Annual monitoring and bi-annual evaluation reports				
		• Conduct state level activities for integration of National Plan into national development plans, policies and programmes	• Annual monitoring and bi-annual evaluation reports				

6.3.5. STRATEGY TO RESTORE DEGRADED ECOSYSTEMS AND PROMOT ACCESS AND BENEFIT SHARING OF BIODIVERSITY AND ECOSYSTEM SERVICES

6.3.5.1. THE STRATEGY

Strategic Objective 5: Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas of South Sudan.
In order to fulfil this objective and address the underlying causes of biodiversity loss, the following targets will be implemented:

9. By 2024, a programme for effective management of protected areas (PA) and PA current network will have been developed
10. By 2023, a national collaborative resource management programme for PAs, wetlands and water resource catchments will have been developed and implemented
11. By 2024, a programme for restoration of degraded wetlands, including the Sudd, will have been developed and under effective implementation
12. By 2024, a programme for restoration of degraded forest areas, will have been developed and under effective implementation
13. By 2023, a national programme for rehabilitation of degraded farmlands will have been developed and under implementation

Beyond policy processes, and procedures, biodiversity management occurs in ecosystems, and at species and genetic levels. The restoration of degraded ecosystems will be at the core of biodiversity conservation in South Sudan. Considerable degradation and damage has occurred due to the ongoing armed conflicts and the collapse of institutions for biodiversity management. To aid in the process of biodiversity restoration and promotion of access and benefit sharing of biodiversity and ecosystem service, NBSAP South Sudan will rely on the Convention guidance through Articles 9 ,8 ,6 and 14. Article 6 of the CBD on "General Measures for Conservation and Sustainable Use" has been highlighted under SO3. Article 8 on "In-situ Conservation" requires Contracting Party such as South Sudan to, as far as possible and as appropriate: (a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity; (b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity; (c) Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view of ensuring their conservation and sustainable use; (d) Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings; (e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas; (f) Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, inter alia, through the development and implementation of plans or other management strategies; (g) Establish or maintain means to regulate, manage or control the risks associated with the use and release of living modified organisms resulting from biotechnology which are likely to have adverse environmental impacts that could affect the conservation and sustainable use of biological diversity, taking also into account the risks to human health; (h) Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species; (i) Endeavour to provide the conditions needed for compatibility between present uses and the conservation of biological diversity and the sustainable use of its components; (j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use

of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilisation of such knowledge, innovations and practices; (k) Develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations; (l) Where a significant adverse effect on biological diversity has been determined pursuant to Article 7, regulate or manage the relevant processes and categories of activities; and (m) Cooperate in providing financial and other support for in-situ conservation outlined in subparagraphs (a) to (l) above, particularly to developing countries.

The ex-situ conservation activities to be implemented in NBSAP South Sudan covered by Article 9 are: (a) Adopt measures for the ex-situ conservation of components of biological diversity, preferably in the country of origin of such components; (b) Establish and maintain facilities for ex-situ conservation of and research on plants, animals and micro-organisms, preferably in the country of origin of genetic resources; (c) Adopt measures for the recovery and rehabilitation of threatened species and for their reintroduction into their natural habitats under appropriate conditions; (d) Regulate and manage collection of biological resources from natural habitats for ex-situ conservation purposes so as not to threaten ecosystems and in-situ populations of species, except where special temporary ex-situ measures are required under subparagraph (c) above; and (e) Cooperate in providing financial and other support for ex-situ conservation.

The responsibility under SO5 also extends to Article 15 "Access to Genetic Resources" including the authority to determine access to genetic resources, which rests with the National Governments and is subject to national legislation, to create conditions to facilitate access to genetic resources for environmentally sound uses and not to impose restrictions that run counter to the objectives of this Convention.

6.3.5.2 ACTION PLAN FOR RESTORINGDEGRADED ECOSYSTEMS AND PROMOTING ACCESS AND BENEFIT SHARING OF BIODIVERSITY AND ECOSYSTEM SERVICE

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO5: Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas of South Sudan							
By 2024, a programme for effective management of protected areas (PA) and PA current network will have been developed	• Situation analysis conducted on status of protected area system in South Sudan	• Comprehensive survey to establish physical and socioeconomic status of PAs and factors driving degradation	• Situation analysis survey report	There was an attempt to undertake situation analysis by UNDP with support of WCS. Due to the security situation the process was halted.	MWCT MEF	MLF MWRI MHADM MAFS State Governments	$300,000
		• Dissemination of results of situation analysis report	Synthesis reports as dissemination materials Number of dissemination activities carried out				
	• General Management Plans for all Protected Areas conducted and completed	• With use of external support conduct consultations, mobilise PA staff and adjacent communities to develop PA • Undertake technical feasibility for the proposed PA management activities and set priorities • Conduct aggregate viability assessment	• General Management Plans (GMPs) for all National Parks and Wildlife Reserves	The Protected areas have not developed GMPs due to lack of resources and little or no revenue collections	MWCT MEF	MLF MWRI MHADM MAFS State Governments	$450,000
	• An Overall Management Strategy for Protected Area of South Sudan completed	• With use of external support conduct consultations with PA managers at state and national level • Aggregate findings of technical feasibility and viability assessments • Integrate socio-economic and political economy considerations	• Overall Management Strategy for Protected Area	An overall management plan for strategic guidance is not available at the MWCT.	MWCT MEF	MLF MWRI MHADM MAFS State Governments	$250,000
By 2023, a national collaborative resource management programme for PAs, wetlands and water resource catchments developed and being implemented	• By 2023, a national collaborative resource management programme for PAs, wetlands and water resource catchments developed and being implemented	• Establish technical working committee comprise state and national PA staff, communities, NGOs (or CBOs) and communities	• Regular minutes of progress of technical working committee	An overall management plan for strategic guidance is not available at the MWCT	MWCT MEF	MLF MWRI MHADM MAFS State Governments	$300,000
		• With use of external support design collaborative resource management programme for PAs • Pilot collaborative resource programme and scale-up to cover all PAs	• Collaborative resource management programme documents • Annual monitoring reports and bi-annual evaluation reports				

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO5: Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas of South Sudan							
By 2024, a programme for restoration of degraded wetlands, including the Sudd, will have been developed and under effective implementation	• At least one-third of the degraded wetlands and Sudd restored by 2024.	• Design wetland restoration action plan including technical feasibility for wetland and Sudd restoration	• Wetland restoration action plan document	There are concerns that the Sudd is declining very quickly although the Sudd is reported to cover a total area of 30,000 square kilometres		MLF MWRI MHADM MAFS State Governments	$60,000,000
		• Implement wetland restoration action plan	• Annual monitoring reports and bi-annual evaluation reports				
By 2024, programme for restoration of degraded forest areas, developed and under effective implementation	• At least %25 of the degraded forests restored by 2024.	• Design forest resource restoration action plan including technical feasibility for wetland and Sudd restoration	• Forest resourcerestoration action plan document	The rate of deforestation was last estimated over %2 in 10-2009.	MWCT MEF	MLF MWRI MHADM MAFS State Governments	$2,500,000
		• Implement forest resource restoration action plan	• Annual monitoring reports and bi-annual evaluation reports				
By 2023, national programme for rehabilitation of degraded farmlands developed and under implementation	• At least %30 of the degraded forests restored by 2024	• Design degraded farmlands restoration action plan including technical feasibility for wetland and Sudd restoration	• Degraded farmlands restoration action plan document	South Sudan has one of the highestrate of soil loss on the African continent. At 12.6 t/ha/ year average predicted soil loss rate (ELD and UNEP 2015)	MAFS MLF State Governments	MEF MWRI MHADM MWCT	15,000,000$
		• Implement degraded farmlands restoration action plan	• Annual monitoring reports and bi-annual evaluation reports				
Sub-total budget $							**78,800,000**

6.3.6. STRATEGY FOR RESOURCE MOBILISATION FOR BIODIVERSITY MANAGEMENT

6.3.6.1 THE STRATEGY

Strategic Objective 6: Develop and implement a resource mobilisation strategy for biodiversity conservation and management in South Sudan.
In order to fulfil this objective and address the underlying causes of biodiversity loss, the following targets are proposed:

14. By 2022, a natural resource mobilisation plan for biodiversity management will have been developed and under implementation.
15. By 2024, at least %50 of the required budget for the NBSAP will have beengenerated from diverse sources and will be made available for its implementation.

The fifth National Report for South Sudan noted that the funding based for biodiversity management in South Sudan was built on annual budgets presented to the Ministry of Finance. The funds are inadequate and not sustainable and alternative financing strategies that provide sustainable sources of funding for the Wildlife Authority are required to assist towards the path of sustainable conservation financing.

The CBD prioritises financial resources generation and financing mechanisms under its Articles 20 and 21. The institution for countries on Article 20. "Financial Resources" are that each Contracting Party undertakes to provide financial support and incentives in accordance with its national plans, priorities and programmes. The Convention also states that developed country Parties shall provide new and additional financial resources to enable developing country Parties to meet the agreed full incremental costs to them by implementing measures which fulfil the obligations of this Convention. Contributions from other countries and sources on a voluntary basis would also be encouraged. The implementation of these commitments shall take into account the need for adequacy, predictability and timely flow of funds as well as the importance of burden-sharing among the contributing Parties included in the list. The developed country Parties may also provide, and developing country Parties may avail themselves of, financial resources related to the implementation of this Convention through bilateral, regional and other multilateral channels. Moreover, developed country Parties' effective implementation of their commitments under the Convention related to financial resources and transfer of technology will take fully into account the fact that economic and social development and eradication of poverty are the first and overriding priorities of the developing country Parties. The Parties shall take into account the specific needs and special situation of least developed countries in their actions with regard to funding and transfer of technology. The Contracting Parties shall also take into consideration the special conditions resulting from the dependence on, distribution and location of, biological diversity within developing country Parties, particularly small island States. Consideration shall also be given to the special situation of developing countries, including those that are most environmentally vulnerable, such as those with arid and semi-arid zones, coastal and mountainous areas.

The CBD also proposed under Article 21. "Financial Mechanisms" for the provision of financial resources to developing country Parties for purposes of this Convention on a grant or a concessional basis, the essential elements of which are described in this article. The mechanism shall function under the authority and guidance of, and be accountable to, the Conference of the Parties for purposes of this Convention. At the same time, Contracting Parties shall consider strengthening existing financial institutions to provide financial resources for the conservation and sustainable use of biological diversity.
The NBSAP South Sudan proposed a development of resource mobilisation plan that covers both financial resources and other resource mobilisation to support implementation of the NBSAP. Financial resource mobilisation priority is expected to be initiated in the first year of implementation of the NBSAP.

6.3.6.2 ACTION PLAN FOR RESOURCE MOBILISATION FOR BIODIVERSITY MANAGEMENT IN SOUTH SUDAN

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO6: Develop and implement a resource mobilizsation strategy for biodiversity conservation and management in South Sudan							
By 2022, a natural resource mobilisation plan for biodiversity management will have been developed and under implementation	• National resource mobilisation plan developed and implemented	• Under policy and institutional review of biodiversity financing, expenditure review and establish an efficient finance gap and needs for biodiversity management	• Resource mobilisation plan developed • Policy review, expenditure review and finance gap reports	Current budget allocations are from the Central Government sub-ventions to the Ministries and State Governments. Withthe exceptionof Global Environment Facility (GEF), projects funded by multilateral donors such as the European Union and the Wold Bank and bilateral donors such as USAID, there is no comprehensive mechanism for financing biodiversity conservation in the country.	MEF MFEP MWCT	MAFS MLFI MEWI	$800,000
		• Develop guidelines for financing biodiversity in South Sudan	• Guidelines for financing biodiversity				
		• Pilot biodiversity finance instruments and solutions at state and national level	• Annual monitoring reports and bi-annual evaluation reports				
By 2024, at least %50 of the required budget for the NBSAP will have been generated from diverse sources and will bemade available for its implementation	• 50% of the required budget for NBSAP generated	• Mobilise resources by creating synergies between the different multilateral Environmental Conventions (climate change, sustainable land management, among others)	• 50% of the resource requirements acquired for biodiversity management		MEF MFEP	MAFS MLFI MEWI MWCT	1,800,000
		• Disseminate and organise resource mobilisation meetings with related government agencies, development partners, and private sector	• Increased funding from regular financing sources for biodiversity management				
	• At least 20% of biodiversity financing for South Sudan raised through innovative financing mechanisms with private sector, and international partners	Put in place an enabling policy or legislative framework for new biodiversity financing mechanisms	• A policy or regulations in place		MEF MFEP MWCT	MAFS MLFI MEWI	400,000
		• Develop guidelines for developing innovative financing mechanisms	• Guidelines for innovative financing mechanisms				
		• Conduct training for mobilisation of funds using innovative financing instruments	• Number of states, national government staff, private and NGO persons trained				
		• Institute appropriate market-based mechanisms for biodiversity goods and services	• Evaluation reports				
Sub-total budget $							**2,000,000**

6.3.7. STRATEGY TO ESTABLISH KNOWLEDGE AND INFORMATION MANAGEMENT SYSTEMS AND AWARENESS CREATION FOR BIODIVERSITY MANAGEMENT

6.3.7.1. THE STRATEGY

Strategic Objective 7: Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan
In order to fulfil this objective and address the underlying causes of biodiversity loss, the following targets will be sought:

16. By 2022, ensure broad extension of environmental education in the society for improving awareness of population on biological diversity and ecosystem services
17. By 2022, strengthen the role of the scientific research and professional institutions, NGO sector and media, including improvement of scientific technologies
18. By 2022, significantly increase the contribution of scientifically based information into biodiversity decision making processes and management interventions.
19. (Let the year here be indicated as 2019) Complete biodiversity information system and build up the capacity of CHM
20. By 2026, complete a national inventory on the genetic diversity of species of cultivated plants, farm animals and wild relatives, with the view to develop actions to safeguard the genetic diversity of other priority species of socioeconomic value, animal species and selected wild plants

Knowledge and information management is an important consideration in the NBSAP South Sudan. The priority for knowledge information and awareness leans on Articles 12 (Research and Training), 13 (Public Education and Awareness), 16 (Access to and Transfer of Technology) and 17 (Exchange of Information) among other articles of the CBD.

The GRSS and stakeholders associated with NBSAP South Sudan seek to integrate traditional knowledge and practices with modern knowledge and practices for effective and efficient biodiversity management in South Sudan. Development of knowledge and information management systems not only deals with developing Clearing House Mechanisms (CHM), it also deals with developing capacity for collation, databases for storage, and generation of new knowledge nationally as well as access to and utilisation of knowledge from outside the country. According to the CBD, exchange of information shall include exchange of results of technical, scientific and socioeconomic research, as well as information on training and surveying programmes, specialised knowledge, indigenous and traditional knowledge as such and in combination with the technologies referred to in Article 16, paragraph 1. It shall also, where feasible, include repatriation of information.

resources to developing country Parties for purposes of this Convention on a grant or a concessional basis, the essential elements of which are described in this article. The mechanism shall function under the authority and guidance of, and be accountable to, the Conference of the Parties for purposes of this Convention. At the same time, Contracting Parties shall consider strengthening existing financial institutions to provide financial resources for the conservation and sustainable use of biological diversity.
The NBSAP South Sudan proposed a development of resource mobilisation plan that covers both financial resources and other resource mobilisation to support implementation of the NBSAP. Financial resource mobilisation priority is expected to be initiated in the first year of implementation of the NBSAP.

6.3.6.2 ACTION PLAN FOR RESOURCE MOBILISATION FOR BIODIVERSITY MANAGEMENT IN SOUTH SUDAN

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO7: Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan.							
By 2023, ensure broad extension of environmental education in the society for improving awareness of population on biological diversity and ecosystem services	• Increased public participation in biodiversity conservation at the national and local level	• Sensitise local communities on what biodiversity conservation is and how they can benefit from biodiversity through radio, community gatherings and local government structures	Quarterly public outreach environmental education in the society for improving awareness of population on biological diversity and ecosystem services		MEF State Governments University of Juba and other Universities	MWCT MLF MWRI MHADM MAFS	$15,150,000
		• A programme for training of staff of different Ministries, Departments and Agencies in Biodiversity Management Across Central Government and State Government and County levels	2 biodiversity managers across (agriculture, forestry, wetlands, environmental management, fisheries) the 32 states trained per year				
		• Conduct public awareness on biodiversity across all states and at national level	Annual reports on public participation in regulation on biodiversity use.				
	• Increased institutional awareness at national and local levels	• Meetings and workshops	Collaboration and information flow among stakeholders improved		MEF State Governments Academia	MWCT MLF MWRI MHADM MAFS	$150,000
		• Establishment of science, technology, engineering and mathematic [STEM]	Dissemination of the information to all the relevant stake holders A reasonable percentage of stakeholders at all levels are aware of NBSAP and its value (after estimating the baseline of where we are now)				

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO7: Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan.							
		• Undertake intensive awareness raising on the content of NBSAP at all levels	A reasonable percentage of stakeholders at all levels are aware of NBSAP and its value (after estimating the baseline of where we are now)		MEF State Governments Academia	MWCT MLF MWRI MHADM MAFS	$300,000
By 2022, strengthen the role of the scientific research and professional institutions, NGO sector and media, including improvement of scientific technologies	• National genetic inventory developed.	• Integrate biodiversity database with other biodiversity system	Availability of up to date data on wildlife species trends	Since the CPA there has not been adequate investment in species and genetic resource management	MWCT MAFS MEF	MLF MWRI MHADM	$500,000
		• Inventory of genetic resources established	Genetic resource conservation and management is effective				
		• Develop strategy and action plans for genetic diversity	Important species and varieties are adequately conserved				
By 2020, significantly increase the contribution of scientifically based information into biodiversity decision making processes and management interventions	• Scientific research streamlined into policies	• Link research to biodiversity	Biodiversity information is well known to the people in the community	There are a few programmes at institutions of higher learning such as the University of Juba. However, the programmes are poorly funded and have very low capacity	MWCT MAFS MEF Academia	MLF MWRI MHADM	$150,000
		• Awareness raised of the benefits of scientific research	Dissemination of this information to the stakeholders				

Targets/Action	Outputs	Activities to achieve outputs	Output indicators	Baseline status	Responsible Agency	Partner institutions	Amount$
SO7: Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan.							
Complete biodiversity information system and build up the capacity of CHM	• Build capacity on the application of Biotechnology	• Assess national capacities in Biotechnology and Biosafety	National capacity for Biotechnology and Biosafety assessed	Since the CPA there has not been adequate investment in Biotechnology and Biosafety	MWCT MAFS MEF	MLF MWRI MHADM	$500,000
	• National biodiversity database system developed	• CHM developed	• Operational CHM and running website	The Ministry of Environment and Forestry has established a biodiversity data bank and with support of GEF/ UN Environment is developing a CHM	MWCT MAFS MEF	MLF MWRI MHADM	$250,000
		• Develop a biodiversity database system	• Information on the biodiversity developed				
		• Promote infrastructural Development and Research on biotechnology and Biosafety	• Accredited Biotechnology and Biosafety infrastructure developed				
		• Support the development of skilled human resources for Biotechnology and Biosafety	• A critical mass of scientists trained in Biotechnology and Biosafety				
By 2016, complete a national inventory on the genetic diversity of species of cultivated plants, farm animals and wild relatives, with the view to develop actions to safeguard the genetic diversity of other priority species of socioeconomic value, animal species and selected wild plants.	• Minimise loss of genetic diversity of cultivated plants and domesticated animals	• Collect information on availability of plant and animal germplasm • Identify, collect and conserve traditional species and varieties	• Information on germplasm documented • Important species and varieties are adequately conserved	There is a limited crop and livestock biodiversity data bank at the Ministry of Agriculture and Food Security and at the University of Juba. However, facilities are poorly maintained	MWCT MAFS MEF Ministry of Livestock and Fisheries	MLF MWRI MHADM	$500,000
Sub-total budget $							**17,500,000**
GRAND TOTAL							**118,150,000**

7

IMPLEMENTATION ARRANGEMENTS

7. IMPLEMENTATION ARRANGEMENTS

7.1. NATIONAL COORDINATION STRUCTURE

The national coordination provides guidance on which institutions and how the implementation of the NBSAP will be coordinated. The national coordination structure was developed through a stakeholder consultation process with support of ministries, departments and state governments, as well input from non-government organisations and academic institutions.

The core coordination ministries for the NBSAP under the leadership of the Ministry of Environment and Forestry are the Ministry of Wildlife, Conservation and Tourism, Ministry of Agriculture and Food Security, the Ministry of Livestock and Fisheries and the Ministry of Water Resources and Irrigation.

7.2. RESOURCE MOBILISATION ARRANGEMENTS

The government operates the austerity measures 2012-13

7.2.1. STATUS OF FINANCING FOR BIODIVERSITY MANAGEMENT

The GRSS budget allocations and appropriations have been on an increasing trend since South Sudan gained independence in 2011. On average the government budget amounted to 14 billion South Sudan Pounds (SSP) per annum yet its revenue averaged 10.8 billion SSP per annum (Table 12). Between 2011-2012 and 2016-2017, the Government budgetary allocation increased by 30 billion SSP (374.8 percent) which translates to an annual increase of 2.3 billion SSP (16.2 percent). Annually, the Government allocates over half of its budget to three sectors including Security (33 percent), Rule of Law (11.8 percent) and Public Administration (11.4) (Table 17). On average the Government of South Sudan (GRSS) allocates 51.3 percent of its total allocation to payment of employee emoluments, 37.3 percent to operations and only 9.7 percent to capital expenditure (Table 18).

From 2011-2012 to 2016-2017, the Government has been on a negative spending mode with expenditure averaging 11.9 billion SSP per annum compared to revenue which stood at 10.8 billion SSP per annum. On average the Government underspent by 2.3 billion SSP (16.2 percent) per annum.

Table 18: Government of the Republic of South Sudan (GRSS) Financial Overview

Fiscal Year	Revenue (SSP millions)	Budget (SSP millions)	Actual expenditure (SSP millions)
2011-2012	10,183	8,017,620,124	10,141,510,261
2012-2013	6,771	6,664,162,032	6,816,534,366
2013-2014	10,403	10,403,498,297	9,072,095,707
2014-2015	11,711	11,205,986,281	11,819,356,980
2015-2016	6,971	10,640,576,478	11,869,109,387
2016-2017	18,535	38,074,035,039	21,513,587,610
Average	10,762	14,167,646,375	14,246,438,862

Between 2011-2012 and 2016-2017, GRSS spending increased by 30 billion SSP (374.9 percent), which translated to an annual increase of 9.6 billion SSP (44.8 percent). The Security Sector (42.8 percent), the Public Administration Sector and the Rule of Law Sector (13.0) are the three largest spenders in the GRSS (*Table 19*).

