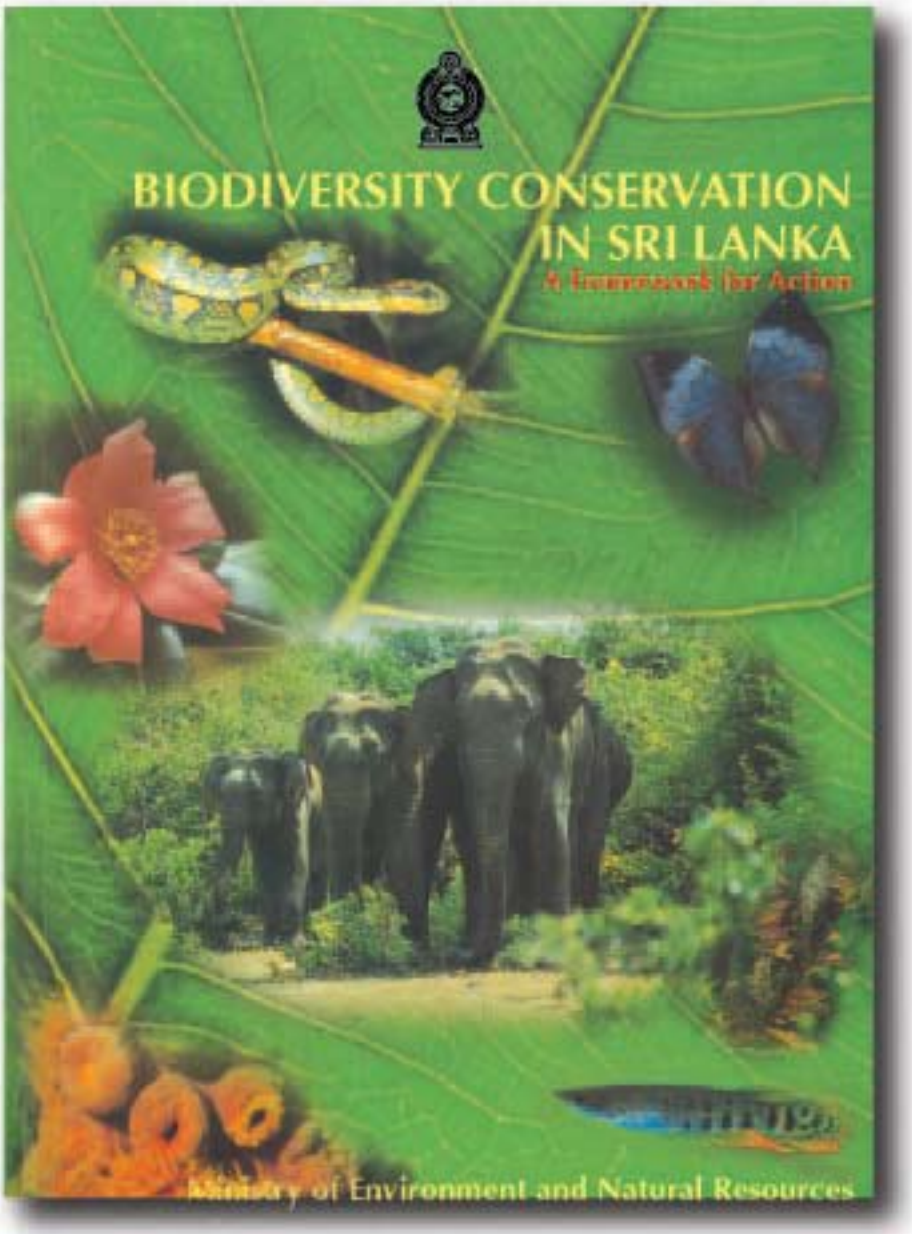
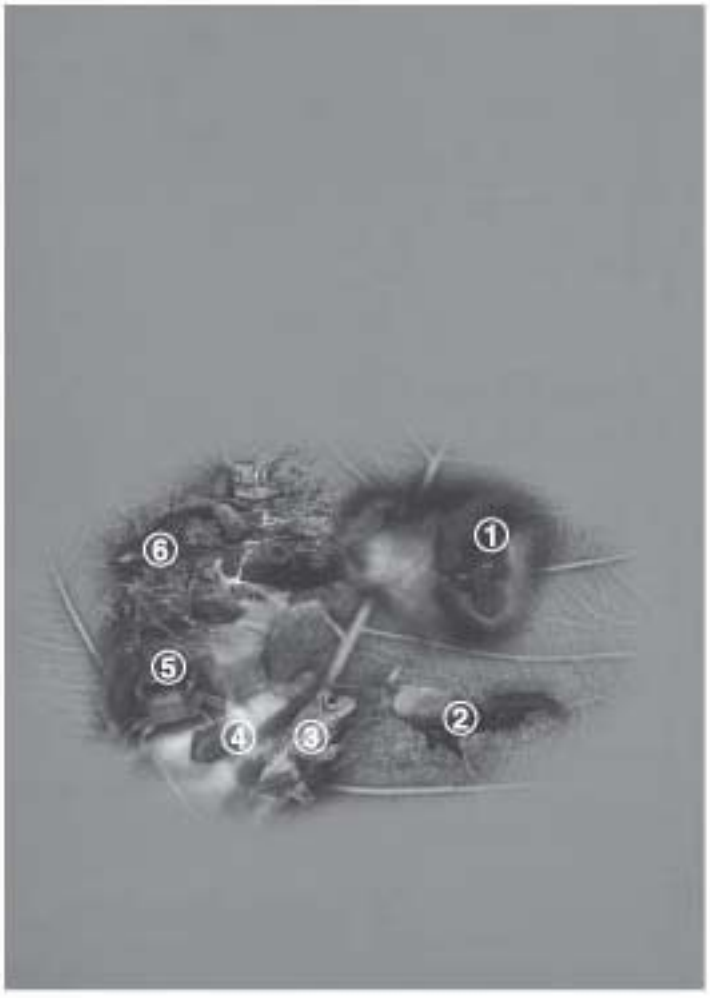
BIODIVERSITY CONSERVATION IN SRI LANKA

A Framework for Action

ADDENDUM



Ministry of Environment and Natural Resources
Biodiversity Secretariat



BACK COVER

1. *Trachypithecus vetulus*
   the purple-faced leaf monkey
2. *Gallus lafayettii*
   the jungle fowl
3. Unidentified tree frog from
   The Adam's Peak reserve
4. a Forest stream
5. *Perbrinckia callista*
   found in the Knuckles range
6. *Vestalis apicalis*
   and endemic damsel fly

(all photos of back cover courtesty WHT)

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Wildlife Heritage Trust of Sri Lanka (WHT)

BIODIVERSITY CONSERVATION IN SRI LANKA

A FRAMEWORK FOR ACTION

ADDENDUM

MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES
BIODIVERSITY SECRETARIAT

2007

BIODIVERSITY CONSERVATION IN SRI LANKA
A FRAMEWORK FOR ACTION

ADDENDUM

The Ministry of Environment and Natural Resources acknowledges the expert/ technical assistance rendered by the Second National Experts Committee on Biological Diversity in the preparation of Addendum to the Biodiversity Conservation in Sri Lanka: A framework for Action, with financial assistance from ADB/GEF funded Protected Area Management and Wildlife Conservation Project.

