STRATEGY FOR BIOPROSPECTING WITHIN AND OUTSIDE PROTECTED AREAS IN KENYA

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CITATION:

This strategy shall be cited as **The Strategy for Bio-prospecting Within and Outside Protected Areas in Kenya.**

Institutions Participated in the Formulation Process:

- Department of Resource Surveys and Remote Sensing
- Institute of Economic Affairs
- Jomo Kenyatta University of Agriculture And Technology
- Kenya Forest Service
- Kenya Forestry Research Institute
- Kenya Industrial Property Institute
- Kenya Wildlife Service
- Kenyatta University
- Ministry of Forestry and Wildlfe
- Moi University
- National Council for Science and Technology
- National Environment Management Authority
- National Museums of Kenya
- Pwani University College
- University of Nairobi

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LIST OF ABBREVIATIONS AND ACRONYMS

ABS	Access and Benefit Sharing
BCE	Bio-prospecting Centre of Excellence
BIOTA	Biodiversity Monitoring Transect Analysis
BTF	Bio-prospecting Trust Fund
BWMD	Biological Weapon of Mass Destruction
CBD	Convention on Biological Diversity
CBO	Community-Based Organization
CGIAR	Consultative Group on International Agricultural Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DRSRS	Department of Resource Surveys and Remote Sensing
EEZ	Exclusive Economic Zone
EMCA	Environmental Management and Co-ordination Act
FAO	Food and Agriculture Organization
GMO	Genetically Modified Organisms
GoK	Government of Kenya
GR	Genetic Resources
ICIPE	International Centre of Insects Physiology and Ecology
IEA	Institute of Economic Affairs
ILRI	International Livestock Research Institute
IP	Intellectual Property
IPRs	Intellectual Property Rights
IRAB	International Regime on Access to Genetic Resources and Benefit Sharing
ISSCMAP	International Standards for Sustainable Collection of Wild Medicinal and Aromatic Plants
ITPGRFA	International Treaty on Plant Genetic Resources fo Food and Agriculture
IUCN	International Union for Conservation of Nature
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KARI	Kenya Agricultural Research Institute
KECOBO	Kenya Copyrights Board
KEFRI	Kenya Forestry Research Institute
KEMFRI	Kenya Marine and Fisheries Research Institute
KEPHIS	Kenya Plant Health Inspectorate Services
KFS	Kenya Forest Service
KIPI	Kenya Industrial Property Institute

KU	Kenyatta University
KWS	Kenya Wildlife Service
LC/ LU	Land Use/Land Cover
MAT	Mutually Agreed Terms
MOSSAICC	Micro-Ogarnism Sustainable Use and Access International Code of Conduct
MOU	Memorandum of Understanding
MTA	Material Transfer Agreement
NABIMESCO	National Bioprospecting Monitoring & Evaluation Steering Committee
NBSC	National Bioprospecting Steering Committee
NCST	National Council for Science & Technology
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
NMK	National Museums of Kenya
PBR	Plant Breeders' Rights
PIC	Prior Informed Consent
RAMSAR	Convention on Wetlands of International Importance
SWOT	Strength Weakness Opportunity Threats
TFs	Task Forces
TK	Traditional Knowledge
TT	Technology Transfer
UNEP	United Nations Environmental Programme
UoN	University of Nairobi
UPOV	The International Union for the Protection of New Varieties of Plants
WIPO	World Intellectual Property Organization
WTO	World Trade Organization
WTO-TRIPs	WTO Agreement on Trade Related Aspects of Intellectual Property Rights

ACKNOLWEDGEMENT

The Strategy for Bioprospecting Within and Outside Protected Areas in Kenya was prepared by Kenya Wildlife Service (KWS) in partnership with key Stakeholders. Financial support was from KWS and USAID-Kenya.

Invaluable support from the Permanent Secretary, Mr. Mohamed Wa – Mwachai and Conservation Secretary Mr. Gideon Gathaara, Ministry of Forestry and Wildlife, during the formulation of this strategy is highly recognized. The Director KWS, Julius Kipng'etich, played a critical role and was the driving force behind the success of this Strategy. Also heads of the following institutions namely, Kenya Forestry Research Institute (KEFRI), Jomo Kenyatta University of Agriculture and Technology (JKUAT), National Environment Management Authority (NEMA), National Council for Science and Techonolgy (NCST), University of Nairobi (UoN), Moi University, National Museums of Kenya (NMK), Kenyatta University (KU), Kenya Forest Service (KFS), Insitute of Economic Affairs (IEA), Pwani University, Kenya Industrial Property Insitute (KIPI) and Depertment of Resource Surveys and Remote Sensing (DRRS) were instrumental for the succefull completion of the strategy by allowing their officers to contribute during the formulation process.

The coordination and formulation of the strategy from conception to its completion by dedicated KWS officers is highly acknowledged. KWS Bioprospecting/Biotechnology staff, Mr. Kavaka Watai Mukonyi, Head Bioprospecting/Biotechnology, Royford Mwenda, Asenath Adienge, Michael Waweru, and Jenipher Olang – support staff are specialy thanked. The input of Dr Samuel Kasiki KWS-Deputy Director, Biodiversity Reseach and Monitoring, Mr. Sipul Tom-Deputy Director Corporate Affairs, Sharon Kisire Head Human Capital, Patrick Omondi Senior Assistant Director and Head of Species Conservation and Management, Mr. Ibrahim K. Lubia Assistant Director,Regulatory, Enforcement and Compliance Affairs, Dr Samuel Andanje Head Ecological Monitoring, Biotechnology and Information Management, Dr. Erustus Kanga and Mr. Solomon N. Kyalo, Senior Scientist Biodiversity Conventions/Agreements is highly valued. Specifically, Mr. Ibrahim K. Lubia, Dr. Erustus Kanga and Mr. Solomon Kyalo worked all through with the Head Bioprospecting/Biotechnology to ensure that this document is delivered to stakeholders.

Special thanks go to the team from partner institutions that dedicated their efforts and tirelessly worked out to ensure that the country gets a strategy for bioprospecting within and Outside Protected Areas. This team includes; Fredrick O. Otswongo (KIPI), Agnes Lusweti (NMK), Dr Gideon Nyamasio, Prof. Julius Mwangi and Dr Isaac Ole Mapenay (UoN), Dr Romano Mwirichia (JKUAT), Nellie C. Oduor (KEFRI), Dr. Alex Machocho (KU), Silas Mulehi (DRSRS), Kiboye Yogo and Anthony Mbayaki (Moi University), Thomas Dheha (Pwani University College) and David Owiro (IEA).

Participants in the formulation process workshops including the stakeholders' workshop of March 2011 that endorsed this document: ***The strategy for Bioprospecting Within and Outside Protected Areas*** are highly acknowledged not forgetting the drivers and local communities who contributed to this process. (Annex 1)

FOREWORD

Kenya's biodiversity is one of the main drivers of the country's economic growth as reflected through the tourism, agriculture and cultural subsector. The country is among the mega biodiversity rich countries in the world. The rich diverse wildlife has given the country a brand trade mark with a global market and attracting various players ranging from scientists, bio-miners, conservationists among others. The valuable biological resources and associated traditional knowledge and derivatives continue to attract huge number of leading world biotechnology companies for bioprospecting.

Globally, bioprospecting is a multi-billion dollar business and may directly or indirectly contribute to creation of wealth, employment and achievement of Kenya's Vision 2030. Bioprospecting is recognized as a potential avenue for wealth creation and income generation, incentive for conservation and environmental protection, and accelerated sustainable development for biodiversity rich countries such as Kenya.

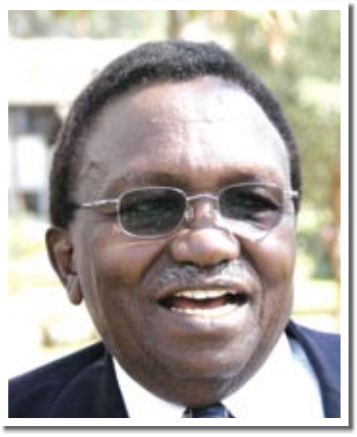
There have been many initiatives both locally and internationally to promote bioprospecting programs. The Constitution emphasizes on the need of the country to maximize yield from its biodiversity and equitably share accrued benefits among its citizens. Kenya is Party to various international instruments that govern management of biodiversity. Some of the key treaties include, CBD, CITES, ITPGRFA-FAO, WIPO, WTO-TRIPS agreement, UN Resolution 1540, BWMD, and ABS protocol (Aichi, Nagoya Japan). More specifically, the Nagoya ABS protocol calls for Nations to put in place strategies for bioprospecting that address biodiversity conservation, sustainable use and equitable benefit sharing from derived products. It emphasizes the need for technology transfer and protection of cultural and indigenous knowledge associated with biodiversity.

It is against this background that key stakeholders led by KWS, have formulated an all inclusive strategy for bioprospecting within and outside protected areas in the country. The strategy is a product of stakeholders' consultative process, taking to consideration the various relevant legislations and institutional frameworks. It therefore incorporates inputs fromthe participtaed stakeholders in the formutaion of the strategy. This strategy focuses on improved governance, institutional capacity, maximizing yield from biodiversity assets, increased technology development and transfer including better information management and benefit sharing. It further provides for mechanism of regulating and monitoring bioprospecting activities in the country through validation and audit systems of Prior Informed Consent (PIC), Certificate of Origin, contractual agreements, patents and licenses among others. It is envisaged that the implementation of this strategy shall result into well conserved biodiversity and a healthy and wealthy Nation.

It is my hope that this strategy will effectively be used as a tool and guide to bioprospecting, and that its implementation shall be a priority in biodiversity conservation and management agenda in the country in line with the Constitution.

Hon. Dr. Noah Wekesa, EGH
Minister for Forestry and Wildlife

EXECUTIVE SUMMARY



This strategy has been developed to guide bio-prospecting within and outside conservation areas and to realign the activities with the Constitution and National development Agenda, to ensure sustainable exploitation, utilization, management and conservation of environment, natural resources and ensure equitable sharing of the accruing benefit. It is envisaged that a budget of Kshs. 10 billion shall be required to implement this strategy in the first 5 years.

Bio-prospecting involves collection, research, discovery, development and commercialization of biodiversity and associated traditional knowledge. Biodiversity is the key driving force for bio-prospecting and biotechnology industries worldwide. Benefits accrued or derived from bio-prospecting cannot easily be quantified, however, it's estimated that between USD 500-800billion is generated globally annually. The current trends indicate the richer biodiversity provider countries earn less or not adequately compensated from their biodiversity by the recipients. Millions of biological specimens continue to be collected for preservation in foreign ex-situ banks, local institutions that act as source of bio-prospecting materials without linkage or recognition of original source.

Uncompensated, uncoordinated, unregulated and unethical bio-prospecting which is referred to as bio-piracy is singled out as one of the major cause of biodiversity loss. As a result, minimal or inadequate benefits are accrued or realized from bioprospecting. Other issues of concern include; Inadequate legal and institutional framework on Bio-prospecting, no standard partnership model for benefit sharing between user and provider, inadequate infrastructure and low level technological support and transfer for academic, industrial, agricultural and biomedical research, inadequate financial support on research and development, as well as technology transfer, lack of recognition of Indigenous knowledge and Intellectual property rights associated with biodiversity and motivation for inventions and innovations.

The strategy has been developed through a consultative process involving series of meetings, workshops and focused group discussions, of stakeholders that critically evaluated and analyzed the bioprospecting situation and challenges in the country and identified five strategic interventions for implementation as follows:

a) Enhance institutional capacity and review of statutory and regulatory framework for effective Bio-prospecting.
b) Develop a system of bio-informatics that include a central biodiversity database on all taxa and inventory including traditional knowledge associated with Bio-prospecting.
c) Develop a benefit sharing framework for biodiversity derived products and associated knowledge.
d) Enhance information access and develop a communication system.
e) Develop a financial and resource mobilization mechanism for Bio-prospecting and implementation of this strategy.

It is expected that implementation of the strategy will lead to proper utilization of biodiversity and associated knowledge for the benefit of people of Kenya in line with the Constitution. The strategy will be implemented through a competent multispectral team coordinated by Kenya wildlife service.

Hon David Mwiraria, EGH
Chairman, KWS Board of Trustees.

