



**Government of the Republic of the Sudan
Ministry of Environment and Physical Development
The Higher Council for Environment and Natural Resources
(HCENR)**

**Second National Report on the Implementation
Of the
Convention on Biological Diversity**

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Foreword

In meeting its obligations and duties to produce a second country report to the Conference of the Parties of the Convention on Biological Diversity in the form of answers to the questionnaire made available by COP Decision V/19, the Government of the Sudan would like to submit a short report to clarify and complement the information provided in the questionnaire provided by the CBD Secretariat.

This report will therefore present an overview of the major activities undertaken in relation to biodiversity in the country. These include policies, action plans and assessment of capacity building needs in country specific priorities for biodiversity implementation.

Abbreviations and Acronyms

ABS	Access to Genetic Resources and Benefit Sharing
ARC	Agricultural Research Corporation
ARRC	Animal Resources Research Corporation
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
COP	Conference of the Parties
DNA	Deoxyribonucleic Acid
FNC	Forests National Corporation
GEF	Global Environment Facility
GIS	Geographical Information System
GPS	Global Positioning System
HCENR	Higher Council for Environment and Natural Resources
IES	Institute of Environmental Studies
MAPRI	Medicinal and Aromatic Plants Research Institute
NBG	National Botanic Garden
NBSAP	National Biodiversity Strategy and Action Plan
NCR	National Center for Research
PGRU	Plant Genetic Resources Unit
RPA	Range and Pasture Administration
SECS	Sudanese Environment Conservation Society
UNFCCC	United Nations Framework on Climate Change
WCGA	Wildlife Conservation General Administration
WRC	Wildlife Research Center

1. Introduction

The Sudan is a vast country extending gradually from the desert in the north, with hot dry climate and almost no vegetative cover, to the African Sahel zone in the center, with light and dense Savannah, and to the sub-tropical region in the south with heavier rains and dense tree cover. This endows the country with various environments and different agricultural systems.

The Sudan is an Afro-Arab country well-placed geographically, median among the Arab countries in North Africa, the Arab countries across the Red Sea and the countries of east, central and west Africa. In this respect, the country serves not only as a bridge facilitating trade and human movement, but also as a melting pot of African and Arab cultures. The country by size and diversity is Africa in miniature with complex cultural, ethnic and religious entities. With 2.5 million square kilometers (sq. km.) in area, Sudan is the largest Arab and African country. It enjoys extensive arable land, estimated at some 85 million hectares (ha) (1ha = 2.38 feddans), that can mostly be rain cultivated with rain-fall varying from about 50 millimeters (mm) in the extreme north to more than 1500 mm in the extreme south. Thanks to the extensive rains, most of central and all southern Sudan are largely covered with forests and grasslands, estimated at some 66 million ha. The Nile River with its various tributaries crosses the country from the south to the north with an annual flow of some 84 milliard cubic meters (md.c.m.), Sudan's share of which is 18.5 md.c.m. at Aswan. The country is also well endowed with underground water, which has hardly been tapped, in addition to numerous seasonal rivers outside the Nile Valley, which need to be controlled and regulated to maximize their utilization. These natural resources have allowed the build-up of a national herd of livestock, estimated at some 116 million head of cattle, sheep, goats and camels, as well as several million wild animals. The Nile Valley and the Red Sea are also rich in fish and aquatic life constituting a tourist attraction in addition to their role in food security. The country is becoming well known for its rich mineral resources, which include oil, gold, iron, lead, chrome, asbestos... etc. Indeed a 1600 kilometers of pipeline, Bashair Sea Port, Khartoum Refinery and other installations have been completed and the export of crude oil began on 30th August 1999. That of refined products is to commence early May 2000.

Even though Sudan is rich in its diversity of ecosystems, habitats, species and genetic resources, no coordinated, comprehensive surveys or assessments have been carried out prior to the launching of the Biodiversity project. Most surveys and studies on biodiversity components were fragmented and were tailored for limited academic or research and scientific purposes. Data collected or information gathered had most of the time been site-specific, local and at the particular institutional levels. However, indicators and observations show that there is a declining trend and diversity loss many components. Conservation and wise utilization of the resources are imperative. It was therefore important for the Sudan to join the Convention on Biological diversity (CBD). It was among the first countries to sign (June 1992) and it has ratified the Convention in October 1995. Becoming Party to the Convention obliged the Government of Sudan to develop its Biodiversity Strategy and Action Plan (BSAP) through stakeholder's full participation and in-line with the CBD directives. The Global Environment Facility (GEF) through the United Nations Development Programme (UNDP) has funded a biodiversity enabling activity for which technical backstopping was provided by IUCN, the Eastern Africa Regional Office (EARO). The Higher Council for Environment and Natural Resources (HCENR) was the implementing agency. The biodiversity activities in the country were implemented in two phases.