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A Framework for Action

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BIODIVERSITY CONSERVATION IN SRI LANKA

A FRAMEWORK FOR ACTION

ADDENDUM

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BIODIVERSITY SECRETARIAT
MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES
2007

***Elephas maximus* - Asian Elephant**

MESSAGE BY THE HON. MINISTER OF ENVIRONMENT & NATURAL RESOURCES

Sri Lanka is a beautiful, small island country situated in the Indian Ocean and blessed with a rich biodiversity. The culture and traditions of her people are nurtured by this biodiversity adding immense value to them. It is appropriate to mention that Sri Lanka's remarkable and profuse floral and faunal variety is favored by a high level of endemism, nevertheless it is currently under threat from ever increasing human activity; and needs monitoring. It is this very same endemism and the threat to it that have contributed to making Sri Lanka a biodiversity hot spots in the world. In the circumstance, we can not abdicate the responsibility of conserving our rich biodiversity for the generations to come, and this duty we are handling with dedication.

Biodiversity conservation is not entirely new to Sri Lanka. The country has had this tradition ever since the king Devanampiyatissa of 3rd century B.C., embraced Buddhism brought to the country by the Buddhist missionary, Arahath Mahinda, son of the Emperor Asoka, who was concurrently ruling India. The new religion embraced, has in its core the principle of right to life established – human as well as all other living beings. Influenced by this teaching, the king Devanampiyatissa found the first sanctuary at Mihinthale, which is also the first of its kind in the world.

Sri Lanka, which adopts a more proactive approach to formulating environmental policy, welcomes the Convention on Biological Diversity (CBD) aimed at reducing, as far as possible, erosion of biodiversity worldwide. Incidentally Sri Lanka was one of the countries which made an early ratification of the CBD in 1994. Further, the Biodiversity Secretariat of my Ministry acts as the national focal point for the CBD. In implementing the obligations of the CBD, the Ministry has prepared a Strategy for Biodiversity Conservation in Sri Lanka. This was followed with the development 'Biodiversity Conservation in Sri Lanka - A Framework of Action' in 1998. This framework was reviewed by the necessity to incorporate the recent most development needs of the country having a direct impact on Biodiversity concept and its sustainable utilization. This revision resulted in a slightly modified policy on Biodiversity Conservation, which goes as an addendum to the policy declared in 1998- the primary policy document on Biodiversity Conservation in Sri Lanka.

I have faith in this addendum as a practical plan having a clearly identified and prioritized recommendations, time targets and already identified implementing agencies. I strongly believe that this would be an excellent guide to all stakeholders, who have a stake in conservation and sustainable use of biodiversity in Sri Lanka.

Patali Champika Ranawaka
Minister of Environment & Natural Resources

MESSAGE BY THE SECRETARY TO THE MINISTRY OF ENVIRONMENT & NATURAL RESOURCES

In March 1994 the Government of Sri Lanka joined the international community, in pledging their support to implement the United Nations Convention on Biological diversity (CBD) which was signed by over 150 states at the Earth Summit. Sri Lanka prepared "the Biodiversity Conservation in Sri Lanka – A Framework for Action" with the support of the World Conservation Union in 1998. Sri Lanka therefore endorses her commitment, and fulfils the finalization of the Sri Lanka's Biodiversity Conservation Action plan with the preparation of this new Addendum. I am pleased to provide this message on the occasion of the publication of the Addendum to the Biodiversity Conservation in Sri Lanka – A Framework for Action" prepared by my Ministry.

The preparation of the Addendum to the "Biodiversity Conservation in Sri Lanka – A Framework for Action" began in early 2003, with financial assistance from the "Component C – Protected Area Management and Wildlife Conservation Project". The Ministry established the Second National Experts Committee on Biological Diversity (NECBD) to advise, guide and undertake the addendum preparatory process. The NECBD assembled expertise and constituted sixteen Task Force Teams, representative of 16 different thematic areas related to biodiversity. The work of each of these teams was coordinated and led by a member of the NECBD. The Addendum preparation was undoubtedly a lengthy process, which involved a range of stakeholders that included specialists, academics, policy makers at national and provincial levels, related institutions and the civil society. Several drafts were reviewed at several stages over a period of 3 years. I wish to acknowledge with appreciation the efforts taken, and the manner in which this arduous task was undertaken by the Biodiversity Secretariat of the Ministry, to bring out this valuable publication.

I believe that this addendum will play a key role on conservation and sustainable use of biodiversity in Sri Lanka. This document has clearly identified the sectoral agencies for priority actions, and I expect their maximum support for the implementation process. I also wish to thank the positive contribution made by the relevant institutions for having implemented some of the recommendations after the second draft, not awaiting this publication. This highlights the significance and importance of the recommendations and its value to economic development and biodiversity conservation in the country.

We are very grateful to all experts and stakeholder groups for their generous support and to the ADB, World Bank and the Government of the Netherlands for initiating the activity by providing necessary financial assistance.

M A R D Jayathilake
Secretary, Ministry of Environment & Natural Resources

FOREWORD

Sri Lanka, like many other Biological Diversity rich countries signed and ratified the 'Convention of Biological Diversity'. Accordingly we developed in 1994 "Strategy for the Conservation and Sustainable use of Biological Diversity". This strategy with NGO consultation received Cabinet of Ministers approval for implementation. Much of the strategies in the document remained un implemented. However, we followed almost immediately to develop the Action Plan. This exercise culminated with the production of the 'Biodiversity Framework Action Plan' (BFAP) in 1998 even though some want to call it the 'Biodiversity Conservation Action Plan' (BCAP), it has same serious drawbacks that resulted in the Ministry clearly stating that it will become a 'Framework Action Plan'. Thus guidance for future action were listed, with an opportunity to complete the process, and to have the final all inclusive 'Biodiversity Action Plan' in the future. The PAMWCP, in recognition of this weakness provided the needed funds to complete the BFAP into a BCAP with appropriate changes or additions.

The National Biodiversity Experts Committee, decided to undertake this task through a major consultative process, with the members agreeing to function as Chairperson of – 16 Task sectors. Thus the consultation of expert opinion came to be over 90 persons. Through numerous sector group sessions, expert workshops, a draft Addendum to the BFAP was prepared to make the whole document – 'Strategy, BFAP and Addendum' to become the BCAP. The final Addendum was further subject to public, and provincial consultations. It is the first expert produced document that was presented to each Provincial Administration for comments. Thus we can be happy that the Addendum to the BFAP full fills a 'Peoples Participated' document of the 'Public at Large', 'Administrators' and experts all contributing to the final BCAP. This was a unique process not done by any other Country. The final product is very comprehensive and is based primarily on meeting the 3 objectives of the Convention – namely (1) "Conservation of Biological Diversity', (2) 'The Sustainable use of its Components' and (3) 'The fair and equitable sharing of the benefits arising out of the utilization of genetic resources'.

However, there are among us who cannot understand the need to meet these objectives of the Conservation and Sustainable use of Biological Diversity. Many are lost in the understanding of the pseudocognate 'biodiversity'. The meaning of which has much to do with a 'deep' and 'wide', understanding of the conventional biological diversity, which is the base for the convention. It is sometimes said that the body of the convention lends for the right 'sustainable use of biological diversity'. But, like all international conventions the legal jargon is difficult for many to understand. With numerous, 'as appropriates as' this makes the interpretation even more difficult. However, it is the CBD, which has provided a much needed push for conservation of biological diversity within Sri Lanka as much as in many other countries.