PREFACE

About 12 % of Kenya's land mass has been set aside for wildlife protection, of which National Parks and National Reserves cover about 8%. These areas have varied ecosystems and habitats ranging from marine, inland wetlands, fresh and salty water lakes, rivers, volcanoes, hot springs, savannahs, forests, Mountains, caves, arid and semi arid areas. These are rich in biodiversity, and they serve as the country's biodiversity treasure trove that contributes to both National and global economy, which has an invaluable and extensive potential for innovative products and resources that are still widely untapped. Bioprospecting on the country's wildlife continues to attract various types of researchers and players for both academic and commercial purposes. This has been a source of many patents on biotechnology innovations globally with no adequate economic returns to the country.

The country's wildlife is a National heritage and a vital component of biological diversity, main engine of Kenya's tourism, agricultural and energy sectors, a source of foreign exchange and a major contributor to GDP, and has a further potential to contribute to the livelihood of the Kenyan people.

Management of biological resources in the country still remains a challenge, ranging from resources identification, inventories and valuation. As a result, it has not been possible to quantify the existing biological assets, consequently limiting maximizing benefits from these resources. It is further compounded by aspects of bio-piracy posing a challenge to wildlife conservation.

The main goal of Kenya Wildlife Service is to "Conserve, in perpetuity, Kenya's rich diversity of species of microbes, plants and animals, habitats and ecosystems, in partnership and consultation with other government agencies and stakeholders for the well being of the Kenyan people and the global community." To achieve this KWS aims at focusing on the following:-

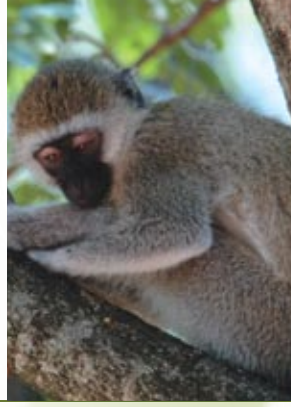
- Providing policy, legal and institutional framework for wildlife conservation, management and protection throughout the country.
- Conserving and maintaining viable and representative wildlife populations in Kenya.
- Developing protocols, methodologies and other tools for effective assessment and monitoring of wildlife conservation and management throughout the country.
- Promoting partnerships, incentives and benefit sharing to enhance wildlife conservation and management.
- Promoting positive attitudes towards wildlife and wildlife conservation and management.

This Bio-prospecting strategy is in line with the country's Constitution and Vision 2030. Its implementation is part of wildlife industry reorganization with a view to maximize benefits and generation of information for improved biodiversity management.

I am grateful to KWS scientists and managers, scientists and researchers from

other government agencies, universities, institutions and individuals, who contributed to development of this strategy. Certainly, Kenya Wildlife Service in collaboration with government agencies and stakeholders is committed to ensure that, all the strategic objectives are implemented accordingly for benefit of the Kenyan people and our global partners.

Julius Kipng`etich, CBS.
Director KWS



CHAPTER ONE

1.0 INTRODUCTION

Bio-prospecting is the systematic search and collection of biological resources for valuable components, organisms whether dead or alive for research, development and commercialization purposes. Bio-prospecting is facilitated by biotechnology which has the capacity to identify and isolate useful components from various organisms and combine them with others or insert them into foreign animals and plants. It covers a wide range of commercial activities in different industrial sectors including pharmaceuticals, food and beverages, biotechnology, seed, crop protection, horticulture, botanical medicines, cosmetics and personal care products. Therefore, it provides valuable leads for new product development and many companies look for new applications of biological species that have not been studied earlier.

Bio-prospecting involves three main phases namely;

i. Collection or access to genetic resources
ii. Biological discovery or research and development, and
iii. Commercialization.

These phases bring into play a number of different stakeholders participating in bio-prospecting agreements that may include local communities, researchers, government officials and industry players.

The collection phase involves negotiations for Prior Informed Consent (PIC), Material Transfer Agreement (MTA) and Access Permit that are initiated and concluded before the biological material is taken to the laboratory for examination. The "examination" or research phase of a Bio-prospecting activity is sometimes referred to as "Bio-discovery" that may lead to commercialization. Intellectual Property Rights (IPRs) are major issues during the commercialization stage. In most cases, IP issues cut across the entire cycle and are maintained to ensure that the product in the market have a competitive edge.

1.1 Bio-prospecting Stakeholders

Bio-prospecting stakeholders are broadly divided into two categories namely;

a) Users and their representatives, and
b) Providers and their representatives.

The first category includes the private sector, universities, scientific research organizations and ex-situ collection centers. The second category includes the national and county governments, and the indigenous and local communities. However, the two categories need not be mutually exclusive.

1.2 Kenya's Biodiversity

Kenya is endowed with diverse habitats that are home to unique and diverse flora and fauna and the country is among the 15 mega diverse countries in the world (UNEP-WCMC, Cancun declaration 2002; Caldecott et al., 1994). Her diverse habitats are represented within the protected area system that comprises of approximately 12 percent of the Kenyan territory, classified as national parks, national reserves, marine reserves and forest reserves (Table 1 and Fig 1). Out of the 34 biological hotspots classified by Conservation International (2008) in the world, Kenya hosts two of these important hotspots. These are the eastern afro-montane and the Coastal forests of Eastern Africa biodiversity hotspots. These biological hotspots extending into neighbouring countries are home to a high number of endemic species of fauna and flora. In addition, there are numerous areas conserved as heritage sites.

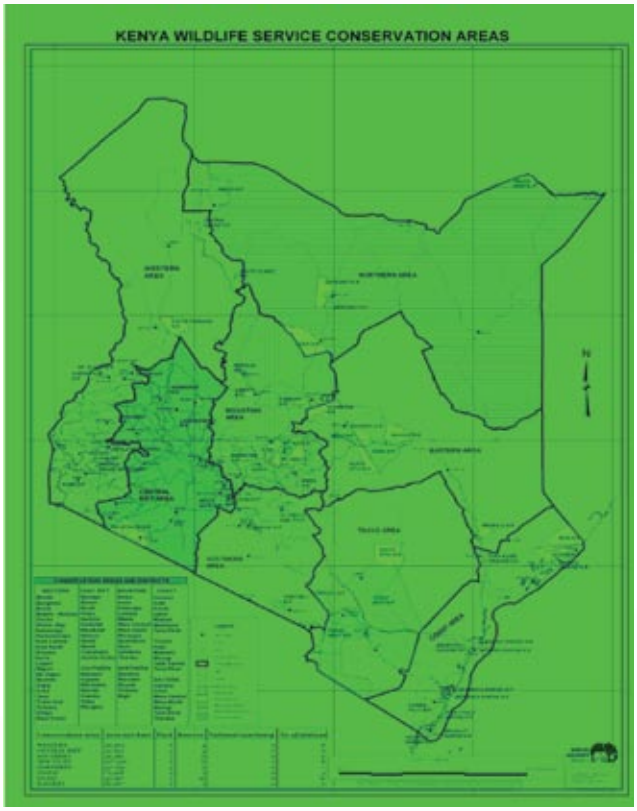
There are five RAMSAR sites namely lakes Nakuru, Naivasha, Baringo, Bogoria and Elementaita. These are all located in the rift valley. Further, Kenya has seven UNESCO designated World Heritage sites; Lake Turkana, Mt Kenya Forest/National

Reserve, Lamu Old Town, the Sacred Mijikenda Kaya Forests, the Kenyan Great Riftvalley lake system(Lakes Bogoria, Elementaita and Nakuru). There are six designated biosphere reserves in Kenya. These are Mt Elgon N.P, Amboseli N.P, Mt Kenya N.P and Reserve, Malindi- Watamu Marine National Reserve, Kiunga Marine National Reserve and Mt Kulal. There are plans to designate more biodiversity and culturally rich areas in the country as Biodiversity hotspots. These areas hold enormous bio-prospecting potential for research, development and economic empowerment and as a result protect valuable natural resources for the Kenyan people and world at large.

Table 1: Protected Areas and Other Sites of Significance

Type	Number	Area (kms^2)
Terrestrial National Parks	22	2,905,002
Marine National parks	5	5,400
Nature Reserves	11	52,679
National Reserves	22	1,452,755
Marine National Reserves	5	70,609
Game Sanctuaries	1	500
Forest Reserves	203	1,669,022*
Private Reserves	6	13,363
Biosphere Reserves	6	1,334,559
RAMSAR Wetlands	5	18,800
Proposed protected areas.	143	938,501
Total	479	6,792,168

Source: KIFCON* report 1995,NEMA-SoE



2003,KWS,DRSRS LU/LC Reports 2008,KFS

Figure 1: Kenya National Parks and Game Reserves. Source KWS 2008

The country has wide range of biodiversity ranging from microbes, plants and animals as indicated in table 2. The Kenyan alkaline Rift Valley Lake system is rich in wide range of microbes that have been source of many industrial products. There is however, insufficient data on the current state of biological diversity in the country.

Table 2: Kenya's Species Diversity. Source NEMA SoE 2003

Taxonomic group	Number of species (identified)	Number of species extinct	Number of endangered species	Number of vulnerable species	Number of rare species
Microbes	1,841	Unknown	Unknown	Unknown	**unknown**
Protozoa	2,714	Unknown	Unknown	Unknown	**unknown**
Plants	6,817	2	31	54	**70**
Animals	23,375	8	89	36	**67**
Total	**34,747**				

Kenya's rich biodiversity encompasses locally, regionally and globally important species, including threatened or vulnerable. The coastal zone harbors 38% of the 159 species of trees and shrubs, 27% of the 71 species of birds,

and 55% of the 9 species of mammals classified as threatened in Kenya. At least 105 species listed in the IUCN Red Data Book are found in Kenya's coastal forests. Coral reef communities extend from shallow inshore waters to about 20–25 m depths, with 220 species of Scleractinian corals. These coral reef ecosystems support a diverse array of species, including 5 species of sea turtles, Dugongs, 5 species of Dolphins, 3 species of Baleen Whales, the Whale shark and many others. Other important habitats include the sea grass beds with 9 species of sea grasses, and the mangrove ecosystem with 10 species of mangroves. Very little is known about the marine microbes, phyto- and zoo - planktons.

Kenya has a diverse and large reservoir of both domestic and wildlife resources and their breeds may be referred as, Animal Genetic Resources majority of which are indigenous and classified according to the communities and regions where they are found. The use of gene (genomic) based innovations to understand, predict and manipulate biological organisms for commercial agriculture and health is being recognized as the engine driving economic development into the 21st century. This offers an avenue for prospecting for valuable genes and products from both wild and domesticated animals and plants. Already there are major bioprospecting activities based on wild animals and plants. For example Wild animals such as Africa Green Monkeys are used as models in development of drugs including testing for safety, efficacy as well as in clinical trials for treatment of human diseases such as sleeping sickness.

Bioprospecting for effective and representative whole animal models as well as tissue culture (cell lines) will continue especially with emerging pandemics and new drug development and search for biomarkers and bio-indicators for monitoring environmental impact assessment and eco-toxicology studies as well as testing allergenicity in Genetically Modified Organisms.

Animal genetic resources are inadequately and ineffectively managed and utilized because of lack of inventory, characterization, documentation and conservation. Although it is believed that valuable genes are contained in wildlife genetic pools, the genotypes have not been characterized nor their phenotypic characteristics documented and therefore cannot be protected through patenting and conservation. This understanding can be linked for example in prospecting for *trypanotolerance* in Orma boran cattle and wild animals, *Theileriosis* resistance in the African Buffalo. *Theileria parva* Serengeti; a transformed sporozoite stabilate derived from the Africa Buffalo is used to immunize cattle against ECF. Wildebeests are resistant to and reservoir for Malignant Catarrhal Fever which kills cattle and Red Masai Sheep is resistance to Wire worms *(Haemonchosis)*.

The wildlife resource provides potential for discovery of genes and /or proteins that could be utilized in development of diagnostics in zoonotic and wildlife diseases of public health importance such as *Trichinellosis* and *cysticercosis,* development of tools for identification of game meat and trophies to aid in anti-poaching and wildlife conservation initiatives

It is recognized Wildlife bio-pharming is a major source of industrial products such as drugs, examples include bioactive alkaloids from frog skin, *Bachratoxins, pamiliotoxins* from mites and ants. Venom mining from reptiles, marine fish *(Teleost fish),* anti cancer and stroke active elements from various species of wildlife are some of the current bioventures. Bovine and porcine species are sources of hormones such as insulin, thyroxin and gonadotropins among others for

human use. Bees provide various industrial products such as wax, honey, immune stimulant drugs, and preservatives. As a result wildlife offers potential for development of useful biopharmaceutical products of immense economic value.