**Phase I
(The NBSAP Enabling Activity)**

This phase included:

1.1. The Biodiversity Assessment

Prior to and as part of the process of the development of the BSAP, a biodiversity countrywide assessment of the different ecosystems, habitats and species was carried out by multi-disciplinary teams of national experts. The effort made was to update the information on the different biodiversity components but future monitoring and filling in of the gaps in knowledge is imperative.

A number of ecosystems, habitats and “hot spots” were assessed in different parts the country. Ecosystems assessed included:

- ✓ Agrobiodiversity;
- ✓ Forests Ecosystem;
- ✓ Rangelands Ecosystem;
- ✓ Wildlife Ecosystem;
- ✓ Freshwater Ecosystems;
- ✓ Marine and Coastal Habitats; and
- ✓ Insects Life.

In addition, cross-cutting issues such as biodiversity economics, legal and institutional frameworks and biosafety were considered.

Summary of Sudan’s Biodiversity Strategy and Action Plan (BSAP)

1.2. The Biodiversity Strategy

The national strategy was developed with a vision stating that: “Conservation of diversity, and related indigenous knowledge for sustainable national development of Sudan”. It has also encompassed many guiding principles which were summarized in the following:

- Protection of the natural environment and its constituent biological, ethnic and cultural diversity, the development and good use thereof is an authentic aspect of fulfilling man’s role as vicegerent on earth. Conversely, the destruction of environment is a mischievous sort of corruption. Thus, furnishing a healthy social environment, its improvement and development is an essential demand in responding to the principle of sustaining the dignity of mankind;
- Every Sudanese citizen has a constitutional right to a healthy environment that secures health, abundance and prosperity;
- Stakeholders at the local, state and national level should have an equitable share of benefits accruing from biological and other dimensions of diversity;

- The formulation of a national biodiversity strategy and an attendant implementation action plan require the voluntary and democratic participation of the society at large; and
- Some aspects of the natural environment and its constituent biological, ethnic and cultural diversity recognize no political or geographical boundaries within or between countries which necessitate sub-regional, regional and international cooperation for the protection of the environment and its development in the context of international conventions and agreements.

1.2.1. Overall Objective

The overall objective is:

“to conserve and enhance biological diversity for the prosperity and development of the Sudan”.

1.2.2. Specific Objectives

The specific objectives are:

1.2.2.1. Conservation of Biodiversity (CBD articles 12 and 17):

This is to ensure conservation of the biological heritage for present and future generations through:

- (i) Strengthening research and monitoring and assessment activities: by improving inventories, database and documentation. This includes indigenous knowledge of the flora, fauna and microorganisms. Collaborative efforts from home and abroad will be necessary for the benefits of all concerned;
- (ii) In-situ conservation (CBD article 8): Conservation of representative samples of ecosystems including terrestrial, marine and fresh water ecosystems through nature reserves, national parks, on-farm conservation, forest reserves and restorative procedures; and
- (iii) Ex-situ conservation (CBD article 9):
- (iv) Establishment of arboreta, botanic gardens, herbaria and zoological gardens at national and state levels; and
- (v) Establishment of gene banks for the important species.

1.2.2.2. Promotion of Sustainable Use of Biodiversity Products (CBD article 10) this is to be through:

- i. Reducing, halting and ultimately reversing the over-exploitation of biological resources through appropriate land use, especially the horizontal expansion in crops on marginal lands of fragile ecosystems, overgrazing and deforestation, and by promoting efficient farming techniques and multiple use of the resources to realize their inherent potential;

- ii. Creating alternative products and sources of alternative income; and Controlling the formal introduction of germplasm especially noxious species in forests and food crops and in livestock.

1.2.2.3. Promoting Awareness on Biodiversity Conservation (CBD article 13):

- i. This can be achieved through:

Informing the public and decision-makers by providing adequate information through the media, improved extension service and networks;

- ii. Assigning real economic and other values to biodiversity products, so as to formulate sound policies for stakeholders through incentives in conservation activities. Initiatives from NGOs (national and foreign) and the private sector should be encouraged. This includes promotion of environment friendly activities like ecotourism, wildlife ranching and upfront preventive activities like environmental impact assessment.