Finally I must take this opportunity to thank all the members of the task committees, and specially the chairpersons for having taken their time and effort to bring this Addendum, and the BCAP to a conclusion. Let us not of course forget the implementation of the actions will be the only way to finally judge the success of any Action Plan. We hope that the Government of Sri Lanka, will undertake the priority action for implementation immediately. Biological Diversity Conservation will only be realized through action rather than talking. The longer we wait to implement the contents proposed in the BCAP, the future we loose the 'Value of Biodiversity'.

Prof. Sarath W.Kotagama
Chairman
Second National Experts Committee on Biodiversity

ACRONYMS

AIA	...	Advanced Informed Agreement
BD	...	Biodiversity
BDS	...	Biodiversity Secretariat
BDFAP	...	Biodiversity Conservation Framework Action Plan
CARP	...	Council for Agricultural Research Policy
CBD	...	Convention on Biological Diversity
CCD	...	Coast Conservation Department
CEA	...	Central Environmental Authority
CITES	...	Convention on International Trade in Endangered Species of Wild Fauna & Flora
CustD	...	Customs Department
DAPH	...	Department of Animal Production Health
DBG	...	Department of Botinic Gardens
DOA	...	Department of Agriculture
DNM	...	Department of National Museums
DNP	...	Department of National Planning
DWLC	...	Department of Wildlife Conservation
DZG	...	Department of Zoologycal Gardens
EIA	...	Environmental Impact Assessment
FD	...	Forest Department
Fish.D.	...	Department of Fisheries
GIS	...	Geographical Information System
GMO	...	Genetically Modified Organism
HRD	...	Human Resources Development
IPR	...	Intellectual Property Rights
ISSG	...	Invasive Species Specialist Group
IU	...	International Undertaking
LMO	...	Living Modified Organism
MAIMD	...	Ministry of Agriculture, Irrigation and Mahaweli Development
MCNH	...	Ministry of Cultural Affaire and National Heritage
MEn	...	Ministry of Environment
MFAR	...	Ministry of Fisheries and Aquatic Resources
MFP	...	Ministry of Finance and Planning
MIM	...	Ministry of Indigenous Medicine
MPBZG	...	Ministry for Promotion of Botanical and Zoological Gardens
MPI	...	Ministry of Plantation Industries
MST	...	Ministry of Science and Technology
MTA	...	Material Transfer Agreement
NARA	...	National Aquatic Resources, Research and Development Agency
NBF	...	National Biosafety Framework
NEAP	...	National Environmental Action Plan
NECBD	...	National Experts Committee on Biodiversity
NGO	...	Non-Governmental Organization
NIE	...	National Institute of Education
NSF	...	National Science Foundation
PA	...	Protected Area
PCs	...	Provincial Councils
PGRC	...	Plant Genetic Resources Center
PIC	...	Prior Informed Consent
SIP	...	Strategic Implementation Programme
SLTA	...	Sri Lanka Tourist Authority
SPBAP	...	Strategy for the preparation of a Biodiversity Action Plan for Sri Lanka
TRIPS	...	Trade Related Aspects of Intellectual Property Rights
UNEP	...	United Nations Environment Programme
Univ.	...	Universities
UPOV	...	Union for the Protection of New Varieties of Plants
VRI	...	Veterinary Research Institute

CONTENTS

Note:

The period between initial compilation and publishing of the addendum was lengthy. During this period some of the recommendations given in this document have already been implemented by the concerned parties.

Stemonoporus petiolaris **- Mendora (Endemic, Critically Endangered)**

Introduction

1.1 Background

1. The Biodiversity Conservation Action Plan published under the title "Biodiversity Conservation in Sri Lanka – A Framework for Action", was an assertion by Sri Lanka to conserve biodiversity in terms of Article 6 of the Convention on Biological Diversity. Its preparation was initiated in early 1996 and finalized in 1997. Its formal acceptance by the Cabinet of Ministers was in August 1998.

2. The Biodiversity Conservation Action Plan *"presents a framework for action. It has not attempted to spell out in detail each activity and to set out the financial budget and other resources needed"* (BDFAP, 1999). Since it essentially represents a framework for action, it will be referred to by the acronym 'BDFAP' in this document. It has to be mentioned here that for all intents and purposes BDFAP remains the accepted policy framework for conservation of biodiversity. BDFAP (1999) has also *"recommended that the Plan be subjected to a review and revision at the end of the first five-year period"*. The current initiative is therefore timely and appropriate.

3. Despite its broad based initiatives, BDFAP has not been implemented in a holistic manner. Action taken by a number of institutions to conserve biodiversity has not had any far reaching effect for want of a coordinated holistic approach. In the period since the preparation of BDFAP, the country had also experienced varied changes in the economic and political arena, and with these have emerged new priorities, plans and programmes that have impacted on environment sustainability, the country's life support system.

4. Sri Lanka has also to cope up with many other issues that have a negative bearing on biodiversity. In fact widespread poverty and malnutrition, human conflicts, the man – animal conflict, inadequacy in management of solid waste and hazardous material disposal, uncontrolled landfills, and even more seriously the issues such as the frequent occurrences of earthquakes or generating 'harbour waves' (Tsunamis), as well as the concerns over global warming, continue to threaten the country's prime position as a biodiversity hotspot in the world.

5. The current developments therefore clearly justify the need to a re-assessment of the provisions of the BDFAP to ensure better effectiveness in the present day context. A comprehensive review of BDFAP is therefore appropriate and indispensable.

1.2. Objectives and Identification of Thematic Areas

6. The broad objectives of embarking on this exercise are as follows:

i. To review the progress in implementation of BDFAP

ii. To identify important areas missing, cross-cutting or inadequately dealt with in the BDFAP

iii. Compile available information.

iv. Propose action plans/recommendations to facilitate effective implementation of BDFAP.

7. A Gap Analysis that preceded the decision to undertake a comprehensive review of BDFAP, led to the identification of 16 functional themes and cross-cutting areas that needed in-depth review by teams of experts. Consequently the Second National Experts Committee on Biological Diversity