Kenya is rich in floral diversity with several endemic. This is reflected in the occurrence of two biodiversity hotspots (eastern afro-montane and Coastal Forests of Eastern Africa). The flora diversity is widespread ranging from natural forests, on private land, and inland water bodies. The Kenya's flora biodiversity has immense value, both for direct and indirect use as well as non-use values. Some of the direct use values that have bearing on bio prospecting include food, forest products, industrial use, fibres, pharmaceuticals, personal care products, education and recreation, while indirect use values include water purification, flood control, climate control, air quality, photosynthesis, pollination, decomposition and biodegradation of wastes. The non-use values include aesthetic, ethical and spiritual values.

The loss of the biodiversity is often associated with the loss of traditional knowledge (TK). Kenya is endowed with diverse cultures rich in TK and recognizes culture as the foundation of the nation and as the cumulative civilization of the Kenyan people and the nation. All the ethnic groups have a rich indigenous knowledge base in medicinal plants, food resources and animals. The cultural diversity offers valuable information that can be exploited to contribute positively to national development and future prosperity.

1.3 Benefits of Bio-prospecting

Biodiversity treasures and associated traditional knowledge provide rich source for discovery and patenting of new industrial products. The raw products are basis for screening, combinatorial synthesis, structure elucidation and profiling of bio-molecules for industrial development. It is estimated that between US$ 500-800 billion per year is generated from biodiversity derived products worldwide through bio-prospecting (Liebig et al., 2000). Currently 75% of conventional drugs are based on plants' natural product model (Laird, 1994). Marine bio-reserves have attracted many bio-prospectors all over the world. Currently, marine bio-prospecting for sponges and blue and green algae has yielded pharmaceutical leads.

Using biotechnology, proteomics, combinatorial chemistry and bio-informatics coupled with intellectual property regimes, it is now easy to utilize biological resources to produce viable products or processes for commercial purposes. Such products are used in bio-remediation, bio-pesticides, bio-diagnostics, enzymes, human Health, vaccines, bio-instrumentation, veterinary, contract research and bioengineering. Kenya has the potential to turn biological resources into important export products through bio-prospecting to augment tourism earnings. This can generate income for biodiversity conservation, create jobs for youth and local communities and attract technology transfer. It can also promote foreign direct investment into the country thus contributing to the Kenya's Vision 2030.

1.4 Problem statement

Bio-prospecting practice has not been adequately developed and institutionalized in Kenya, despite extensive consultation in local, national and international fora. Kenya has also acceded to many Multilateral Environmental Agreements (MEAs) related to bio-prospecting, some of which have been domesticated but lack structures of implementation. As such the negative effects of bio-piracy still go on. Consequently, the country has probably lost biological materials without being fully compensated. This state of affairs is attributed to the following:

i. Inadequate legal and institutional framework on bio-prospecting.

ii. Lack of standard partnership model for benefit sharing between resource owners and users

iii. Inadequate infrastructure and low level technological support for academic, industrial, agricultural and biomedical research.

iv. Inadequate financial support for research, innovations and development as well as technology transfer.

v. Inadequate awareness of the intellectual property rights associated with innovations from bio-prospecting.

1.5 Justification

Bio-prospecting is multidisciplinary, involving science, technology, access to resources, trade, legal and intellectual property rights. There is need to recognize the rights and responsibilities of users and providers in connection with the use of valuable discoveries, inventions and other development resulting from research, involving research specimen and associated know how.

Accordingly, there are various pieces of legislations governing the use of bio-diversity resources. These include EMCA 1999, National Heritage and Museums Act, 2006, Forest Act 2005, Industrial Property Act 2001, Seed and Plant Varieties Act 1977, Bio-safety Act 2009, Science and Technology Act, 1980 (Cap 250). The Wildlife (Conservation and Management) (Amendment) Act Cap 376, 1989 empowers the Minister responsible for wildlife to make policies and regulations for better management of wildlife. The Act also empowers KWS to formulate policies regarding conservation, management and utilization of all types of fauna and flora (not domesticated). It further mandates KWS to administer and coordinate in consultation with the Minister, international protocols, conventions and treaties related to wildlife. Therefore, there is need for a strategy to provide structures and systems to effectively and efficiently manage and regulate the bio-prospecting sector in Kenya.

1.6 Bio-prospecting strategy Formulation Process

The KWS, other government agencies and line ministries, partner institutions and stakeholders held a roundtable consultative meeting in March 2009 in Mombasa to deliberate on biodiversity management in line with Vision 2030.The meeting came up with various recommendation among them is as follows:

i. There was an urgent need for the country to develop a National Bio-prospecting strategy, policy and enactment of appropriate legislations.

ii. It was imperative that proper linkages between biodiversity providers and users be established and enhancement of their capacities.

iii. Need to have appropriate framework that includes technology transfer and intellectual property rights which supports bioprospecting.

A follow up experts' consultative meeting was held in September 2009 to discuss and analyze status of bio-prospecting and initiate development of the bioprospecting strategy. Series of workshops were held in Nakuru (May 2010), Voi Safari Lodge (June 2010) and Mombasa (Sai Rock hotel, November 2010) to draft the strategy. The final stakeholders' workshop was held in Mombasa (Whitesands hotel, March 2011) which reviewed, endorsed and adopted the strategy.

1.7 Scope

The strategy covers access to biodiversity, associated traditional knowledge, technology transfer and equitable sharing of benefits derived from use of biodiversity in the protected and outside protected wildlife areas. This strategy is aligned to the Constitution, provisions of the Wildlife Act CAP 376, various statutory provisions related to biodiversity conservation and management and biodiversity related Multi-lateral Environmental Agreements(MEAs) that Kenya is signatory to.

This strategy aims at providing guidance on the following:

a) Harmonize research and development, sustainable utilization, management of

biodiversity and bioprospecting components in Kenya

b) Identification of the forms in which Kenya can benefit from its biological resources such as payment of license fee, royalties, negotiated advance and milestone payments, capacity building, facilities, equipment and technology transfer, collaborative research and shared benefits.

c) Provision for an integrated system for monitoring and evaluation of Bio-prospecting activities.

1.7.1 Guiding principles

This strategy shall be guided by the following principles:

i. Sustainable Development as articulated in the Agenda 21 of Rio declaration;

ii. Access to biodiversity and equitable benefit sharing as articulated in the Convention on Biological Diversity (CBD);

iii. Benefit for Kenya Philosophy guided by the Bill of Rights in the Constitution of Kenya

iv. Hyper access for research and development;

v. Compensated Bio-prospecting within the Prior Informed Consent and Material Transfer Agreement regimes as articulated in the Addis Ababa principles and guidelines 2004 and Nagoya Protocol on Access and Benefit Sharing;

vi. Respect for property ownership that includes intellectual Property rights encompassing indigenous knowledge as articulated in the Constitution of Kenya ;

vii. International cooperation as negotiated within the frameworks of international agreements, conventions and protocols;

viii. Precautionary principles as articulated in the Rio Principles 1992,CITES Convention and the Constitution of Kenya;

ix. Indigenous Community values and stability as articulated in the Constitution of Kenya .

1.7.2 Bio-prospecting strategy objectives

The objectives of this bio-prospecting strategy are:

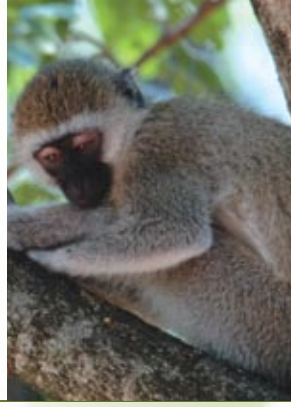
a) To provide a framework to guide the country's bio-prospecting activities.

b) To advance bio-prospecting for economic development and for attainment of Vision 2030.

c) To provide a road map for engaging the country with its partners in development.

d) To establish and provide a framework for public private sector partnerships in bio-prospecting.

e) To provide the basis for review, formulation and harmonization of the national bio-prospecting policies, laws and practices.



CHAPTER TWO

2.0 SITUATIONAL ANALYSIS OF BIOPROSPECTING IN KENYA

2.1 Overview

There are several legislations that guide on regulation, control, management and use of natural resources and their by-products. These legislations are being implemented by various institutions. However, there are inadequate synergies among these institutions a fact that leads to ineffective and inefficient control, management and regulation of bioprospecting activities. The existence of international regimes of which Kenya is party further complicates bioprospecting activities in the country. It is imperative therefore, to build greater synergies among these various institutions for purposes of effective implementation of the national legislation, international regimes and enhanced bioprospecting activities in the country. In this strategy the list of legislations and institutions presented are not exhaustive but is a reflection of the key ones relevant to bioprospecting in this country.

This chapter reflects on the current status of legal and institutional framework for bioprospecting in Kenya.

2.1.1 Policies and Legislations

The Constitution of Kenya, the supreme law of the country provides for sustainable exploitation, utilization, management and conservation of the environment and natural resources for the benefit of the people of Kenya. Various subsidiary legislations are being realigned to the Constitution for effective management and utilization of the natural resources.

In addition, Kenya is party to key international framework (conventions, treaties, agreements and protocols) on access, control and management of biodiversity. This framework is considered as part of the national legislation.

2.1.2 National Policy Framework

There are various policies that form the basis of bioprospecting in the country; however, they do not meet the emerging needs of bioprospecting concerns i.e. Prior Informed Consent (PIC), Mutually Agreed Terms (MAT) and Material Transfer Agreement (MTA) which are key international instruments of Access and Benefit Sharing regime. It is therefore necessary to put in place a harmonized strategy to address the issues and concerns and ensure greater synergies among lead agencies and stakeholders with respect to bioprospecting. The key national policies relevant to bioprospecting include:

- The Kenya's Wildlife policy: Sessional paper No. 3 of 1975 (Statement on future Wildlife Management), which emphasizes on optimization of returns from wildlife (defined broadly to include aesthetic, cultural, scientific and economic gains, taking into account the income from other land uses) was identified as primary goal of wildlife conservation. The draft, Wildlife Policy, further provides a framework for conserving in perpetuity, Kenya's rich diversity of species, habitats and ecosystems for the well being of its people and global community and lays down framework for bioprospecting.
- The Forest Policy, 2005 provides a framework to enhance the contribution of forest sector in the provision of economic, social, environmental goods and services. The policy recognizes other lead agencies such as NEMA, KWS, NMK and KEFRI.
- The National Seed Policy provides for breeders to source viable germplasm and broaden the genetic base of various crops and plant species and also strengthen and support gene banks and conservation of biodiversity.

- Biotechnology Policy 2009 recognizes the role of biodiversity and associated traditional knowledge in economic development. It recommends exploitation of microbes, flora and fauna both from conservation and outside conservation areas and suggests need for the government to support these initiatives. The policy also recommends the need for information database on bioprospecting activities in the country for informed decision making including establishment of culture centres and monitoring purposes.
- The National Biodiversity Strategy Action Plan 2000 proposes various strategies to address policy and legislation issues on biodiversity. It highlights the need of developing a country's bioprospecting strategy. It also emphasizes on ex-situ conservation of biodiversity and equitable sharing of benefits derived from the use of biodiversity.
- The National Policy on Traditional Knowledge, Genetic Resources and Traditional Cultural Expression, 2009.The policy proposes to protect traditional knowledge through a sui generis system, ensure mandatory disclosure of origin of genetic resources and traditional knowledge in intellectual property applications and develop mechanisms for certification, labeling, trademark and geographical indications authorized by the communities concerned.

2.1.3 National legislation and institutional arrangements

In Kenya, management and control of biological resources is regulated under several legislations being implemented by various lead agencies as mandated by respective statutory provisions. However, there is no specific legislation on bioprospecting in the country. The bioprospecting strategy will compliment the EMCA Legal Notice 160(Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006 and implement the provisions of the Wildlife Act Cap 376.

Kenya Wildlife Service (KWS) (Wildlife Act Cap 376)

Kenya Wildlife Service is the designated wildlife Management Authority of Kenya with mandate to formulate policies regarding the conservation, management and utilization of all types of wild fauna and flora.KWS therefore has statutory obligations to ensure that all transactions of wildlife, its conservation and utilization operations are within the provisions of the national legislations and in compliance with provisions of wildlife related multilateral environmental agreements, which Kenya is a signatory to. Bioprospecting is a key component of wildlife utilization.

Kenya Forest Service (KFS) (Forest Act 2005)

The mandate of Kenya Forest Service is to enhance protection, conservation, development and management of all forest resources in the country, with special emphasis on development of commercial plantations and protection of indigenous forests. The Act provides for sustainable use and management of forest resources including access to medicinal plants within the forest reserves. Medicinal and aromatic plants and associated indigenous knowledge is a key component of Bio-prospecting.