1.2.2.4. Creating an Enabling Environment for Biodiversity Conservation by:

- i. Promoting political goodwill for the cause of biodiversity and availing incentives to stakeholders;
- ii. Strengthening the institutional technical capacity by improving the technical infrastructure and strengthening the manpower base through training to carry out the tasks;
- iii. Enacting a comprehensive and effective biodiversity conservation policy and practice that addresses, among other things, issues such as land allocation, land tenure and possible conflicts;
- iv. Adopting economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biodiversity (CBD article 11); and
- v. Undertaking and considering financial resources and financial mechanisms as stated in articles 20 and 21 of the CBD.

1.2.2.5. Complying with and Benefiting from Regional and International Agreements and Mechanisms (CBD article 22 and COP decisions)

Through signature and/or ratification, Sudan is a party to a number of arrangements and mechanisms, legally binding and non-legally binding, which contain substantive elements, addressing different biodiversity and environmental aspects. Sudan should honor its commitments and benefit, to the maximum from ratified arrangements. The Sudan participated in and is party to the following agreements:

I. Global

- i. Convention on Wetlands of International Importance, especially as Waterfowl Habitats (Ramsar);
- ii. Convention for the Protection of the World Cultural and Natural Heritage;
- iii. United Nations Framework Convention on Climate Change (UNFCCC);
- iv. Convention on Biological Diversity (CBD);

- v. United Nations Convention to Combat Desertification (UNCCD);
- vi. Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES); and
- vii. General Agreements on Tariffs and Trade (GATT) / World Trade Organization (WTO).

II. Regional

- viii. League of Arab States (LAS) and its organizations e.g.:
 - Arab Organization for Agricultural Development (AOAD);
 - Arab League Educational, Cultural and Scientific Organization (ALESCO); and
 - Arab Center for the Studies of Arid Zones and Drylands (ACSAD).
- xi. Organization of African Unity (OAU).
- x. Lome IV Convention
- xi. The Common Market for Eastern and Southern Africa (COMESA)
- xii. Inter-governmental Authority on Development (IGAD)

III. Treaty-based Organizations

- xiii. Center for International Forestry Research (CIFOR)
- xiv. Consultative Group for International Agricultural Research (CGIAR)
- xv. International Monetary Fund (IMF)
- xvi. Regional Development Banks
 - African Development Bank (AfDB)
 - Arab Bank for Economic Development in Africa (BADEA)
- xvii. Islamic Development Bank (IDB)
- xviii. Food and Agricultural Organization of the United Nations (FAO)
- xix. United Nations Educational, Scientific and Cultural Organization (UNESCO)
- xx. World Bank (WB)
- xxi. World Trade Organization (WTO)
- xxii. International Fund for Agricultural Development (IFAD)

IV. Non-legally Binding Arrangements.

Organizations and Fora

- i. International Center for Research in Agroforestry (ICRAF)
- ii. Intergovernmental Panel on Climate Change (IPCC)
- iii. International Union for Conservation of Nature (IUCN)

- iv. International Union of Forestry Research Organizations (IUFRO)
- v. International Plant Genetic Resources Institute (IPGRI)
- vi. International Center of Genetic Engineering and Biotechnology (ICGEB)

V. Initiatives, Processes and other Political Commitments

- vii. United Nations Programs (created by the General Assembly of UN)
 - United Nations Development Program (UNDP)
 - United Nations Environment Program (UNEP)
 - United Nations Conference on Trade and Development (UNCTAD)
 - World Food Program (WFP)
 - FAO Regional Commissions (including Near East and Africa Forestry Commissions)
- viii. Agenda 21, Chapter 11 (UNCED)
- ix. Non-legally Binding Authoritative Statement of Forest Principles for a Global Consensus on the Management, Conservation and Sustainable Development of All types of Forest (Forest Principles-UNCED)
- x. Commission on Sustainable Development (CSD)
 - Intergovernmental Panel on Forests (IPF)
 - Intergovernmental Forum on Forests (IFF)
 - Criteria and Indicators for Sustainable Forest Management
 - Dry Zone Africa Initiative
 - Near East Initiative
- xi. Global Environment Facility (GEF)

VI. Legislative Aspects

(CBD articles 14, 15, 16 and 17)

- i. Promote appropriate institutional, legislative, technical or other arrangements to ensure that the environmental consequences of sectoral programs and activities that have or are likely to have impacts on biological diversity are taken into account, mitigated or reduced;
- ii. Promote appropriate conditions and measures for legal access to genetic resources and techniques deemed important for agriculture, forestry, animal husbandry and safety;
- iii. Emphasize biosafety and social considerations in the development and application of biotechnology; and

- iv. Build capacity and promote legal capabilities to safeguard the national interests and rights of the Sudan and Sudanese people over their intellectual property rights pertaining to biodiversity resources, indigenous knowledge and national heritage.