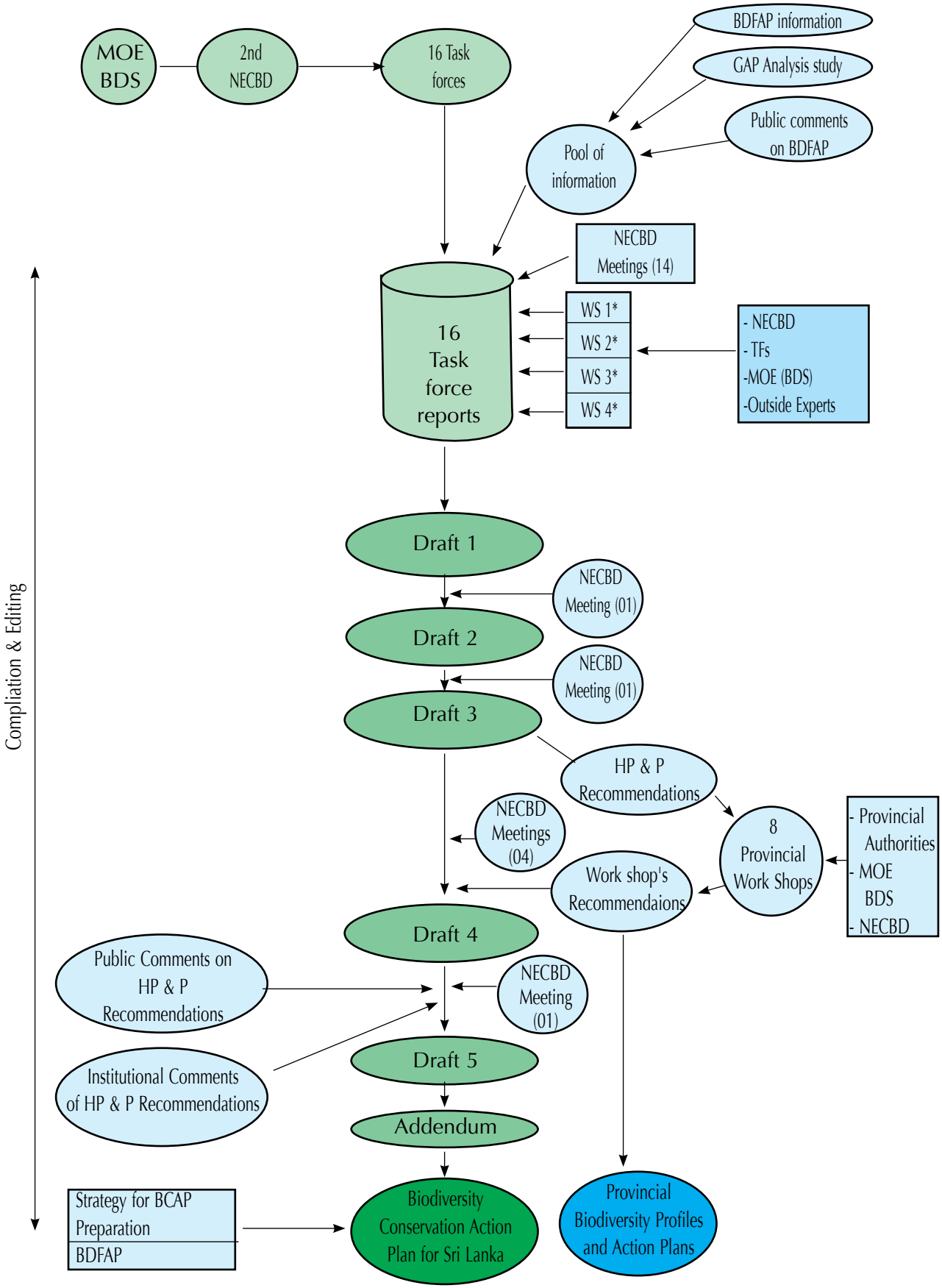
appointed by the Minister of Environment in 2003, assembled 16 task force teams to undertake a review of thematic areas and cross-cutting areas. Each review team undertook a 'needs assessment' followed by the preparation of a comprehensive report based on interactive discussions and seminars, as well as data retrieval, collation, and analysis.

8. The 16 thematic and cross-cutting areas identified were as follows:

i. In-situ conservation
ii. Ex-situ conservation
iii. Access to genetic resources
iv. Traditional knowledge and cultural biodiversity.
v. Impacts on biodiversity
vi. Sustainable use and benefit sharing
vii. Biosafety
viii. Biodiversity valuation and economics of conservation
ix. Policies, strategies and action planning
x. Monitoring and co-ordination
xi. Institutional aspects and capacity building
xii. Legal framework on biodiversity conservation
xiii. Education, awareness and training
xiv. Research, development and technology transfer
xv. Information management
xvi. Agricultural biodiversity

9. The final reports prepared by these Task Force Teams constitute the basis for the preparation of the Addendum to the BDFAP. The current report is a synopsis of the main findings and recommendations of the reports drafted by the 16 Task Force teams that comprised the panel of experts. It was however, inevitable that the review teams had to cover several over-lapping thematic and cross-cutting areas, which invariably led to many common findings. In this summary report steps have been taken to avoid repetitive mention of a common issue by retaining such a point only at the most appropriate position. This has been possible only where it is justifiably feasible. A detailed assessment of each of the above thematic and cross-cutting areas is available as a technical report for those who wish to get a comprehensive account of the findings of the respective Task Force Teams.

1.3 The Addendum Preparatory Process Depicted Diagramatically



WS 1* - Workshop to review addendum preporatory process
WS 2* - Workshop to review the structure of the addendum
WS 3* - Workshop to identify overlappings and gaps of and amendments to the addendum
WS 4* - Workshop to finalize the recommendations of the addendum
HP & P - High Priority and Priority Recommendations of the addendum
2nd NECBD - Second National Experts Committee on Biodiversity

BDS - Biodiversity Secretariat
MOE - Ministry of Environment
TF - Task Force
BDFAP - Biodiversity Conservation Framework Action Plan

Zosterops ceylonensis **- Sri Lanka White Eye**

CHAPTER 2

In-situ Conservation

2.1 Introduction

10. Sri Lanka's rich biological diversity lies mainly in her natural forests, wetlands and coastal and marine ecosystems, while the island's agricultural systems support a unique biodiversity. The conservation in situ of these resources, in a framework of sustainable use, is the primary challenge addressed in this Chapter.

Summary based on the Task Force report prepared by-

Dr.U.K.G.K.Padmalal
Dr. Jinie Dela
Mr. H.G.Gunawardena
Mr. Leslie Wijesinghe
Mr.H.D.Rathnayake.
Dr.Channa Bambaradeniya

11. In-situ conservation is inexorably linked to and affected by institutional weaknesses that hamper institutional action required for biodiversity conservation. As such much of the work under this thematic area was carried out jointly with the review team on Institutional Aspects and Capacity Building. This joint effort helped to identify the mandate and policy requirements for implementing actions in the BDFAP for in-situ conservation, and the relevant institutional needs in terms of funds, human resources and coordination activities

2.2 Gaps and Issues

12. Gap analysis has shown that 73 percent of recommended actions in the BDFAP relevant for in–situ conservation are being currently implemented, while 31 percent of recommended actions that are implemented at present need enhancement. Only 9 percent of recommended actions have not commenced because of a lack of resources. Consequently, eight new recommendations have been identified to enhance efforts for in-situ conservation. Some of these, which are common to other thematic areas have been incorporated under the more appropriate chapter. It has been observed that institutional needs to facilitate in-situ conservation in all ecosystems (inconclusive of agricultural, livestock, coastal and marine ecosystems) are constrained by the absence of coordination, collaboration, and capacity in terms of funds, human and other resources Among the many issues are:

i. A disturbing feature is the anomalous situation within the existing Protected Area (PA) systems managed by the Department of Wildlife Conservation (DWLC) and the Forest Department (FD), leaving many biodiversity rich areas unprotected.

ii. The absence of a lead agency responsible to overlook wetland conservation.

iii. Research and monitoring of both marine and freshwater biodiversity are recognizably constrained as National Aquatic Resources Research and Development Agency (NARA) is unable to concentrate on biodiversity conservation at the required levels.

iv. Failure to address the potential threats to wild crop relatives from GMO's and LMO's.

2.2 Recommendations

13. To address these needs the following recommendations have been proposed:

i. Identify critically important biodiversity hotspots in the country outside forests and bring these under a relevant protected area category.

ii. Study the status/trends in wildlife areas, and identify the need for wildlife corridors and linkages as an option for species conservation.

iii. Prepare and implement recovery plans for threatened species that need special conservation actions (both for in-situ and ex-situ in addition to habitat conservation).

iv. Establish protected area. objectives in buffer zones where GMO's and LMO's are excluded.