Table 19: GRSS average sectoral budget and outlays from July 2011 – June 2017

Sector	Budget (SSP)	Expenditure (SSP)	% Total Budget	% Total Expenditure
Accountability	424,188,179	892,604,932	3.0	7.5
Economic Function	318,200,580	278,662,046	2.2	2.3
Education	719,232,384	502,763,880	5.1	4.2
Health	344,789,970	215,354,853	2.4	1.8
Infrastructure	381,831,309	357,527,846	2.7	3.0
Natural Resources & Rural Development	431,606,321	326,239,253	3.0	2.7
Public Administration	1,614,662,663	2,110,078,883	11.4	17.8
Rule of Law	1,666,079,919	1,544,280,400	11.8	13.0
Security	4,723,292,335	5,079,996,541	33.0	42.8
Social and Humanitarian Affairs	114,541,649	78,571,119	0.8	0,7

On average, the Government overspends on wages and salaries by 2.2% but underspends on day to day activities by 5.4% (Table 15).

Biodiversity management in South Sudan largely falls under the Natural Resources and Rural Development sector of GRSS. The budget allocations and expenditures of the natural resources and rural development sector were used to contextualise the GRSS financing of biodiversity related agencies for the fiscal years 2011-2012 to 2016-2017. On average, GRSS allocates 3 percent of its total allocations to the natural resources and rural development sector but the outlay was only 2.7 percent of the average allocation to the sector (*Tables 14 and 15*).

Between 2011-2012 and 2016-2017, the sector's budget allocation increased by 75.3 percent accounting for a 320.7 million SSP increase which translates to an average increase of 81 million SSP (16.4%) per annum. Between 2011-2012 and 2016-2017, the sector's spending increased by 47.8 million SSP (13.5 percent), which translates to an average expenditure of 8 million SSP(3.1 percent) per annum. The variation in allocation and spending accounts to 105.3 million SSP (24.4 percent) between 2011-2012 and 2016-2017. A breakdown of allocations and spending in the sector based on budget lines showed that, the GRSS allocates 67.6 percent of its average allocations to the sector on employee emoluments, 18.9 percent on day to day activities (operations) and only 11.8 percent on capital expenditure (Table 20). While the expenditure in the sector is a mirror image of the allocations to budget lines, the sector spends more than allocated to cover the sector's ever increasing wage bill which stands at an average 73.5 percent compared to operations (11.3 percent) and capital expenditure (11.8 percent) (*Table 20*).

Table 20: GRSS mean budget allocations and spending from July 2011 – June 2017

Level/Agency	Wages & Salary		Operation		Capital		Other	
	% Budget	% Outlay	% Budget	% Outlay	% Budget	% Outlay	% Budget	% Outlay
GRSS	**51.3**	**53.5**	**37.3**	**31.9**	**9.7**	**11.7**	**1.7**	**2.9**
Natural Resources & Rural Develop	67.6	73.5	18.9	11.3	11.8	14.9	1.7	0.2
Wildlife Conservation & Tourism	89.5	86.6	9.9	8.4	0.5	4.9	0.01	0.00
Environment & Forestry	33.7	46.3	46.3	50.1	9.8	3.5	0.0	0.0
Livestock & Fisheries	34.3	52.3	41.7	32.1	24.0	15.6	0.0	0.0
Agriculture & Food Security	35.2	49.0	33.2	26.8	31.6	24.2	0.0	0.1
Water Resources & Irrigation	43.5	37.8	28.1	26.2	28.5	7.6	0.0	28.5
Petroleum and Mining	41.8	29.5	41.4	54.7	16.7	1.2	0.0	14.6

7.2.2. POLICY AND INSTITUTIONAL FRAMEWORK FOR FINANCING BIODIVERSITY MANAGEMENT

The resource mobilisation strategy for the NBSAP of South Sudan will be jointly coordinated by the Ministry of Environment and Forestry (MEF) and the Ministry of Finance and Planning. The core coordination structure will mirror the NBSAP coordination structure with commitments from all Cabinet ministries of GRSS.

7.2.3. PROJECTED RESOURCE REQUIREMENTS

The NBSAP development process has proposed a cost of $118,150,000. The estimate was simplistic cash flow projections based on discussions with stakeholders engaged in the NBSAP development. A more refined assessment of financial requirements, mobilisation, policy legislation and institutional arrangements has been proposed in the NBSAP.

7.2.4. SOURCES OF FINANCING

7.2.4.1. TRADITIONAL FINANCING MECHANISMS

a) *Central Government allocations under the national budget*

The national budget for GRSS is initiated by MFP (Ministry of Finance and Planning) through submission of a national budget plan to the Council of Ministers for approval. The Council of Ministers approves budget ceilings for different ministries and government agencies. Typically, sectoral budget plans comprise of funds allocated for wages and salaries, use of goods and services (operations) and capital expenditure. The capital expenditure generally does not cater for mandatory development activities of spending agencies. The national budget process runs from November to June when the approvals are made, and the national budget instrument passed by government.

The national budget comprises of Central Government revenues and donor support under on-budget allocation. The budget allocated for the Natural Resources and Rural Development sector in 2015-2016 was 431.6 million SSP (equivalent to $66 million) while the budget outturn was 362.2 million SSP (equivalent to $50 million). The allocation was 3 percent of the national budget while the outturn was 2.7 percent. On budget funds from the Central Government is the

main form of financing for biodiversity related activities in South Sudan.
While the priority of the GRSS is security receiving 42.8 percent of the budget outturn, the outturn towards the Natural Resources sector was still higher than the outturn for health (1.8 percent), economic functions (2.3 percent), social and humanitarian affairs (0.7 percent).

Therefore, the level of priority in government allocation may be secondary to the size of the national budget.

b) *Off-budget support from Donors and Non-Tax Revenue by government agencies*

Traditionally, South Sudan receives a large portion of finance, especially for relief activities, under off-budget funds managed by multilateral agencies such as the United Nations, by non-government organisations but also from donor partners such as the World Bank, USAID, and European Commission among others. The size of the off-budget support has not been articulated in the background documents of the National Budget, but it is considered to be substantial.

The security concerns across the country have limited efforts by agencies such as UNDP, WCS, and USAID among others from implementing biodiversity management activities on ground. There will be additional emphasis on integrating any biodiversity related funds with implementation of the NBSAP.

c) *Overseas Development Assistance*

Both the national budget and off-budget financing receive considerable contributions from overseas development assistance (ODA) as well as support channelled through other multilaterals such as the African Development Bank (AfDB) and the Inter-Governmental Authority on Development (IGAD). The ODA falls under categories of multilateral donors, bilateral donors and under the CBD, South to South Cooperation. The regular multilateral donors for South Sudan are; the World Bank, the European Commission and the United Nations under its agencies- UN Environment, UNDP, United Nations Industrial Organisations (UNIDO) and FAO.
Bilateral donors to South Sudan have traditionally included; USAID, the federal Government of Germany, Norway, Japan, South Korea and France, among others.
South to South Cooperation occurs through reformed multilateral arrangements such as IGAD, the East African Community (EAC), and transboundary resource management with South Sudan's neighbours including, Uganda, Kenya, Ethiopia, DRC, CAR and Sudan.

d) *International funds that support biodiversity-related activities*

a) The Global Environment Facility (GEF). GEF is a partnership of United Nations member states, civil societies and private sector whose main purpose is to address global environment issues while supporting national sustainable development. GEF was established on the eve of the 1992 Rio Earth Summit. Since 1992, the fund has provided $17 billion in grants and mobilised over $ 88 billion in financing of projects in at least 170 countries across the world. GEF financial mechanisms support 5 major international conventions including UNFCCC, CBD, the Stockholm convention on Persistent Organic Pollutants (POPs) and the Minimata convention on Mercury.
GEF is one of the key international financing arrangements for biodiversity management in South Sudan. The support of GEF would be sought in implementation of the NBSAP South Sudan.

e) *Green Climate Fund*

The Green Climate Fund (GCF) is a new fund created to support developing countries to respond to the challenges of climate change-comprising of climate change mitigation and adaptation. The fund promotes a paradigm shift to low-emissions and climate resilient development taking into account the needs of the nations that are particularly vulnerable to climate change impacts. The Green Climate Fund supports the implementation of the Paris Agreement whose goal is to keep climate change well below 2 degrees Celsius. GCF funds come mainly from developed countries and also from developing countries and when the initial resource mobilisation was launched in 2014, pledges worth $10.3 billion were gathered. By 2017, over $10 billion had been mobilised with contributions from both the public and private sector.

7.2.4.2. INNOVATIVE FINANCE MECHANISMS

1. Payments for ecosystem services

Payment for environmental services scheme is defined as (i) a voluntary transaction in which, (ii) a well-defined environmental service (ES), or a form of land use likely to secure that service, (iii) is bought by at least one ES buyer, (iv) from a minimum of one ES provider, and (v) if and only if the provider continues to supply that service (conditionality) (Lund 2005). The biodiversity conservation options proposed in the guidelines include but are not limited to the purchase of high-value habitat, payment for access to species or habitat, payment for biodiversity-conserving management practices, tradable rights under cap & trade regulations, and support to biodiversity-conserving businesses.
To achieve success with PES systems in biodiversity conservation, it is important to include the following considerations in design:

i. A pro-poor PES programme is one that maximises its potential positive impact and minimises its potential negative impact on the poor.

ii. Keep transaction costs low. This is important in all PES programmes, as it affects their efficiency. Keeping transaction costs low is particularly important when many potential participants are poor, as they will be relatively more heavily affected.

iii. Devise specific mechanisms to counter high transaction costs. When many potential participants are smallholders, transaction costs will inherently be high. Specific mechanisms should be developed to reduce these costs, such as collective contracting.

iv. Provide targeted assistance to overcome problems that impede the participation of poorer households. This may take the form of technical assistance or credit programmes for example.

v. Avoid implementing PES programmes in areas with conflicts over land tenure.

vi. Ensure that the social context is well understood, so that possible adverse impacts are anticipated, and appropriate remedial measures can be designed.

2. Biodiversity offsets

Offsets are measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimised and/or rehabilitated or restored, in order to achieve no net loss or a net gain of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat(s), arrested degradation or averted risk, protecting areas where there is imminent or projected loss of biodiversity.

Developers of large infrastructure projects such as hydroelectric power projects, mines, oil and gas projects and large agricultural production projects will be encouraged to use biodiversity offsets as part of the review of the Environmental Impact Statement (EIS). Results of cost-effectiveness, cost-benefit analyses and other economic instruments will be used to demonstrate the benefits of biodiversity offsets over alternative biodiversity loss mitigation measures. The main stakeholders, beneficiaries or losers, will use available incentives of acknowledgement in publications, international media, websites and use of environmental compliance audit reports and sector reporting to encourage project developers to establish biodiversity offsets.

3. Environmental fiscal reforms

"Environmental fiscal reform" (EFR) refers to a range of taxation and pricing measures which can raise fiscal revenues while furthering environmental goals. EFR measures include (i) taxes on natural resource extraction, (ii) product subsidies and taxes, (iii) taxes on polluting or harmful emissions and (iv) user charges or fees. The feasibility of EFRs depends on: (i) natural resource pricing measures, such as taxes for forests and fisheries exploitation; (ii) reforms of product subsidies and taxes; (iii) cost recovery measures; (iv) pollution charges.

i. Fiscal instruments i.e. taxes and subsidies, are mechanisms for raising and transferring funds between sectors. While economic development is critical for lifting people out of poverty and raising living standards for the broader population, it also causes harmful side effects—particularly for the environment—with potentially sizeable costs for the macro-economy.

ii. Fiscal instruments (emissions taxes, trading systems with allowance auctions, fuel taxes, charges for scarce road space and water resources, etc.) can and should play a central role in promoting greener growth. Fiscal instruments for biodiversity conservation should be employed based on three criteria: (i) effective at reducing environmental harm—so long as they are carefully targeted at the source of the problem (e.g. emissions); (ii) cost-effectiveness (i.e. they impose the smallest burden on the economy for a given environmental improvement)—so long as the fiscal dividend from these policies is exploited (e.g. revenues are used to strengthen fiscal positions or reduce other taxes that discourage work effort and investment); (iii) strike the right balance between environmental benefits and economic costs—so long as they are set to reflect environmental damages.

iii. Charge systems: Charges are defined as payments for use of resources, infrastructure, and services and are akin to market prices for private goods. Charges include pollution charges, user charges e.g. for wetlands, betterment charges (imposed on private property which benefits from public investments), impact fees, access fees and administrative charges.

iv. Financial instruments: The financial sector is the set of institutions, instruments, and the regulatory framework that permits transactions to be made by incurring and settling debts, that is, by extending credit. All companies, regardless of sector, both impact on biodiversity and ecosystems and depend on ecosystem services. There is an important role for the financial sector in this regard, including: the management of biodiversity risks in lending and investment decisions and setting up of new innovative financial mechanisms for pro-biodiversity businesses and biodiversity conservation areas.

4. Performance bonds

Environmental performance bonds and deposit refund systems are economic instruments that aim to shift responsibility for controlling pollution, monitoring, and enforcement to individual producers and consumers who are charged in advance for the potential damage. Performance bonds require proponents of environmentally damaging enterprises, such as mining, timber harvesting, and road building, post-performance or assurance bonds. In order to be effective, bonds must be set at a level which accurately reflects all anticipated environmental damages that could result. Government agencies must monitor and enforce compliance effectively. The bonds must be held long enough to ensure the proponents have complied with their obligations.

5. Green markets through natural resource trade and value chains

Market for green products refers to the trade mechanism for products certified using criteria that support the three objectives of the CBD. Such products are either natural products including wild plant and animal products used as food sources or used for bio-chemicals, new pharmaceuticals, cosmetics, personal care, bioremediation, bio-monitoring, and ecological restoration, or nature-based products involving many industries, such as agriculture, fisheries, forestry, biotechnology based on genetic resources, recreation and ecotourism.

Institutional support will be needed to ensure that products are eligible to compete for markets. The markets in Europe, the United States, Asia and within Africa require appropriate standards attainment, volumes and regularity of supply. Other considerations such as market information, transaction costs and other business skills are acquired through product-based entrepreneurship training.

6. Climate finance

The more frequently implemented carbon projects focus on climate change mitigation. Communities and project developers are urged to implement voluntary carbon standards that have explicit biodiversity conservation criteria such as Plan Vivo, CCB and VCS. For CDM and REDD Plus projects, biodiversity is generally embedded in forestry projects.

Biodiversity conservation stakeholders supporting projects that could affect some forms of biodiversity such as wetlands, fisheries, vegetation, insect and animal population as well as agro-ecosystems should seek specific biodiversity criteria.

There is a need to work with partners who have a strong interest in biodiversity conservation such as the United States Agency for International Development (USAID), the World Bank, the German, Norwegian, Belgian, Swedish and United Kingdom Governments and other development partners to integrate biodiversity in their climate change support programmes.

Buyers of carbon credits should have the option of buying bundled carbon credits demonstrated. The possible bundle should include carbon, watershed and biodiversity conservation. If premiums are earned, they should be reflected as market incentives to attract more buyers.

There is a need to upscale community carbon finance initiatives and facilities that promote bundled carbon finance with other forms of PES. The early initiatives currently being promoted should be promoted with additional facility support.

7.3. TECHNOLOGY NEEDS, COMMUNICATION AND OUTREACH

Empowered by Articles 13, 16 and 18 of the CBD, the GRSS has integrated public education and awareness, access to and transfer of technology and technical and scientific cooperation at the core of its transition into implementation of the NBSAP South Sudan. The opportunities created under the Convention Protocols (the Cartagena Protocol on Biosafety and the Nagoya Protocol on Access and Benefit-Sharing) to fast track technology needs assessment and filling the gap on technology to be able to effectively implement the protocols as well as the Convention as a whole and the related conventions under the Rio MEAs and other biodiversity related conventions.

Similarly, the GRSS will seek support from the cooperation and partnership arrangements of the CBD including South to South Cooperation particularly with other African and Southern Hemisphere Countries to bridge the knowledge and technology gaps through learning visits and exchanges and demonstration of best practices that can be adopted by NBSAP stakeholders and partners in South Sudan.

7.4. CAPACITY BUILDING

The fifth National Report of South Sudan to the CBD highlighted that the lack of infrastructure and equipment needed to manage a Park is either absent or dilapidated. Most Parks generally lack roads and have no vehicles and equipment needed for Park management or patrols. In addition, there was inadequate capacity to undertake comprehensive environmental and socioeconomic impact assessments with major impacts on biodiversity prior to implementation of major projects such as hydropower development, road construction, and activities that alter natural wetlands and its associated biological resources, among others. In terms of Human resources, many Government departments in South Sudan suffer inadequacies such as a lack of experienced and/or trained staff. Many of the current staff have a strong military background as most of them were transferred from SPLA with limited skills to implement biodiversity management.

The NBSAP has noted the need to train the existing biodiversity related personnel and encourage other qualified people across all biodiversity related ministries and sectors at national and subnational levels. The wildlife training centers (e.g. Boma Wildlife Training Center and Nimule Training Center) as well as universities such as the University of Juba, which has Departments for Environment, Agriculture and Wildlife Science can support the capacity building efforts. International facilities can support capacity building at the national universities to ensure sustainability of programmes. The capacity development effort should also be extended to communities (pastoralists, farmers and anglers) living in or around protected areas to improve their skills in the protection of wildlife and poverty alleviation.

8

MONITORING AND EVALUATION

8.1. LOG-FRAME FOR NBSAP SOUTH SUDAN

The monitoring and evaluation framework for the NBSAP South Sudan has been summarised in the log-frame (Table 21. The log-frame shows the flow of targets/ actions for each of the strategies, objectives, the outputs, and output indicators. The log frame also shows the means of verification for indicators comprising of internal and external evaluation activities, as well as documented evidence and physical observation. The key assumptions to the success of the NBSAP and the Monitoring and Evaluation framework are the availability of resources, political will, improvement of security conditions and willingness of stakeholders both within and outside South Sudan to patronise the strategic objectives and actions. The timeline for the NBSAP is 2017-18 to 2025-26.