1.3. The Biodiversity Action Plan

The BSAP came out with general and specific actions in the way of implementation. Below are suggested general and specific actions that need to be taken:

1.3.1. General Actions

- Goals are to promote institutional, legislative, technical or other arrangements to ensure that the environmental consequences of sectoral programs and activities that have or are likely to have impacts on biological diversity are taken into account, neutralized or reduced.
- Promote appropriate conditions and measures for legal access to genetic resources, indigenous knowledge and techniques deemed important for agriculture, forestry, animal husbandry and safety.
- Emphasize biosafety and social considerations development and application of biotechnology.
- To develop the CNS 1992-2002 into a new CNS 2002 – 2012 and to develop a national action plan. A land use plan is a priority within the action plan.
- The legislation in relation to establishment of the 26 states should be revised to cater for neglected ecological concerns e.g. dividing the states of Kordofan and Darfur into northern and southern states and causes further stress on their deteriorated resources.
- Revisions of laws dividing power and revenues in relation to natural resources between the central government and state government to come up with the best situation that emphasize conservation and sustainable use.
- Existing institutional set up related to biodiversity conservation should be subjected to critical evaluation and restructuring should dictate lines of coordination and integration.
- Capacity building is needed in the areas of genetic resources protection and biosafety. Necessary legislation should be established.
- To evaluate and suggest improvement measures of land use tenure legislation and practices to include regulations that requires sustainable use.
- Facilitate popular participation in biodiversity conservation programs capacity building programs for NGOs and CBOs should be developed.
- Consolidation of the role of the HCENR as the national focal point and coordination body in relation to biodiversity and other environmental issues.

1.3.2. Specific Actions

Strategies and actions should be directed to alleviate poverty. A participatory approach to development should be adopted. Awareness raising is needed and decision-makers should be won to the cause of environmental conservation. There are many actions that are in common between the different biodiversity components and need to be taken. The actions to be taken are summarized in the following:

1.3.2.1. In-situ Conservation

The following in-situ conservation measures need to be considered:

- Systematic surveying and inventorying of plant and animal genetic resources;
- In-situ conservation of wild relatives of field and horticultural crops, endemic and indigenous herbaceous and woody species. Species and areas need to be determined, e.g. pearl millet in the west, okra in the center, watermelon in the north and medicinal in their locations;
- On-farm conservation of farmers' varieties: improvement of cultural practices for better yields by traditional varieties, e.g. sorghum in Nuba Mountains, Southern Blue Nile, Southern Sudan and River Atbara; watermelon in Western Sudan, date palm in Northern Sudan and Darfur;
- Restoration of traditional varieties in war or disaster-affected areas, e.g. sorghum for the south and Nuba Mountains;
- Mitigation measures to reduce the negative impacts of natural and man-made factors upon in-situ conserved crops, e.g. floods, drought, riverbank erosion and fires; and
- Developing monitoring and early warning system for loss of genetic resources.

1.3.2.2. Ex-situ Conservation

The following ex-situ actions should be taken:-

- Priorities should be set for collecting plant and animal genetic resources throughout the country to rescue material that may soon disappear in the field or be subjected to catastrophes such as war, epidemics or drought;
- These genetic resources need to be collected through a national campaign that involves governmental and non-governmental institutions. Research centers, universities, agricultural departments, farmers, national societies, women,...etc. could participate;
- For such task of short- and long-term ex-situ conservation there is a need to strengthen the present PGR Unit at ARC to accommodate new collections that include natural vegetation species. New establishment for animal embryo and tissue culture is to conserve plant, domestic animals and wildlife genetic resources;
- Establishment of in-vitro conservation facility and field gene banks for the conservation of vegetatively propagated crops;
- Current field genebanks of fruit trees need to be maintained;
- Regeneration program is to be executed for the current collections in the PGR Unit/ARC;