© Samantha Mirandu

Horton Plains National Park

© Forest Department

Sinharaja Tropical Rain Forest

Ex-situ Conservation

3.1 Introduction

Summary based on the task force report prepared by -

Dr. Siril Wijesundara
Dr. Magdon Jayasuriya
Brig. H.A.N.T. Perera
Mr. K.B. Ranawana

14. Ex situ conservation comprise collection, handling and management (including research) of germplasm, and ensure its storage, regeneration, characterization/evaluation, documentation and dissemination of information to users, while at the same time emphasizing the need to ensure that such steps do not threaten ecosystems and in situ populations of species. However, it must be emphasized that this involves a temporary, short-term set of germplasm preservation techniques that are usually applied as the choices of last resort.

15. The techniques include, but are not limited to propagule collection from natural populations and cryogenic storage, garden propagation, tissue culture, transplantation, and the establishment of new populations in nature. Such measures involve the transposition of plants/propagules and animals from their habitats into botanic gardens, zoos, aquaria, gene banks, or other types of managed sites in the expectation that the species populations can be re-established in the wild at some later data.

16. These techniques do not conserve all of the genetic variation, the meta-population characteristics, the symbionts, the associated species, the community as a whole, the habitat, or the ecosystem of the endangered plant. Consequently, species conservation does not take place in the totality of its characteristic environment, and also within its evolutionary and ecological contexts.

17. It is important to note that ex-situ conservation should not be attempted under specific circumstances, which include when adequate ecological information does not exist for the remaining natural populations of a target species; when re-establishment in the wild of plant or animal species conserved ex situ could result in genetic contamination of existing populations of the same or different taxa; when the ex-situ techniques are not based on scientific principles or facts, or when the methods and results of such projects are not fully documented; and when the ex-situ conservation effort is not designed or conducted by qualified biologists or with the knowledge and consent of relevant governmental agencies (e.g., DWLC,FD,DOA).

3.2 Gaps and Issues

18. A lack of co-ordination between institutions involved in in-situ and ex-situ activities is a major constraint. The other constraints include, a) lack of financial and human resources to launch realistic ex-situ conservation activities, b) shortage of public awareness programmes, and c) lack of monitoring programmes.

19. Reviewing the information provided to develop an investment proposal for strengthening identified centers such as gene banks for indigenous animals has not been done, while the need to monitor the efforts of private sector organizations to propagate commercially important indigenous threatened species using biotechnology has not been considered. Compiling a directory of all privately and institutionally held species collections and establishing a set of guidelines that define their rights and obligations needs serious consideration. On the other hand formulating a national policy for germplasm conservation, and strengthening the capacity and scope of the Plant Genetic Resources Center (PGRC) have not received adequate consideration.

20. Identification of critical species and strengthening the geographical distribution and facilities of

the botanic gardens to expand their ex-situ conservation activities has not been considered. At the same time improving the facilities available at the National Zoological Garden so that it will serve as a repository of genetic material for all indigenous wild animal species has not been pointed out.

3.3 Recommendations

21. To address these issues the following recommendations are made:

i. Commission relevant in situ and ex situ experts and agencies as a matter of priority, to identify the species for which ex situ measures are necessary, assess and restore their habitats, provide for their reintroduction, and develop ex situ conservation programmes.

ii. Develop competent civil-society entities across the island as centres for ex situ conservation within a regulatory framework that maximizes conservation benefit, assures ethical treatment of animals, and provides for human and environmental safety.

iii. Generate interest and competence in ex situ techniques by encouraging citizens to engage in the challenges of conservation, e.g. by the National Botanic Gardens propagating threatened tree species, and making these available for planting in home gardens; and by encouraging citizens (especially young people) to keep and breed animals (e.g. fish, garden animals) that are not under threat.

iv. Establish more botanical gardens, and mandate them to undertake ex-situ conservation of biodiversity in all bioclimatic regions.

v. Develop capacity in the National Zoological Gardens to engage in ex situ conservation programmes, and serve as a regulator for ex situ centres in general.

vi. Maintain a directory of all privately and institutionally held threatened-species collections.

Orchid (Sampran gold)

Orchid House at the Botanic Gardens, Peradeniya

Orchid (Vanda hybrid)

Access To Genetic Resources

4.1 Introduction

Summary based on the task force report prepared by-

Dr. Magdon Jayasuriya
Ms. S. C. J. Dissanayake
Dr. R. M.T. Rajapakse
Dr.D.K.N.G.Pushpakumara

22. The issues on the control and access to genetic resources are of importance to Sri Lanka particularly for conservation of its rich biological diversity, and to promote their sustainable utilization in order to obtain high economic, social and environmental benefits. The Legal Task Force of the Ministry of Environment and Natural Resources developed recommendations for access, and fair and equitable sharing of benefits arising out of the utilization of genetic resources. Although it contains the structure and organization for an Access and Benefit Sharing (ABS) mechanism, it does not have a legal framework. While Sri Lanka has a range of regulations to manage and protect biological resources, these are generally meant for conservation purposes, and not to promote utilization or regulate access to genetic resources.

4.2 Gaps and Issues

23. On the basis of an extensive review of regulatory mechanisms obtained from various sources several major gaps and issues were identified in the BDFAP. Some of the notable gaps include the absence of a clearly defined policy to regulate access to genetic resources and the absence of a legal framework - only a draft legal framework is available - to ensure regulatory functions. In fact the impact of existing national legal status has not been properly analysed against the draft framework. The development of a legal framework requires a public consultative process, but this has not happened.

24. Furthermore, the human resource needs to handle issues related to access regulations and IPR issues have not been assessed, while awareness programmes on the strategic and economic values of genetic resources are lacking. There has been no effort to identify agencies that could assist farmers in accessing genetic resources, while mechanisms to promote utilization of genetic resources for economic benefits are also absent. Finally the absence of the recognition to incorporate traditional knowledge on biological resources into IPR systems or legislative systems is a shortcoming.

4.3 Recommendations

25. The specific recommendations are as follows:

i. Establish a team of experts to review international and multilateral access negotiations, and develop a suitable national policy for Sri Lanka.
ii. Develop a broad-based consultative process on regulatory mechanisms for access to genetic resources, and establish a procedure and time frame for the task of preparing regulations.
iii. Prepare model agreements and guidelines related to impacts and access to genetic resources.
iv. Develop PIC's, MTA, sui generis systems and benefit sharing mechanisms.
v. Review TRIPS, CITES UPOV etc in relation to access and benefit sharing, and study IU in relation to ex-situ collections of international centres prior to the CBD.
vi. Compile information and case studies on EIA related to exploitation of genetic resources.
vii. Organize human resources development programmes to ensure a critical mass of trained scientific personnel to assess and monitor access and benefit sharing related issues

Chili MI-2

Momordica dioica

Pumpkin varieties

Traditional Knowledge and Cultural Diversity

5.1 Introduction

Summary based on the task force report prepared by-

Prof. C. M Madduma Bandara
Prof. Nimal Perera.
Mr. Kushan Tennakoon.
Mr.S.N.Wickremarathne
Mr. K.B. Ranawana
Dr. H.M.D.R. Herath

26. Sri Lanka with a recorded history of over 2,500 years and a prehistory of several millennia, acquired an accumulated wisdom of managing and conserving her natural resources and her rich biodiversity. This knowledge base had been gradually eroded due to foreign influences and a spell of colonial rule extending over 500 years. Despite these vicissitudes of history, people of Sri Lanka and particularly those in the rural interior, continue to retain a stock of traditional knowledge related to biodiversity. Traditional Medicine depends heavily on the exceptional diversity of tropical plants in the Island. The rich biodiversity of the island is also reflected in its toponomy, culture and literature. It is clear that this wealth of traditional knowledge had hardly been recognized or harnessed in the past for community development or biodiversity conservation. It is also recognized that in sustainable development, and in the conservation of nature and its riches, traditional wisdom and the life styles of people perform a vital role

27. The BDFAP, although has made some passing references to history and culture, it is doubtful whether it had received the attention it deserved. Therefore the present attempt to delve into the cultural aspects of biodiversity is a logical continuation of the initial recommendations of the BDFAP.