Table 21: Log-Frame for implementation of NBSAP of South Sudan

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
Strategic Objective 1 (SO1): Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan					
By 2018, NBSAP will be adopted and effectively implemented, and a comprehensive National biodiversity coordination framework will be in place	Adoption of NBSAP by Council of Ministers	Adoption of Cabinet paper by MEF	National NBSAP adoption resolution instrument	NBSAP meets government expectations and is aligned with government strategic plans and programmes	
		Resolution of Council of Ministers			
		A National Biodiversity Policy Framework in place			
	Adoption of Institutional Coordination Framework for NBSAP by the Minister for Environment and Forestry	A final draft NBSAP coordination framework paper for Cabinet approval	Multi-institution NBSAP coordination framework or MOU instrument	Agreement by all implementing stakeholders (public, private and non-government)	March 2018 to December 2018
		Resolution of Council of Ministers			
Biodiversity values mainstreamed into the National Economic Development Plans and Budget Framework papers, and for State and County Development Plans.	Situation analysis of status integration of biodiversity values (directly and indirectly into National Economic Development Plansand Budget Framework papers)	Report on national policy and regulatory review	Internal annual evaluation and external -2.5 year evaluation reports	Availability of resources to conduct evaluation activities	Annually and every 2.5 years 2018 - 2026
		Synthesis reports for government, non-governmental organisations and private sector			
		State level reports, video files,			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
Strategic Objective 1 (SO1): Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan					
Biodiversity values mainstreamed into the National Economic Development Plans and Budget Framework papers, and for State and County Development Plans.		Knowledge and capacity assessment reports (government, non-governmental organisations and private sector)			
	Biodiversity and ecosystem valuation integrated into a natural capital accounting framework undertaken	National natural capital accounting scoping report	Clear categories of biodiversity (forestry, wildlife, agro-ecosystems, water resources, etc.) included in the national accounts and annual national and state budget votes	Political will and availability of resources	2020 - 2027
		National natural capital accounting design report and templates			
		National Social Accounting Matrix (SAM), and/or input-output tables			
		National CGE model for integration of biodiversity modelling data			
		National and local Government Staff engaged in data collection, collation and analysis			
		National biodiversity accounts spread sheets and report			
		A CGE (Computable General Equilibrium) analysis of biodiversity and national economy			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
Strategic Objective 1 (SO1): Develop a stakeholder co-ordination framework for national and subnational biodiversity management in South Sudan					
	Biodiversity and ecosystem valuation integrated into a natural capital accounting framework undertaken	A national guideline for mainstreaming biodiversity values developed	Clear categories of biodiversity (forestry, wildlife, agro-ecosystems, water resources, etc.) included in the national accounts and annual national and state budget votes	Political will and availability of resources	2020 - 2027
		National and state level staff trained			
		Government plans & projects mainstreamed into biodiversity values			
By 2025, an integrated national biodiversity monitoring, assessment and reporting system will be established	Establishment of the integrated national biodiversity monitoring, assessment and reporting system	Instrument of technical and minutes of meetings and decisions taken	Designated officers at state and national level. Operational national biodiversity monitoring, assessment and reporting mechanisms	Availability of resources	2018 - 2027
		Draft documents			
		Endorsement of the framework for establishment of the integrated system			
		Capacity built for writing project proposals			
		Secretariat offices operational			
		Annual monitoring & evaluation reports			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO2: To strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.					
By 2022, National Government and State Governments will have reviewed relevant legislation, policies and programmes to maximise synergies with the NBSAP	National Government (State) reviewed relevant legislation, policies and programmes on biodiversity management. For synergies and gaps in relation to NBSAP	At least 80% of all legislation and policy documents will have been reviewed	A national programme for filling missing gaps in regulation and capacity building for biodiversity management in South Sudan	Availability of resources and willingness of national stakeholders and international partners	2020 - 2027
		Regulatory reforms/ actions offer the best opportunity for synergies to maximise benefits of biodiversity management			
	Assess and build capacity for regulatory enhancement to enhance synergies	Assessment report.			
		Guidance for capacity building			
		Capacity building reports, and legislative, regulatory and policy documents that would have been reviewed			
By 2022, prepare the legislation and establish the conditions for ratification and/ or accession and implementation of the Nagoya Protocol, Cartagena and other biodiversity - related conventions (Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),	Layout necessary conditions for preparation of legislation	Government endorsed Instrument of accession to ABS Nagoya Protocol	Accession completed for ABS Nagoya Protocol and the other seven international biodiversity related agreements	Availability of resources and willingness of national stakeholders and international partners	2019 - 2024
	Alignment of relevant policies, programmes undertaken	National ABS Regulations and/or guidelines including essential elements of the Nagoya Protocol. Relevant plans and projects initiated.			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO2: To strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.					
Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (RAMSAR), World Heritage Convention (WHC), International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and International Plant Protection Convention (IPPC)	Layout necessary conditions for preparation of legislation for all other biodiversity related conventions	All other biodiversity related conventions and Government endorsed Instruments of accession.	Accession completed for ABS Nagoya Protocol and the other seven international biodiversity related agreements	Availability of resources and willingness of national stakeholders and international partners	2019 - 2024
	National consultation process undertaken on ratification and accession to Biodiversity conventions/ agreement	Revised ABS Regulations submitted to Cabinet for consideration and/or approval			
		Revised regulations of CITES submitted to Cabinet for consideration and/or approval			
		Revised regulations of CMS submitted to Cabinet for consideration and/or approval			
		Revised regulations of RAMSAR submitted to Cabinet for consideration and/or approval			
		Revised regulations of WHC submitted to Cabinet for approval			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO2: To strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.					
By 2022, prepare the legislation and establish the conditions for ratification and/or accession and implementation of the Nagoya Protocol, Cartagena and other biodiversity - related conventions (Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Wetlands of International Importance, Especially as Waterfowl Habitats (RAMSAR), World Heritage Convention (WHC), International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and International Plant Protection Convention (IPPC)	National consultation process undertaken on ratification and accession to Biodiversity conventions/ agreement	Revised regulations of ITPGRFA submitted to Cabinet for consideration and/or approval	Accession completed for ABS Nagoya Protocol and the other seven international biodiversity related agreements	Availability of resources and willingness of national stakeholders and international partners	2019 - 2024
		Revised regulations of IPPC submitted to Cabinet for consideration and/or approval			
		Both bioprospecting and bio-trade are regulated for the benefit of the population			
		Joint ownership of patents and other IP rights reserved			
		Revenue inflows for enterprises related to ratified and access conventions received at community and household level			
		A coordinated mechanism put in place			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO2: To strengthen policy, legislative and institutional capacity for biodiversity conservation and management for all actors in the country.					
By 2020, the National Strategy on Invasive Alien Species (IAS) will be fully implemented, with the participation and	Strategy on Invasive Alien Species is achieved through stakeholder consultations	National guidelines on invasive species in place	External evaluations show that increased biodiversity management compliance for development projects. Annual compliance increases at 50% by 2026 Evaluations show a national strategic planning framework for biodiversity management	Availability of resources and willingness of national stakeholders and international partners	2020 - 2027
		Adequate measures to contain alien invasive species in vulnerable ecosystems are in place			
		An inventory of alien invasive species			
	National IAS strategy developed	Strategy in place, meetings held, survey documents in place			
		Focal point designated			
	Capacity for implementation of IAS strategy assessed	Assessment report			
		Guidance for capacity building			
	Capacity building conducted	Capacity building reports			
	Implementation of IAS strategy	Reduced incidence of IAS at field level			
		Reduce import or transfer as IAS into country			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.					
Strengthen biodiversity-inclusive Environmental Impact Assessment (EIA) and Environmental Audits, and Strategic Environment Assessment (SEA)	Situation analysis on environmental compliance for biodiversity management conducted	Established projects abide by the EIA	External evaluations show that increased biodiversity management compliance for development projects. Annual compliance increases at 50% by 2026 Evaluations show a national strategic planning framework for biodiversity management	Availability of resources and willingness of national stakeholders and international partners	2020 - 2027
		Establishment of EIA committees			
		Consultations with the various environmental experts			
	Capacity assessment for integration of biodiversity management into EIA, Environment Audit and SEA conducted	Capacity assessment report			
		Synthesis report on capacity needs for integration of biodiversity management in environment compliance			
	Instruments/ guidance for biodiversity inclusive ESIA, Environmental audit and SEA developed	Guidelines and instruments for strengthening biodiversity management compliance in SEA, EIA and audits			
	Implementation of capacity strengthening of biodiversity inclusive environmental compliance and enforcement	Baseline reports			
		Records of training and capacity built			
		Number of staff with capacity in biodiversity integration in compliance			
		University and training programmes on biodiversity integration in compliance			
		Reports on progress of integration of biodiversity management in compliance			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.					
Commitment of National and states to the elaboration of National Policy, ensuring the continuous and updated diagnosis of species and genetic resources and effectiveness of Action Plans for Prevention, Contention and Control of loss of biodiversity at species and genetic level in the country	Development of action plan for Prevention, Contention and Control of loss of biodiversity at species and genetic level	Number of research initiatives on under-utilised taxa undertaken	2.5-year annual evaluation reports	Availability of resources and willingness of national stakeholders and international partners	2022 - 2027
	Capacity building for national and state officials for implementation of action plan	A guidelines document for the action plan			
		Annual monitoring and fiveyear evaluation reports			
	Support establishment of genetic banks (germ plasm) and research for plant species	At least one national genetic resource databank established			
		Annual monitoring and fiveyear evaluation reports			
		At least one operational community genetic resource centre per state			
	Support establishment of sanctuaries for rehabilitation of rescued species, and restoration to the wild	At least one or more operational wildlife sanctuary			
		At least one operational zoo per state within the territory of South Sudan			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.					
By 2020, incentives and subsidies harmful to biodiversity will have been identified and reformed, and controls related to biodiversity will have been enhanced	National diagnostic study of policies, regulations, and practices to identify incentives used for biodiversity management across public, private, non-governmental and community categories	An instrument for creation of working group	Internal annual evaluation and external 2.5-year evaluation reports	Availability of resources to conduct evaluation activities	2020- 2027
		Minutes from technical working group			
		Reports on proposed review, revision and reform of harmful incentives			
		A capacity assessment report			
	National action to revise and reform harmful incentives, while promoting positive incentives developed, including national incentives guidelines for biodiversity management	Guidelines document on review, revision and reform of harmful incentives, while promoting positive ones			
		Number of harmful incentives reviewed, revised and/or reformed			
		Annual monitoring reports and Five-year evaluation reports			
	Support efforts to harness modern biotechnology for socioeconomic development while ensuring adequate safeguards for human health and existing biodiversity	Report of national capacity in Biotechnology and Biosafety			
		Number of effective Information and awareness activities at national and state level			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.					
By 2020, incentives and subsidies harmful to biodiversity will have been identified and reformed, and controls related to biodiversity will have been enhanced	Support efforts to harness modern biotechnology for socioeconomic development while ensuring adequate safeguards for human health and existing biodiversity	Availability of knowledge and equipment for monitoring biotechnology (environment compliance, customs, among others)	Internal annual evaluation and external 2.5-year evaluation reports		2020- 2027
		Number of mechanisms developed			
		Annual monitoring reports, and bi-annual evaluation reports			
		Annual monitoring reports, and bi-annual evaluation reports on Human and Infrastructural Resource Capacity Development, deployment and retention			
By 2020, the rate of loss of natural habitats (forests, wetlands, water resources catchments) will be reduced by at least %50 (in comparison with the 2016 rate) and, as much as possible, brought close to zero, and degradation and fragmentation is reduced	Baseline assessment of the status of forest resources in South Sudan undertaken and drivers for forest, wetland and water resources degradation and/or restoration	National status of forestry resources, inventory report, spreadsheets, and spatial data in maps and digital files	External evaluation shows a bottoming out of natural habitat loss and/or an increase by 2026	Availability of resources and political will	2020-2027

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO3: Reduce negative impacts and enhance positive impacts on biodiversity through facilitation, design and capacity enhancement for enforcement and compliance, for biodiversity regulations and incentive mechanisms.					
By 2020, the rate of loss of natural habitats (forests, wetlands, water resources catchments) will be reduced by at least %50 (in comparison with the 2016 rate) and, as much as possible, brought close to zero, and degradation and fragmentation is reduced	Baseline assessment of the status of forest resources in South Sudan undertaken and drivers for forest, wetland and water resources degradation and/or restoration	National wetland inventory report	External evaluation shows a bottoming out of natural habitat loss and/or an increase by 2026	Availability of resources and political will	2020-2027
		National water resources inventory report			
		Synthesis report on drivers and synthesis of key actions for restoration and/or conservation of forest, wetland and water resources			
	Drivers of degradation of forests, wetlands and water resources reduced and / or taken away through policy, community and individual actions	Revised regulations on deforestation and degradation of forests			
		Revised regulations on wetlands degradation and/or conservation			
		Revised regulations on water resources degradation and/or conservation			
		Reduced Emissions from Deforestation and forest Degradation (REDD+) and other actions monitoring reports (annual) and bi-annual evaluation reports			
		Annual monitoring and bi-annual evaluation reports			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO4: Strengthen capacity forand conduct resource assessments, spatial, ecological and land use planning and benchmarking of the value of biodiversity in South Sudan to support sustainable use and management of biodiversity					
By 2022, resource assessments, spatial biodiversity, ecological land use planning and benchmarking of the value in South Sudan	Capacity assessment and capacity building for spatial biodiversity, ecological and land use planning for biodiversity management conducted	Capacity needs assessment reports. Field visit reports Manuals and guidance documents Annual monitoring and bi-annual evaluation reports	External evaluations show biodiversity resource assessment used in physical, infrastructure and other development plans	Government commitment and political will	2022-2026
By 2026, National Plan with ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity in South Sudan will be integrated into National Development Plan for South Sudan	National Plan with ecological, land use planning and benchmarking of the value for sustainable use and management of biodiversity in South Sudan developed	National Plan for ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity document Number of dissemination materials and reports on activities conducted including field visits to ascertain	External evaluations show availability of technical capacity at national and state level, including universities for ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity in South Sudan	Government commitment and political will	2022-2026
	Plan for ecological and land use planning and benchmarking of the value for sustainable use and management of biodiversity integrated into National Development Plan	Annual monitoring and bi-annual evaluation reports			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO5: Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas of South Sudan					
By 2024, a programme for effective management of protected areas (PA) and PA network will have been developed	Situation analysis conducted on status of protected area system in South Sudan	Situation analysis survey report	External evaluation studies show implementation of General Management Plans for PAs, and a national programme for biodiversity networks	Availability of resources and political will	2022 - 2027
		Synthesis reports as dissemination materials			
		Number of dissemination activities carried out			
	General Management Plans for all Protected Areas conducted and completed	General Management Plans for all National Parks andWildlife Reserves			
	An overall management strategy for Protected Area of South Sudan completed	Overall management strategy for Protected Area			
By 2023, a national collaborative resource management programme for PAs, wetlands and water resource catchments will have been developed and implemented	Collaborative resource management programme for PAs, wetlands and water resource catchments developed	Regular minutes of progress of technical working committee	A 2.5 external evaluation report	Availability of resources and political will	2023 - 2027
		Collaborative resource management programme documents			
		Annual monitoring reports and bi-annual evaluation reports			
By 2024, programme for restoration of degraded wetlands, including the Sudd, developed and under effective implementation	At least one-third of the degraded wetlands and Sudd restored by 2024.	Wetland restoration action plan document.	A 2.5 external evaluation report	Availability of resources and political will	2024 - 2027
		Annual monitoring reports and bi-annual evaluation reports			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO5: Restore degraded ecosystems and promote access and benefit sharing of biodiversity and ecosystem services, including for protected areas and non-protected areas of South Sudan					
By 2024, a programme for restoration of degraded forest areas will have beendeveloped and under effective implementation	At least 25% of the degraded forests restored by 2024	Forest resource restoration action plan document Annual monitoring reports and bi-annual evaluation reports	A 2.5 external evaluation report	Availability of resources and political will	2024 - 2027
By 2023, a national programme for rehabilitation of degraded farmlands will have been developed and under implementation	At least 30% of the degraded forests restored by 2024	Degraded farmlands restoration action plan document Annual monitoring reports and bi-annual evaluation reports	A 2.5 external evaluation report	Availability of resources and political will	2023 - 2026
SO6: Develop and implement a resource mobilisation strategy for biodiversity conservation and management in South Sudan					
By 2022, a natural resource mobilisation plan for biodiversity management will have been developed and under implementation	National resource mobilisation plan developed and implemented	Resource mobilisation plan developed Policy review, expenditure review and finance gap reports Guidelines for financing biodiversity Annual monitoring reports and bi-annual evaluation reports	A natural resource mobilisation plan for biodiversity management under implementation within the timeline of implementation of the NBSAP	Availability of resources and political will	2023 - 2027

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO6: Develop and implement a resource mobilisation strategy for biodiversity conservation and management in South Sudan					
By 2024, at least 50% of the required budget for the NBSAP will have been generated from diverse sources and will be made available for its implementation	50% of the required budget for NBSAP generated	50% of the resource requirements acquired for biodiversity management	External evaluation shows %50 of the instruments proposed in the Biodiversity Finance Plan in place	Availability of resources and political will	2027-2024
		Increased funding from regular financing sources for biodiversity management			
	At least 20% of biodiversity financing for South Sudan raised through innovative financing mechanisms with private sector, and international partners	A policy or regulations in place			
		Guidelines for innovative financing mechanisms			
		Number of states, national government staff, private and NGO persons trained			
		Evaluation reports			
SO7: Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan					
By 2021, ensure broad extension of environmental education in society for improving awareness of population on biological diversity and ecosystem services	Increased public participation in biodiversity conservation at national and local levels	Quarterly public outreach environmental education in the society for improving awareness of population on biological diversity and ecosystem services	A 2.5 external evaluation report	Availability of resources and political will	2027 - 2021
		Annual reports on public participation in regulation on biodiversity us			

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO7: Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan					
By 2021, ensure broad extension of environmental education in society for improving awareness of population on biological diversity and ecosystem services	Increased institutional awareness at national and local levels	Collaboration and information flow among stakeholders improved Dissemination of the information to all the relevant stake holders A reasonable percentage of stakeholders at all levels are aware of NBSAP and its value (after estimating the baseline of where we are now)	A 2.5 external evaluation report	Availability of resources and political will	2027 - 2021
By 2020, strengthen the role of the scientific research and professional institutions, NGO sector and media, including improvement of scientific technologies	National genetic inventory developed	Availability of up to date data on wildlife species trends Genetic resources conservation and management is effective Important species and varieties are adequately conserved	A 2.5 external evaluation report		2027 - 2020
By 2020, significant increase in the contribution of scientifically based information into biodiversity decision making processes and management interventions	Scientific research streamlined into policies	Biodiversity information is well known to the people in the community Dissemination of this information to the stakeholders	A 2.5 external evaluation report	Availability of resources and political will	2027 - 2020

Targets/Action	Outputs	Indicators	Means of verification	Assumptions	Timeline
SO7: Establish knowledge and information management systems and awareness creation for biodiversity conservation in South Sudan					
Complete biodiversity information system and build up the capacity of CHM	Build capacity on the application of Biotechnology	National capacity for Biotechnology and Biosafety assessed	An operational CHM. Observed online and active for at least five out of every seven days of the week. -2.5year evaluation	Availability of resources and political will	2020 - 2027
	National biodiversity database system developed	Information on biodiversity developed			
		Accredited Biotechnology and Biosafety infrastructure developed			
		A critical mass of scientists trained in Biotechnology and Biosafety			
By 2020, complete a national inventory on the genetic diversity of species of cultivated plants, farm animals and wild relatives, with the view to develop actions to safeguard the genetic diversity of other priority species of socioeconomic value, animal species and selected wild plants	Minimise loss of genetic diversity of cultivated plants and domesticated animals	Information on germplasm documented	A 2.5 external evaluation report	Availability of resources and political will	2020 - 2027
		Important species and varieties are adequately conserved			

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Ibrahim, A.B. and Badi, K.H. (2006). Forest Management and Conservation, HCENR, National Plan for Environment Management. Paper Presented to UNEP PCEA Workshop in Khartoum.

Ibrahim, A.B. and Badi, K.H. (2006). Forest Management and Conservation, HCENR, National Plan for Environment Management. Paper Presented to UNEP PCEA Workshop in Khartoum.

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ANNEX I: TECHNICAL TEAM AND PROJECT STEERING COMMITTEE

Technical and Editorial Team

Mr. Joseph Africano Bartel – Undersecretary for Environment

Mrs. Jane Wambui Kahata – International Consultant

Mr. Joseph Lam Achaye - Director General, Wetlands and Biodiversity

Dr. Bojoi Moses Tomor - Associate Professor, Directors for Projects, University of Juba

Dr. Pasquale Moilinga - Associate Professor, Department of Wildlife Science, University of Juba

Dr. John Leju Celestino - Associate Professor, Deputy Dean, College of Natural Resources and Environmental Studies, University of Juba

Dr. Thomas Francis - Associate Professor, Department of Wildlife Science, University of Juba

Dr. Augustine Bongo - Associate Professor, Coordinator for Post-Graduate Studies, College of Natural Resources and Environmental Studies, University of Juba

Dr. Zuhier Abdirahman - Associate Professor, Department of Forestry, University of Juba

Mr. Paul Lado Demetry - D/Director for Biodiversity-CBD-National Focal Point

Project Steering Committee

Mr. Joseph Africano Bartel - Undersecretary for Environment, Ministry of Environment and Forestry-Chairperson

Mr. Joseph Lam Achaye - Director General for Wetlands and Biodiversity/ RAMSAR -Deputy Chairperson

Mr. John Ater - Director for Wetlands

Mr. Beda Diing, Director for Biodiversity

Mr. Paul Lado Demetry - D/Director for Biodiversity-UNCBD-Focal Point - Focal Point/Secretary

Mr. Lwanga Tiba Charles - CBD/CHM Desk officer

Dr. Yatta Samuel Lukou- Global Taxonomy Initiative (GTI)-Focal Point

Mr.Kenyi Bullen Baggu Global Strategy for Plant Conservation (GSPC)-Focal Point

Mr. David Batali Oliver - GEF- Operational Focal Point or/and Desk officer

Mr. Joseph Africano Bartel - Green Climate Fund (GCF) Operational Focal Point

Dr. Malik Doka Morjan- Program of Work on Protected Areas (PoWPA)-Focal Point/ Desk Officer

Mr. Payai Manyok John - UN-Framework Convention on Climate Change (UNFCCC)-Focal Point

Dr. George Tadu Louis - United Nations Convention on Combating Desertification (UNCCD)

ANNEXES

Mrs. Kapuki Tongun Lado-Vienna Convention-Focal Point

Mr. Khamis Adyang-Convention on International Trade in Endangered Species (CITES)

International Tropical Timber Organization (ITTO)/REDD+

Mr. Francis Wajo-International Waters /Nile Basin Initiative

Mr. Arshad Khan - Country Manager, UNEP South Sudan

Mr. Martin Dramani - UNEP South Sudan

Dr. Bojoi Moses Tomor - University of Juba- Director for Projects & Biodiversity Expert

Dr. John Leju Celestino - University of Juba, Department of Environmental Studies

Mr. John Pangech-Cooperative and Rural Development-Comprehensive Agriculture Master Plan

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ANNEX II: CONTRIBUTORS TO THE NBSAP SOUTH SUDAN

The National Biodiversity Strategy and Action Plan (NBSAP) and Clearing House Mechanism Workshop May, 2017.					
S/N	NAME	ORGANISATION	POSITION/ TITLE	EMAIL	TELEPHONE
1	Rita Nyoka	MLH&UD	Inspector for Sanitation	ritastanley20@gmail.com	956266616
2	Oyor Moses Ayul	Upper Nile University	D/Dean, animal Production	m_oyor@yahoo.com	927706338
3	Isaiah Ajak	MED	DG. Engineering corporation	ajakthuk@gmail.com	956199396
4	Lurit Salvatore	MHADM	Inspector	lurita84@gamil.com	927474699
5	Ipuot Moses	MHADM	A/Director	estherinakacuol2016@gmail.com	955264012
6	Solomon Celso	MAFS	Researcher/D. Agronomy	sclomek123@gmail.com	954054381
7	Clement Wani Modi	MAFS	Inspector for Research	losugga@gmail.com	956377777
8	Angelo Okenyi	MOEF	Director	langalanga@gmail.ccom	955659499
9	John Morris	MOP	A/Inspector for HSE	johnmoah15@gmail.com	955006665
10	Ogawi Ojwok	UNU – JUBA	Lecturer	ogawibny@gmail.com	955334220
11	Ladu David	JUBA UNIVERSITY	Lecturer	ldavidson2020@yahoo.ca	956252409
12	Mindo Odrande	MOEF	Director	jamesmindo@yahoo.com	955413019
13	Lupisaly Roman	MoM	Mining Engineer	lupisaly.roman@gmail.com	956349949
14	Cirino Odego	MWCT	Trainee	cirino.odego@gmail.com	920004047
15	Yong Kuorwel	UNMISS	Environmental Officer	kuorwel@un.org	920900005
16	Massimo Moilinga	University of Juba	A/Professor	massimomoilinga@yahoo.com	955342045
17	Nyele Mabe James	WFP	N. Program Officer	nyele.mabe@wfp.org	955341637
18	Rosa Mayou	MOEF	A/Inspector	yartelar@gmail.com	956813847
19	Gai Simon	MWRI	A/Inspector	mawn82@yahoo.com	955474866
20	Joseph Kulang	MOEF	D/Director for EIA	kulangakech@gmail.com	956221933
21	Dut Jacob Daw	MOEF	A/Inspector	dutdawdhuang@gmail.com	955666623
22	John Pangen	MAFS	D.G	jo.pangern@yahoo.co.uk	955750282