Kenya Forestry Research Institute (KEFRI) (Science and Technology Act Cap 250)

A State corporation established in 1986 under the Act, its mandate is to undertake forestry research, generate appropriate technologies, disseminate information and provide extension services on sustainable utilization and management of forest resources with special emphasis on social economic empowerments of communities to create wealth.

National Museums of Kenya (NMK) (National Museums and Heritage Act, 2006)

National Museums of Kenya is a State corporation operating under National Museums and Heritage Act, 2006.Its role is to collect, preserve, study, document, research and present Kenya's past and present cultural and natural heritage. The purpose is to enhance knowledge, appreciate, respect and sustainably utilize these resources for the benefit of Kenya and the world, for now and posterity.

Kenya Plants Health Inspectorate Services (KEPHIS) (Plant Protection Act Cap 324)

Kenya Plants Health Inspectorate Services is a State corporation, which coordinates, administers and enforces Kenya's regulations and procedures for importation and exportation of any form of plant material, such as seeds, cuttings, bud, wood, fresh fruits, flowers, plantlets, timber and agricultural produce. This is done through issuance of phytosanitary certificates.

Kenya Revenue Authority: (Kenya revenue authority Act 1995)

The Customs Department is an enforcement agency under Kenya Revenue Authority with the mandate of verification of accompanying documents and clearance for exports and imports. Customs shall play a critical role in validation of permits and certificates and verification of quantities of bioprospecting products exported from and imported into the country against the accompanying legal documents.

Kenya Agricultural Research Institute (KARI) (Science and Technology Act Cap 250)

Kenya Agricultural Research Institute is a State corporation established under Science and Technology Act Cap 250.One of the research areas of focus at KARI is biotechnology research for crops and livestock improvement including development of livestock vaccines and diagnostic kits. The role of KARI in bioprospecting shall be to undertake research in wild relatives of crops and livestock to improve productivity and livelihoods.

Department of Veterinary Services (Animal Diseases Act Cap 364)

Department of Veterinary Services is a government agency responsible for control and management of all animal diseases as recognized by the World Organization for Animals (OIE). All animal related materials have to be cleared from the Director veterinary Service for either export, import, re-exports or on transit.

Kenya Marine and Fisheries Research Institute (KEMFRI) (Science and Technology Act Cap 250)

Kenya Marine and Fisheries Research Institute was established with a mandate to conduct aquatic research covering all the Kenyan waters and the corresponding riparian areas including the Kenyan's Exclusive Economic Zone (EEZ) in the Indian Ocean waters. Aquatic plants and animals are a major source of bioprospecting activities.

Kenya Medical Research Institute (KEMRI) (Science and Technology Act Cap 250)

The Kenya Medical Research Institute (KEMRI) is State Corporation responsible for carrying out biomedical research and advisor to the government on biomedical related matters.

Kenya Industrial Property Institute (Industrial Property Act 2001)

Kenya Industrial Property Institute is a State corporation established under the Act which provides for grant and administration of Industrial Property Rights, screen technology transfer agreements and licenses, provision of information on industrial property to the public and promotion of inventiveness and innovativeness in Kenya. The role of KIPI in bioprospecting shall be to safeguard intellectual property of both the biological resource provider and the user, through the grant and regulation of patents, utility models, technovations and industrial designs.

Universities and Colleges (Universities Act Cap 210)

In Kenya there are 7 public Universities and their constituent Colleges and significant number of private Universities. All are established under the same Act and various constituting Acts which provide for carrying out research, training and outreach programs. Respective Universities and Colleges are major players in bioprospecting as they train scientists and researchers at under graduate and post graduate levels respectively. In this respect University researchers are involved in collecting of biological materials from the wild and access IK from local communities, enter into collaborative arrangements with national and international partners where material transfers and exchange take place all the time.

National Council for Science and Technology (NCST) (Science and Technology ACT. Cap. 250)

National Council for Science and Technology is a statutory institution established in 1977. Its mandate is to advice the government on all matters relating to the scientific and technological activities and research necessary for proper development for the country and for coordination of research and experimental development.

National Environment Management Authority (NEMA) (EMCA 1999)

The National Environment Management Authority was established under the Environment Management and Coordination Act (EMCA) of 1999. Its key mandate is to coordinate and oversee all matters related to environment including issuance of access permits and monitoring of environment impacts in Kenya.

Department of Resources Surveys and Remote Sensing (DRSRS)

The department is mandated to generate, manage and disseminate geo-spatial information land base resources, conduct research, training and consultancy on matters of geo-spatial information and advise the government on all aspect of remote sensing and Geographical Information System (GIS). Its main function is to monitor the conditions and trends of rangeland through wildlife, livestock and vegetation surveys using remote sensing, aerial survey and ground sampling techniques.

2.1.4 International Obligations and Regimes

There are various international regimes (conventions, treaties, agreements and protocols) that are relevant to Kenya's biodiversity conservation and Kenya is signatory. These include the Convention on Biological Diversity (CBD), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), International Treaty on Plant Genetic Resource for Food and Agriculture(ITPGRFA - FAO) , WTO/TRIPS agreements and Nagoya protocol of CBD on access and benefit sharing among others.

The CBD, CITES, Nagoya protocol on ABS and ITPGRFA regimes recognize sovereignty and rights of signatory States over their resources in areas within their jurisdiction and therefore the Party States have authority to protect and determine access to the resources and obligation to take appropriate measures with aim to share benefits derived from such resources.

2.2 Stakeholder's analysis

The key stakeholders in bioprospecting initiatives include resource regulators, providers, users and repositories.

2.2.1 Resource regulators

The regulators control access to and use of the biological resource material. They include various government agencies such as intellectual property offices and biodiversity access permit offices, export and import regulators and law enforcement agents. The access to and use of the biological resources is regulated through access permits, use of intellectual property rights, export and import permits, veterinary and plant health certificates.

Among the key regulatory agencies include the National Environment Management Authority, Kenya Wildlife Service, Kenya Plants Health Inspectorate Services, Department of Veterinary Services, Kenya Forest Service, Department of Public Health and Kenya Industrial Property Institute. These Agencies have statutory roles of regulating access to and use of the country's biological resources; functions derived from the mandates as provided for in the respective legislations establishing the Agencies.

2.2.2 Providers

Primary providers

These are institutions that are mandated by law to manage the country's biological resources. These institutions are agencies of the National and County governments. They are involved in economic and sustainable development planning, formulating policies and regulations on conservation and management, including access to and use of genetic resource and associated knowledge.

Secondary providers

These are individuals and institutions (public/private) that by virtue of ownership of biological resources may provide materials to a third party on authorization of the primary provider. This category of providers shall include private ranches, conservancies, individual land owners and indigenous community groups.

The law provides for right to own land either as public, private and communal land. Indigenous and local communities conserve biodiversity and preserve traditional knowledge associated to it. As secondary owners of biological resources, this category would be secondary providers of materials for the purpose of bioprospecting.

2.2.3 Users

They include individuals, research institutions, universities, companies and NGOs.

2.2.4 Repositories

Most of the country's taxonomic wild collections including their culture forms are preserved or conserved ex situ in herbaria, botanical gardens, gene banks and designated laboratories as repository centres. In addition the country has acquired and conserved exotic species in the local conservation centres. These ex-situ repository centres are sources of biological materials

and associated knowledge available for exchange. These repository centres therefore, act as both users and secondary providers.

There is lack of synergies linking *in-situ* and *ex-situ* conservation in the country line with ABS framework. In most cases, exchanges and donations of biological materials from these centres are transacted without adequate contractual agreements on the transfer of such materials as required by the National law and international regimes.

2.3 Bioprospecting initiatives in Kenya

Bio-prospecting activities are being carried out by different institutions in the country at various levels. However, most of the activities are neither coordinated nor documented. Some of the initiatives by key stakeholders include:

2.3.1 Kenya Wildlife Service

Kenya Wildlife Service has branded 21 National parks as part of a high profile marketing and infrastructural development. This has resulted in increased awareness of their unique biodiversity richness and has attracted attention of a wide range of stakeholders including researchers, tourists, and bioprospectors and film makers.

KWS has signed various memoranda of understanding with local and international institutions for bio-prospecting activities. Some of the collaborating institutions include, International Centre of Insect Physiology and Ecology (ICIPE), Kenya Forestry Research Institute (KEFRI), Jomo Kenyatta University of Agriculture and Technology (JKUAT), University of Nairobi (UoN), Diversa, DuPont Corporations, Novozymes, Ministry of Education and Science-Germany on BIOTA project and Royal Botanic Garden (KEW) on Millennium Seed bank project.

2.3.2 Egerton University

The bioprospecting initiatives include anti microbial and pesticidal substances, marker genes for high food yielding, for disease resistance and indigenous chicken genotypes and livestock improvement projects

In addition there are projects on Marker genes for heat stress tolerance, drought tolerance, water use efficiency and nutritional health properties. The university has MOUs and MTAs involving both local and international partners in the various projects such as biotechnology, seed plants, aquatic resources, animal genetic resources and plant genetic resources.

2.3.3 Jomo Kenyatta University of Agriculture and Technology

The core research projects include tissue culture of horticultural and commercial plants, Oyster and button mushrooms, microbial bioprospecting and organic farming practices. Notable post graduate studies related to bioprospecting include:

Microbial Diversity of Lake Elementeita; Distribution, Quantification and Eradication of Banana Viruses; Collection and Characterization of *Carica papaya* Germplasm; Characterization of Fusarium species in maize *(Zea mays)* and determination of their mycotoxins; Characterization of Aerobic Soil Bacteria; Biodegradation Potential of Selected Pesticides Applied in Horticultural Farms; Growth, sporulation & delta-endotoxin, synthesis and toxicity control during fermentation of *Bacillus thuringiensis;* Determination of whitefly diversity, natural enemies and mode of transmission of cassava brown streak virus disease.

2.3.4 Kenyatta University

Kenyatta University bioprospecting research agenda aims to contribute to economic growth by focusing on developing technologies for; enhancing health in human and livestock, agricultural productivity, environmental management and adding value to industrial products and processes and environmental management. Some of the research programs highlighted include work in human and animal health, screening of bioactive products from plants, crop and animal resistance to pests and diseases.

The School of Environmental management is developing technologies for the treatment of waste water from abattoirs and tanneries and organic waste and has encouraging results from microbial isolates from these areas with potential in cellulotic and xylanase activities. Collaborating institutions include local and international universities and research institutions. Their notable achievements include 2 joint patents with ICIPE with a 50-50 benefit-sharing plan.

2.3.5 Moi University

Moi University has local and international collaboration on ramifications for bioprospecting potentials. The major projects being undertaken relevant to bioprospecting

include, a comparison of soil fertility management practices in Western Kenya, Bean germplasm evaluation, chick pea improvement, French variety development/ Snap bean improvement; Impact of consumptive utilization of wetland resources on ecological integrity and livelihood in selected areas of Lake Victoria basin.

2.3.6 University of Nairobi

The University of Nairobi has a large collection of biological specimens and cultures for research and training. Active research includes phytochemistry of useful compounds and screening of plants for herbal medicines, research on identification of game meat (species identification) and a postgraduate program on natural products, bioprospecting and value chain. Also there are researches on useful enzymes from extremophic micro-organisms, biofertilizers, plant and animal genetic improvement.

2.4 Biological Depository centre's initiatives

Biological resource centres provide for;

i. *Ex-situ* conservation of biological resources
ii. Exchange of germplasm
iii. Protection of genes for food security
iv. Exchange of material for research and bioprospecting
v. Development of innovations and commercialization of useful bioproducts

Ex-situ conservation structures are not well organized in the country. There are no designated *ex-situ* conservation sites as required by Law, however there is a number of *ex-situ* conservation sites in the country. Section 52 of EMCA 1999 puts in provisions for establishment of *ex-situ* conservation sites. The National strategy on biodiversity conservation action plans also recommends for the need of putting in place mechanisms for establishment of *ex-situ* depository centers.

Most of the country's biological collections are held by the National Museums of Kenya, National gene bank – KARI, Animal Genetic Resource Centre, Kabete (facility for cryo-preservation), Universities and research institution collection centres, community botanical grooves and in CGIARS. Although Animal genetic resources may be conserved *ex-situ* (frozen ova, semen, embryo or genes) or *in-situ,* there are a few *ex-situ* conservation programmes.

2.4.1 National Museums of Kenya

The NMK houses one of the largest and unique biodiversity collections in the region. These include natural, cultural, pre-historic heritage as well as indigenous knowledge. Biological collections comprise of zoological and botanical specimens.

The NMK currently holds over 3 million biological specimens and is also the regional reference centre for botany and a national repository of botanical knowledge. There is an established Resource Centre comprising of a Library that covers all academic disciplines such as, anthropology, natural science, museology e.t.c and an archive with collections of paintings, research notes books and historical photographs.