28. This review extends to literature, folklore, poetry, culture and life style, and local toponomy. In the field of traditional medicine, a primary source of information was the Sarartha Sangrahaya compiled by the renowned King Buddhadasa in the 5th Century AD, and published recently by the Department of Government Archives. The village data bases (though incomplete) available at the Ministry of Environment and Natural Resources and at the Plant Genetic Resources Center (PGRC), as well as the internet data bases compiled by the US Department of Interior, and the Islamic Finder Web Sites, have been retrieved and collated to establish biodiversity related toponomy in Sri Lanka.

29. Accordingly, the cultural aspects of biodiversity have been examined in the five related fields of flora, fauna, ecosystems, agriculture, culture and toponomy. The findings from these studies have led to sets of recommendations for each related field, and these are recorded in detail in the Task Force Report.

5.2 Gaps and Issues

30. The field of cultural biology is a relatively new area, and had hardly gained a niche in the modern scientific discourse. Traditional knowledge rests largely on the premise that there is a wealth of knowledge passed down from generation to generation, gathered through long experience and ancient wisdom. This knowledge remains largely scattered and under threat of total extinction in the wake of advancing technology and modernization. Therefore, it has to be preserved for the benefit of the present as well as future generations of human society both locally and globally.

31. The manner in which the cultural value of biodiversity could be harnessed for biodiversity conservation has not been adequately appreciated and promoted. Significantly, the traditional system of nomenclature and classification of animals, plants and ecosystems appear meaningful and more detailed than most modern systems, and therefore needs scientific investigation. It has also to be noted

that agricultural development during ancient times, which was guided by the traditional crop calendar facilitated conservation agriculture, and hence must be investigated.

5.2 Recommendations

32. The specific recommendations are as follows:
    i. Study and conduct further research and promotion of traditional medicine and related medical practices, and other important traditional products/methods based on flora and fauna.
    ii. Identify traditional ecological sites, locations and geographical positions and associated knowledge for preservation.
    iii. Mobilize and develop cultural practices and traditional wisdom related to biodiversity.
    iv. Study and investigate traditional beliefs, norms and rituals associated with traditional agricultural practices, and provide a basis for their adoption.
    v. Establish a National Steering Committee to serve as a watchdog body, and for the mobilization of cultural practices in biodiversity conservation.
    vi. Establish a National Register of Traditional Knowledge.

God Minneri festival *(Mangalle)*

Traditional home garden-paddy field ecosystems in Sri Lanka

CHAPTER 6

Impacts On Biodiversity

6.1 Introduction

33. The threats to biodiversity have several underlying causes that include population growth, demographics, trade pressures, political instability, perverse incentives, economic performance, poverty, corruption, lack of law enforcement, poor protection standards, lack of awareness, lack of information, and lack of a clear articulation of the respective rights and obligations of the people and the government. Biological diversity of the country has been lost due to habitat loss resulting from fragmentation, invasive alien species, unsustainable harvesting of resources, pollution of soil, water and atmosphere, desertification, global warming and climate change, and unregulated industrialization and economic development.

Summary based on the task force report prepared by-

Dr. Buddhi Marambe.
Dr. D. K. N. G. Pushpakumara
Dr. (Mrs). Pradeepa Silva.
Mr. H. D. Rathnayaka.
Mr.S.Widanage

34. As pointed out in Chapter I of this review, new threats are emerging for which biologists are inadequately equipped to cope. Despite an increase in the extent of protected areas and associated improvements in their management, the continuing loss of habitats and species demonstrates that Sri Lanka is failing to achieve conservation objectives. New tools and mechanisms to counter threats to biological diversity have not been used effectively in the country.

6.2 Gaps and Issues

35. The gaps in biodiversity in different ecosystems and impacts on biodiversity identified during the review process are summarized below:

i. The impacts of development projects, recreational activities and urbanization have not been considered.

ii. Inadequacy in networking among protected areas has not been considered.

iii. Impact of LMOs and GMOs has not been analyzed.

iv. Impact of traditional and non-traditional farming systems, encroachment and chena cultivation on forest and wildlife biodiversity has not been reviewed.

v. Impacts of the compliance and enforcement of international conventions and agreements on trade for which Sri Lanka is a signatory have not been reviewed.

vi. Impacts of globalization and international trade have not been reviewed.

vii. Impact of human dimensions in livestock biodiversity, and impact of livestock breeding/ improvement programs on domestic animal diversity have not been considered.

viii. Impact of invasive alien species has not been reviewed.

ix. Impact of climate change and global warming has not been reviewed.

x. Impact of agrochemicals has not been analyzed.

6.3 Recommendations:

36. In order to address the above shortfalls, the following recommendations have been made:

i. Assess the impacts of developmental and urban greening projects, climate change, agrochemicals and pollutants on biodiversity and propose recommendations, to develop a data base on available information with respect to impact of above on biodiversity in Sri Lanka; to strengthen EIA process to evaluate the impact of above on biodiversity; to develop a national plan to introduce mitigatory options; and to provide funding for research on techniques to minimize the impacts of climate change on loss of biological diversity

ii. Introduce remedial measures to overcome direct threats to endangered animals and plants including a mechanism to regulate and monitor the collection of flora and fauna.

iii. Initiate programmes to rehabilitate the degraded critical habitats, and implement strategies for promotion and strengthening of home gardens.

iv. Prepare long term plans to mitigate the elephant-human conflict.

v. Regulate/mitigate impact of invasive species and over-harvesting on native freshwater organisms.

vi. Establish and regulate a list of freshwater organisms that may be imported alive.

vii. Discourage through regulation, the harvesting of freshwater fish from the wild, and facilitate instead the culture in captivity.

viii. Integrate biodiversity concerns into Environmental Impact Assessments (EIA).

ix. Ensure management and control of invasive alien species. For this purpose, establish an Invasive Specie Specialist Group; prioritize invasive alien species including GM, terrestrial and aquatic species; prepare a national database on invasive alien species; and provide funding for research on methods to control the spread of prioritized invasive alien species

Lantana camara **- Invasive Alien Plant**

Killed Elephant

Sustainable Use and Benefit Sharing

7.1 Introduction

37. The issue of biodiversity utilization (whether sustainably or otherwise) has become increasingly contentious in view of the growing divergence between adherents of two forceful conservation paradigms: preservation and sustainable use. The growing population and consequent demand for natural resources has led however, to the need to ensure that such use is 'sustainable'— i.e. that resources are used today in a manner that assures their availability also to future generations.

Summary based on the task force report prepared by-

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Dr. Prithiviraj Fernando
Dr. Devaka Weerakoon.
Prof. Eric Wicramanayake
Mr. Kelum Manamendra_ arachchi

38. The Convention on Biological Diversity envisages a transition from protecting the elements of biodiversity (e.g. animals, plants, landscapes) for their own sake, to one of providing economic incentives, while ensuring that benefits are equitably shared. It is necessary therefore that the demands for utilization of biological resources be balanced against public concern for their sustainable use within a framework of ethical principles.