ANNEXES

The National Biodiversity Strategy and Action Plan (NBSAP) and Clearing House Mechanism Workshop May, 2017.					
S/N	NAME	ORGANISATION	POSITION/ TITLE	EMAIL	TELEPHONE
23	Peter Manase	MWCT	W.L Mgt Dep.	petermanase60@ yahoo.com	954289933
24	Kapuki Tonga	MOEF	S/Inspector	kapuki.tonga@yahoo. com	955707855
25	Gatluak Khan	DMA	HR. Officer	gatluakkkhangatluak@ gmail.com	953500000
26	Paul Ladu Demetry	MOEF	D/Director	ladulodemen@yahoo. com	956600801
27	Mylinda Justin	University of Juba	Director	myljustin@gmail.com	954007776
28	Gwollo Moses	MOEF	Member		950654802
29	Paul Peter	WCS	LE Coordinator	pawol@wcs.org	912477837
30	Gatkuoth Mayik Kom	CORE	Assistant Manager	mayikkom1@gmail. com	952000802
31	Dr. Malik Doka	MWCT	Director of protected Areas W	malikdoka@gmail.com	955765475
32	Manila K. Albino	MOEF	Climate change Officer	manila.keji@yahoo.com	956784676
33	Bismark George	MWCT	A/Director	bismarkgeorge@gmail. com	955738861
34	Amum Edward	MWCT	Researcher		956155493
35	Benedict Lagu	University of Juba	A/Professor	benedicto2014@gmail. com	955311032
36	Musinguzi Junior	Green Belt	Consultant	j.misinguzy@yahoo. com	2567782147
37	Santo George	MOP	A/Inspector	santoochaya40@gamil. com	955724747
38	Steven Luga	SSDO	Program Director	info@ssdoprog.org	957101445
39	Malish Thomas	MLH&UD	A/S. Civil Engineer	malish.luat@gmail.com	955308408
40	Charles Celiano	MPT (MRB)	Environmental Officer	chalto.celiano@yahoo. com	956288441
41	Eng. Yambio Joel	Mining Energy & Dam	D.G	yambio1950@gmail. com	956909566
42	Diseremo Sebit	JCC	Consultant on Environment	diseremosebit2014@ outlook.com	956492029
43	David Deng Adol	Weet	Director	achershoot@gmail. com	955634242
44	Johnson Ezibon	FMS/ NRM	Specialist	ppoo16.johnson@ gmail.com	955859135
45	Tiyanga Simaya Athanasio	MWRI	Inspector for Water Resource	tiyongas@gmail.com	955472790

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The National Biodiversity Strategy and Action Plan (NBSAP) and Clearing House Mechanism Workshop May, 2017.					
S/N	NAME	ORGANISATION	POSITION/ TITLE	EMAIL	TELEPHONE
46	Achol Deng	MOEF	A/Inspector	acholdengyel@gmail.com	955029240
47	Lwanga Jiba	MOEF	Biodiversity	tiba_lwanga@yahoo.com	955635722
48	Leo Okwachi	MTDI	D/G Industry		956694007
49	Emmanuel Ladu	MGC&SW	D/Inspector	loikong2@gmail.com	955851030
50	Wani Nelson	MOEF	A/Inspector	waniloaler78@gmail.com	955570008
51	Joice Jore	NBS	Agric Statistician	joicejore14@gmail.com	956227803
52	Dinah Charles	MAFS	Research Assistant	dinahguli@yahoo.com	955022428
53	Nicola Paul	MOP	HSE	nicolapaul285@gmail.com	956937218
54	Jada Albert	JCC	Tech. Advisor	jadis101@gmail.com	955243752
55	Obany Okuki	Upper Nile University	Lecturer	ookuki@yahoo.com	954933557
56	Hakim Araba	Upper Nile University	Lecturer	hakimaraba4@gmail.com	921259341
57	Peter Lomude	GIZ	Agrc Officer	lomudepeter@gmail.com	955 082824
58	Peter Lemi	MWCT	Wildlife Officer	onepetero@yahoo.com	955696666
59	Dora Sallvatore	MOEF	A/Inspector	enoughkose@yahoo.com	956692292
60	Gearge Tadu	MAFS	Research Scientist	georgetadu57@gmail.com	956180388
61	Aluk Deng	MOP	A/Inspector fro HSE	alouk12@yahoo.com	922888222
62	Michael Lopidia	WCS	COP. Deputy Director	mlopidia@wcs.org	955054809
63	Samuel Buwar	Upper Nile University	Head of department W.L	samuelajak211@gmail.com	955411105
64	Moses Ruai	AMA	Advocasy and Research Officer	moslrua@gmail.com	955894506
65	Bojoi Moses	University of Juba	Ass. Professor	mbojoi@hotmail.com	955339441
66	Kenyi Bullen	MOEF	Director	beggubullen@gamil.com	956019225
67	John Garang Awan	MOF&P	D/Director	awan.pep@gmail.com	955661031
68	Patrick Taban	MOEF	Director	patricktaban11@gmail.com	955179427
69	Joseph Lam	MOEF	DG	lamjoseph61@yahoo.com	928289140

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The National Biodiversity Strategy and Action Plan (NBSAP) and Clearing House Mechanism Workshop May, 2017.					
S/N	NAME	ORGANISATION	POSITION/ TITLE	EMAIL	TELEPHONE
70	Lansana Wonneh	UN Women	Deputy Reg.	lansana.wonneh@unwomen.org	954984526
71	Lubang David Ladu	JCC	Coodinator Envi. & Sanitation	lubangaladu603@gmail.com	956921092
72	Sawsan Omar	MGCSW	S/Inspector	abasawsan@gmail.com	955708466
73	Ajah Deng	SOSSahel SS	Director		912806911
74	Pagan John	MWRI	Inspector	paganjhn@yahoo.com	955974755
75	Nakoo Naama	UNEP	Intern	isaacnakoo@gmail.com	956164356
76	Androus Ajanz	Ministry of Mining	A. Geologist	androusojangajanz@gmail.com	911340079
77	Martin Dramani	UNEP	Program Specialist	martin.dramani@unep.org	928009518
78	Yatta Samuel	University of Juba	A/Professor	hikru2013@gmail.com	956443120
79	David Batali	MOEF	DG	db_oliver@gmail.com	955181821
80	Angelo Okenyi	MOEF	Director	langalanga@gmail.com	955659499
81	Deng Deng Jor	MAFS	S/ Inspector	deng_jor@yahoo.com	955414508

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The National Biodiversity Strategy and Action Plan (NBSAP) and Clearing House Mechanism Workshop August, 2017.					
S/No	NAME	ORGANISATION	POSITION/ TITLE	E-mail	TELEPHONE
1	Rita Nyoka Stanley	MLHUD	Assistant Inspector	ritastanley20@gmail.com	955266616
2	John Ater Maker	MOEF	Director Wetlands	dhalbeny08@gmail.com	955916599
3	Emmanuel Martin	SSDO	Project Officer	emmanuellukud@gmail.com	955444888
4	Michael Ottongo	Ministry of Energy & Dams	Assistant Inspector	michaelassai@gmail.com	914286236
5	Francis Wajo	MWRI	Director for Regulations	wanifrancis@gmail.com	09251259221/ 0956932856
6	Richard Okeruk	MOEF	Senior Inspector	richescos@yahoo.com	9544143537
7	Sydney Chance	MOEF	Inspector	__	927484848
8	Lopisaly Roman	Ministry of Mining	Mining Engineer	lopisalyroman@mom-goss.org	956369460
9	Nicola Paul	Ministry of Petroleum	HSE	nicolapaul285@gmail.com	956957218
10	Alex Amin John	Ministry of Information	Senior Media Officer	alexamin443@ymail.com	955427061
11	Aluk Deng	Ministry of Petroleum	Assistan Ispector HSE	alouk12@yahoo.com	922888222
12	Peter Lemi Yose	Ministry of Wildlife	Wildlife Researcher	onepeter@yahoo.com	955696666
13	Amumu Edward	Ministry of Wildlife	Wildlife Researcher	oudluckdidigo@gmail.com	956155493
14	Dr. Malik Doka	Ministry of Wildlife	Director	malikdoka@gmail.com	955765475
15	Gai Simon	MWRI	Assistant Inspector	mawn82@gmail.com	955474866
16	Joseph Lam	MOEF	Director General	lamjoseph61@yahoo.com	928289140
17	Isaac Bazugba	Cosultant	Consultant	iajbazugba@yahoo.co.uk	955450121
18	Diseremo Sebit	Juba City Council	Director of Environmentals	diseremosebit2014@outlook.com	956402029
19	Jada Albert	Juba City Council	Technical Advisor	jadis101@mail.com	955243752
20	Ajak Deng	SOS SAHEL	Ex-Director	arich@magansahel.org	928806412
21	Deng Leek	MOCITPS	Director	dengleek2001@gmail.com	955208118
22	Sawsan Omer	MGCWSD	Senior Inspector	abasawsan@gmail.com	955708466
23	Ajour Chol Deng	MOFA&IC	Diplomat	ajoirchol@yahoo.com	09277104471
24	Steven Luga	SSDO	Program Director	info@ssdoprog.org	957101445

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The National Biodiversity Strategy and Action Plan (NBSAP) and Clearing House Mechanism Workshop August, 2017.					
S/No	NAME	ORGANISATION	POSITION/ TITLE	E-mail	TELEPHONE
25	Dinah Charles	MOAFS	Research Assistant	dinahgulli@yahoo.com	955022428
26	Hakim Araba	Upper Nile University	Assistan Professor	hakimaraba4@gmail.com	954001029
27	Bol Gabriel Ajok	National Bureau of Statistics	Economist	gabokijok@gmail.com	955471853
28	Dora Salvatore	MOEF	Assistant Inspector	enoughkose@yahoo.com	956692292
29	Yuanes Mayik	MOEF	Senior Inspector	yuanes-mayik@gmail.com	955472323
30	Payai Manyok Jol	MOEF	Senior Inspector	johna-manyok@yahoo.com	955665017
31	Neimat Taban	MoLF	Inspector of Planning	neimattaban80@gmail.com	9556633014
32	Santo George	Ministry of Petroleum	Assistant Inspector for Health, Safet and Environment	santochaya40@gmail.com	925590877
33	Patrick Taban	MOEF	Deputy Director	patricktaban@gmail.com	955179427
34	Thomas F. Lado	University of Juba	Assistant Professsor	jsuliman.lado@gmail.com	956971248
35	Yata Sam	University of Juba	Assistant Professor	Lukou2013@gmail.com	956443120
36	Paul Lado. Demetry	MOEF	Deputy Director	ladolodemen@yahoo.com	956600801
37	Victoria Apiou	MOEF	Inspector	tana-2210@yahoo.com	955977280
38	Tiyonga Simaya	MWRI	Inspector	tiyongas@gmail.com	955472790
39	Rosa Mayou	MOEF	Assistant Inspector	rosalindayar20@gmail.com	956813847
40	Martin Dramani	UN Environment	Program Specialist	martin.dramani@unep.org	928009518
41	Mindo Odrande James	MOEF	Director	jamesmindo@yahoo.com	955413019
42	Obach Simon	MOEF	Senior Inspecor EIA	chanobach@yahoo.com	954116757
43	Arsan	MAFS	Deputy Director	bagouniwa@yahoo.com	955713685
44	Betty Kiden	MGCWSD	Senior Inspector	kideneg@gmail.com	955058611
46	Juma Ali Mohamed	SSMCE	Head of Forecast Section	borrow234@gmail.com	0921171623/ 0955544081

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The National Biodiversity Strategy and Action Plan (NBSAP) and Clearing House Mechanism Workshop August, 2017.					
S/No	NAME	ORGANISATION	POSITION/ TITLE	E-mail	TELEPHONE
48	Achol Deng	MOEF	Assistant Inspector	acholdengyel89@gmail.com	955029240
50	Mabior Deng Thon	MOEF	Assistant Inspector	mabiorengdit@yahoo.com	954278059
51	Boum Andew	MRB	Deputy Director	boummakur@yahoo.co.Uk	955475122
52	DR. Bajoi Tomor	University of Juba	Director of Projects	mbojoi@hotmail.com	955339441
53	Hon. John Hassan	Council of States	Member of Parliament	johnhassan505@gmail.com	955663316
54	Joseph Bartel	MOEF	Undersecretary	bartel64@yahoo.com	955582853
55	Youhana Daniel Ngor	Ministry of Petroleum	Assistant Inpector	danielngor@gmail.com	0956596886 / 0927223061
56	Bulo Tong	Ministry of Petroleum	HSE	N/A	924907035
57	Jaden Reja	__	Student	N/A	956382545
58	Garang Aleu	NPGC	Inspector for Downstream	garangalusak@gmail.com	_
59	Monica Abaa	MHDAM	Inspector	sweetdawet@gmail.com	955083083
60	Winfred Patrick	CEPO	SOW	nyunyu1984@gmail.com	956761677
61	David Batali Oliver	Ministry of Environment and Forestry	Director General	db_oliver@ymail.com	_
62	Lingdit Mai Nguoth	ECONET	Student	lingditn@gmai.com	954214374
63	Richard Angelo	WCS	Ecological Researcher	richardange222@gmail.com	955655195
64	Oting William	UNEP_Tongji IESD	Intern	otingwill@gmail,com	955559076
65	Duku Emmanuel	G12-FSDAM	Project Officer	emmanuel.duku@g12.de	955478989
66	Suzan Victor	NPGC	Legal Advisor	suzanvictor24@yahoo.com	955524742
67	Solomon Celso Kumudan	MAFS	Research Scientist	sclomek@gmail.com	954054381
68	Adrapkwo George	ME&D	A/Director for Transmission	gadrapkwo@yahoo.com	955878388
69	George Gai	Ministry of Labour and Public Services		gaimanyang@gmail.com	954819638
70	Gatluak Khan	AMA	H.R Officer	jubaama@gmail.com	953500000
71	Marial Akec	Ministry of Mining	Senior Chemist	N/A	956336215
72	Jansuk Samuel	Farmers' Training Institute	Program Assistant	jansuksamuel@gmail.com	956730684
73	Isaac Ismael	MWRI	Geologist	isaacjambo@gmail.com	956666488

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The National Biodiversity Strategy and Action Plan (NBSAP) and Clearing House Mechanism Workshop August, 2017.					
S/No	NAME	ORGANISATION	POSITION/ TITLE	E-mail	TELEPHONE
74	Mary Abdasio	MHDAM	Senior Inspector	juwannakirri@gmail.com	955095987
75	Angelo Longa	MAFS	Senior Planning Officer	longaangelo@gmail.com	921099034
76	Aduot Madit	MRB	Road Project Engineer	rigkher@gmail.com	954655368
79	Charles Monna	National Bureau of Statistics	Director for GIS	agonodic@gmail.com	955677389
80	Emmanuel Quino	SSMD	Meteorologist	equino@yahoo.com	954310077
81	Fiorine Abal	NPGC	Assistant Director	florinonpgc@gmail.com	955920233
82	Jon Sebit	MARF	Inspector	sebitbenanow@yahoo.com	956837323
83	Ogansi Ojwok	Upper Nile University	Lecturer	ogawibny@gmail.com	955334220
84	David Kenyi	MRB	Surveyor	davidkeny@yahoo.com	951379308
85	Mylinda Justin	University of Juba	Director of Projects	myljustin@gmail.com	954007976
86	Humoon Chol Deng	Ministry of Petroleum	Diector HSE	hdeng@mopeum.goss.org	926560541
87	Cirino Odego	MWCT	Trainer	cirino.odego@gmail.com	920004047
88	Peter B.S. Gama	University of Juba	Associate Professor	minyolika@gmail.com	956014275
89	Benedict Liogu	University of Juba	Associate Professor	benedikto2014@gmail.com	955311032
90	Kenyi Bullen	MOEF	Director	baggubullen@gmail.com	956014275
91	David Deng	MWCT	Director	N/A	955634242
92	Clementina John Mario	Ministry of Transport	Assistant Inspector	soburangu@gmail.com	956707305

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ANNEX III: WORKING GROUPS FOR VALIDATION OF NBSAP SOUTH SUDAN

NATIONAL BIODIVERSITY STRATEGY AND ACTION (NBSAP) AND CLEARING HOUSE MECHANISM (CHM) REPORT VALIDATION WORKSHOP November 29 - 30th 2017					
GROUP WORK_TEAMS					
GROUP ONE					
.S/No	NAME	ORGANISATION	POSITION/ TITLE	E-MAIL	PHONE
1	James Taban Elias	FAO	Agriculture Officer	jameselias.taban@fao.org	(0)955177077
2	Michael Sereno	Ministry of Wildlife Conservation and Tourism	Wildlife Officer	N/A	(0)954200992
3	Suleiman O. Legge	Ministry of Agriculture and Food Security	Director Training	N/A	(0)956128999
4	Mona Chol	South Sudan Land Commission	Legal Advisor	N/A	(0)955384024
5	George Wesley Brown	Ministry of Wildlife Conservation and Tourism	Official	N/A	(0)955979306
6	William Ladu Peter	Ministry of Trade Industry and East African Community	Inspector	tongunsw@yahoo.com	(0)959100703
7	Dut Jacob Daw Dut	MoEF	Assistant Inspector	dutdawdhueng@gmail.com	(0)955666623
8	Salvatoe Ater	Ministry of Mining	Geologist	ucusalvatore@gmail.com	(0)55419964
9	Daniel Obwony Padiet	Ministry of Culture Youth and Sports	S/Inspector	N/A	(0)955610017
10	Malual Deng	Ministry of Water Resources and Irrigation	S/Inspector for Irrigation	malual99@hotmail.com	(0)955315022
11	Leo Okwahi Lole	Ministry of Trade Iindustry &East African Community	Director General	leookwahi@gmail.com	(0)956694007
12	Augustino Changjwok Otin	Ministry of Water Resources and Irrigation	Assistant Inspector for Hydrology	okucotin@gmail.com	(0)954098133
13	Mogga Bill Paul	South Sudan Native Conservation Organization	Project Coordinator	moggabilly735@gmail.com	(0)954039723
14	Michael Wuor Dau	Transitional Natioanal Legislative Assembly	Member of Parliament	N/A	(0)955034281
15	Samuel Kenyi Christopher	Ministry of Wildlife Conservation and Tourism	Ecologist	samuel20kenyi@gmail.com	(0)955986453
16	Suzana Gabriel	Ministry of Livestock and Fisheries (CAMP)	Senior Inspector for Fisheries	mberafandas@gmail.com	(0)955714465

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NATIONAL BIODIVERSITY STRATEGY AND ACTION (NBSAP) AND CLEARING HOUSE MECHANISM (CHM) REPORT VALIDATION WORKSHOP November 29 - 30th 2017					
17	Susan Ayot	Ministry of Agriculture and Food Security	Research Scientist	susantokwiny@gmail.com	(0)956397043
18	Grace Lat	Ministry of Livestock and Fisheries	Assistant Inspector Animal Production	gracegai2014@gmail.com	(0)954944388
19	Labanya Margaret	National Bureau of Statistics	Direcor General	mathyaugilo@yahoo.com	(0)923505854
20	Mylinda Justin	Live well	Executive Director	myljustin@gmail.com	(0)954007776
21	Shahinaz el Kamil	Ministry of Mining	Chemist	elkamils@yahoo.com	(0)954915986
22	Simon Malual Deng	National Legislative Assembly	Acting Chair MP	simonmalual5@gmail.com	(0)954721002
23	Stephen Laduma	CODERO	Programme Manager	lomorjan@gmail.com	(0)956034422
24	Suleiman O. Legge	Ministry of Agriculture and Food Security	Director Training	N/A	(0)956128999
25	Susan Ayot	Ministry of Agriculture and Food Security	Research Scientist	susantokwiny@gmail.com	(0)956397043
26	Suzana Gabriel	Ministry of Livestock and Fisheries ((CAMP	Senior Inspector for Fisheries	mberafandas@gmail.com	(0)955714465
GROUP TWO					
S/No	NAME	ORGANISATION	POSITION/TITLE	E-MAIL	PHONE
1	Anthony Yatta	Ministry of Petroleum	Inspector for Health, Safety and Environment	yatta22222@gmail.com	(0)955718821
2	Eng. Philip Ayuol	Ministry of Land, Housing and Urban Development	Director for Sanitation	N/A	(0)956236330
3	Nyoun Mak	CORE	Programme Officer	nyounmak@gmail.com	(0)956666036
4	Cirino Odego	Ministry of Wildlife Conservation and Tourism	Trainer	cirino.odego@gmail.com	(0)920004047
5	Samuel Baraba	Ministry of Environment and Forestry	Deputy Director	slumaya@gmail.com	(0)956155058
6	Aluk Deng	Ministry of Petroleum	Inspector for Health, Safety and Environment	alouk12@yahoo.com	(0)922888222
7	Gai William	Coalition for Resiliance	Staff	gaiwilliam1@gmail.com	(0)955592280
8	Dr. Solomon Celso	Ministry of Agriculture and Food Security	Researcher	sclomek123@gmail.com	(0)954054381

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NATIONAL BIODIVERSITY STRATEGY AND ACTION (NBSAP) AND CLEARING HOUSE MECHANISM (CHM) REPORT VALIDATION WORKSHOP November 29 - 30th 2017					
9	Sydney Chance Yairo	Ministry of Environment and Forestry	Inspector	sydney.yairo@gmail.com	(0)927484848
10	Noel Bangazo Cleopas	Ministry of Environment and Forestry ((CAMP	Deputy Director	noelbangaza@yahoo.com	(0)956030976
11	Freser Henry	Ministry of Petero-leum	Inspector for Health, Safety and Environment	freser22@gmail.com	(0)955180018
12	Freszer Yokule David	CODERO	F/Coordinator	yokuledavid@gmail.com	(0)956748686
13	Azaria Gilo	Ministry of Mining	Senior Geologist	lonyiri2@gmail.com	(0)955840994
14	Balentino Deng	NEPACO	Programme Manager	balentinog@yahoo.com	(0)955898688
15	Rachel Amina	Ministry of Wildlife Conservation and Tourism	Officer	rcyrus1@yaoo.com	(0)955014018
16	Samuel Kenyi Christopher	Ministry of Wildlife Conservation and Tourism	Ecologist	samuel20kenyi@gmail.com	(0)955986453
17	Samuel Mateyo Bandas	South Sudan Customs	Administrator	samuelbandas@hotmail.com	(0)955201489
18	Samuel Thon Ayor	South Sudan Meteorological Department - MoT	Meteorologist	kisamuelthon@yahoo.com	(0)955098099
19	Sarah Noah	South Sudan General Farmers Union	Manager	sarahtomalu@gmail.com	(0)955309917
20	Sebit Hunter	Ministry of Wildlife Conservation and Tourism	Manager	sebithunter.74@gmail.com	(0)956490385
21	Sebit Marko	MPA	Director	N/A	(0)955288616
GROUP THREE A					
S/No	NAME	ORGANISATION	POSITION/ TITLE	E-MAIL	PHONE
1	Gisma Louis Eward	Ministry of Transport	Meteorologist	gismalouis@yahoo.com	(0)954274494
2	Sebit Marko	MPA	Director	N/A	(0)955288616
3	Sarah Noah	South Sudan General Farmers Union	Manager	sarahtomalu@gmail.com	(0)955309917
4	Paul Lore	Ministry of Environment and Forestry	Biodiversity Officer	kuworinit@gmail.com	N/A
5	Joseph Kulang	Ministry of Environment and Forestry	Deputy Director for Environmental Impact Assess-(ment (EIA	kulangakech@gmail.com	(0)956221933
6	Dominic Joseph Bill	Upper Nile University	Head, department of Fisheries	dominicbill15@gmail.com	(0)955421054
7	Mut Shiguokteny	Nile Pet	HSE - Senior Officer	m.shiguok@gmail.com	(0)915541949