NMK houses the East African Herbarium and the Nairobi Botanic Garden whose functions are the identification of specimens, verification of plant names and propagation and preservation of live plant specimens respectively. The herbarium has a comprehensive databank with over 1 million specimens.

2.4.2 The National Genebank, Muguga

The National Genebank was established in 1988 to undertake *ex-situ* conservation of Kenya's plant genetic resource. Currently there are 49,000 accessions of plant germplasm representing 165 families, 893 genera and 1725 species conserved. Over 60% of the accessions conserved are from Kenya, while the remaining ones are from more than 137 countries. A significant proportion of the collection consists of cultivated species although there is substantial amount of wild species of economic value such as medicinal plants (over 4000 accessions representing over 1000 species).

2.4.3 Kenya Forestry Research Institute

The Kenya Forestry Research Institute bioprospecting research agenda aims to contribute to the country's economic growth by focusing on developing technologies for sustainable development and utilization of forest and allied natural resources to enhance a clean and healthy environment and development of enterprises through natural product. Some of these research programs include: work on screening of bioactive products from plants, resistance to pests and diseases, establishment of botanical gardens and the tree seed centre which serve as repositories for natural resources. The tree seed centre has wide range of indigenous tree seeds that have been collected from wide range of ecological zones in

the country. The seeds are for commercial purpose as well as for research and exchange programs.

2.4.4 Kenya Forest Service

The Kenya Forest Service manages a large expanse of indigenous or natural forest areas specifically for the conservation of forest and forest related biodiversity and for provision of ecosystem services such as water catchment function and carbon sequestration among others. *Ex-situ* conservation programme such as the National Arboretum for certain important indigenous tree species are being undertaken in addition to specially dedicated seed stands or plantations of high commercial value tree species such as *Prunus africana, Juniperous procera, Podocarpus sp, Croton sp.* and *Vitex keniensis* among others.

2.4.5 Universities and other repository centres

Kenya has seven public universities each established under different Act of Parliament. All the public universities carry out research besides teaching and storage of genetic resources and knowledge.

Universities such as Nairobi University, Moi University, Kenyatta University, JKUAT, Egerton University, Masinde Muliro University of Science and Technology and Maseno universities have established botanical gardens. These are used for exchange of biological material and also for learning process. Some of the Universities have micro scale depositories of microbials and cell lines.

The Kenya Marine and Fisheries Research Institute (KEMFRI) undertake research on Marine life and carries out *ex-situ* marine and freshwater conservation.

There are a number of community based organizations (CBOs) and NGOs that conduct *ex-situ* conservation activities. Other institutions such as KARI, KEMRI, KETRI, KEVAVAPI and Veterinary Laboratories' have kept various types of culture collections ranging from microbes, tissue and blood serum.

International organizations based in Kenya such as ILRI and ICIPE have wide range of *ex-situ* collections of both flora and fauna. These centres act as source of biological materials for exchange; however, there is no clear validation, management and audit system. As a result, there is inadequate information on what is held in these repositories.

2.5 Biodiversity Intellectual assets management in Kenya

Kenya is rich in biodiversity and one of the source countries for wild plants and animals conserved ex-situ in other countries. The country is equally rich in both recorded and informal traditional knowledge associated to biodiversity which has been the basis of development and protection of intellectual property rights worldwide.

However, the benefits derived from commercialization of the intellectual property rights arising from these biodiversity and related traditional knowledge have not been quantified in Kenya. As a result, we have limited protection of intellectual property derived from biological intellectual assets as indicated in the Table 3.The country has put in place legislations for management and enforcement of intellectual property rights. The IP laws are administered through KIPI for patents, KECOBO for copyrights and KEPHIS for plant variety rights. In addition, KIPI enforces aspects of technology transfer and through WIPO university initiative, they have facilitated establishment of technology transfer office desks in various universities and research institutions.

Table 3: Status of Patents Applications from Kenya Institutions

S.NO.	INSTITUTION	PATENT APPLICATION	FIELD
1	KARI	6	Vaccines
2	KEMRI	8	Plant Extracts
3	University of Nairobi	1	Plant Extract
4	KIRDI	6	Mostly Biopesticides
5	Tea Research Foundation	1	Pesticide
6	KEFRI	5	Plant Extract, developed products
7	Coffee Research Foundation	2	Varied
8	Moi University	4	Varied

S.NO.	INSTITUTION	PATENT APPLICATION	FIELD
9	Kenyatta University/ICIPE	2	Acaricides
10	Maseno University	2	Traditional Nutrition
11	JKUAT	3	Varied
12	Egerton University	1	Pesticide
13	Kisumu Polytechnic	1	Electronic
14	ILRI	1	Vaccine
15	ICIPE	4	Biopesticides
16	Institute of Primate Research	2	Vaccine
Total		**49**	

Source: KIPI records 2011

During the period July 2007 – June 2008, about 85 new applications for plant breeders' rights were received as summarized in Table 4.

Table 4: Application for Plant Breeders' Rights.

S.No.	Species	No.	Country of Origin
1.	Pea	1	United Kingdom
2.	Roses	52	Netherlands, Germany &France
3.	Maize	22	Kenya & Zimbabwe
4.	Soybean	1	Zimbabwe
5.	Wheat	2	Kenya
6.	Statice	1	Netherlands
7.	Chrysanthemums	4	Netherlands
8.	Alstroemeria	2	Netherlands
	Total	**85**	

Source: KEPHIS Annual Report and Financial Statements, July 2007-June 2008.

Although there is patent application, we have no indication of the origin of the biological material and other associated knowledge to inform mechanism for traceability and sharing of benefits accruing from the use of the rights.

2.6 Biopiracy in Kenya

Biopiracy or unethical bioprospecting has been identified as one of the major threats to biodiversity conservation, not only in Kenya but also globally. Ethical bio-prospecting involves accessing natural resources legally by ensuring Prior Informed Consent from the custodians of the relevant natural resources and promoting equitable benefit-sharing with the appropriate parties. Elements of compliance and enforcement of agreed terms, monitoring and evaluation of use of the materials accessed and equitable sharing of benefits accruing from the use of the materials are critical. Movement of materials between resource provider and resource user is controlled through Material Transfer Agreements (MTAs).

Whereas unethical bioprospecting is the uncompensated (and unauthorized) commercial use of biological resources and/or associated IK, as well as the patenting by corporations of inventions based on such resources or knowledge and lack of Prior Informed Consent, there are many MTAs entered into by various agencies and stakeholders that are not properly negotiated, drafted and not legally binding. There is little, (if any) auditing or follow-up on research outputs of the accessed materials, including compensation on commercialized products.

There are a number of documented cases of unethical bioprospecting in the country and the products commercialized without reference to country of origin (Kenya) nor compensation for the use biological materials accessed. The biological materials removed and used in production have immense economic value and would have contributed significantly to the economy of the country, hence improving the livelihoods of the communities in the source areas.

- **Case of Extremophiles microbes**

  The extremophiles microbes from the Kenyan Rift Valley lakes, specifically Lake Bogoria and Lake Nakuru are some of the cited cases of biopiracy in Kenya. These extremophiles have yielded puradex and indiage, being high ranking industrial detergents internationally. Puradex is the main driving force behind the faded denim jeans worldwide that is generating billions of US dollars to processing industries.

Examples of products developed through enzymes derived from *Bacillus* species from Kenyan lakes are shown in Plates 1 and 2;-

Plate 1: sunlight washing powder

Plate 2: denim jeans wear

The concerns being raised regarding the development of these products include; were there negations?, what agreements had been put in place? Were there MTAs? , Who gave the access permit, what conditions were stipulated while granting the permit? Were the biological materials sneaked outside the country without the permissions from the Kenya government?, what were the benefit to the Kenya government and the community in the source areas?

- **Acarbose anti-diabetic drug**

Acarbose, is an alpha glycosidase inhibitor which is used in regulating absorption of glucose into the bloodstream for Type II diabetes mellitus management. It is a derivative of a microbe isolated from Ruiru dam. A process for making acarbose using Actinoplanes *sp.* was patented by Bayer, a German pharmaceutical company. Patents issued in US, EU and Australia on Actinoplanes *sp*. Strain SE50 as disclosed in the patent application has unique genes that enable biosynthesis of acarbose in fermentors. The strain SE50 is said to have originated from Ruiru dam in 2004 and Bayer's Acarbose sales amounted to Euro 278 million (US $ 379m). Despite the amount of money that has been generated through commercialization of acarbose, there is no free or subsidized medicine for Kenya, no benefit to the community near the dam and no specific benefit to the country.

- **Kenya's HIV/AIDS Vaccine Development.**

A collaborative research between University of Nairobi and Oxford University on HIV vaccine development, where work involved isolation of a genome from commercial sex workers that protects them against HIV/AIDS, the vaccine was developed and patented in the UK in 2000. Whereas the country was the source of the genome, the Kenyan collaborators were neither recognized as inventors nor did Kenya benefit from the proceeds or royalties.

- **Collection of microbial, flora and fauna specimens**

Millions of microbial, flora and fauna specimen have been accessed and conserved *ex- situ* in foreign centres. No legal procedures such as Mutual Transfer Agreement's (MAT) and Prior Informed Consent (PIC) have been used to access and use the materials. Some of these may have

led to development of commercial products most whose source identity is undisclosed to public. Other commonly cited pirated materials include those from Red Masai sheep for the wire worm *(Haemonchus conturtus)* resistance genes and Kikuyu grass *(Pennisetum clandestinum)*.

2.7 Bioprospecting Challenges

Bioprospecting is the access and utilization of genetic resources with proper agreed sharing mechanism. However, uncoordinated, uncontrolled and unregulated bioprospecting activities are causing a major challenge to sustainable use of natural resources that enhances conservation and wealth creation. Listed are highlights of bioprospecting challenges in Kenya today:-

a) Underutilized biological resources and access to them without adequate compensation,

b) Inherent Biopiracy,

c) No comprehensive legally established mechanisms for bioprospecting,

d) No clear link between ABS and IP regime in the country, consequently economic value of bioprospecting is not quantified,

e) Uncoordinated, unplanned and inadequately regulated bioprospecting activities,

f) Loss of TK related to biodiversity due to lack of documentation,

g) Climate change and the changing land use patterns leading to continuous loss of untapped biodiversity,

h) Inadequate funds and support from the government, to lead agencies and universities/ colleges to support bioprospecting research, training and product development,

i) Overlaps and incoherence in mandates and practices between lead agencies,

j) Inadequate technical and technological capacity,

k) Lack of awareness on the benefits of bioprospecting and potential to contribute to the economy,

l) Lack of gender equity in bioprospecting activities,

m) Inadequate negotiation skills.

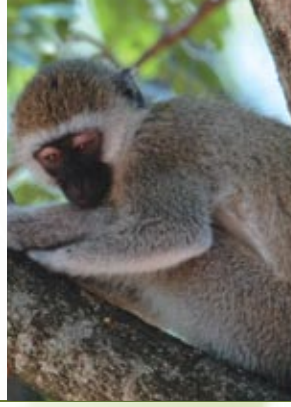
2.8 SWOT (Strengths Weaknesses Opportunities and Threats)

In this case SWOT analysis was used to evaluate the capacity for Kenya in respect to bioprospecting activities and results presented in Table 5.

Table 5: SWOT Analysis

STRENGTHS	WEAKNESSES
• High species diversity already described • Diverse habitats with a wide range of species • The Constitution of Kenya. • Recently enacted land policy 2009 • High capacity of technically trained personnel • There is political good will and international relations on environmental matters • Basic Research and Development infrastructure in place • Relevant legal and Institutional framework in place • Diverse cultural and indigenous knowledge • International goodwill to fund Bio-prospecting programs • There is a viable market for biotech products • Existing international frameworks on access, control and management of biodiversity e.g. CBD, CITES • IP protection regimes	• Lack of comprehensive biodiversity database • Limited knowledge of type, quantity, extent and value of the country's biological resources. • Lack of political good will in implementing the land policy • Brain drain of qualified nationals to foreign territories • Lack of national strategy to implement MEAs • Uncoordinated research and development activities • Policy frameworks which are not operational or harmonized • Lack of awareness on the value of cultural and indigenous knowledge • Overreliance on external donor funds • Lack of capacity to absorb, utilize and account for donor funding • Lack of Public Private Partnerships in the development of Biotechnology industries in the country.