- Establishment of program of surveys and research to generate and collect information-related to biotechnology
- Establishment of gene banks to preserve microbial cultures of importance
- Promotion of the effective use of plant tissue culture methods for conservation and propagation of endangered species.
- Proposal of projects that essentially aim to provide base data of micro-flora collections in Sudan.
- Retrieval of Sudanese germplasm conserved abroad;
- Creation of capable full-time collection team;

1.3.2.3. Utilization

Conservation and utilization are inextricably linked, because utilization provides the principal utilization purpose for conservation. Utilization of genetic resources involves the following:-

- Multiplication and characterization of collected materials in the regions where they are collected;
- Evaluation of local germplasm for the desirable characters;
- Participation between genebank, breeder and farmers in the utilization of the local germplasm or breed;
- Use of molecular evaluation techniques to develop core collections, and to avoid duplications;
- Purification of local diversified germplasm to produce varieties for commercial use;
- Production of multi-line varieties;
- Promotion of under-utilized, local varieties;
- Promotion of seed production systems both at local and national levels.

1.3.2.4. Documentation

Many plant and animal breeders are deterred from using collections because of a lack of information and documentation. Documentation should include the following activities:

- Documenting while collecting or characterizing;
- Documenting of plant and animal genetic resources using a computerized system;
- Documentation of indigenous knowledge, practices and technologies;
- Establishment of information network between plant and animal genetic resources units and users in research centers and universities;
- Publication of germplasm or breed catalogues.

1.3.2.5. Training, Education and Extension

- Recruitment and training of staff for the national plant genetic resources center and the regional units. Training includes training at the postgraduate level for researchers, and long and short training courses for researchers and technicians in a number of technical, managerial and policy areas;
- Training staff of research centers, universities and agricultural departments to participate in the collection operations;
- Development of syllabi on plant and animal genetic resources in the curricula of universities and colleges;
- Training in the areas of taxonomy (both plant and animal);
- Strengthening extension and extension facilities to develop a feedback mechanism to help researchers to scientifically approach field problems;
- Inclusion of biodiversity issues in the curricula of schools;

1.3.2.6. Institutional Arrangements

- Establishment of centrally coordinated program for plant genetic resources under the umbrella of the ARC for the conservation of local germplasm of current and potential agricultural crops
- PGR Unit/ARC is to be expanded into a national plant genetic resources center (in Khartoum or Wad Madani) where the base collection of crop germplasm in Sudan is maintained.
- The objectives of the national center include planning for collection, evaluating and use of the crop genetic resources as a coordinating body with the regional units. It will be responsible for the distribution of germplasm as regulated by legislation
- The base collection is to be deposited in the national center while the active collections are to be held by the regional units
- Some central facilities are to be attached to the national center for the conservation and evaluation of the collected germplasm. Examples of these are molecular biology laboratory and in-vitro conservation facility
- Five regional plant genetic resources units are to be established in the north, west, south, east and center where active collections of the materials collected from those regions are maintained
- Objectives of establishing regional units include collecting inside the regions, and evaluation of such materials collected in these regions.
- Consolidation of relationship and cooperation with relevant regional and international organizations.
- Strengthening institutional capacities by determining the proper affiliations. For example, RPA should be affiliated to other natural resources administrations. The WCGA affiliations should be revised and its linkages with natural resources agencies strengthened. The relationship between the WCGA and WRC are to be formalized.

1.3.2.7. Legislative Arrangements

- Development of national legislation to regulate access to biological resources including both crop and animal genetic resources;
- Development of national legislation to protect local communities, farmers and pastoralist rights to biological resources and their indigenous knowledge, practices and technologies;
- National legislation to safeguard and protect breeders rights;
- Development of national legislation to regulate the movement of germplasm and breeds to and out of the country;
- The rangeland legislation should be passed to address land use in rangelands, integration of animal production and crop production, establishment of range reserves. (unfenced through people participation), and develop land tenure system that recognizes rangeland use as a major land use type;
- Maritime, marine and coastal legislation need to be enforced.
- Enforcement of laws that regulate introduction of exotic biological specimens (Pathogenic)
- Endorsement and implementation of Biosafety and risk assessment laws.
- Endorsement and implementation of laws that protect patents of intellectual property rights.
- Endorsement and implementation of laws that prohibit Bio-piracy.
- Adoption of plans to promote understanding of bioethics with emphasis on manipulation of human genome and gene transfer.

Table 1 links threats to biodiversity, opportunities and actions.