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NATIONAL BIODIVERSITY STRATEGY AND ACTION (NBSAP) AND CLEARING HOUSE MECHANISM (CHM) REPORT VALIDATION WORKSHOP November 29 - 30th 2017					
8	Hakim Araba	Upper Nile University	Lecturer	hakimaraba4@gmail.com	(0)921259341
9	Sebit Mark	Ministry of Wildlife Conservation and Tourism	Manager	sebithunter74@gmail.com	(0)956490385
10	Eng. Daniel Atide	Ministry of Enegry and Dams	Director	daniel350@gmail.com	(0)955612673
11	Stephen Ladu	CODERO	Programme Manager	codero@gmail.com	(0)956034422
12	Garang Mathiang Kuach	Ministry of Culture, Youth and Sports	Senior Inspector		(0)916625976
13	Michael Max Lomoji	Ministry of Agriculture and Food Security	A/Director	N/A	(0)955532048
14	Ibrahim Ismail	Ministry of Environment and Forestry	Deputy Director	aboudjaden@gmail.com	(0)954948992
15	Francis Wajo	Ministry of Water Resources and Irrigation	Director	wanifrancis@gmail.com	(0)956932856
16	John Ater	Ministry of Environment and Forestry	Deputy Director	dhalbeny08@gmail.com	(0)955916599
17	William Olami	IGAD	National Coordinator	william.athil@igad.int	(0)955550763
18	Bulo Tong	Ministry of Peteroleum	A/Inspector for Health, Safety and Environment	ayekdian@gmail.com	(0)924907035
19	Golda Leo	Ministry of Environment and Forestry	A/Inspector for carbon trade	goldaleo63@gmail.com	(0)954286385
20	Rita Nyoka Stanley	Ministry of Land, Housing and Urban Development	A/Inspector for Urban Sanitation	ritastanley20@gmail.com	(0)956266616
21	Mindo Odrande James	Ministry of Environment and Forestry	Director	jamesmindo@yahoo.com	(0)955413019
22	Joseph Deng Kuir	Ministry of Roads and Bridges	Engineer	babakuir@gmail.com	(0)955046213
GROUP THREE C					
S/No	NAME	ORGANISATION	POSITION/ TITLE	E-MAIL	PHONE
1	Simon Malual Deng	National Legislative Assembly	Acting Chair MP	simonmalual5@gmail.com	(0)954721002
2	Dr. Bojoi Tomor	University of Juba	Director DIFP	mbojoi@hotmail.com	(0)955339441
3	Androus Ajang Ajang	Ministry of Mining	Geologist	androusajangajang@gmail.com	(0)911340079
4	Okumu Clement	Upper Nile University	Teaching Assistant	oc.ilario33@gmail.com	(0)955410128
5	Eluzai Manasseh Rume	Ministry of Culture, Youth and Sports	A/Director	N/A	(0)956200124

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NATIONAL BIODIVERSITY STRATEGY AND ACTION (NBSAP) AND CLEARING HOUSE MECHANISM (CHM) REPORT VALIDATION WORKSHOP November 29 - 30th 2017					
6	Samuel Mateyo Bandas	South Sudan Customs	Administrator	samuelbandas@hotmail.com	(0)955201489
7	Dr. Yatta Sam	University of Juba	A/Professor	lukou2013@gmail.com	(0)956443120
8	Daniel Samson	NEPASDO	Programme Manager	dsa-aru@gmail.com	(0)956421438
9	Joy Hezekiah	Ministry of Environment and Forestry	A/Inspector	N/A	(0)955080116
10	Abdurahman Okuch	Ministry of Justice	Legal Counsel	N/A	(0)955500666
11	.John Majok T	Ministry of Roads and Bridges	A/Inspector	N/A	(0)955191126
12	Lwanga Tiba	Ministry of Environment and Forestry	Inspector	Tiba_lwanga@yahoo.com	(0)955635722
13	Shahinaz el Kamil	Ministry of Mining	Chemist	elkamils@yahoo.com	(0)954915986
14	Samuel Thon Ayor	South Sudan Meteorological Department - MoT	Meteorologist	kisamuelthon@yahoo.com	(0)955098099
15	Ajak Deng	SoS Sahel South Sudan	Executive Director	ajakmayen@sahel.org.uk	(0)912806417
16	Fiorino Abal Anthony	National Petroleum and Gas Commission	Acting Director	florinonpgcssd@gmail.com	(0)955920233
17	John Garang Awan	Ministry of Finance and Economic Planning	D/Director IGER and Policy	awan.mofep@gmail.com	(0)955661031
18	Sydney Chance Yairo	Ministry of Environment and Forestry	Inspector	sydney.yairo@gmail.com	(0)927484848
19	Thomas Atari Wvalter	Ministry of Trade, Industry and East African Affairs	D/Director for Industry	attarittai@gmail.com	(0)955017545
20	Tor Mauach Adoom	Upper Nile University	Teching Assistant	tormakuach@gmail.com	(0)956181441
21	Victoria Apiou	Ministry of Education	Inspector	N/A	(0)955978280
22	Victoria Ofawa Angelo	Ministry of Environment and Forestry	S/Inspector	vivioangelo@gmail.com	(0)956006450
23	William Ladu Peter	Ministry of Trade Industry and East African Community	Inspector	tongunsw@yahoo.com	(0)959100703
24	William Olami	IGAD	National Coordinator	william.athil@igad.int	(0)955550763
GROUP FOUR					
.S/No	NAME	ORGANISATION	POSITION/ TITLE	E-MAIL	PHONE
1	Tor Mauach Adoom	Upper Nile University	Teching Assistant	tormakuach@gmail.com	(0)956181441
2	Richard Angelo	Wildlife Conservation Society	Ecological Researcher	rangelo@wcs.org	(0)955655195

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NATIONAL BIODIVERSITY STRATEGY AND ACTION (NBSAP) AND CLEARING HOUSE MECHANISM (CHM) REPORT VALIDATION WORKSHOP November 29 - 30th 2017					
3	Asif Kafi Yousif	ANATABAN#	A. Manager	y.kafi@yahoo.com	(0)954936793
4	Peter Manase	Ministry of Wildlife and Tourism	Researcher	petermanase60@yahoo.com	(0)954289932
5	Lutana Musa	Ministry of Environment and Forestry	Director General Climate Change	lomurlasu@gmail.com	(0)956967161
6	Peter Taban	Nile Petroleum Company	Director Health, Safety and Environment	ptaban@nilepet.com	(0)959002511
7	Obany Okuki	Upper Nile University	Fishery Researcher	ookuki@yahoo.com	(0)954933557
8	Jansuk Samuel	Farmers Training Institute	Programme Assistant	ftisouthsudan@gmail.com	(0)956730684/ 0926044747
9	Okimo David	National Petroleum and Gas Commission	Office Manager	okimodavid@gmail.com	(0)955222399
10	Kenyi Bullen	Ministry of Environment and Forestry	Director	baggubullen@gmail.com	(0)956024275
11	Joseph Apwoya	Minsitry of Trade	Public Relations Officer	josephapwoya@gmail.com	(0)955933728
12	Emmanuel Martin	South Sudan Development Organization	Project Officer	po@ssdoprogrammes.org	(0)955444888
13	Geroge Gai	Ministry of Public Service and Human Resource Development	Director General for Public Service	gaimanyang@gmail.com	(0)954819638
14	James Wani Paulino	Nowegian Peoples Aid	Forestry Conservator	wanijames12@yahoo.com	(0)955124948
15	Mayom Mayen	Minsitry of Wildlife Conservation and Tourism	Officer	mayomkuot@gmail.com	(0)954245945
16	Idro Mark Dradi	Ministry of Environment and Forestry	Inspector	idromark2015@gmail.com	(0)955150292
17	Peter Aluma Mathew	Ministry of Transport	Senior Inspector for Vehicles	N/A	(0)956380324/ 092221561
18	Peter Manase	Ministry of Wildlife and Tourism	Researcher	petermanase60@yahoo.com	(0)954289932
19	Peter Taban	Nile Petroleum Company	Director Health, Safety and Environment	ptaban@nilepet.com	(0)959002511
20	Rachel Amina	Ministry of Wildlife Conservation and Tourism	Officer	rcyrus1@yaoo.com	(0)955014018
21	Richard Angelo	Wildlife Conservation Society	Ecological Researcher	rangelo@wcs.org	(0)955655195
22	Rita Nyoka Stanley	Ministry of Land, Housing and Urban Development	A/Inspector for Urban Sanitation	ritastanley20@gmail.com	(0)956266616

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NATIONAL BIODIVERSITY STRATEGY AND ACTION (NBSAP) AND CLEARING HOUSE MECHANISM (CHM) REPORT VALIDATION WORKSHOP November 29 - 30th 2017					
22	Salvatoe Ater	Ministry of Mining	Geologist	ucusalvatore@gmail.com	(0)55419964
GROUP SIX					
.S/No	NAME	ORGANISATION	POSITION/ TITLE	E-MAIL	PHONE
1	Victoria Ofawa Angelo	Ministry of Environment and Forestry	S/Inspector	vivioangelo@gmail.com	(0)956006450
2	.James Pakaa M	Ministry of Roads and Bridges	Road Inspector	pakaajames@gmail.com	(0)955365635
3	Peter Aluma Mathew	Ministry of Transport	Senior Inspector for Vehicles	N/A	(0)956380324/ 092221561
4	Thomas Atari Wvalter	Ministry of Trade, Industry and East African Affairs	D/Director for Industry	attarittai@gmail.com	(0)955017545/ 0955781877
5	May Edward Mindo	NEPASDO	Protection Manager	blessingmay451@gmail.com	(0)954905911
6	Aban Francis Amum	Ministry of Wildlife Conservation and Tourism	Officer	abanfrancis017@gmail.com	(0)956963413
7	Deng Juma Rihon	Ministry of Justice	Legal Counsel	dengjuma23@gmail.com	(0)956356868
8	Asunta Alphonse Akot	Ministry of Mining	Senior Chemist	athioldidakut@yahoo.com	(0)955232225
9	David Yokwe	Ministry of Wildlife Conservation and Tourism	Conservation Education Officer	yokwedavid@gmail.com	(0)955685497
10	Pagan John Akwach	Ministry of Water Resources and Irrigation	Inspector	paganjhn@yahoo.com	(0)955974755
11	Joseph Modi	Ministry of Roads and Bridges	Senior Inspector for Highways	josephmodi@gmail.com	(0)955297141
12	Massimo Moilinga	University of Juba	A/Professor	massimomoilinga@yahoo.com	(0)955342045
13	Arok Mabior Arok	Ministry of Wildlife Conservation and Tourism	Wildlife Officer	arokmabior021@gmail.com	(0)929064333
14	Daniel Bur Kuir	National Bureau of Statistics	Head of Energy/ Industry	danbul.kuir@gmail.com	(0)955778280
15	Ogawi Ojwok	Upper Nile University	Lecturer	ogwaibny@gmail.com	(0)955334220
16	Benedict Lagu	University of Juba	A/Professor	beneditto@gmail.com	(0)955311032
17	Huda Seed Khan	Ministry of Agriculture and Food Security	S/Inspector	N/A	(0)956405513
18	Mary Silivia Yapete	Ministry of Livestock and Fisheries	D/Director	zaruonya@gmail.com	(0)956092368
19	Michael Ottongo Eskriano	Ministry of Energy and Dams	S/Inspector for Electrical Engines	michaellassai24@gmail.com	(0)914286236
20	Jada Albert Modi	Juba City Council	Technical Advisor	jadis101@gmail.com	(0)955243752

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ANNEX IV: SUMMARY OF VALIDATION WORKSHOP REPORT

The National Validation Workshop for the National Biodiversity Strategy (NBSAP) of South Sudan was held in Juba, Dembesh Hotel, on the 29-30 November 2017. The South Sudan NBSAP is an expression of the intentions of the Government of the Republic of South Sudan (GRSS) and people of the country to integrate biodiversity concerns into public (national and subnational), private, and community policies, plans, programmes and projects. The NBSAP envisions an NBSAP that establishes a strong framework for biodiversity conservation and contributes to economic prosperity and enhanced quality of life for all. The goal of the NBSAP is a well-development institutional and operational framework for sustainable biodiversity conservation and sustainable and equitable use. The purpose of the workshop was for national stakeholders to: listen to a brief of the Draft NBSAP Report of South Sudan; review the NBSAP Chapter by Chapter; provide feedback on the Draft NBSAP; listen to a brief on the status of the CHM for South Sudan; and provide consensus on the validation of the NBSAP Draft report.

The validation workshop was implemented over two days and the programme of activities included an opening session that comprised of welcome remarks from UN Environment, a description of objectives and expectations from the CBD Focal Point for South Sudan, and an opening address from the Under Secretary for the Ministry of Environment and Forestry (MoEF). In his opening remarks, the Country Manager UN Environment, Mr. Arshad Khan thanked the national stakeholders for coming in large numbers and for their commitment to the conservation efforts promoted by the GRSS. Prior to his address the Undersecretary invited the Honourable Member of National Legislative Assembly who represented the Wildlife Conservation and Tourism and Environment Committee to address the workshop attendees. The Honourable member of the National Legislative Assembly noted the increase in health problems and child deformities that are suspected to be associated with the oil and gas development, and the need for scientific research and increased regulation on how to minimise and/or eliminate the impacts. He noted that he represented the Legislative Assembly and would be in a position to pass on the progress achieved and lessons learned to his legislative colleagues. The Honourable Undersecretary (Mr. Joseph Africano Bartel) urged the participants to focus on the pillars of citizenship and knowledge of their rights, the need for science and knowledge in order to introduce technology, the need for the GRSS to listen to the people, and private sector to push forward technology, production and industry. The Undersecretary provided updates on the international climate change process and willingness of multilateral and bilateral partners to support South Sudan's conservation efforts.

The workshop activities consisted of a presentation of the NBSAP Draft and outlined issues for review by the NBSAP consultant. The national stakeholders were then divided into six Working Groups based on the flow of the chapters of the NBSAP Draft Report. The groups were:

1. CHAPTER 1: INTRODUCTION; CHAPTER 2: STATUS OF BIODIVERSITY IN SOUTH SUDAN; CHAPTER 5: BACKGROUND TO THE NBSAP. This covered South Sudan's National Profile, Biodiversity by Ecosystem (Forest, Agriculture, Aquatic, Protected Areas, Biodiversity by Species (Flora, Fauna, microbes) & Genetic Biodiversity (Crop and Animal) Biodiversity Management and importance of NBSAP.

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2. BIODIVERSITY TRENDS, THREATS AND NEW AND EMERGING ISSUES. The new and emerging issues consisted of Climate Change, Oil & Gas, Conflict, Invasive Species, GMOs, Tech Gaps, and Biomass etc.

3. STRATEGIC OBJECTIVES AND ACTION PLANS 1-2. These covered Coordination of Implementation - and Strengthening Policy, Legislative & Institutional Capacity.

4. STRATEGIC OBJECTIVES AND ACTION PLANS 3-5, which includes: Reduce Negative Impacts and Enhance Positive Impacts; Biodiversity Assessment, bench marking the value of Biodiversity and Biodiversity Planning; and Restoring degraded ecosystems and benefit sharing.

5. STRATEGIC OBJECTIVES AND ACTION PLANS 6-7 + CHAPTER 7: IMPLEMENTATION PLAN. This group reviewed the components of Resource Mobilisation, Technology Need, Communication outreach, and Capacity Building.

6. MONITORING AND EVALUATION PLAN. The review group worked on the Logical Framework for the NBSAP and the accompanying notes as well as the information in the Annexes of the report.

The review of the NBSAP was completed during the morning of the second day of the workshop. The team leaders of the working groups were arranged into a panel, and as members of the panel they presented the review input of their teams and also discussed the critical areas that needed to be addressed, and where additional recommendation was made for improvement of the report. There was discussion with the plenary for the meeting and feedback from the national stakeholders to validate the report. The stakeholders requested the NBSAP Consultant to make the necessary changes to the report for subsequent submission of the National Technical Steering Committee for review and recommendation.

After the NBSAP validation activity three additional presentations were given, two drawing from the NBSAP, a brief on Indigenous Knowledge, and a brief on the status of Resource Mobilisation for biodiversity finance in South Sudan. A brief presentation was given on the Status of the Clearing House Mechanisms (CHM) for South Sudan, it was given by the CHM Consultant.

In the final session of the workshop, the National CBD Focal point presented a recap of the workshop and presented a way forward. The way forward is as follows:'

- The consultants will incorporate the review comments and recommendation from the validation work into the draft NBSAP
- The NBSAP will capture comments from the CBD secretariat into the Draft NBSAP
- UNEP will share the updated draft with the NBSAP Steering Committee
- The final NBSAP will be presented to the Hon. Minister, MoEF/RSS
- Submission of the NBSAP to the Council of Ministers for approval
- Launching and dissemination of the NBSAP
- Submission to the CBD Secretariat in Montreal, Canada
- Implementing the NBSAP
- Reviewing and updating the NBSAP

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The closing session of the workshop comprised of an expression of thanks from the UN Environment Country Manager. The Honourable Member of National Legislative Assembly who represented the Wildlife Conservation and Tourism and Environment Committee also expressed gratitude and assured the national stakeholders that their views would be captured by his committee and the National Legislative Assembly. The workshop was closed by the Undersecretary MoEF who thanked the participants for their efforts, and stated that he looked forward to supporting the actions for endorsement and subsequent implementation of the NBSAP South Sudan.

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ANNEX V: DESCRIPTION OF PROTECTED AREAS ACCORDING TO IUCN CLASSIFICATION

CLASSIFICATION	DESCRIPTION
I (a) Strict Nature Reserve	Strictly protected areas set aside to protect biodiversity and possibly geological/geomorphic features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring.
I (b) Wilderness Area	Usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.
II National Park	Large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.
III Natural Monument or Feature	Large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities
IV Habitat/Species Management Area	Aim to protect particular species or habitats and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.
V Protected Landscape/Seascape	An area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.
VI Protected Area with Sustainable use of Natural Resources	Conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.

Source: www.iucncategory

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ANNEX VI: SUMMARY OF NATIONAL REPORT ON FINANCING BIODIVERSITY CONSERVATION IN SOUTH SUDAN

By Dr. Moses Bojoi, Juba University, 2017 Submission for NBSAP South Sudan Ministry of Environment and Forestry, Juba.

South Sudan has made both domestic and international commitments to conserve biodiversity and use biological resources sustainably. Prior to independence in 2011, the Government of Southern Sudan (GOSS) developed some legal, policy and participatory measures to address issues of conservation and sustainable use of biological resources as enshrined in the Interim Constitution of Southern Sudan (2005) and subsequently in the Transitional Constitution of the Republic of South Sudan, 2011 (Article 41.3). Since independence in 2011, many of these policies and laws have undergone various stages of development but only a handful have been enacted into law. Being signatory of the Convention on Biological Diversity (CBD) since 2014, South Sudan is also committed to achieving the objectives of the Convention and are scaling up its efforts in order to achieve the relevant Aichi targets defined in the CBD's strategic plan for 2011-2020.

Although available evidence shows that biodiversity is under threat globally due to habitat loss and fragmentation, over-exploitation, invasive alien species, pollution and climate change, few studies have assessed the cost of biodiversity conservation. To offset biodiversity loss and realise its benefits, the South Sudan Government through the Ministry of Environment and Forestry supported by UNEP through GEF funding has embarked on development of a National Biodiversity Strategic Action Plan (NBSAP) as a first step to realise the relevant Aichi targets. The responsibility of developing the NBSAP was contracted to a Ugandan Consultancy Firm called Green Belt. As part of the development of the NBSAP, a review of existing public and private biodiversity financing mechanisms was undertaken as a basis for developing a resource mobilisation strategy for the NBSAP.

Data for the review were sourced mainly from GRSS financial manuals covering the FYs 2011-2012 to 2016-2017. The budget books and donor books were provided by the Directorate of Economic Management and Budgeting of the Ministry of Finance and Economic Planning. The government data was supplemented by data from the review of published reports by international financial and development agencies including IMF, World Bank, UNDP and AIMS.

This report is a compilation of the baseline data on public and private agencies that spend on biodiversity conservation. The review on South Sudan monetary flows showed that:

1. The GRSS uses a top-down budgeting process that does not allow spending agencies to prioritise their spending on programmatic activities for which they were established.
2. Over the period analysed, the GRSS budget averaged 14 billion SSP and it has been increasing at an annual rate of 6 billion SSP.
3. Annually, the GRSS underspend averaged 2.3 billion SSP over the six-year period of the analysis. The underspend was generally attributed to resource limitation in the government treasury.
4. The GRSS allocates and spends over 50 percent of its total budget on paying the wages and salaries of its employees.

5. The GRSS commitment to sustainable natural resource utilisation and biodiversity conservation is financially backed by an average allocation of SSP 486m (3 percent) per year to the NRRD Sector. In this review, the NRRD Sector was considered most relevant to biodiversity conservation and sustainable utilisation of natural resources. The agencies in the sector have

mandates for protection of biodiversity and sustainable natural resources utilisation.

6. Over the period analysed, the sector recorded a positive budget growth rate of 64 million SSP per annum but the sector's expenditure remained at an average low of 26 percent of total allocations. The low underspend can be attributed to a consistent overspend by the MWCT.

7. In the NNRD Sector, 74 percent of the budget is spent on paying personnel emoluments and only 26 percent of the average 360 SSP expenditure in the sector is used for operations and capital costs.