7.2 Gaps and Issues

39. Many complex issues with regard to the ownership of biological resources remain to be resolved in Sri Lanka. For example the ownership of biological resources not indigenous to Sri Lanka and biological resources associated with the human body (including parasites) etc., have not been dealt with here owing to a lack of knowledge and awareness of these issues amongst both scientists and policy-makers.

40. It is clear that harvesting of medicinal plants and other plant material for food and consumptive use from the wild is not regulated so as to assure sustainability. While the ornamental fish industry has introduced a large number of invasive alien species, the continuous wild collecting of fish may not be sustainable for target as well as for non-target species. It is also considered that since the near-shore and freshwater food fishery are not regulated, such harvesting may not be sustainable.

41. Over-dependence on firewood as an energy source is leading to deforestation, especially in montane areas, while the shortage of cultivated timber, and the slow pace of harvesting state forestry has led to a dearth of sawn wood and encouraged illegal logging.

42. Wild animals in captivity do not have an assurance of welfare and do not serve a conservation function, and there is no regulation and monitoring of wild animals legally in private ownership. It has also to be noted that turtle hatcheries are not regulated so as to ensure a conservation function, and unfortunately the present legal and regulatory framework does not encourage a research, education, awareness system that is necessary and beneficial to conservation. Finally there is the unregulated development of the tourism industry, which in environmentally sensitive areas may not be sustainable

7.3 Recommendations

43. In order to address the above concerns the following recommendations are presented:

i. Following on from the WB/GEF Medicinal Plant Conservation Project, and in association with the Ministry of Indigenous Medicine, develop a database depository and GIS on medicinal plants, their distributions and harvesting levels, and implement measures to cultivate ex

situ. Similar measures to be taken also in respect of aquatic ornamental and horticultural species.

ii. Assess viability of production from principal wild food plants— including kitul, goraka, siyambala, divul and madu— identifying distribution, socio-economic impact, harvest levels, and sustainability issues, and the need for regulatory measures.

iii. Establish and regulate a positive list of freshwater organisms that may be imported alive, so as to minimize the risk of further releases of potential invasive alien species.

iv. Discourage through regulation the harvesting of freshwater fish from the wild and facilitate instead the culture in captivity of as many species as possible, for trade and as an ex situ resource. License and establish quotas to collectors involved in the marine ornamental fishery.

v. Monitor and establish quotas for near-shore and offshore fish stocks through the respective fisheries. Assess the impact on freshwater ecosystems of alien species, and ensure that all releases, of exotic organisms into the wild are preceded by an EIA, which includes methods for eradicating a species that turns noxious.

vi. Plan and implement a mechanism to provide incentives, to establish community woodlots in close proximity to areas of high biodiversity to minimize extraction of firewood from such areas.

vii. Encourage the sustainable harvesting from state-owned plantation forests so as to maintain low cost sawn-wood, and thereby offer a disincentive to the illegal logging of natural forests.

viii. Amend legislation to make the Department of National Zoological Gardens the authority for regulation of ex-situ conservation of animals. Introduce legislation for welfare of all non-domestic animals in captivity, Introduce practical means of regularizing animals presently held illegally, addressing primarily the welfare of such animals. Facilitate centers of ex situ conservation of threatened species under a monitoring framework Facilitate the establishment of animal rescue and welfare centers. Legitimize pet keeping of species that may safely and sustainably be kept.

ix. Establish after regulatory reform, a register of elephants and other wild animals scheduled as threatened and held in captivity, including genetic fingerprints of each animal, and provide incentives for such elephants to be bred to develop a sustainable population within a regulatory framework for humane treatment.

x. Turtle hatcheries, currently illegal in terms of Fauna and Flora Protection Ordinance, should be regularized and monitored through appropriate facilitating legislation, while providing incentives in situ conservation.

xi. Recognizing that research, education and awareness require access to, and sustainable use of biodiversity, and biodiversity conservation in turn depends on these activities. Establish a legal framework that facilitates the accomplishment of objectives and sharing of information [Action: MENR]

xii. Monitor protected areas continuously to ensure that uses are sustainable, especially pollution and disturbance caused by vehicles and excessive visitors in fragile ecosystems.

xiii. Institute a regulatory regime for tourism development in pristine habitats, contain excessive visitors through differential entry fees.

Stilt Fishery

Cinnamon Peeling

Project Logo - National Biosafety Framework Development Project (2003-2005)

Biosafety

8.1 Introduction

Summary based on the task force report prepared by-

Prof. A. L. T. Perera
Prof. Ira Thabrew
Prof. I.A.U.N.Gunathilake
Dr. Anil Jayasekera
Dr. P.P.G.S.N.Siriwardena
Prof. Asoka Gunawardena.

44. Biosafety is a concept that refers to the need to protect human health and the environment from the possible adverse effects of the products of modern biotechnology (as defined in the Cartagena Protocol on Biosafety). Biosafety is one of the many issues addressed by the Convention on Biological Diversity (CBD).

45. The Convention very clearly recognizes the two important aspects of modern biotechnology, i.e. its advantages as well as the risks and concerns. Article 16 paragraph 1, and Article 19 paragraphs 1 and 2 provide for the access to and transfer of technologies including biotechnology, that are relevant to the conservation and sustainable use of biological diversity. On the other hand, Articles 8(g) and 19 paragraph 3 points to the development of appropriate procedures to enhance the safe use of biotechnology in reducing all potential threats to biological diversity and to human health. Article 8(g) deals with steps that Parties should adopt at national level, whilst Article 19 paragraph 3 seeks the development of an international legal instrument.

46. After many years of negotiations, the Working Group on Biosafety established by the Conference of Parties to the Convention, developed the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, which deals especially with the trans-boundary movement of GMO/FFPs. Sri Lanka has signed and ratified this Protocol.

47. Biotechnology has also been identified as a thrust area for future development by state institutions and universities, and priority areas for research have been formulated. Thus, there is an urgent need to establish biosafety measures not only for GMOs that may be produced locally in the future, but also for those that can come into the country from abroad.

48. The use of modern biotechnology has resulted in the production of transgenic plants, animals and microbes carrying various foreign genes in their genomes. Genes conferring resistance to herbicides and pests, and for abiotic stress as well as genes that enhance the nutritional value have been transferred to many plants including rice, soybean, corn and tomato. In addition, transgenic ornamental plants and tree crops have been produced. Transformed microbes include those used for conversion of waste and break down of pollutants, and for use in industries such as brewery, confectionary, detergent, leather, and pharmaceuticals. Modern biotechnology has also been used to produce transgenic animals including fish, sheep and cattle.

8.2 Gaps and Issues

49. Although many benefits of GMOs have been reported, many risks and concerns regarding their use have also been aired. These include the possibility of the products of new genes being toxic or allergenic, and the possibility of the transgene moving to other organisms through natural systems, and thus creating new undesirable organisms such as super weeds. There is also the chance of the product of a transgene, such as the Bt toxin affecting non-target organisms, and the likelihood of the antibiotic resistant marker gene getting transferred to human pathogenic microbes. Likewise the transgenic organisms can become invasive, and thus affect our biodiversity. On the other hand a few

organizations "owning" through patenting the myriad of genes available in the country can cause much concern, especially because ethical and moral issues such as "owning" life and the inclusion of animal genes in vegetables and other products are not under regulation or monitoring.

50. At present there is also a lack of scientific certainty of the potential adverse effects of GMOs on conservation and sustainable use of biological diversity, on the environment, and on human health. However, this should not prevent a country from taking appropriate steps/precautions with regards to the import of GMO/FFPs based on this precautionary principle.