Table (1): Summary of Threats, Opportunities and Proposed Actions.

Threats	Opportunities	Actions
<ul style="list-style-type: none"> • Environmental changes. • War and civil strife. • Biotic factors. • Fire. 	<ul style="list-style-type: none"> - Exploration, collection, preservation and documentation of flora and fauna. - Ex-situ conservation. - Conservation of representative areas of ecosystems. 	<ul style="list-style-type: none"> - In-situ conservation. - Ex-situ conservation (establish genebanks, botanic gardens, arboreta ...etc). - Documentation (information system, database, internet...etc).
<ul style="list-style-type: none"> • Improper land use planning • Modern agriculture • Inadequate or lack of legislation. 	<ul style="list-style-type: none"> - Legislation, particularly on land tenure. - Limiting cultivation of annual crops in marginal fragile ecosystem and gradual replacement by suitable land use system. 	<ul style="list-style-type: none"> - Develop national legislative arrangements that consider land allocation issues. - Raise awareness of communities at all levels including decision makers. - Empower laws for the various units concerned with biodiversity.
<ul style="list-style-type: none"> • Socio-economical factors. • Economic distortions and failures. 	<ul style="list-style-type: none"> - Efficient financial incentives and mechanisms. - Minimize market, policy, institutional and implementation failures 	<ul style="list-style-type: none"> - Adopt economically and socially sound measures that act as incentives for the conservation of biodiversity components.
<ul style="list-style-type: none"> • Inadequate institutional capacities. 	<ul style="list-style-type: none"> - Re-organization of coordination mechanisms. - Adequately provide institutions with skilled personnel and equipment. 	<ul style="list-style-type: none"> - Strengthen institutional capacities by determining the proper affiliations - Consolidation of relationship and cooperation with relevant regional and international organizations - Improve technical skills by training and education in areas of biodiversity and provide necessary equipment

1.4. Modality of Implementation

1.4.1. Putting the NBSAP into Effect and Use

The Sudan NBSAP shall be a useful guide to the implementation of the CDB. Accordingly, the NBSAP was:

- a. Presented by the Ministry of Environment and Physical Development to the Council of Ministers for Government approval. It was passed by Parliament and endorsed by the President of the Republic. This was to secure government ownership and commitment to its implementation. The approved NBSAP was publicized widely to secure stakeholder and public ownership and understanding. The latter could involve making it user-friendly through preparation of abridged versions for different stakeholders;
- b. Supposed to be used as a planning tool by the National Council for Planning and other levels of government planning to integrate biodiversity in the over-all national development and sectoral planning respectively;
- c. Meant to be used by the Ministry of Finance and National Economy (MFNE) as reference in budgeting and allocation of government resources;
- d. Used as a useful tool for fundraising and co-ordination of donor support to biodiversity conservation and implementation of CBD, UNFCCC, UNCCD, CITES, Ramsar, Forest Principles and other related conventions, including facilitating synergy among the conventions. It is suggested that an environment/biodiversity donor liaison committee be formed immediately to harmonize funding strategy for implementation of the NBSAP and biodiversity related activities;
- e. Used as a guiding tool for the HCENR as a Government agency responsible for the CBD. The NBSAP will greatly assist to oversee the implementation of Sudan's obligation to the CBD. In line ministries, the desk officers responsible for the related conventions will find this NBSAP a useful tool for co-coordinating implementation of CBD and the conventions they are responsible for;
- f. Used as a guiding tool for assisting states to integrate biodiversity in their states development planning, policies and laws;
- g. Used as a source of information for the National Information data bank(s), research institutions and sectoral agencies (e.g. Agriculture, Forestry, RPA, Livestock, Fisheries, Wildlife.... etc.). It will also point out information gaps and research priorities that sectoral agencies should work on;
- h. Used as a guide to the development agencies/partners that would identify programs for support to biodiversity conservation and sustainable development; and
- i. Used as a guide to Government of the Republic of the Sudan in implementing regional and international conventions and agreements as well as the Horn of Africa and other regional frameworks.