8. The MWCT is the biggest spender in the NRRD Sector with an average spend of 70.6 million SSP per annum. Over the period analysed, the ministry recorded a positive budget growth rate of 75.9 million SSP but despite the ever-increasing budget allocation, the Ministry's overspend amounted to an average 33.7 million SSP (12.4 percent) per annum. The huge spend could be attributed to the Ministry's role in the protected area management system. In the NRRD Sector, the Ministry's wage bill stands at 86.6 percent of its average allocation of 271.7 million SSP per annum.

9. Over the period reviewed, the MEF, MLF, MACRD and the MWRI registered negative average growth rates in their budgets ranging from 2.0 million SSP in the MWRI to 11.8 million SSP in the MACRD. Although the budgets of the four ministries were in declining mode, their spending was likewise declining with underspends ranging from 38.1 percent in the MWRI to 52.9 percent in the MEF. This may infer that these ministries have low spending capacity. The truth however is that the funds allocated to the ministries were not disbursed as planned in their budgets.
10. The MEF which officially holds the biodiversity desk is allocated 0.2 percent of the total GRSS budget and 3 percent of the NRRD Sector allocation. Despite this low allocation, the MEF spend averages 0.04 percent of total GRSS spend and 1.7 percent of the sectoral spend.
11. Total ODA to GRSS comes from 21 development partners of which 11 are bilateral and 10 multilateral. The NRRD Sector is funded by 17 of the 21 development partners.

12. Between 2011 and 2016, ODA to the RSS declined by 90.9 million USD (13.2 percent). On average, ODA to RSS declined at a 4 percent annual rate which accounts for a 246 million USD decline in disbursements.
13. Over the period analysed, ODA to the NRRD Sector grew by 3.3 million USD which represented a growth rate of 0.7 million USD per year. This support to the sector though considered development was more humanitarian as 97 percent of the aid was disbursed to the MACRD mainly for improvement of food security and livelihoods. The only biodiversity component of the aid was disbursed to the MWCT, MEF and the MLF which was just 35 million USD over the five-year period.
14. The only NGO with substantial biodiversity conservation engagement in South Sudan is WCS. Funds for the society come mainly from the USA. The USA committed over 40 million USD to the society from 2011 to 2016. Other sources of funding to WCS are UNDP which committed to the Society Southern Sudan's share of GEF 4 allocation to Sudan in 2010. WCS also received funds from UNEP as part of GEF 6 commitment to the RSS.

This review has revealed that the GRSS financing mechanism is inadequate for the implementation of the NBSAP given that current public funding for biodiversity is basically for maintenance. Implementation of the NBSAP will have to rely on donor funding which as revealed here in this

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analysis is patchy and can easily be influenced by political, economic and security concerns of the donors. Of the 225.9 million USD of donor disbursement to the NRRD Sector over the last five years, only 35 million USD was used for biodiversity conservation related activities. Much of the donor funds used in the Sector were for improvement of food security and livelihoods which is more of humanitarian than development aid. Thus, the South Sudan NBSAP will have to rely on GEF funding for its initial period of implementation. Although the potential for leveraging funds from traditional biodiversity conservation development partners exists, the current political, economic and conflict situation in the country does not favour increased donor support for developmental activities.

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ANNEX VII: REPORT ON THE INDIGENOUS KNOWLEDGE AND BIODIVERSITY CONSERVATION IN SOUTH SUDAN

By Moilinga, Massimo, University of Juba 2017 submission for NBSAP South Sudan, Ministry of Environment and Forestry, Juba.

Indigenous People of South Sudan

There are indeed tribal, traditional and/or indigenous people in South Sudan. Their total number is 64 and they speak 64 languages. These are broadly categorised into Nilotic, Nilo Hamitic and the South Western Sudanic groups.

Nilotic group: Includes the Dinka, Nuer, Shilluk, Murle, Kachiopo, Jie, Anyuak, Acholi, Maban, Kuma, Lou (Jur), Bango, Bai, Ndogo, Gulu, Endri, Forgee, Chod (Jur), Khara, Ngorgule, Forugi, Siri, Zandi, Benga, Agar, Pakam, Gok, Ciec, Aliap, Hopi, Guere, Atuot, Apaak, Lango, Pari, Otuho and Ajaa.

Nilo-Hamitic group: Includes the Bari, Mundari, Kakwa, Pojulu, Nyangwara, Kuku, Latuko, Lokoya, Toposa, Buya, Lopit, Kuku, Kakwa, Nyabgwara, Tennet, Lopit and Didinga.

South-Western Sudanic group: Includes Kresh, Balanda, Banda, Ndogo, Zande, Madi, Olubo, Murus, Mundu, Baka, Avukaya and Makaraka.

Thus, the total number of indigenous people/tribes in South Sudan is 64 and their distribution in different ecological zones and states of South Sudan is shown below in Table (1) and (2) respectively.

Available information and data suggest that virtually every part of the South Sudan ecosystem has been inhabited, modified and manipulated throughout history by these indigenous people/tribes of South Sudan. Some of these indigenous people have lived in and harboured especially the fragile ecosystems in different ecological zones of South Sudan. For centuries these indigenous people have used their local-specific views, knowledge and practices to sustain their survival and livelihoods in these different parts of South Sudan. In doing so these indigenous people of South Sudan are deemed to have contributed successfully in biodiversity conservation in most of the fragile ecosystems they have inhabited in South Sudan.

Indigenous Knowledge

Indigenous knowledge refers to the knowledge and skills developed outside formal education systems and is widely identified with indigenous people. It is the outcome of continuous experimentations, innovations and adaptation that enable communities to survive.
Because indigenous knowledge is handed from generation to generation by word of mouth, it is not easily accessible and has not been stored in a systematic manner. Therefore, as indigenous people become more integrated into western society and economic systems, indigenous and/or traditional knowledge practices are being lost.

More than 83 percent of the population of South Sudan live in rural areas (SSCCSE 2010), and their livelihoods almost entirely depend on traditional farming, animal herding, fishing, hunting, gathering of wild plants and others. Thus, the utilisation and/or exploitation of the natural

resources by these indigenous people/tribes of South Sudan are deemed to have profound and direct bearing on the biodiversity conservation in South Sudan.

The utilisation of the sensitive natural resources by the traditional/indigenous people of South Sudan based on their traditional and/or indigenous knowledge can be unique to a particular culture and tradition of a specific tribe and this can act as the basis for decision making in traditional farming, animal herding, hunting, fishing, gathering of wild plants and other natural resource management activities.

Such traditional knowledge/indigenous knowledge is important because it provides the basis for problem-solving for indigenous people/local communities specifically the poor ones in South Sudan. It also represents an important component of knowledge on development issues in South Sudan.

The indigenous people and especially the rural communities in South Sudan have rich indigenous knowledge/traditional knowledge though poorly documented but very obvious such as the way they consume both domestic and wild plants for various purposes such as food, treatment, and the land use practices such as traditional farming, hunting, fishing, wild and domesticated plant gather.

Traditional Knowledge of Food Plants

Introduction
Since the dawn of history man has been in close relationship with his surroundings and the environment. Foraging for wild plant and animal resources was the mode of his first subsistence strategy. He has undergone various changes during his evolutionary and social history from hunting and gathering phases to modern times after the implementation of agriculture.
Even nowadays, especially in developing countries such as South Sudan food shortages, gaps and/or famine still occur due to wars, environmental disasters (such as floods, droughts, climate change etc.) and lack of physical, human and institutional capacities. Therefore, wild plant food still plays a substantial contribution especially in the human diet of the rural population in South Sudan.

Status of domesticated and wild food plants in South Sudan
In South Sudan more than 83 percent of the population is rural (SSCCSA 2010) and 78 percent of its households depends on small scale farming and animal husbandry as their main source of livelihood. The few available medium and large scale agricultural schemes in the country do not really meet the daily feeding requirements of the nation in terms of nutrition and energy, thus the country apparently depends substantially on imports of plants and animal foods from abroad.

Food plants/agricultural crops in South Sudan
South Sudan with its diverse ecological zones provides different types of growing seasons that range from 280 to 300 days to a range of 130 to150 days per annum. These seasons occur in the southern parts of the high rainfall woodland savanna and northern parts of low rainfall woodland savanna respectively. The favorable soils, the availability of water and good climatic conditions render more than 70 percent of the total land area of South Sudan suitable for crop production. However, less than 4 percent of the total land area is currently cultivated, and the country continues to experience recurrent episodes of acute food insecurity.

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Almost all agricultural production systems in South Sudan depend on rainfall, thus its variability in terms of quantity and distribution have impacts on crop performance and production. Crop production systems in South Sudan are generally conducted on small, hand-cultivated plots and farmed by poor farmers. The area cultivated by the households is determined by the size of the household labour force, limited use of productivity-enhancing technologies, capacity constraints, etc.

Sorghum (Sorghum bicolorL.) is an indigenous plant that belongs to the East African region of the crop genetic diversity center of which South Sudan is part of (Purselove 1977), this is the main crop cultivated by the traditional sector and it occupies about 70 percent of the area sown to cereals. The indigenous farmers prefer seeds of the many local races, though there are also some improved seeds from Sudan that have become well established in the northern parts of the low rainfall woodland savanna zone where large-scale mechanised farms and hand-cultivated farming areas do exist. This area extends from Renk to Awei and Abyei.

Maize (Zea maysL.) is an exotic plant species introduced from Tropical America (Purselove 1977). It is estimated to be planted in about 27 percent of the cereal area in South Sudan (FAO 2015). It is the most popular cereal crop in the green belt which falls within the southern parts of the high rainfall woodland savanna zone. Bulrush millet (Penuisetum typhordeumRich.) and finger millet (Eleusine coracana) and rice (Oryza sativa L.) are all introduced plant species from the Sahel region of African, high land of Uganda and Ethiopia, and Southeast Asia respectively (Purselove 1977). These crops are estimated to make up the remaining 3 percent of the planted cereal area in South Sudan (FAO 2015). In the western part of the low rainfall woodland savanna zone which falls within the Northern and Western Bahr el Gazal, Warrap, and Lakes States, Sorghum (Sorghum bicolor) is intercropped with Bulrush Millet (Penuisetum typhordeum Rich.), whereas Finger Millet (Eleusine coracana) and upland rice (Oryza sativa L.) are mostly found in southern parts of the high rainfall woodland zone that falls within the greater Equatoria region. Other important cultivated crops include Cassava (Manihot esculnta Crantz), sweet potatoes (Ipomoea batatas (L.)Lam), Yam (Dioscorea spp.), and groundnuts (Arachis hypogea L.). All of these plant species are exotic Cassava and sweet potato are introduced from tropical America, Yam and groundnut are introduced from tropical Africa and South America, respectively. Cassava (Manihot esculenta Crantz) is estimated to make up 30-40 percent of the planted area in southern parts of the high rainfall woodland savanna zone, which fall within the greater Equatoria region, and 27 percent of the cultivated area in southwestern parts of the high rainfall woodland savanna zone that falls within western Bahr el Gazal state (FAO 2015). Cultivated areas for groundnuts range from 5-15 percent according to various locations.

Okra (Abelmocus esculentus), Cowpeas (Vigna unguicullata L. Walp), Green gram (Phaseolus luntus L.), Pumpkin (Cucurbita maxima Dush), Bambara nuts (Vocandzia subterranean Thrw), Tobacco (Nicotiana tabacum), and many others are all widely grown around homesteads in all ecological zones.

Vegetables such as onions (Allium cepa L.) which is an exotic plant from Central Asia, and tomatoes (Lycopersicum esculentum Mill.) also an exotic plant from Tropical America, and many other vegetables are also planted near towns and cities to supply urban markets. In almost all these cultivation activities farmers prefer and/or use their local seeds.

Wild edible plants in South Sudan

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Wild edible plants (WEPs) refer to species that are neither cultivated nor domesticated but are available from their wild natural habitat and used as sources of food (Beluhan and Ranogajec 2010). Despite the primary reliance of most South Sudanese societies on staple crop plants, the tradition of eating WEP products continues in the present day.

In almost all ecological zones of South Sudan there are many trees which have edible fruits, seeds or gum, and many grasses with edible seeds, and still leaves of many herbs, shrubs and trees are edible, and many plants have tubers, storage roots or bulbs which can be eaten in the dry season. Many of these wild plants play an important role in human nutrition, especially during droughts or shortages of other food. They often help to provide variation and add important vitamins and minerals to an otherwise deficient nutrition (Von Noordwijk 1984).

When the human population is still small, the use of plant parts does not really damage the vegetation. However, when population density increases man must care for these useful plants. Sparing useful trees when land is being cleared for cultivation is crucial. By planting them or promoting their growth, man is 'domesticating' plants. Many of the wild plants present in South Sudan might become of use in the future by the process of domestication through selection of the best varieties.

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Table: Indigenous wild plants eaten by the traditional people of South Sudan

S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
			I	II	III	IV	V			
Wild Grass with Edible Grains										
1	Brachiaria obtusiflora Staff.	UmKhirr (A.); Ajoak (D.)			X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Dinka	Edible grains	
2	Dactyloctenium aegypticum	Koreb, Absaba (A.)		X	X	X		Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Dinka, Maban, Shilluk, Uduk	Edible grains	
3	Oryza barthii	Ruz (A.); Lop (D.)				X		Nuer, Maban, Shilluk, Uduk, Dinka	Edible grains	
4	Hyparrhenia spp.	Penze and Bagau (Z)			X			Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu	Edible grains	
5	Nymphaea lotus L.	Water Lily				X		Nuer, Maban, Shilluk, Uduk, Dinka	Edible grains	
6	Eragrostis pilosa	Am Hoy, Kwoinkwoin (A.); Nua (D.)	X	X				Dinka	Edible grains	
7	Panicum laetum	Kreb (A.)	X					Dinka	Edible grains	
8	Echinochloa colonum	Defera (A.); Akuath (D.)	X	X				Dinka	Edible grains	
9	E. pyramidalis	Urn Suf (A.); Kam (D.)	X	X				Dinka	Edible grains	
10	Cenchrus biflorus	Haskanit (A.)	X					Dinka	Edible grains	
Wild Plants /Herbs Used as Vegetables										
11	Abelmoschus spp.	Wild Okra							Edible fruits and Edible leaves	
12	Amaranthus graecizans	Lisan elteer							Edible leaves	
13	Cleome gynandra								Edible laves	
14	Corchorus fascicularis								Edible Leaves	

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S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
15	Corchorus olitorius								Edible leaves	
16	Cucumis melo var. agrestis								Edible fruits	
17	Portulaca oleracea								Edible leaves and stems	
18	Sonchus carnutus	Molieta							Green salad leaves	
19	Sonchus oleraceus								Edible leaves	
20	Hibiscus spp.								Edible leaves	
Wild Trees/Shrubs with Edible Fruits, Seeds, Leaves, Tubers										
21	Vitellaria paradoxa (Gaertn. F.) Hepper	Lulu (A), Kumuru (B.), Kumuri (Kuku), Rak (Dinka), Enguroti (Latuka), Awa (Madi), Kpakari (Zande), Riek (Nuer), Shea butter tree (English)			X			Balanda-Boor, Balanda-Bviri, Banda, JurBeli, Jurchol, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo,	The kernels are rich in oil and after roasting, grinding and boiling the extracted oil is known as Shea butter. This is used locally for cooking. Fleshy pup is usually allowed to be slightly overripe before being eaten raw	
22	Anona senegalensis Pers.	Apinrot (D.); Bogora (Z.); Lomudi (B.)			X			Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Azande, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Pojullo,	Fruits	

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S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
23	Borassus aethiopum Mart.	Fanpalm; Doleb (A.); Agep, Tuk (D.);			X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Maban, Shilluk, Uduk, Anyuak, Atout, Dinka, Jiye, Murle, Kachipo, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari,	Fruits pulp is edible, the immature seeds can be eaten and contain a sweet jelly which has a refreshing taste. The sap makes a good palm wine or can be drunk straight	
24	Ziziphus abyssinica (L.) Desf.			X				Dinka,	Fruits and sprouts	
25	Ximenia Americana L.	Kalto, Alankuwe (A.); Melat (D.); Lama (B.)			X	X		, Ifoto, Lotuka (Otuho), Anyuak, Atout, Dinka, Jiye, Murle, Kachipo, Nuer, Maban, Shilluk, Uduk, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu,	Fruits pulp is edible and thirst-quenching although it does contain cyanic acid	
26	Phoenix reclinata Jacq.	Kinge (Z.)			X			Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu,	Fruits	
27	Cordia africana Lam.	Sudan teak; Gambil (A.)			X			Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit	Fruits	

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S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
28	Sclerocarya birrea (A. Rich) Hochst.	Homeid (A.); Akarnil (D.)			X	X		Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu	Fruits	
29	Hyphaene thebaica (L.) Mart.	dom palm; Dom (A.); Taam (D.), Nyieth			X	X	X	: Maban, Shilluk, Uduk, Dongotona, Toposa, Nyangatum	Fruits	
30	Crateva adansonii DC.	Dabkar, Urn Bukesha (A.); Kait (D.)			X	X		Maban, Shilluk, Uduk, Bari	Fruits and seeds are occasionally eaten often after boiling	
31	Boscia octandraHochst ex Radik	Mokheit (A.); Fog (D.)			X		X	Toposa, Nyangatum	Fruits, seeds and young leaves are eaten, fruits eaten cooked when unripe and eaten fresh when ripe	
32	Courbonia virgateA. Brongen	Kurdan (A.); Daya (B.)							Fruits	
33	Capparis decidua (Forsk.) Edgew.	Tundub (A.); Naugot (Sh.)		X				Dinka ,Shuluk	Fruits edible	
34	Lophira alataBanks. Ex. Gaertn. F.	Tanga (D.); Zawa (Z.)			X			Dinka, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu,	Fruits	

ANNEXES

S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
36	Balanites aegybtiaca Del.	Lalob		X		X		Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Toposa, Nyangatum, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Dinka, Anyuak, Atout, Dinka, Jiye, Murle, Kachipo, Nuer, Maban, Shilluk, Uduk,	Ripe fruits eaten raw or sundried and stored like dates, made into sweetmeats or fruit juice and mixed with cereals. Leaves and young shoots used as vegetables, added to soups, preliminary boiling removes bitterness. Kernels are obtained by hand cracking or nuts are boiled in water until shell bursts and frees seeds then roasted.	
38	Salvadora persica L.	toothbrush tree; Arrak, Sac (A.); Acuil (D.); Kurreh, Lupari (B.)		X				Maban, Shilluk, Uduk, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu,	The fruits are edible and eaten fresh, ripe, or may be cooked or dried and stored	

ANNEXES

S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
39	Diospyros mespiliforrnis Hochst. ex. DC.	Cum (D.); Kumi (B.)			X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu	Fruits can be eaten fresh or dried	
40	Olea africana Miller	Brown olive; Badda (A.)					X	Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit,	Fruits	
41	Cordia sinensis Lam	Sudan teak; Gambil (A)			X			Toposa, Nyangatum, Lotuka (Otuho), Madi, Tenet/Teus, Pari,	Fruits eaten fresh	
42	Vitex doniana Sweet.	Kurain, Abdugulgul (A.); Konink (D.), Oyelu (Acholi), Kornyugwi (Kuku), Ariholi (Latuka)			X			Balanda-Boor, Balanda-Bviri, Banda, Dinka, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo,	The fruits are used as a sugar substitute and a black molasses is prepared from them	

ANNEXES

S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
43	Syzgygium guineense	Sanambiri (Z.); Kula (J.)			X		X	Balanda-Boor, Balanda-Bviri, Banda, Gollo, Jurchol, Ifoto, Lotuka (Otuho), Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Kakwa, Keliku, Kuku, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu,	Fruits	
44	Grewia tenax (Forsk.) Fiori	Gaddeim (A.); Apor (D.); Tireye (B.)	X	X	X	X		Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/ Teus, Pari,Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo,Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Dinka,	Fruits are eaten and they contain a large amount of iron and are commonly made into drinks	

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S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
45	Celtis integrifolia Lam.	Tutal (A.); Bakka (B.)			X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/ Teus, Pari,Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu,	Fruits	
46	Piliostigma thonningii (Schum.) Milne-Redh.	Abu Khameira (A.); Pac (D.); Dagpa (Z.), Ogali (Acholi), Pepe, Fope(Kuku, Bari), Mabba (Madi), Afafali (Latuka), Agali (Lango), Khuf el Jamal (Arabic), Camel's food (English)		X	X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Anyuak, Atout, Dinka, Jiye, Murle, Kachipo, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu,	Pods and possibly seeds are edible. The seeds and crushed green pods are edible	

ANNEXES

S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
47	Tamarindus indica L.	Ardeib (A.), Cuei (D.), Abanza (Z.)			X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu,	Fruits	
48	Parkia filicoidea Welw. ex. Oliv.	Umrashad (A.); Akon (D.), Abongba (Z.); Muluti (B.)			X			Kakwa, Keliku, Adio (Makaraka), Bari, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu,		
49	Cordyla africana	Donyduak (D.)			X		X	Balanda-Boor, Balanda-Bviri, Banda, Gollo, Jurchol, Dinka	Fruits	
50	Ziziphus mucronata Willd	Sidr, Nabak (A.); Lang (D.); Lujbati (B.)			X	X		Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Shilluk, Neur, Bari	Fruits	

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S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
52	Kigelia Africana (Lam.) Benth.	Abushutur			X	X	X	Anyuak, Atout, Dinka, Jiye, Murle, Kachipo, Shilluk, Uduk, Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu,	Fruits	
53	Nauclea latifolia Sm.				X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu,	Fruits	
54	Bridelia scleronouroides Muel. Arg.				X			Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari,	Fruits	
55	Grewia mollis Juss.			X	X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Kakwa, Keliku, Kuku , Ifoto, Lotuka (Otuho),	Fruits and leaves	

ANNEXES

S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
56	Hymenocardia acida Tul.				X			, Balanda-Boor, Balanda-Bviri, Banda, Gollo, Jurchol, Kakwa, Keliku, Kuku, Nyangwara, Pojullo, Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit,	Fruits and leaves	
59	Elaeis guineensisJacq.	Oil palm			X			Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu,	Oil	
60	Boscia angustifolia A. Rich.	Sereh, Sehel (A)			X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari,	Fruits edible but bitter and require repeated boiling	
61	Maytenus senegalensis (Lam.) Exell	Eeoy (A)			X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu,	Fruits and seeds are eaten	
62	Detarium microcarpum	Abu liela (A)			X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari,	Fruits are edible with quality varying to growth conditions	