OPPORTUNITIES	THREATS
• Develop a unique and comprehensive biodiversity database • Expanded democratic space to implement national policies • Enabling environment for establishment of centers of excellence • Focal point for Coordination and implementation of the MEAs in the country • Collaborative research (south-south or north-south) • Supportive MOUs with partners • Awareness creation on the value of cultural and indigenous knowledge • Advancement in Technology • Vision 2030 as a guideline	• Loss of biodiversity • Loss of Traditional Knowledge • Climate change • Biopiracy • Genetic engineering • Political and financial instability • Land use change and habitat degradation • Unfavorable Intellectual Property regimes



CHAPTER THREE

3.0 PRINCIPLES OF BEST PRACTICES IN BIOPROSPECTING.

3.1 Introduction

There is need to embrace best practices principles of both providers and users of biodiversity and associated knowledge. There already exists various best practice guidelines applied in bioprospecting. Such guidelines include the Micro Organism Sustainable Use and Access International Code of Conduct (MOSSAICC), International Standards for Sustainable Collection of Wild Medicinal and Aromatic Plants (ISSCMAP), Food and Agriculture Organization's International Code of Conduct for Plant Germplasm Collecting and Transfer, International Certification for Wild Harvest Medicine and Aromatic Plants (ICMAP) and CITES guidelines.

Other guidelines include United Nations guidelines for collecting research specimens and establishing benefits sharing agreements, Bonn guidelines, Botanic gardens benefit sharing guidelines, Swiss Academy of Science guidelines on non commercial research, Costa Rica (INBIO) benefit sharing models, International Cooperative Biodiversity Groups (ICBG) guidelines, and the Biotechnology Group of Companies (BIO) bioprospecting guidelines, Nagoya protocol and WIPO.

The Constitution of Kenya states that the government shall ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources and equitable sharing of the accruing benefits. It further emphasizes that the State shall utilize the environment and natural resources for the benefit of the people of Kenya. More so, the State shall protect genetic resources and biological diversity, it shall further protect and enhance intellectual property and indigenous knowledge of biodiversity and genetic resources of the communities. The Constitution further stipulates that Parliament shall make legislation for purposes of transfer or exploitation of any natural resources in Kenya.

The internationally recognized best practices shall form the basis guiding the development of this strategy in line with the Constitution which embraces a number of values from the recognized best practices internationally. Consequently, the strategy shall focus on the sustainable conservation and management of biodiversity for improvement of the livelihood of the Kenyan people and form a key pillar as the driver of the economy.

The best practices principles will be applied at all stages of access to and use of biodiversity and genetic resource to include Prior Informed Consent, access (collection and discovery),*ex-situ* conservation, research and development, Commercialization, fair benefits sharing and monitoring and auditing system.

3.2 Application of the Principles of Best Practices

Access to and use of biological materials and associated traditional knowledge shall be guided by the Constitution, EMCA 1999, Wildlife Act Cap 376 and various statutory provisions, including international ratifications that Kenya is party to.

The following steps will be part of best practice principles and shall guide the process for access and use of biological materials and associated traditional knowledge.

3.2.1 Prior Informed Consent

The following shall be steps to follow to acquire Prior Informed Consent to access biological materials and associated traditional knowledge

i. Rules and procedures on accessing genetic resources will clearly be stipulated;
ii. Information on how to apply for prior informed consent shall be availed;
iii. Consent from a competent authority, in consultations with resource provider

and other lead agencies shall be sought before issuance of PIC;

iv. Where applicable, and subject to legislation, set out criteria and/or processes for obtaining prior informed consent or approval and involvement of indigenous and local communities for access to genetic resources;

v. A notification process through clearing house mechanisms to monitor issued access permits or its equivalent as evidence of the decision to grant prior informed consent and Mutually Agreed Terms entered into;

vi. Rules and procedures for establishing mutually agreed terms. Such terms shall be set out in writing.

The user shall comply with criteria and requirement of obtaining PIC subject to the law at all times.

3.2.2 Mutually Agreed Terms (MAT)

The conditions of access to genetic resources and associated knowledge shall be negotiated and agreed between the user, provider and other stakeholders as follows;

i. The MAT will be reached in a manner to establish long term, transparent and respectful relationship and communication;

ii. The MAT will be reached in compliance to PIC to allow flow of benefits to conservation and livelihoods improvement;

iii. The MAT will take into account needs of different stakeholders, including government, private land owners, communities and ex-situ centres.

3.2.3 Traditional knowledge

i. The collection and use of TK will be undertaken in consideration of the integrity and respect for local TK and associated genetic resources;

ii. Mechanisms for protection of accessed community TK associated with genetic resources will be complied with during bioprospecting;

iii. Mechanism will be put in place to ensure fair and equitable compensation to individuals and communities from whom TK will be accessed;

iv. Mechanism will be put in place to develop a community based tradition knowledge digital libraries to ensure protection.

3.2.4 Conservation and Sustainable Use

i. Collection and harvest of wild species will be done in respect to sustainable wild harvest principles. Where the activity is most likely to have a significant impact on the environment, a Non Detrimental Finding (NDF) study shall be done and to a larger extend an Environmental Impact Assessment (EIA) shall be recommended where applicable;

ii. *Ex-situ* conservation of collected specimen based on laid down procedures shall be encouraged;

iii. A mechanism will be put in place to ensure proper sharing of information generated from use of biodiversity.

3.2.5 Benefit Sharing

i. Mechanisms will be put in place to ensure a fair and equitable sharing of benefits arising from utilization of genetic resources and associated traditional knowledge in compliance with CBD objectives and National goals;

ii. Mechanisms will be put in place to ensure that benefit sharing at all stages is accounted for i.e. from collections, discovery, research, development and commercialization. Short-term ,medium and long- term benefits will be considered;

iii. Benefits will be shared fairly and equitably with all the identified stakeholders within the agreements;

iv. The benefits will be used to strengthen capacity specifically technology transfer and training relevant to conservation and sustainable use of genetic resources;

v. All the benefits sharing provisions and arrangement will be negotiated and implemented towards contribution to conservation of biological diversity.

3.3 Management process

Mechanism will be established to ensure appropriate procedures for effective management of bioprospecting activities and sustainable use of biodiversity.

Best practice standards for appropriate management focusing on both external and internal factors shall be incorporated and applied. This will also incorporate emerging practices and concerns such as participation of indigenous and local communities, documentation of traditional knowledge (TK) and information management and sharing, reporting and compliance with National laws.

3.3.1 Research for Academic and Commercial Purposes

It is difficult to differentiate between academic and commercial research. Some companies or institutions access biodiversity management information through literature and databases in public domain and some time to a large extend through lead agencies in form of collaboration and partnerships.

A system shall be established to create awareness and ensure intellectual properties of indigenous communities is recognized and compensated and the country gets its rightful share for purposes of economic development out of these partnerships and collaborations entered into. The use of PIC, MAT and MTA instruments shall form the basis of Intellectual property protection.

3.3.2 Local communities

The participation, rights and interests of the local communities shall be recognized and respected in all processes of bioprospecting strategy implementation. Efforts towards developing local community structures to improve governance shall be enhanced. As a result, benefits shall trickle downwards to majority of the local community concerned, consequently creating a positive impact to livelihood.

Education and awareness activities will be carried out to enhance the local community capacity undertakings in bioprospecting programmes.

3.3.3 Compliance with Statutory Provisions

Both national and international statutory provisions will be complied with in bioprospecting activities. The use of Geographical Information System (GIS) to ascertain the source and status of biological material shall be emphasized. The certainty of the origin of the material, which will include issuance of the certificate of origin, production of Prior Informed Consent certificate and MTA shall be enforced in bioprospecting process.

3.3.4 Partnership and Collaborations

Both local and international collaborations and partnership shall be encouraged; however, such collaborations shall be within a defined framework of Cooperative Research and Development Agreement (CRADA).

3.3.5 Use of Trans-Boundary Resources

Inventories will be undertaken to map out the extent of the bio-resources across inter-community. Mechanisms will be established to guide on access and use of the shared resources and sharing of benefit accruing. However, where the bio-resources cut across the international boundaries joint expeditions and inventories shall be encouraged for purposes of

mitigating conflicts and harmonizing fair and equitable distribution of benefits thereof.

3.3.6 Material Transfer Agreement

Exchange and transfer of biological materials have been routinely done without structures for monitoring, enforcement and compensation to the provider for the use of the transferred materials. Such biological material include live specimens, parts and derivatives including tissues,seeds,clones,cells, extracts, plasmids e.t.c and the exchanges have been facilitated by individual researchers, communities and government institutions.

While such exchanges and transfers might have accelerated scientific discoveries, these arrangements might not have been of much value to the country as compared to the contribution these bio-materials transfers have made to the economy of the recipient country. This scenario has the potential for litigations, animosity and loss of benefits to the provider.

An MTA as a contractual legal instrument shall therefore be entered into between the provider and the recipient as contracting parties set forth terms and guidelines on how propriety bio-material shall be transferred and used.

3.3.7 Intellectual Property Rights

Issues of intellectual property rights (IPRs) derived from biological resource and associated knowledge will be recognized. Measures will be taken to promote establishment of institutional IP offices and develop IP Policy documents that will serve as a guide to management and utilization of intellectual property assets. Attempts will be made to file and acquire patents, plant breeders' rights, trademarks, industrial designs, utility models and copy rights for byproducts', innovations, services and creations coming out of bioprospecting programmes. Contractual agreements on confidentiality, licenses, assignment and technology transfer will be established.

3.3.8 Benefit Sharing Plan

Appropriate stakeholder benefit sharing plan shall be developed to guide equitable sharing of benefits accruing from bioprospecting programmes.

3.3.9 Incentives

Mechanisms for providing incentives for bioprospecting shall be explored. Such incentives may include provision of funds by the government and development partners in form of research grants and venture capital. Other incentives may include tax exemptions on technology acquisition, protection of community intellectual property rights and compensation e.t.c.

CHAPTER FOUR

4.0 STRATEGIC OBJECTIVES AND ACTION PLAN

4.1 Introduction

Bio-prospecting constitutes a realm of different activities that brings together different partners and collaborating institutions, at local and international levels. The purpose of this strategy is to streamline bioprospecting issues in pursuant of the Constitution and provisions of the Wildlife Act Cap 376, EMCA 1999 (Conservation of Biological Diversity and Resources Regulation 2006) and other National legislations.Bio-prospecting strategy will not only ensure conservation and sustainable utilization of biological diversity in the country but also fair access and equitable benefit sharing of profits arising from utilization of genetic resources and associated traditional knowledge. This is a five-year strategic plan.

The Bioprospecting strategy will contribute immensely towards transforming Kenya into a knowledge based economy, as envisaged in Vision 2030.

4.1.1 Definition

This Bioprospecting strategy is a tool that will provide the mechanisms and practices to be used to give direction for coordination and building synergies amongst stakeholders.

4.1.2 Vision

A prosperous healthy nation based on its biodiversity assets.

4.1.3 Mission

To sustainably use biodiversity intellectual assets for the well being of Kenyan citizens

4.2 Strategic Objectives

- Enhance institutional capacity and review of statutory and regulatory framework for sustainable Bio-prospecting
- Develop a bio-informatics system that include a central biodiversity database on all taxa and inventory including traditional knowledge associated with Bio-prospecting.
- Develop guidelines for sharing of benefits derived from the use of biodiversity and associated knowledge for economic development.
- Enhance information access and develop a communication system
- Develop a financial and resource mobilization mechanism for Bio-prospecting and implementation of this strategy.

4.3 Strategic Interventions and Activities

4.3.1 Institutional capacity and regulatory framework

There is need for enhancing institutional capacity and review statutory and regulatory framework for effective and efficient bioprospecting processes. To achieve this, the following actions are needed:-

a) Establish a National Bioprospecting Steering Committee to oversee the implementation of this strategy.

b) Review and harmonize existing legislation and policies in order to streamline conflicting, deficient, obsolete and incompatible legal statutes and align with the Constitution. These include: EMCA 1999, ABS Regulations (legal notice160), Wetlands regulations, National Heritage and Museums 2006, Wildlife (Conservation and Management) Act 1989,Forest Act 2005, Animal Diseases Act (cap364), Industrial Property Act 2001, Seed and Plant Varieties act 1977, Copyright 2001 Act, Biosafety Act 2009, Science and Technology Act (Cap 250), Witchcraft Act 1925.

c) Formulate, gazette and promulgate new rules and regulations on Bio-prospecting

and biodiversity intellectual assets, schedules within the respective legislative Acts.

d) Harmonize relevant Bio-prospecting related legislations in line with the Constitution, regional and international protocols.

e) Enhance capacity of public and private sector in Bio-prospecting including; research, product development, creating good value chains, access to markets and sustainable management and utilization of natural resources.