1.4.2. Endorsement and Approval

The draft NBSAP was subjected to formal endorsement by a forum of key stakeholders. The Council of Ministers, Parliament and the president and was then approved. The key institutional stakeholders from whom endorsement was sought included:

- Government ministries particularly Ministry of Agriculture and Forests (MAF), Ministry of Animal Resources, Ministry of Irrigation, Ministry of Environment and Tourism (MEAT), Ministry of Interior, Ministry of External Relations, Ministry of Finance and National Economy, Ministry of Culture and Information, Ministry of Industry and Investment and Ministry of Justice;
- Research institutions namely ARC, ARRC, NCR and universities;
- Training institutions including universities and training institutions affiliated to line ministries;
- Donor and development assistance partners such as UNDP, FAO, UNESCO, EC and member countries; and
- Relevant NGOs such as SOS Sahel (Sudan) and SECS.

1.4.3. Implementation

The NBSAP was planned to be implemented through 12 projects taking into consideration the specific objectives, and suggested actions. The project approach was thought to be preferable in Sudan because:

- It is the appropriate mechanism for implementing activities that need multisectoral approach such as those suggested in NBSAP;
- The project lead agency will be in a better position to co-ordinate the resources requirements and delivery of outputs;
- Limited capacity that is also scattered in different sectoral institutions with limited experience in multisectoral planning and co-ordination; and
- Mobilization of fund will be much easier and facilitate its allocation to most pressing and priority areas.

1.5. Proposed Projects

The Action Plan is illustrated in form of the proposed projects for each of which titles, background and justifications are given below (more details are in the NBSAP document):

1.5.1. Organizational Set-up for Conservation of Biodiversity

Biodiversity conservation is a cross cutting interest among all users of natural resources. Administrations of land use, range, forestry, wildlife, fisheries and agriculture are all involved in activities related to biodiversity conservation. There is an urgent need for strengthening coordination among different users of biodiversity.

1.5.2. Raising Awareness of Communities at all Levels on Biodiversity and its Importance:

Biodiversity conservation can only be achieved through participatory action that includes all stakeholders and communities. Raising awareness about biodiversity and its values is much needed among all communities to solicit support, commitment and participation of all stakeholders in biodiversity conservation and sustainable use.

1.5.3. Strategic Land Use Planning for Conservation of Natural Resources:

Biodiversity conservation could only be achieved in the context of an accepted national land use plan. Stakeholders and communities should be consulted. The plan should be based on soil classification and soil capabilities survey and maps. Natural resources distribution should also be included. Land use planning and mapping should cater for different stakeholders' needs without compromising conservation needs.

1.5.4. Exploration, Collection, Preservation and Documentation of Flora and Fauna of Darfur, central clay plains, River Nile, Northern, Equatoria, Bahr El Ghazal and Upper Nile Regions:

Flora and fauna studies were not recently conducted. All data were compiled in the past and the need for updating is evident. Enormous changes in flora and fauna need to be documented and knowledge need to be enriched as a lot is unknown and little explored.

1.5.5. Conservation of Representative areas of Various Ecosystems

Different ecosystems and their biodiversity are being destroyed at an alarming rate. Increased population, depletion of natural resources and drought are contributing to the loss of biodiversity. Areas under several forests and protected wildlife areas should be increased.

1.5.6. Rangelands Conservation and Sustainable Use:

Major changes are taking place in nomadic grazing patterns. Such changes are due to increased numbers of livestock and drought. Tribal seasonal use of land has not been studied recently. With recent development of water resources and increase in export of livestock drastic changes in grazing systems could occur.

1.5.7. Ex-situ Conservation:

Establishment of arboreta, museums, marine and fresh water aquaria and zoological gardens could greatly enhance biodiversity conservation.

1.5.8. Capacity Building in Systematic:

To conserve biodiversity it is very important to have good knowledge of the varieties available, distribution and abundance. Monitoring change in biodiversity is a continuous task, which requires a good number of specialists in systematics.

1.5.9. Conservation of Local Races of Livestock

The Sudanese local races of livestock are threatened due to breeding with imported races. Conservation of pure races of different species of indigenous livestock is urgently needed.

1.5.10. Conservation and Sustainable Utilization of Agrobiodiversity

1.5.11. Establishment of National Center for Biotechnology

Agenda 21 is a participatory plan of action jointly formulated and agreed upon by the world community at the earth summit in Rio, Brazil 1992. It proposes a number of plans and action programs aimed towards sustainable development. Chapter 16 of the Agenda highlights the significance of biotechnology in improvement of environmental protection, food quality and availability, feed and renewable energy, human health and biosafety in application and transfer of biotechnology.