ANNEXES

S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
63	Acacia nilotica (L.) Willd. ex. Del. subspp nilotica along water courses and subspp Astringens prefers dry soils	Sunt (A), Egyptian thorn €			X			Lokoya, Bari, Mundari, Dinka, Nuer, Shulluk,	Roasted seeds areeaten and young pods are served as vegetables	
64	Acacia senegal (L.) Willd.	Gum Arabic (A)	X	X	X	X		Dinka, Nuer, Shulluk, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Toposa, Nyangatum	Seeds can be dried and preserved for use as vegetables for human consumption	
65	Prosopis africana (Guill. & Perr.) Taub.	Mesquite A)			X	X		Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Gollo, Jurchol, Maban, Shilluk, Uduk	Seeds are fermented and used as seasoning	
66	Ziziphus spina-christi (L.) Desf.	Nabak tree (A)		X				Dinka, Nuer, Shulluk,	Fruits are edible	
67	Dobera glabra (Forsk.) A. DC.	Mikah (A)	X					Toposa, Nyangatum	Seeds are edible but needs to be boiled	
68	Grewia bicolor Juss.	Abu underab (A)	X	X				Dinka, Nuer, Shulluk, Maban, Shilluk, Uduk	Fruits eaten fresh or dried and a drink can be made out of it	
69	Grewia flavescens Juss.	Kelisan (A)			X	X		Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Dinka, Anyuak, Atout, Dinka, Jiye, Murle, Kachipo	Fruits are eaten and can make a drink	
70	Grewia villosa Willd.	Mutraq (A)			X	X		Dinka, Nuer, Shulluk	Fruits can be eaten but not actively sought of	

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S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
71	Celtis integrifolia Lam.	Tutal			X			: Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari	Both leaves and fleshy fruit are edible, the leaves in soup or salad, the fruits are eaten raw	
72	Pterocarpus lucens Guill. &Perr.	Nyangilo, Maleri (Kuku), Safi (Zande), Dig-dig (Dinka)			X			Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Moro, Moro Kodo, Balanda-Boor, Balanda-Bviri, Banda	Leaves are edible	
73	Grewia mollis Juss.	Pobo (Acholi), Tire (Kuku), Alioto (Latuka)			X			Dinka, Jurchol, Balanda-Boor, Balanda-Bviri, Banda, Kakwa, Keliku, Kuku , Ifoto, Lotuka (Otuho)	The young leaves are cooked and eaten	
74	Oxytenanthera abyssinica (A.Rich.) Munro.	Bamboo (English), Ganna (Arabic)			X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Lokoya, Lugbwara, Lulubo, Nyangwara, Pojullo, Acholi, Ifoto, Lotuka (Otuho)	In times of famine the seeds can be eaten	

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S/N	Botanical name	Local / common name	Distribution in ecological zones					Ethnic groups	Traditional use	Remarks
75	Irvingia gabonensis Baill.	Daritar (Dinka), Tabuu, Kuvondoro, Nzerri (Zande), Wild mango (English)			X			Acholi, Zande, Dinka, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu	The seeds inside the nut are edible and rich in oil	
76	Ficus vallis-choudea Del.	Ubologoi (kakwa)			X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu	The Zande eat the stems	
77	Coffea canephora Pierre ex Froehner.	Bum (Acoli), Wild robusta coffee (English)			X			Acholi: Didinga, Dongotona, Imatong	The seeds are used for making coffee. Robusta coffee is a form of this species grown commercially in Brazil	

ANNEXES

Traditional Knowledge of Medicinal Plants
Introduction

The plants that possess therapeutic properties or exert beneficial pharmacological effects on the animal and human body are generally designated as medicinal plants. The history of the use of medicinal plants for alleviating diseases had its origin in the activities of the most primitive man of the remote past. Our ancestors were forced to use any natural substances that they could find to ease their sufferings caused by acute and chronic illness, physical discomforts, wounds and injuries and even terminal illnesses. Since those ancient times, plants with therapeutic properties have occupied an important place in the disease treatment practices. Thus, they serve as important therapeutic agents as well as important raw materials for the manufacturing of traditional and modern medicines. They are rich sources of bioactive compounds and thus serve as important raw materials for drug production.

Status of traditional medicinal plants in South Sudan

In South Sudan there is a sizable amount of different types of woody plants and herbs which are being used as medicinal materials since time immemorial, and there has never been any systematic phytochemical inventory of these medicinal plants. Thus, it is quite possible that there may exist many of such potential medicinal plants in the country that are yet to be explored and are waiting to be assessed. Unfortunately, these valuable assets are likely to be depleted rapidly because of apparent unsustainable exploitation which could be attributed to the growing number of population in the country, destruction of habitat of medicinal plants by converting forests and other lands into agricultural lands and settlements or the illicit cutting of trees for firewood and charcoal making around big towns.

Therefore, failure to stabilise the status of these medicinal plants, would eventually negatively affect not only the biodiversity and the forests ecosystems functioning but also the health and livelihood of many of our people especially in rural areas who largely depend on the medicinal plants. Solutions for conservation of such valued medicinal plants may include, actions for specific species, increased collaboration with traditional healers to promote propagation of endangered medicinal plants and sustainable harvest techniques, public awareness activities and research programmes.

ANNEXES

Table: Wild and cultivated medicinal plants utilised by the traditional people of South Sudan

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
1	Acacia sieberiana DC	Kochai (A), Lasuru (Acholi), Bukuli (Bari, Kuku), Angoroni (Lango), Debe (Zande), Tipagok (Dinka), Tiap (Shilluk)	Wild tree		X		X		Dinka, Acoli, Bari, Kuku, Lango, Zande, Shilluk, Nuer, Bari, Mundari, Madi, Jie, Jurchol, Balanda, Balanda-Boor, Balanda-Bviri	The Kuku use an infusion of the bark to soothe muscle pains.
2	Combretum collinum Fresen.	Aduku (Acholi), Gogwati (Kuku), Mayi (Madi), Ebaniti (Latuka)	Wild tree			X	X		Jurchol, Balanda, Azande, Baka, Moru, Mundu, Jurbel, ongo, Kakwa, Makaraka, Pajulu, Kuku, Lugwara, Murle, Anyuak, Jie, Acholi, Latuka	The bark is ground and put onto wounds as a healing agent, the Latuka chew the leaves to alleviate stomach trouble.
3	Grewia mollis A. juss.	Pobo (Acholi), Tire (Kuku), Alioto (Latuka)	Wild tree		X	X			Dinka, Nuer, Shilluk, Balanda-Boor, Balanda-Bviri, Banda, Kakwa, Kuku, Latuka, Ifotu	The Acholi apply the crushed bark as a healing agent onto wounds.

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
4	Piliostigma thonningii 9K.Schum.) Milne-Redhead	Camel food (English), Ogali (Acholi), Pepe, Fope (Kuku, Bari), Kau (Zande), Mabba (Madi), Afafali (Latuka), Agali (Lango), Khuf el Jamal (Arabic)	Wild tree			X	X		Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Anyuak, Atout, Jiye, Murle, Kachipo, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/ Teus, Pari	The Latuka use the fibres for binding and healing fresh wounds, and the Acholi chew the bark to alleviate toothache.
5	Stereospermum kunthianum Cham.		Wild tree			X	X		Balanda-Boor, Balanda-Bviri, Banda, Jurchol, Azande, Mundu, Avukaya, Muro, Mundari, Dinka, Bari, Kuku, Madi, Acholi, Latuka, Lulubo, Murle, Nuer, Jie	The Zande apply the crushed bark to wounds. The Kuku use an infusion of the bark to stop diarrhea and stomach aches caused by nervousness and witchcraft
6	Nauclea latifolia Smith	Kwomo (Acholi), Angatu (Arabic), Lugwe (Bari), Goat (Dinka), Adoi (Latuka), Logo (Madi, Moru), Dama (Azande).	Wild shrub			X			Balanda-Boor, Balanda-Bviri, Banda, Gollo, Jurchol, Ndogo, Bari, Acholi, Dinka, Latuka, Madi, Azande, Moru	The root or root bark is used against constipation. A root infusion is used by the Zande as medicine for gonorrhoea.

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
7	Lonchocapus laxiflorus Guill.&Perr.	Meska, Gebira (Arabic), Olwedo (Acholi), Lakudi, Loke'bek (bari,Kuku), Olohidi (Latuka), Nzirripia, Agongo, Zigi (zande)	Wild shrub			X			Acholi, Bari, Kuku, Latuka, Azande, Jurchol, Balanda, Bongo, Moru, Mundari, Lokoya, Nyagwara	The juice from the crushed roots are a diuretic and are used for curing hepatitis. The juice of the pounded are used to relieve menstrual pains.
8	Cardenia ternifolia K. Schum. & Thonn.	Odwong CAcholi), Adong (Dinka), Dungi (Kuku), Otong (Lango), Ahore, Alotong (Latuka), Iroroa (Madi), Ngebege (Zande)	Wild shrub			X			Acoli8, Dinka, Kuku, Lango, Latuka, Madi, Azande, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu	The Latuka and Kuku use the leaves to cure eye infections in humans and animals. The leaves are boiledor the dry wood is burnt, and the eye infections are then treated with the stem or smoke
9	Khaya grandifolliola C.DC.	Broad leaved Mahogany (English), Eriago (Madi), Ahiri (Latulka), Teedo (Acholi), Kir (Kuku and Bari), Ahir (Lango), Tit (Dinka)	Wild tree			X			Balanda-Boor, Balanda-Bviri, Acholi, Azande, Baka, Avukaya, Mundu, Makaraka, Kakwa, Kuku, Madi, Latuka, Bari, Lango, Dinka	Locally an infusion of the bark is used to cure diarrhoea.

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
10	Albizia grandibracteata Taub.	Owak (Acholi), Red nongo (Trade name)	Wild tree			X			Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Acholi, Ifoto, Lotuka (Otuho), Kakwa, Keliku, Kuku, Adio (Makaraka),	An infusion from the roots is drunk in cases of tonsillitis.
11	Margaritaria discoidea (Baill.) Webster	Atiko, Otego (Acholi), Atego (Lango), Odzeki (Madi)	Wild tree			X			Acholi, Lango, Madi, Kakwa, Kuku, Makaraka, Lugwara, Azande	The Zande use parts of the plant for cough medicine.
12	Vernonia subuligera O. Hoffm.	Taa, Lyec (Acholi)	Wild shrub			X		X	Acholi, Didinga, Dongotona, Imatong, Lango, Larim/ Boya, Lopit, Azande	The roots of the plant are pounded andboiled and the decoction is drunk to relieve menstrual pains.
13	Sclerocarya birrea (A.Rich) Hochst	Homeid (Arabic)	Wild and planted tree			X	X		Latuka, Anyuak, Nuer, Dinka,, Balanda-Boor, Balanda-Bviri, Banda, Jurchol, Lokoya, Acholi	The bark is said to cure dysentery, labour pains, stomach aches, constipation, snake bite, toothache, and skin disease

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
14	Annona senegalensis Pers	Wild custard apple (English), Gishta Gaba, Gishta (Arabic)	Wild shrub			X		X	Didinga, Dongotona, Imatong, Lango, Larim/ Boya, Lopit,: Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Pajulu, Nyangwara	The bark is used to treat guinea worm and other worm infestations, diarrhea, some stomach complaints, snake bites and as a mouthwash for toothache. The bark and leaves are used to treat respiratory infections. The leaves are used to treat pneumonia and as a tonic for general well-being. The roots are used in cases of stomach disorders and venereal diseases. Various parts of the tree are also used in treatments for skin and eye complaints.
15	Adenium obesum (Forssk.) Roem. &Schult	Desert Rose (English), Sedger el sin (Arabic)	Wild shrub			X			Latuka, Bari, Lokoya, Lopit, Lulobo	An infusion from the roots is used to kill lice. This shrub is extremely poisonous
16	Balanites eagyotiaca (L.) Del.	Desert date (English), Lalob, Heglig (Arabic)	Wild tree		X	X	X		Shilluk, Dinka, Nuer, Mundari, Bari, Lokoya, Latuka, Toposa, Murle	It is used for control of schistosomiasis, and of guinea worm, and in the treatment of stomach complaints, epilepsy, sterility and mental diseases.

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
17	Kigelia Africana (Lam.) Benth	Sausage tree (English), Umshutur (Arabic)	Wild tree			X		X	Didinga, Dongotona, Imatong, Lango, Larim/ Boya, Lopit, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Madi, Acholi, Azande	Concoction prepared from the bark cures headache, and one prepared from theleaves cures malaria. Fruits are used to treat skin conditions.
18	Stereosprmum kunthianum Cham	Pink Jacaranda (English), Kashkash, Samr (Arabic)	Wild tree			X	X		Dinka, Nuer, Shilluk, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Jurchol, Murle, Jie, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu	The bark, roots and pods are used in the treatment of ulcers, skin eruptions, leprosy, venereal diseases, and coughs.

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
19	Cordia sinensis Lam.	Sandpaper tree (English), Underb (Arabic)	Wild tree		X	X			Dinka, Nuer, Shilluk, Mundari, Moru, Pori, Lopit	Ash is used to treat skin troubles, wet soaked bark as a hot compress or to help staunch wounds following tooth extraction, leaves as wound dressings and it is said that the roots boiled with milk can cure malaria.
21	Boscia angustifolia A. Rich.	Sereh, Sehel (Arabic)	Wild shrub	X	X				Dinka, Toposa, Nyangatum,	The roots are said to be effective in relieving chest pains, the bark can be used to treat swollen feet, kidney pains, and a stiff neck.
22	Boscia senegalensis (Pers) Lam ex Poir	Mukheit, Kursan (Arabic)	Wild shrub			X	X		Dinka, Nuer, Shilluk, Murle, Jie, Mundari, Pori, Lopit,	The leaves are used for an eyewash to treat schistosomaisis (bilharaia), intestinal complaints, haemorrhoids, ulcers, and guinea worm sores
23	Capparis decidua (Forssk.) Edgew.	Tundub (Arabic)	Wild shrub	X	X		X		Dinka, Nuer, Shilluk,	Used for treatments of fever, rheumatism, diarrhea, venereal diseases, jaundice, and enlarged spleen.

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
24	Carica papaya L.	Papaya, pawpaw (English), Fafay (Arabic)	Planted tree	X	X	X		X	Almost grown in all ecological zones	Seeds are used to treat malaria, as a d-wormer, an abortifacient, and as a counterirritant.
25	Casuarina equisetifolia L.	Whistling pine, Beefwood tree (English), Casurina (Arabic)	Planted tree	X	X				Planted in many areas in different ecological zones as a garden and shade tree	Many medicinal uses are reported for this tree in its original habitat, although these are not known in South Sudan.
26	Maytenus senegalensis (Lam.) Exell	Confetti tree (English), Eeoy (Arabic)	Wild shrub		X	X	X		Dinka, Nuer, Shilluk, Mundari, Pori, Lopit,	Roots are used to treat snake bites, syphilis, stomach complaints, leprosy, dysentery and as an aphrodisiac. Leaves to treat toothache, worms, eye troubles, female sterility, sores, and to prepare mouthwash and mild laxative
27	Conocarpus lancifolius Engl. And Diels	Common tig tree (English), Damas (Arabic)	Planted tree		X		X		Planted in Upper Nile	Its resins are used as a treatment for chest and bowel complaints

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
28	Guirewia senegalensis J.F Gmel	Gobaish, Robaish (Arabic)	Wild shrub	X	X				Dinka, Nuer, Shilluk	A decoction of the roots is said to cure diarrhea and dysentery. The bark is used to treat stomach complaints. An infusion of the leaves reportedly cures bronchitis fever, coughs, and stomach complaints, as well as providing as a general health tonic. The fruits cure the hiccups and the smoke from burning leaves in used as a fly repellent mainly for animals.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
29	Terminalia brownii Freen.	Subakh, Darot, subaraya (Arabic)	Wild tree			X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu,	In some communities, the bark is used as an effective treatment against chest goals, colds and tuberculosis.
30	Diospyros mespilifomis Hochst. ex ADCA	African ebony (English) Gughan, Jokhan, Abu Sebela (Arabic)	Wild tree			X			Dinka, Balanda, Balanda-Boor, Balanda-Bviri, Jurchol, Azande, Jurbel, Muro, Mundari, Bari, Kuku, Acholi	Bark is used to cure sores and ulcers, roots to treat dysentery, worms, fevers, pneumonia, syphilis, and wounds.
32	Cassia fistula L.	Golden shower, Indian labumum (English), Fistula (Arabic)	Planted tree	X	X	X			It is a decorative plant widely planted in South Sudan by almost all the ethnic groups	A dark brown sweet pulp which has a laxative effect is contained within the pods.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
33	Cassia siamea Lam.	Yellow cassia, Ironwood yellow cassia, (English), Cassia (Arabic)	Planted tree	X	X	X	X	X	Planted in shelterbelts and firewood production throughout South Sudan by almost all the ethnic groups	It cures a variety of ailments associated with the blood forming organs, it also treats herpes, rhinitis and used as a laxative
34	Cassia sieberana DC.	African luburmum (English), Um kitsch	Planted tree			X	X	X	Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Dinka, Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit	Roots are used in treatment for elephantiasis, venereal diseases, dysentery and hemorrhoids. The leaves and pods are used to treat fevers, ulcers and may be applied as a gum wound dressing

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
35	Parkinsonia aculeate L.	Horse bean tree, Jerusalem tree (English), Sesaban (Arabic)	Planted tree	X	X				Dinka, Nuer, Shilluk	It is reported that the leaves, seeds, flowers and bark may be used as an infusion for fever.
36	Piliostigma thonningii (Schum) Milne-Rech	Monkey bread tree, Camel's foot tree (English), Khuf al jamal (Arabic)	Wild tree			X	X		Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Dinka, Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Murle, Anyuak	It is used as an eye lotion, as a contraceptive, and to treat gum infections, coughs, malaria and worms

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
37	Tamarindus indica L.	Tamarind, Indian date (English), Aradeb (Arabic)	Wild tree			X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu	It is a laxative, also used for treatment of diarrhea, venereal diseases, and infection of the gums and eyes
38	Acacia mellifera (Vahl) Benth	Wait a bit thorn (English), Kitr (Arabic)	Wild shrub		X		X		Dinka, Nuer, Shilluk	It is used as a cure for stomach complaints, to ease sore eyes and alleviate coughing, and it is also used to cure pneumonia, sterility and malaria

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
39	Acacia nilotica (L.) Wilid. Ex Del.	Egyptian thorn, Pricky acacia (English), Sunut tree (Arabic)	Wild tree	X			X		Shilluk, Dinka, Nuer, Mundari, Bari, Madi, Murle, Jie, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu	The bark, roots, gum, and leaves are used to cure colds, diarrhea, scurvy, toothache and opthalmia.
40	Acacia polycantha Willd	Falcon's claw acacia (English), Kakamut, Um siniena (Arabic)	Wild tree				X		Shilluk, Dinka, Nuer, Mundari, Bari, Kuku, Madi	The roots act as a general health tonic, as an antidote for snakebites, and as a cure for venereal diseases. Preparation from the bark is used for general stomach disorders.
41	Acacia Senegal (L.) Willd	Gum Arabic, Three thorn acacia (English), Hasab, Alloba (Arabic)	Wild tree		X		X		Dinka, Nuer, Shilluk, Mundari, Bari, Kuku, Madi, Latuka, Lopit, Toposa, Nyangatum	It is used for treatment of colds, stomach aches, diarrhea, hemorrhages, constipation, and syphilis. It is also reported as an aphrodisiac

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
42	Acacia seyal Del.	Whistling thorn (English), Taleh (Arabic)	Wild tree		X		X		Dinka, Nuer, Shilluk, Anyuak, Murle, Jie, Nagam (Kachipo)	The bark, leaves, and gum are used for treatment of hemorrhage, diarrhea, colds, headaches, and burns
43	Acacia tortilis (Forssk.) Hayne	Umbrella thorn, Karamoja, Israel babool (English), Seyal, Samar (Arabic)	Wild shrub	X	X				Dinka, Nuer, Shilluk, Toposa, Nyangatum	Parts used as a cure for malaria, swollen joints, and skin disorders.
44	Albizia amara (Roxb)Boiv.	Arad (Arabic)	Wild tree		X	X	X		Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari,Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu,Murle, Jie, Nagam (Kachipo), Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu	Fruits help in curing malaria and coughs, however, the seeds are said to be poisonous.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
45	Albizia lebbek (L.) Benth.	East Indian Walnut, Koko (Engglish), Dign el basha, Lebbek (Arabic)	Planted tree	X	X	X			Almost grown by all ethnic groups in South Sudan	Flowers are used for treatment of boils, other parts are used for treatment of diarrhea, dysentery, hemorrhoids and leprosy.
46	Faidherbia albida (Del.) A. Chew	Apple ring acacia, Winter thorn (English), Haraz Arabic)	Wild tree				X		Nuer, Dinka, Shilluk, Murle, anyuak, Jie, Nagalam (Kachipo),	Various parts are used for treatment of coughs, pneumonia, vomiting diarrhea, toothache and rheumatism, and others.
47	Leucaena leucocephala (Lam.) de. Wit	Horse tamarind, Lead tree (English), Leuceana (Arabic)	Planted shrub		X	X			Dinka, Nuer, Shilluk, Mundari, Bari, Kakwa, Kuku, Madi, Acholi, Azande,	Seeds are used for curing gonorrhea, and defective vision.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
48	Prosopis africana (Guill. &Perr.) Taub.	Abu suruj (Arabic)	Wild tree			X	X		Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Shilluk, Nuer, Dinka, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu	Tree parts can be used to provide remedies for headaches, toothaches, rheumatism, skin diseases, fever, and dysentery.
50	Dalbergia melanoxylon Guill. & Perr.	African black wood, African ebony (English), Babanous, kelto (Arabic)	Wild shrub		X	X	X		Dinka, Nuer, Shilluk, Didinga, Dongotona, Imatong, Lango, Larim/ Boya, Lopit, Balanda-Boor, Balanda-Bviri, Banda	The roots and/or bark helping to cure diarrhea, syphilis, colic and toothache, and the smoke used to ease headache and bronchitis.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
51	Lonchocarpus laxiforus Guill. &Perr.	Monkey's indigo (English), Khashkhash azrak, Har har (Arabic)	Wild tree		X	X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu	Bark and roots used as a stimulant and in the cure of jaundice. The leaves are reported to cure ulcers.
52	Azadirachta indica A. Juss.	Neem (English0, Neem (Arabic)	Planted tree	X	X	X	X		Almost planted by all ethnic groups of South Sudan	The bark, leaves, fruits, oil, and sap are said to help cure skin diseases, venereal diseases, rheumatism, sprains, and many more complaints. Leaves are used to treat malaria and as an ingredient in other medicines.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
53	Khaya senegalensis (Des.) A. Juss.	African mahogany, Senegal mahogany (English), Mahogoni, Murraya, (Arabic)	Wild tree		X	X			Dinka, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Bongo, Muro, Mundari, Bari, Pojullo, Nyangwara, Lokoya, Latuka, Madi, Lopit	Bark extract is used to treat jaundice, dermatoses, scorpion bites, allergies, and hookworms as well as for its laxative effects. Seeds and leaves are used to alleviate fevers and headaches, roots provide a treatment for sterility and general illness and are used as an aphrodisiac and in magic.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
54	Moringa oleifera Lam.	Horse radish btree (English), Rawag (Arabic)	Planted tree		X	X	X		Dinka, Nuer, Shilluk, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu	Many medicinal uses have been reported for various parts of the plant, including treatments for rheumatism, boils, scurvy, yellow fever, syphilis, gonorrhea, beriberi, headaches, and diarrhea.
55	Eucalyptus camaldulensis Dehnh.	Red River gum, Long beak Eucalyptus (English), Ban, Kafur (Arabic)	Planted tree		X	X			Dinka, Nuer, Shilluk, Bari, Kakwa, Madi, Kuk	The oil from the laves is used for medicinal applications

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
56	Psidium guajava L.	Guava (English), Juava (Arabic)	Planted shrub	X	X	X		X	Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/ Teus, Pari, Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu	Leaves are utilised for curing diarrhea.