- **Build the capacity of institutions to identify, assert and protect the different forms of Intellectual Property Rights relating to Genetic Resources.**
  - i. Establish IP management offices and systems in research institutions, tertiary institutions and related government arms e.g. KWS, NEMA, KFS, regional development authority's e.t.c.
  - ii. Build skilled IP capacity in the institutions.

- **Increase the capacity of Academia and research institutions to;**
  - i. Establish and or designate institutions as centers of excellence, repositories, techno parks, and incubation centers for purposes of Bio-prospecting.
  - ii. Encourage local bio-prospecting/ exploitation of bio-raw material and related intellectual assets.
  - iii. Increase funding and support for Bio-prospecting research.
  - iv. Develop standards of best practice for Bio-prospecting (ethical Bio-prospecting and standards development).
  - v. Promote transfer of appropriate technology and provide technical support.

- **Set up pilot bioprospecting spin off enterprises**

4.3.2 Bio-Informatics (Central Biodiversity Database) and Inventory.

a) Develop a framework for database and knowledge coordination

b) Initiate and undertake Biodiversity resource inventory and valuation

c) Document and protect IP and Traditional knowledge associated with biodiversity

d) Facilitate local communities to document their Traditional Knowledge associated with biological resource use.

e) Increase human resource capacity for Bio-prospecting and intellectual asset documentation.

4.3.3 Benefit Sharing Plan and Implementation

a) Develop and establish acceptable benefit sharing structures,

b) Put in place mechanisms for local communities to conserve, sustainably use and promote their TK and biological resources,

c) Improve the capacity of local communities to identify, assert and safeguard their rights over their TK and biological resources in the context of negotiation and implementation of Bio-prospecting agreements,

d) Build the capacity of private sector to uphold standard operating procedures in Bio-prospecting.

4.3.4 Develop a Bio-prospecting information access, communication and monitoring strategy

a) Develop, adopt and implement a communication framework for information access and sharing

b) Establish and implement an integrated monitoring and evaluation reporting protocol

c) Develop, adopt and implement a monitoring and evaluation mechanism of this strategy

4.3.5 Develop a financial and resource mobilization mechanism for Bio-prospecting and implementation of this strategy.

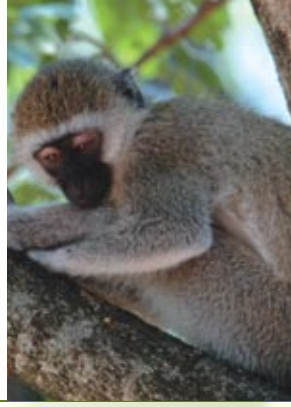
a) Establish a government budget line for funding bioprospecting programmes,

b) Fundraise with development partners to support Bio-prospecting activities,

c) Establish a Bio-prospecting fund,

d) Develop mechanisms for linking Bio-prospecting to payment for Ecosystem services,

e) Enhance entrepreneurship capacity of private sector to identify and utilize business opportunities that arise from Bio-prospecting.



CHAPTER FIVE

5.0 IMPLEMENTATION, MONITORING AND EVALUATION PLAN

5.1 Why Monitoring and Evaluation for Bioprospecting Strategy

Sustainable Bioprospecting will be achieved through the set out strategic objectives and interventions. Implementation of the objectives and intervention will be evaluated at various stages to keep track of such developments. The strategy will establish mechanisms to monitor and evaluate the implementation of the set out action plans.

The process of monitoring and evaluation of the Bioprospecting will respond to the following questions:

a) How much biodiversity and associated knowledge is there and how important is it? What is the economic value? What is the conservation status? Is it increasing or decreasing? If decreasing at what rate? And what impacts will this have on the health and economic prospects of the nation?

b) Who are the key stakeholders influencing and affecting the conservation of biodiversity?

c) How effective are different methods used in conserving biodiversity?

d) What is the demand for access to genetic resources and is this demand likely to grow or dwindle in the short, medium and long term?

e) What is the value of genetic resources?

f) How can Kenya gain a competitive advantage through access to and benefit sharing of the genetic resources?

5.2 Bioprospecting Monitoring Indicators.

a) Review of legislations and policies,

b) Compliance with statutory provisions,

c) Increased capacity of stakeholder to undertake bioprospecting activities

d) Enhanced management and protection of the country's biodiversity intellectual assets

e) Improved stakeholders' participation in bioprospecting activities.

f) Enhanced technology transfer in respect to the country's bioprospecting programme.

g) Enhanced conservation of biodiversity and improved livelihood.

h) Developed and updated database of genetic resources and Traditional knowledge associated with the country's genetic resources,

i) Developed framework for sharing of benefits

j) Developed financial and resources mobilization mechanisms.

k) Developed information management network for Bioprospecting.

5.3 Monitoring and evaluation strategy

This will be implemented through systems of monitoring, evaluation and audits based on Prior Informed Consent (PIC), certificate of origin, Material Transfer Agreement (MTAs), permits, contractual agreements, patents, licenses and revenue generated from bioprospecting process.

The complexity and multi-disciplinary nature of this Bioprospecting strategy will require that a National Monitoring & Evaluation Steering Committee is established. This committee comprising of key stakeholders will oversee the entire process of strategy implementation. It will evaluate the implementation of the action plan in this strategy to ensure that key institutions remain actively engaged. The Steering Committee

will liaise with all stakeholders in providing information, designing objectively verifiable indicators and in formulation of joint participatory M&E processes. It is envisaged that involving stakeholders in the design of indicators, against which to assess implementation, can provide a clearer picture of developments on the ground than external assessments using pre-set indicators.

The key Stakeholders involved in participatory M&E System for the strategy shall include NGOs,CBOs, Local Communities and individual TK holders, inventors and Scientific Researchers, National and County Governments, Technicians from lead agencies and Private Sector.

For some of the strategic objectives, permanent stakeholder task forces (TFs) may be established to oversee implementation of action plans using a well structured but flexible M&E Tool Kits. Operation of such TFs will be built into the action plan to provide for its budget. TFs will agree on how to:

a) Develop means of verification of indicators
b) Identify priorities for M&E
c) Come up with methods, responsibilities and timing for information gathering
d) Determine who should utilize information and how

A Tool Kit for M&E will be developed to assess the log frame, measure the progress and analyze assumptions, assess the extent of both process (negotiation) and content (benefits), indicators for fair and equitable benefit sharing process (Ten Kate et al, 1999). The tool kits and other instruments for M&E of the strategy will be compared with other strategies.

6.0 STRATEGY IMPLEMENTATION ACTION PLAN

Strategic Objective	Activities	Expected Output	Responsibility	Performance Indicator	Time Frame	Expected Budget (KES Millions) 000					
						Year 1	Year 2	Year 3	Year 4	Year 5	Sub totals
SO 1: Enhance institutional capacity and review of statutory and regulatory framework for effective Bio-prospecting	Establish and operationalise a 15-member National Bioprospecting Steering Committee (NBSC)	NBSC	KWS	ToRs, Nomination of members by respective instituti ons&stakeholders, Appointment letters, Gazette Notice, Minutes of meetings.	**6 months after Launch of strategy**	5,000	5,000	5,000	5,000	5,000	**25,000**
	Establish and operationalise an NBSC secretariat	Secretariat	NBSC & KWS	5-year Action Plan, Reports	**3 months after NBSC**	10,000	10,000	10,000	10,000	10,000	**50,000**
	Review existing and develop legislations to provide for Bio-prospecting	Harmonized legislation, rules and regulations	KWS, KFS, NEMA, NCST, NBSC & other lead agencies	Draft rules and regulations, Designation of Bio-prospecting institutions	**5 years**	15,000	5,000	5,000	3,000	3,000	**31,000**
	Develop and gazette appropriate rules and regulation on Bio-prospecting	Gazetted legislation	NEMA, KWS,KFS	Draft regulations and Acts	**5 years**	2,000	2,000	2,000	2,000	2,000	**10,000**
	Develop, up-scale and/or modernize Bio-prospecting repositories, technoparks and incubation centers, IP desk, centre of excellence in R&D	Bio-prospecting centers operationalize	NBSC, NCST, NEMA KWS, KFS, KARI, KEMRI, KIPI, KEPHIS and other Participating institution	Number of functional centers, Material deposits, number of product developed	**5 years**	1,000,000	2,000,000	1,200,000	200,000	200,000	**4,600,000**
	Support 5 pilot venture bioprospecting projects (Enterprises)	Establish 5 pilot venture enterprises	NBSC, KWS, KIPI, Universities and other participating institution	Functioning enterprises	**5 year**	500,000	550,000	600,000	650,000	700,000	**3,000,000**
	Train appropriate human resource for Bio-prospecting	Higher Diploma,MIP, MSc/MA and PhD	Participating institution	Number of staff trained, transferred technology	**5 years**	250,000	200,000	150,000	100,000	100,000	**800,000**
Sub Totals											**8,516,000**

Strategic Objective	Activities	Expected Output	Responsibility	Performance Indicator	Time Frame	Expected Budget (KES Millions) 000					
						Year 1	Year 2	Year 3	Year 4	Year 5	Sub totals
SO 2: Develop Bioinformatics' system (a central biodiversity database) and species inventory and associated knowledge.	Develop a framework for database and knowledge coordination	Centralized functional Bio-prospecting information sharing and management system.	KWS, NBSC and other stakeholders	Operational database, Reports, Equipments, Number of Trained personnel.	**5 years**	15,000	10,000	5,000	5,000	5,000	**40,000**
	Initiate and undertake Biodiversity resource inventory and valuation	Biodiversity status and potential established;	KWS, NBSC, NEMA, NMK, KFS, KEFRI, DRSRS, KARI and other stakeholders	Reports, Publications,	**5 years**	150,000	100,000	50,000	30,000	30,000	**360,000**
	Document traditional knowledge associated with bioprospecting	Systems for TK associated with biodiversity established and documented	KWS, NBSC, KIPI, NMK, KEFRI, Universities and other stakeholders	TK digital libraries, community database,reports,publications and IP rights	**5 years**	30,000	10000	5000	5000	5000	**55,000**
Sub total											**455,000**
SO 3: Develop access and benefit sharing guidelines for biodiversity derived products and associated knowledge for economic development	Develop and establish acceptable access and benefit sharing structures.	Benefit sharing structures developed & implemented	NBSC, NEMA, KWS ,universities and others	Reports, Stakeholder Workshop reports	**two years**	20,000	20,000	2,000	2,000	2,000	**46,000**
	Put in place mechanisms for local communities to preserve, sustainably use and promote their TK and biological resources	structures established, Offices,	NBSC, KWS, KEFRI, DRSRS, NMK, KIPI and other stakeholders	Group of Elders, Reports, databases	**5 years**	150,000	150,000	80,000	60,000	50,000	**490,000**
	Improve the capacity of local communities to identify, assert and safeguard their rights over their IPRs, TK and biological resources	Capacity for local communities to conserve their TK & Biological resources enhanced	NBSC,KWS, NMK, Department of Culture, KIPI and others	Workshops reports, Training Manuals, Access toolkits, Community consultants	**5 years**	30,000	30,000	20,000	20,000	20,000	**120,000**
	Build capacity of public and private sector to uphold standard operating procedures in bioprospecting	SOP developed, adopted and implemented regulatory body	NBSC, NEMA, KWS	SOP manuals, training manuals, workshop reports, new curricula, training materials, workshop trainees	**5 years**	10000	10000	10000	10000	10000	**50000**
Sub total											**706,000**