An early attention to the potential advantages of biotechnology is indispensable if Sudan is to evolve into a modern state. Biotechnology represents a new pervasive technology but simple and mostly appropriate to a developing country like Sudan where many of its problems relate to poor conservation of environment, self-sufficiency in food and energy. Therefore, it is high time to call for the establishment of a national Centre for biotechnology that essentially aims to promote:

- Interest and awareness of the potential advantages of biotechnology application particularly with reference to conservation and biodiversity aspects;
- Capacity building by development of training and research programs in areas of biotechnology related to biodiversity and conservation of environment;
- Interaction and collaboration between national/international institutions that work in the fields of biotechnology and biodiversity e.g. gene banks, plant tissue culture, labs., centers of animal breeding and artificial insemination etc;
- Programs for the biodiversity assessment and conservation of biological specimens exploited in biotechnology applications with special emphasis on microflora;
- Implementation of new rDNA technology in survey studies of biodiversity.
- Investment in biotechnology areas that aims at appropriate utilization and conservation of biological resources; and
- Legislations related to aspects of biosafety and biopiracy.

1.5.12. Reducing Impact on Biodiversity from Civil Strife

Sudan's biological resources suffer from long time civil wars and associated phenomena as much as refugees' movements and settling of population. It is important that the issues of biodiversity conservation and sustainable use are made part of the negotiations in conflict resolution and in resettling moving population from within and outside Sudan.

1.6. Institutional Arrangements

The Higher Council for Environment and Natural Resources (HCENR), the Focal Point to the CBD, is envisaged to be the federal agency responsible for coordinating management and conservation of biodiversity in the Sudan. Its organizational setup, hierarchy and mission need to be revised to reflect this and other roles. As such the HCENR is the lead agency for coordinating implementation of the NBSAP and especially the proposed projects. It is also to be the lead agency in implementing the following specific projects:

- Organizational setup for conservation of biodiversity in Sudan;
- Capacity building in systematics;
- Capacity building for biodiversity information management and monitoring;
- Any other projects that need capacity or multi-sectoral co-ordination if cannot be adequately implemented by the relevant sectors.

The HCENR will establish a biodiversity coordinating unit that will be responsible for:

- Providing secretariat support for the national environment committee on biodiversity issues;
- Implementing all biodiversity projects under HCENR;
- Coordinating the overall implementation of the NBSAP; and
- Providing technical support to the government in the general implementation of the CBD and preparations for CBD events such as Conference of the Parties (COP) and Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA), Africa and other regional biodiversity fora.

1.7. Implementation Schedule

The NBSAP will be implemented over an initial period of six years, equivalent to two three-Year Programs in conformity with the planning cycle adopted in Comprehensive National Strategy CNS (which is now changed to the Quarter Century Strategy).

1.8. Prioritization of the NBSAP Activities

Following approval and launching of NBSAP by early 2001, the proposed projects listed above are awaiting implementation over a period of six years, 2001-2007.

1.9. Monitoring, Evaluation and Reporting

The implementation of NBSAP will require monitoring and evaluation of the progress as well as the assessment of biodiversity status and trends to follow up on the impact of the implementation. HCENR is the overall responsible for monitoring of biodiversity and NBSAP implementation. Through a participatory process, the council will identify areas for monitoring and develop a comprehensive monitoring program. Among other areas the program will include:

- Monitoring implementation of the NBSAP;
- Monitoring the state of biodiversity; and
- Monitoring reporting on biodiversity.

The council will also guide and build capacity of all participating institutions for their contribution in implementing the monitoring program.

Table 2: Key steps for Developing a Monitoring Program include:

Output 1: needs and capacity for monitoring assessed	
Action	Activities
Identify biodiversity issues (in addition to those mentioned above) for monitoring and respective responsible institutions.	Identify biodiversity Areas/themes/sectors/ecosystems/species /states etc. for biodiversity monitoring Identify focal co-coordinators for co-coordinators in different themes etc. Assess and build capacity
Output 2: Implementation of the NBSAP monitored	
Develop indicators for monitoring Institutional/management changes for biodiversity management and conservation	Develop indicators on monitoring: Planning, reforms and budget availability for incorporating NBSAP principles, goal and objectives Institutional arrangements and capacity enhancement to accommodate NBSAP implementation needs
Output 3: Biodiversity status and trend monitored	
Develop list of reporting requirements, types of reports, deadlines, types of audience e.g. biannual national biodiversity status report, report to COP, annual report to parliament, half-yearly sectoral reports etc.	Develop appropriate technologies for data processing and reports production as per reporting needs Prepare reports including mechanism for approving reports. Publish and distribute reports as per identified requirements