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
57	Ximenia Americana L.	Medica, Umeid abiad, Abu khamier (Arabic)	Wild tree		X	X	X		Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Bongo, Murle, Jie, Shilluk, Dinka, Nuer	Many medicinal uses have been reported including treatments for headaches, toothaches, fevers, constipation, leprosy, infections of the eyes and ears.
58	Borassus aethiopum Mart.	African fan palm, Ron palm (English), Delieb (Arabic)	Wild palm tree			X	X		Madi, Lokoya,Latuka, Shilluk, Nuer, Bari, Mundari, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu	A root decoction is used as a mouthwash and in the treatment of asthma. The leaves are said to be an aphrodisiac and the sap is reputed to have many uses.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
59	Ziziphus spina-christi (L.) Dest.	Christ thorn (English), Sidr (Arabic)	Wild shrub		X				Dinka, Nuer, Shilluk	Parts used for treatment of snakebites (powder from burnt thorns), and blood purification.
60	Citrus aurantifolia (Christm.) Swingle	Lime (Englis), Leemun (Arabic)	Planted shrub		X	X	X	X	Planted almost by all ethnic groups of South Sudan	Medicinally the fruit is very rich in vitamin C, which helps resistance to various ailments including the common cold. Fresh limes are often squeezed out and used to flavour water, it is reputed antibacterial and that cholera can be prevented by this practice.
61	Citrus paradise Macfad.	Grapefruit (English), Grape (fruit), (Arabic)	Planted shrub		X	X	X	X	Planted almost by all ethnic groups of South Sudan	Medicinally the fruit is rich in vitamin C, which enhances resistance to various ailments including the common cold.
62	Citrus sinensis (L.) Osbeck	Sweet orange (English), Bortugan (Arabic)	Planted shrub		X	X	X	X	Planted almost by all ethnic groups of South Sudan	Medicinally the fruit is rich in vitamin C, which helps strengthen resistance to the common cold.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
63	Salvadora persica L.	Toothbrush tree, Mustard tree (English), Arak, Shaow, El rak (Arabic)	wild shrub			X	X		Shilluk, Nuer, Anyuak, Murle, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/ Teus, Pari	Many medicinal uses have been reported including treatments for fever, headache, gonorrhea, bronchitis, asthma, and as an anthelmintic (de-wormer).
65	Vitellaria paradoxa (Gaertn.f.) Hepper	Shea butter tree (English), Lulu (Arabic)	Wild tree			X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/ Teus, Pari, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, JurcholMangayat, Ndogo, Sere, Shatt, Yulu, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo	Shea butter is often used to treat skin ailments and may also be used as a cosmetic. Extracts from the bark are taken for their curative effects and leaf decoctions are used to treat headaches and to make an eye lotion.
66	Sterculia setigera Del.	Tartar, Faidr (Arabic)	Wild tree			X	X		Didinga, Dongotona, Imatong, Lango, Larim/Boya, Lopit, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/ Teus, Pari, Moro, Moro Kodo	The gum is used for treatment of venereal diseases. The bark and leaves are also used in various treatments including those for coughs, catarrh, fevers and leprosy.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
67	Tamarix aphylla (L.) Karsten	Tamarisk, Salt ceder (English), Tarfa (Arabic)	Planted tree				X		Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo	It is said that a crushed fruit of some tamarisks is a good cure for colds.
68	Grewia bicolor Juss.	Abu underab (Arabic)	Wild tree	X	X				Dinka, Nuer, Shilluk	There are many medicinal uses for this tree including treatments of chest complaints, snake bites, intestinal infections and using the leaves for dressing wounds.

ANNEXES

s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
69	Grewia flavescens Juss.	Hilliw, Khelisan (Arabic)	Wild tree		X	X			Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Bongo , Dinka	Extracts of the bark being used to treat diarrhea and as an aphrodisiac.
70	Grewia mollis juss.	Basham (Arabic)	Wild shrub		X	X			Dinka, Nuer, Murle, Shilluk, Kakwa, Kuku, Pajollu, Naygwara, Latuka, Lokoya	Known medicinal uses are for snake bites. The leaves can be used as a wound dressing.
71	Grewia tenax (Forssk.) Fiori	Guddiem (Arabic)	Wild shrub		X	X	X		Dinka, Nuer, Shilluk, Mundari, Bari	Parts of the plant are used as a remedy for colds and chest complaints and also as a chief constituent in a remedy for typhoid. The bark can be used as a medicine against parasites.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
72	Grewia villosa Willd	Gregdan, Tikko, Mutraq (Arabic)	Wild shrub		X	X	X		Dinka, Nuer, Shilluk, Murle	The bark (powdered or fresh) is used to treat wounds, and various parts of the plant are used to treat syphilis, spleen trouble, eye-ache andstomachache.
73	Celtis integrifolia Lam.	African nettle tree, African false elm (English), Mohagria, Lipinga, Tutal (Arabic)	Wild tree			X			Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/ Teus, Pari	The bark is said to cure rheumatism and various other parts of the tree are reported to provide effective treatment for headache, sterility, boils, mental disorders, worms, blood clots, loss of strength, and also to aid in childbirth.
74	Mangifera indica L.	Mango (English), Manga (Arabic)	Planted tree	X	X	X	X	X	Planted almost by all ethnic groups of South Sudan	The bark, leaves and flowers are used to treat complaints ranging from diarrhea, toothache, asthma, rheumatism and bronchitis.

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s/n	botanical name	local/ common name	status and habit	distribution in ecological zones					ethnic groups	traditional use
				I	II	III	IV	V		
75	Nerium oleader L.	Oleander (English),	Planted shrub		X	X			Acholi, Ifoto, Lotuka (Otuho), Madi, Tenet/Teus, Pari, Adio (Makaraka), Bari, Kakwa, Keliku, Kuku, Lokoya, Lugbwara, Lulubo, Mundari, Nyangwara, Pojullo, Avukaya, Azande, Baka, Moro, Moro Kodo, Mundu, Aja, Bai, Balanda-Boor, Balanda-Bviri, Banda, Froghe, Gollo, Indri, JurBeli, Jurchol, Mangayat, Ndogo, Sere, Shatt, Yulu, Dinka, Bongo	The roots are reported to act as a cure for ringworm, however all parts of the plant contain poisonous cardiac glycosides.
76	Capparis decidua (Forssk.) Edgew	Tundub (Arabic)	Planted shrub	X	X				Dinka, Nuer, Shilluk	Parts are used for treatments fever, rheumatism, diarrhea, venereal diseases, jaundice and enlarged spleen.

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Comparison between traditional medicinal plants and modern medicines

The usage of traditional medicinal plants is developed by specific societies thus its usage is unique to a particular culture and society, and it is used in treating the illness and injury of people within that society. The usage of these traditional medicinal plants is essentially a tacit knowledge, that is not easily codifiable, thus its relvance, reliability, functionality and effectiveness cannot be garanteed, though this is an important area for primary health care especially in developing countries. However, its area of application appears to be limited and it requires development and research which should involve examination and testing the relevance, effectiveness, functionality and reliability, of these so call medicinal plants.

Modern medicine is a well-founded scientific discipline based on a very huge accumulated knowledge of studies supported with extensive experience and research with results that are well tested and statistically confirmed reliable. Therefore, modern medicine is internationally recognised and accepted and can be applied worldwide, and it is reliable, relevant, functional and effective in treatments for human illness and/or injuries.

Possible dangers from traditional medicinal knowledge

There are many poisonous plants containing alkaloids that can cause adverse effects when ingested. Accidental ingestions can be responsible for fatal poisonings. When people pick edible wild plants, it is crucial that the plants are correctly identified this is because many of them are similar in appearance to poisonous plants. Every year at different seasons such misidentification mistakes could result in poisoning accidents.

In addition, many edible plants have poisonous parts. It is important to learn how to identify poisonous plants that grow in the wild, backyards and neighbourhoods. We should only eat plants that we can positively identify and know that they are safe to eat. It is suggested to use caution when picking wild plants. Other incidents of poisoning by medicinal plants include overdose, contact with poisonous plants, and incorrect preparation of medicinal plants.

There are plants all around us that contain psychoactive chemicals and other abusable substances. When taken for nonmedical reasons, usually for their mind-altering effects, they are called drugs and their use is abused, the most affected are adolescents and young adults. Patients may also substitute more conventional therapies for herbal remedies without informing the doctor. Negative effects can result from bad communication between the patient and a healthcare professional, which include adverse effects or drug-herb interactions.

When medicinal plants are overdosed, incorrectly used or used regularly over a long period of time, some plants that possess “harmful effects”, have the potential to induce adverse effects. Some medicinal plants are known to be toxic at high doses and others may have potentially adverse effects under some conditions. Just as with many foods and pharmaceuticals, there is a possibility of allergic reactions.

Promotion and protection of medicinal plants

This is possible through the following steps

9. Identifying species that need priority attention: It is necessary to identify species that are endangered or likely to become endangered in each region and to initiate programmes to

mitigate the threats. The categories of medicinal plant species that are most vulnerable to over-exploitation can be identified by combining the insights of herbal medicine gatherers with knowledge on plant biology and distribution.

10. Prioritising conservation areas: Prioritising large areas for conservation should take two main factors into account: The importance of the biodiversity of each region and speed of urbanisation or economic change. Problems of resource management of medicinal plants exist in densely populated and rapidly urbanising regions and it is herethat reaching a balance between human needs and medicinal plant resources is most urgent. Urban centres provide markets for traditional medicine but also accelerate change in land use in the neighbouring districts.

11. Riding on existing strengths. There is a need to strengthen cultural practices that ensure sustainable management. However, with cultural change, increased entry into the cash economy and rising unemployment, these controls are breaking down.

12. Capitalising on current goodwill, momentum and interest to review policies and legislation: The sustainable use of medicinal plants has, in the past, not received adequate attention by governments. This is partly because their potential in ensuring healthcare has not been recognised fully resulting in a lack of appropriate national policies and legal frameworks and insufficient financial support for research and development.

13. Re-examining current policies and legal frameworks. Regarding policy and legal frameworks, there is a need for a general assessment of existing policies and legislation relating to medicinal plants and natural resources with specific focuses on access, ownership, protection of community rights, conservation, in order that any flaws in current policies and legislation are addressed.

14. Intensifying research and providing up-to-date data for decision-making. Very few research activities have been carried out to address the conservation and sustainable use of medicinal plant genetic resources (their geographical distribution, ecological requirements, reproductive biology, seed storage and germination, sustainable management, etc.). Governments should ensure that there is continuous and up-to-date data on the status of the regular medicinal plants, especially those found in markets.

15. Supporting cultivation/domestication and sustainable harvesting: Cultivation as an alternative to over-exploitation of scarce traditional medicinal plants that has not been successful in Africa due to: (i) lack of support for production and dissemination of key species for cultivation by the state - mainly as a result of inadequate policies and legal frameworks; (ii) low prices paid for traditional medicinal plants by herbal medicine traders and urban herbalists. (This is in spite of high transport costs due to poor infrastructure, search time and the long-distance). (iii) Many good medicinal plants are trees that take a long time to mature. It is, therefore, cheaper for harvesters to harvest from the wild. If cultivation is to be a success as an alternative supply to improve the self-sufficiency of traditional medical plants and take harvesting pressure off wild stocks. Then plants have to be produced cheaply and in large quantity in order to compete favorably with material obtained from the wild. Cultivation in urban areas, especially for herbaceous plants, needs to be encouraged.

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16. Enhancing cooperation and networking: There is need for increased collaboration with and within traditional healers in order that ideas are exchanged. Better cooperation and coordination between local communities, local researchers, national governments, and international bodies are needed to design and implement sustainable in-situ and ex-situ conservation strategies.

17. Creating awareness: There is a need for awareness among harvesters and importers on threats posed by their actions and the need for sustainable harvesting.

Traditional Knowledge of Domesticated/Livestock and Wild Edible Animals

Status of domesticated animals/livestock in South Sudan

South Sudanese communities have a long tradition in livestock rearing. The Nilotics ethnic groups (Dinka, Nuer, and Shilluk) and the Nilo-Hamites groups (Murle, Toposa, Mundari and Boya) who inhabit the fliid plains and slopes of southeastern hills and mountains keep large herds/flocks of cattle, sheep and goats. Other tribes such as the Bari, Lulubo, Lokoya,etc. in Equatoria and Jur In Bahe el Ghazal regions who practice subsistence agriculture also possess some few herds of cattle, sheep and goats. Backyard poultry farming is a common practice by most traditional South Sudanese.
The livestock of South Sudan are either known by the name of their geographical habitat or after the tribes who possess them. For example, Nilotic longhorn Zebu/cattle, these are owned by the nilotics (Dinka, Nuer, and Shilluk). The short horn Zebu cattle are known by various names such as Mongalla cattle or mountaineous cattle, similarly the sheep and goats are known as Nilotic sheep, Nilotic goats or mountaneous goats. The following table shows the distribution of livestock types in the different ecological zones of South Sudan.

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Table: Distribution of domesticated animals/livestock and their utilisation by traditional people of South Sudan

s/n	scientific name	local name	population		Distribution in ecological zones					ethnic groups	Traditional use	Remarks
					I	II	III	IV	V			
1	Bos indicus	Nilotic longhorn Zebu cattle					X	X		Dinka, Nuer, ,Shilluk	Meat and milk	
		Shorthorn Zebu cattle Mongalla-cattle Mundari-cattle Kuku-cattle Toposa-cattle .etc-			X		X X X			Bari Mundari Kuku Toposa	Meat and milk Meat and milk Meat and milk Meat, milk and blood	
2	Ovis aries	Nilotic sheep Toposa sheep .etc	X					X		Dinka, Nuer, Shilluk Toposa	Meat Meat	
3	Capra hircus	Nilotic goat .etc						X		Dinka, Nuer, Shilluk	Meat and milk	
4	Sus scrofa	Pig			X	X	X	X		Maban	Pork	
5	Gallus domesticus	Chicken	X	X	X	X	X	X	X	Almost all the ethnic groups in South Sudan	Meat and eggs	

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Promotion and protection of edible domesticated animals/livestock

The conservation of local breeds of animal genetic resources and/or new conservation projects firstly requires astatement of the conservation objectives which among others more often include the following,

VI. Adaptability to the environment: The preservation of breeds that are adapted to specific environments is a priority if the objective of conservation is, for example, to have animals that can cope with future production systems that provide uncontrolled environmental conditions for animal breeding.

VII. Economic importance: It's the most common parameter used today to justify the conservation of a local breed. It depends on the characteristics of current importance (for example: high fertility, high rate of feed conversion, high quality of products, disease resistance, etc.).

VIII. Uniqueness of one or more characters: Some breeds may be given priority in order to achieve specific conservation objectives due to their behavioural, phenotypic or physiological characteristics.

IX. Historical and cultural value: This value is difficult to quantify but is particularly important in societies where agriculture and animal husbandry have radically changed. This value can generate income if properly exploited as a tourist resource.

X. Genetic uniqueness: Saving genetically distant breeds is important to preserve the different gene combinations that characterise them, and which are manifested through characters that could prove useful in the future.

After the definition of the conservation objectives and the prioritisation of breeds, the conservation programs start with the selection of the most suitable techniques; the available human and financial resources should always be considered in this phase.

Techniques for the conservation of animal genetic resources are divided into two categories: in situ and ex situ. When in situ conservation is possible, a local population is maintained and bred for production in its agro-ecosystem of origin or evolution, or in the areas of current breeding.

The ex situ conservation is defined as conservation through maintenance of live populations not kept under normal farm conditions (including zoos, agricultural parks, etc.) and/or outside the area in which they evolved or are now normally found.

Whatever the chosen technique may be (in situ, ex situ or a combination of both), it is necessary to ensure the maintenance of the greatest genetic variability within the breed; this is particularly true for small populations with high risk of inbreeding and loss of genetic variability.

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Annex VIII Report on Stakeholder Consultations for the National Biodiversity Strategy and Action Plan: Jonglei State

This report covers the discussion points and emerging issues from field engagements conducted in Jonglei state. The state level consultation was conducted as part of the development and completion of the National Biodiversity Strategy and Action Plan (NBSAP) for South Sudan. The field activity took place between the 8 November 2017 and 11 November 2017.

The team that undertook the consultation comprised of a technical team appointed by UNEP South Sudan, the National Ministry of Environment and Forestry and the National Ministry of Wildlife Conservation and Tourism. The consultations were undertaken with State level teams comprising of the Technical leadership at three ministries as well as Society leadership represented by the Ministers of Jonglei State.

The first meeting was held with State level stakeholders representing the Ministry of Wildlife Conservation and Tourism. The meeting which was led by the Director General Wildlife Conservation and Tourism Jonglei State was attended by General Zakaria- Atemu the Director General, Rev. Thomas Agou – Acting Director Tourism and Hotels, Dut Achwek Lwol Director Hotels, and Dut Achuek Lual – Minister of Local Government and Law Enforcement.

The second meeting was conducted with staff of the Ministry of Agriculture and Forestry. The meeting was convened by the Director General Agriculture and Forestry, and it was attended by Mr. Atem De Gak, the Director General, and other staff of the Directorate including Mr. Machar Awuol Deng, Mr. Mayem Atem Jok and Mr. Abuoi Mawout David.

The third meeting was held with staff of the Directorate of Livestock and Fisheries. The meeting was attended by Mr. Geu Wurthony Gak - Director General of Livestock and Fisheries, Kwol Alier Deng – Deputy Director Planning and Majok Chol Ayieth – Deputy Director Rural Cooperatives and Development.

The fourth meeting was held with the Ministry of Health and Environment. There were two separate meetings one with the Minister as a key stakeholder discussion and another very brief meeting with technical staff of the Ministry. The stakeholders met were Dr. Angok Gordon Kuol Minister of Health and Environment, Jonglei State, Deng Ajak – Director Finance Ag. Director General Health and the Director Public Health – Mr. Magok.

The emerging issues from the discussions were the following:

Wildlife Conservation and Tourism

- There is a lot of wildlife conflict occurring with poaching occurring at a very high rate.
- The Wildlife Ministry has very little capacity for enforcement as the people involved in poaching often belong to the national armed forces or opposing armed forces.
- There is human wildlife conflict over livestock grazing in the Wildlife Reserves.
- The long-armed conflict in the area has affected the functioning of institutions including wildlife agencies.
- Awareness creation is needed to empower communities to look at wildlife management as their responsibility and as them conserving their own resources.
- Reduction of armed conflict and disarmament will allow the wildlife staff to work without fear of being attacked by armed groups in the field.

- There is considerable technical and institutional capacity building needed for an effective wildlife management.
- Mindset change as people change from thinking about war and back to development

Agriculture and Forestry

- Jonglei is a flood plain and it is considering establishing an artificial lake, not a good idea though as the environmental and social impacts are likely to be considerable.
- Land mapping, and land use planning are needed to improve use of land and zones within the State.
- Wetland management programme, potential for the Sudd region.
- The potential for management of value chains of indigenous tree species particularly Acacia Seyal, Acacia Senegal and the Shea Nut tree. These could have economic potential and can be exploited under the GEF Biodiversity programme as well as under ABS.
- Awareness creation on biodiversity management is another potential area of intervention.
- There is need for capacity building especially in terms of working facilities, structure for staff and institutional organisation as a functioning unit.

Livestock and Fisheries

- Very low or poor technical and physical capacity for livestock management, there are no government veterinary services. The services depend on donor (UNMIS) and NGO programmes which are short term projects of three to 12 months.
- There is no data on livestock populations in the state, and there is evidence of a growing uncontrolled population of pigs particularly at the landing site next to the livestock directorate offices.
- There are still tensions between pastoralists and farmer communities, particularly because of the historical cultural cattle movement corridor where animal movements were announced and efforts to control disease spread were abandoned. This represents a potential project area.
- The Directorate needs considerable capacity development, including the possibility of moving the offices to a more conducive working area, the offices are overwhelmed by the fishing processing and trading activities.
- The livestock keepers burn up forest lands to allow regeneration of grass and to wipe away dense forest areas where armed groups could hide and cause insecurity. However, this also causes considerable biodiversity destruction and interferes with other livelihoods.

Health and Environment

- The institutional structure for environment management has been weakened by loss of staff to other states and the lack of a budget for environment management.The State has an environment policy as evidence of effort to strengthen environment management and create the appropriate structure.
- The 2013 war put a halt to the progress that had been made on the environmental policy,

as well as engagement with external partners to support the ministry.

- The Environmental Directorate in the Ministry of Health and Environment would still be the main means for coordination of biodiversity management in the State.
- There are two clear opportunities for the State in the early phases of NBSAP implementation – developing the institutional structure for environment management, and awareness creation on the NBSAP. The State may also be helpful in promoting the component of introducing the Nagoya Protocol on Access and Benefit Sharing (ABS).

Convention on
Biological Diversity

UN
environment
programme