Strategic Objective	Activities	Expected Output	Responsibility	Performance Indicator	Time Frame	Expected Budget (KES Millions) 000					
						Year 1	Year 2	Year 3	Year 4	Year 5	Sub totals
SO 4: Develop a Bio-prospecting information access, communication and monitoring strategy	Conduct sensitization workshops (scientists, researchers, communities, resource managers, politicians etc),	Action plan	NBSC, KWS, NCST, other stakeholders, communities	Brochures, Fliers, List of trainers, Number of seminars, Developed Training materials and manuals, Print and electronic media programmes	**5 years**	15,000	15,000	15,000	15,000	15,000	**75,000**
	Develop publicity materials for all media (print and electronic)	Informed stakeholders	NBSC, NEMA, DRSRS, KWS other stakeholders, communities	Brochures, Fliers, List of trainers, Number of seminars, Developed Training materials and manuals,	**5 years**	5,000	3,000	3,000	3,000	3,000	**17,000**
	Establish and implement an integrated M&E reporting protocol	M&E tool kit	NCST, KWS, NEMA, DRSRS	annual reports, newsletters	**5 years**	5,000	5,000	5,000	5,000	5,000	**25,000**
Sub totals											**117,000**
SO 5. Develop a financial and resource mobilization mechanism for Bio-prospecting and implementation	Mainstream government funding.	A government budget line	GoK/ Treasury, parent ministries, KWS, NBSC	Budget estimates, Government National development plan	**5 year**						
	Create fundraising activities with potential bioinvestors (Development partners, private sector) including money for developing the next strategic plan	Increased investments in Bio-prospecting	NBSC, KWS and other stakeholders	Development partners consultative meetings	**5 years**	10,000	10,000	10,000	10,000	10,000	**50,000**
	Establish and operationalize a Bio-prospecting fund	Enhanced benefits and stakeholder partnership	NBSC, Private sector, Government, Development partners,	Certificate of registration, Bank Accounts, memoranda,	**5 years**	2,000	2,000	2,000	2,000	2,000	**10,000**
	Develop mechanisms for linking Bio-prospecting to payment for Ecosystem services	Enhanced revenue generation for conservation	NBSC and other stakeholders	Periodic reports, Level of revenue generated	**5 years**	10,000	5,000	5,000	5,000	5,000	**30,000**
				Sub totals							**90,000**
EXPENDITURE (Grand Total)											**9,884,000**

Note: Amount in Kshs

Expected government funding	3 billion
Bioprospecting fund	1.65 billion
External funding	5.150 billion
Total budget	**9.884 billion**

Table 6: Summary of the Projected Budget and Source of Funding

	STRATEGIC OBJECTIVE	Source of Funding			**Projected Budget Kshs(`000)**
		GoK `000	External `000		
			Development partners	Bio-entreprises	
1.	Enhance institutional capacity and review of statutory and regulatory framework for sustainable Bio-prospecting				**8,516,000**
2.	Develop a bio-informatics system that include a central biodiversity database on all taxa and inventory including traditional knowledge associated with Bio-prospecting.				**455,000**
3.	Develop guidelines for sharing of benefits derived from the use of biodiversity and associated knowledge for economic development.				**706,000**
4.	Enhance information access and develop a communication system.				**117,000**
5.	Develop a financial and resource mobilization mechanism for Bio-prospecting and implementation of this strategy.				**90,000**
6.	**TOTAL AMOUNT**	**3,000,000**	**5,190,000**	**1,650,000**	**9,884,000**

REFERENCES

1. The Constitution of Kenya 2010
2. Government of Kenya 1975 *Wildlife Policy Sessional paper 3 of 1975* (future management of wildlife in Kenya)
3. Wildlife conservation and management (Amendment 1989) ACT CAP 376
4. *Forest Act* 2005;
5. *Science and Technology Act* Cap 250;
6. *National Museums and Heritage,* 2006;
7. *Plant Protection Act* Cap 324;
8. *Science and Technology Act* Cap 250;
9. *Animal Diseases Act* Cap 364;
10. *Industrial Property Act* 2001;
11. *Universities Act* Cap 210;
12. *Environmental Management and Coordination Act,*(EMCA) 1999;
13. www.kenyalaw.org ,
14. Government of Kenya, 2006 *A national Biotechnology development policy,*
15. Government of Kenya 2000-The Kenya National Biodiversity and Action Plan Kenya,
16. Republic of Kenya (2000). National Development Plan 2002-2008,
17. James, C, 2005. *Global Status of Commercialized Biotech/GM Crops:* ISAAA Briefs No 34. ISAAA: Ithaaca, NY.
18. Brooks & Barfoot (2005). GM Crops: The *Global Economic & Environmental Impact* 1996 – 2004. PG Economics UK. www.pgeconomics.co.uk
19. Ten Kate K, Laird S. 1999. The Commercial Use of Biodiversity: *Access and Benefit Sharing.* Earthscan, London
20. *Mukonyi, K.W;* and *Lusweti,* A.M; 2009. *Proceedings of Bioprospecting experts brainstorming workshop* held at Lake Bogoria SPA resort 8th -11th Sept 2009.
21. Evanson Kamau ; 2009. Sovereignty over genetic resources; *Right to regulate access in a Balance.* Case of Kenya.
22. *Mukonyi, K.W; Winston O.O; Ndenga, E; Owiro,D; Otswtong'o ,O. F;* and *Lusweti A,M;* 2009. *Towards Effective Utilization of Biodiversity for Economic Growth and the Attainment of Kenya's Vision 2030.* Workshop proceedings, 19 – 21 March, 2009; White Sands Hotel, Mombasa, Kenya.
23. *Heong Chee Yoke 2005.* report on 32 cases show biopiracy grown in Africa**.** *TWN Info service on WTO and trade issues (mar06/12): http://www.twnside.org.sg/tile2/twinfo.374.htm*
24. *Caldecott.J.O. M.D.Jenkins, T.Johnson and B. Groombridge.1994.* priorities from Conservation Global Species Richness and Endemism. In world conservation and monitoring centre, biodiversity series *No.3 (N.Mark Collins,ed.)pp 17.World Conservation Press, Cambridge, UK.*

ANNEXES

ANNEX I : LIST OF PARTICIPANTS, VOI AND WHITESANDS WORKSHOP.

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FORMULATION OF BIOPROSPECTING STRATEGY FRAMEWORK FOR PROTECTED AREAS:

28 FEB – 03 MARCH 2011AT WHITESANDS HOTEL, MOMBASA

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FORMULATION OF BIOPROSPECTING STRATEGY FRAMEWORK FOR PROTECTED AREAS:

28 FEB – 03 MARCH 2011 AT WHITESANDS HOTEL, MOMBASA (Cont.)

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ANNEX II: TERMS OF REFERENCE FOR NATIONAL BIOPROSPECTING STEERING COMMITTEE

ESTABLISHMENT OF THE NATIONAL BIOPROSPECTING STEERING COMMITTEE (NBSC)

There is Established the National Bioprospecting Steering Committee (NBSC) under the Wildlife (Conservation and Management) Act Cap 376 to perform the following duties;

a. Driving the process of implementation of the National Bio-prospecting Strategy for bioprospecting from within and outside the protected areas IN KENYA.

b. Together with the National Environment Management Authority (NEMA) as provided for under the Environmental management and Coordination Act of 1999 (EMCA) and other pertinent institutions and offices in the country, spearhead the development of further strategies, policy, legal and institutional framework.

c. The NBSC will work with NEMA as envisaged under EMCA and representing the interests of the pertinent lead agencies and supervise all the Bio-prospecting activities in all the wildlife protected areas in the country other than those pertaining to Bioprospecting from Humans, the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA) under the Ministry of Agriculture, or issues pertaining to the plant varieties under the Seed and Plant Varieties Act Pursuant to the UPOV and will Include:-

- Co-ordination of the various Bio-prospecting management activities being undertaken in Kenya by the:-
  1. lead agencies
  2. Indigenous Communities
  3. National institutions
  4. National Research Institutions
  5. International institutions
  6. National researchers
  7. International Researchers
  8. Members of indigenous communities
  9. Other legal persons
- Promotion of the integration of Bio-prospecting considerations into development policies, plans, programs and projects with a view to ensuring the proper management and rational utilization of biodiversity resources on a sustainable yield basis for the benefit of Kenya.
- Establishment and management of the Bio-prospecting Trust Fund (BTF) and any other fund of the NBSC In consultation with the lead agencies and the national research institutions.
- Ensure that the minimum conditions for agreements between National research institutions, researchers and indigenous communities are strictly observed and complied with.
- Create and operate mechanisms that will ensure effective protection of community intellectual property rights and generally complement EMCA on Access and Benefit sharing agenda.
- Take stock of Bio-prospecting activities, ensuring they ARE geared towards being in tandem with the national access goals.
- Take stock of the utilization of knowledge from bioprospecting for local innovation, international collaborations, local industrialization agenda and international cooperation.
- In liaison with the other stakeholders advise the Government on legislative and other measures for the management of the Bio-prospecting or the implementation of relevant international conventions, treaties and agreements in the field of Bio-prospecting, as the case may be;
- In liaison with the other stakeholders advise the Government on regional and

international Bio-prospecting conventions, treaties and agreements to which Kenya should be a party and follow up the implementation of such agreements where Kenya is a party;

- In liaison with the other stakeholders undertake and co-ordinate research, investigation and surveys in the field of Bioprospecting and collect, collate and disseminate information about the findings of such research, investigation or survey;
- In liaison with the other stakeholders mobilize and monitor the use of financial and human resources for Bio-prospecting management;
- In liaison with the other stakeholders undertake, in co-operation with relevant lead agencies, programs intended to enhance Bio-prospecting education and public awareness about the need for sound Bioprospecting
- In liaison with the other stakeholders manage as well as enlist public support and encouraging the effort made by other entities in that regard;
- Prepare and issue an annual report on the state of the Bio-prospecting in Kenya and in this regard may direct any stakeholders to prepare and submit to it a report on the state of the sector of the Bio-prospecting under the administration of that lead agency;
- The NBSC may after giving reasonable notice of its intention so to do, work with the other lea agencies to perform, within such time and in such manner as it shall specify, any of the duties imposed upon the stakeholder by or under a written law;
- Perform such other functions as the Government may assign to the NBSC or as are incidental or conducive to the exercise by the NBSC of any or all of the functions;
- Reviewing the current Bio-prospecting strategy or developing the subsequent Bioprospecting strategies;
- Mainstreaming indigenous knowledge of Kenyan communities as a major factor for bioprospecting and in consultation with the NCST, KIPI and the Kenya Plant Health Inspectorate Services (KEPHIS) the development of various mechanisms for protecting intellectual property rights over indigenous knowledge;
- Working with the various stakeholders in building an efficient policy paradigm and with the parliament in crafting an appropriate legislation.

1. The Director will constitute the National Bio-prospecting Steering Committee as follows:-

a) One appointment from the KWS to serve as the Chairperson of the NBSC;

b) Two appointments from institutions that manage biodiversity in the protected areas, in this case the KWS and the Kenya Forestry Services (KFS);

c) Two appointments from the collection centers in this case representing the National Museums of Kenya (NMK), Kenya Agricultural Research Institute and the Kenya Medical Research Institute;

d) One appointment from NEMA;

e) One Representative from the National Council for Science and Technology (NCST);

f) One representative from the Kenya Industrial Property Institute (KIPI);

g) Two appointments to represent the interest of the following academic specialist areas, thus, veterinarians, ecologists, agriculturalists; Molecular biologists, biotechnologist, microbiology, Anthropologists, paleontologist, among other related areas of specialization.

h) Two appointments to represent the interests of Technology Transfer Offices in Academic and research institutions.

i) One appointment to represent the interest of the Private sector, Non-governmental Organizations (NGOs) and Community Based Organizations (CBOs).

j) A legal expert.

2. The director shall also set up a secretariat within the KWS consisting of three members appointed from the stakeholder institutions.

3. The work of the steering committee shall be guided by the by the following principles:

a) Sustainable Development as articulated in the Agenda 21 and provided for under EMCA, section 3(5);

b) Equitable access and benefit sharing as articulated in the CBD and EMCA section 53.

c) Benefit for Kenya Philosophy guided by the Bill of Rights in the Constitution of Kenya 2010;

d) Hyper access for research and development as guided by and complementary to The Vision 2030;

e) Compensated Bio-prospecting within the Prior Informed Consent and Material Transfer Agreement as articulated in the Addis Ababa principles and guidelines of 2004.

f) Respect for innovation and property ownership that includes Intellectual Property Rights encompassing indigenous knowledge as articulated in the Constitution of Kenya 2010;

g) International cooperation as negotiated within the frameworks of international agreements, conventions and protocols.

h) Precautionary principles as articulated in the Rio Principles of 1992 and the EMCA;

i) Respect for Indigenous knowledge, Indigenous Community values and stability as articulated in the Constitution of Kenya and EMCA;

j) The work of the NBSC shall be guided further by the principles of participatory management, Integrated Management, encompassing all the relevant sectors, Public/ Private partnership and Multidisciplinary.

Elements of Mutually Agreed Terms.

Checklist of possible clauses to be included in biodiversity prospecting contracts

- Recitals
- Definitions
- Source and Amounts
- Uses
- Licences
- Price/Benefits
- Right to patent/Protection of Intellectual Property Rights
- Exclusivity
- Copyrights
- Trademarks
- Trade secrets
- Contractual Protection
- Dispute resolution
- No liability
- No warranty
- Authorization
- Confidential Information
- Publications
- Indemnification
- Standards of Conduct
- Accounting and recording

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