51. Sri Lanka signed the Biosafety Protocol on 24 May 2000, and ratified it on 28 April 2004, which requires a signatory party to set up a national regulatory framework in accordance with the articles of the Protocol.

52. The Ministry of Environment and Natural Resources, which is the focal point for biosafety has already embarked on establishing the National Biosafety Framework for Sri Lanka (NBFSL). NBFSL is a system of legal, technical and administrative mechanism, set in place to address safety in the field of modern biotechnology. The main elements of the framework consist of the following:

i. A legally binding regulatory system to address safety issues in the field of modern biotechnology.
ii. An administrative structure to handle requests for permits for importation, or for field release of GMOs.
iii. A system for risk assessment and management based on the Advanced Informed Agreement.
iv. A mechanism for public participation in the decision-making process
v. A National Policy on Biosafety

8.3 Recommendations

53. The specific recommendations to address these issues are as follows:

i. Establish the National Biosafety Framework for Sri Lanka that includes the above elements, and provide the necessary resources for its implementation.
ii. Create a national database on biotechnology and biosafety, and a website on Biosafety. Provide resources to maintain the database, and link it up with other relevant regional and international databases, and the Biosafety Clearing House.
iii. Carry out regular awareness and training programmes on biosafety. Disseminate knowledge in the safe use, and probable hazards of modern biotechnology, while emphasizing biosafety and bioethical considerations.
iv. Identify laboratories for testing GMO/FFP, and provide resources to sustain such laboratories.
v. In the interim period until the national biosafety measures are in place, existing legislation should be enacted in order to regulate and manage GMOs.

CHAPTER 9

Biodiversity Valuation and Economics of Conservation

9.1 Introduction

54. Biodiversity is an economic resource as its consumption generates utility and is increasingly becoming scarce. Biodiversity valuation is an essential methodology in economics that facilitates economic analysis of biodiversity conservation. Specifically economics enables the identification of economic causes of biodiversity degradation (market and Policy failure); the introduction of economic incentives (removal of pervasive incentives) to conserve biodiversity (correction of market and policy failures): introduction of mechanisms to finance biodiversity conservation (appropriation of values and allocation to conservation); assessing whether economic and conservation investments are socially worthwhile: and communicating the need (value) to conserve.

Summary based on the Task Force Report prepared by-

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55. A study was conducted in 1996 to assess the potential of using economics in biodiversity conservation in Sri Lanka, by the Natural Resources and Environmental Economics Policy Project (NAREPP). The recommendations of this Project however, have not been implemented.

9.2 Gaps and Issues

56. The general deficiencies/ gaps of the BDFAP include the lack of specific emphasis on functional use of economics/valuation of biodiversity in biodiversity conservation. The functional uses are in communicating the values of biodiversity to decision makers both in the public and private sectors, identifying the economic causes of biodiversity loss and rectifying such through economic strategies, introducing mechanisms to generate finances to conserve biodiversity.

57. Compared to the CBD in which use of economics in biodiversity conservation has been used as a crosscutting discipline linked to most conservation areas and strategies, the BDFAP has not linked use of economics to the different themes of conservation within the BDFAP.

58. The BDFAP has also not provided an action plan specifying activities, and who should undertake such in what period. There has been no emphasis on generation of finances and allocation of finances for biodiversity conservation and sustainable use.

9.3 Recommendations

59. An Action Plan Matrix with the following main recommendations to be achieved within five years, mainly by the Ministry of Environment and Natural Resource Management has been drawn up.

i. Enhance national awareness on the use of economic valuation of biodiversity and their use in biodiversity conservation among the school children, decision makers, politicians and general public. School curriculums be formulated, support materials and textbooks to be published and introduced with appropriate teacher training programs and institutional arrangements to improve the knowledge of the subject among school children.

ii. Utilize media such as television and radio programs, workshops, seminars and newspaper articles effectively to raise awareness among the general public.

iii. Conduct annual EIA training programs introducing a module on environmental economics and extended benefit cost analysis to strengthen the Environmental Impact Analysis tools.

iv. Undertake M/Phil or PhD studies in Sri Lankan Universities and sponsor students (at least 2 students per year). Financial resources be allocated in national budget and also receive from various other projects such as GEF.

v. Develop and maintain environmental value database, undertake valuation studies and quantify the biodiversity contribution to GDP. Provide incentives and promote research on environmentally friendly technology, including waste / effluent treatment and adopting such technology in their industrial operations.

vi. Analyze government policies using environmental economic tools; undertake relevant studies on annual work programs, action plans etc and identify appropriate instruments (incentives/ charges etc.) for biodiversity conservation.

vii. Gradually strengthen the institutional capacity of data collection, revision of databases and project and policy appraisals (EIA etc.). Train officers on environmental economics tools in policy appraisals and assign to appropriate institutions. Resources need to be allocated from annual budgets and specific projects.

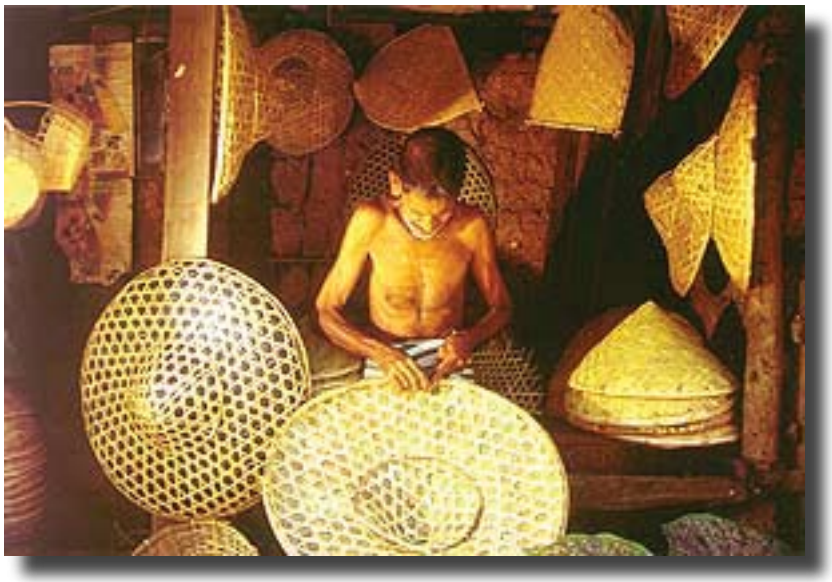
viii. Proactively prepare programs to receive appropriate finances (budgetary allocations, international financing and means of enhancing appropriation of biodiversity values) and recruit new staff trained in environmental economics and/ or public finances.

ix. Develop innovative financing mechanisms to generate sustainable self-financing for biodiversity conservation and benefit sharing mechanism for buffer zone communities. Test the applicability of those mechanisms in pilot project basis involving local communities.

x. Develop and implement bio-prospecting program with relevant institutions established and strong institutional support.

xi. Study and monitor the application of environmental economics in biodiversity conservation in cross – cutting areas regularly as guided by CBD by the Biodiversity secretariat.

xii. Present the addendum to the BDFAP in development and economic terms.



Basket Viewing

CHAPTER 10

Policies, Strategies and Action Planning

10.1 Introduction

Summary based on the task force report prepared by-

Prof. Sarath Kotagama

60. The existing gaps in policies on biodiversity conservation within the relevant sections or thematic areas should be identified in the first instance, and then based on this information, a comprehensive framework of action can be drawn up to fill the identified gaps. The purpose of this exercise is to finally emerge with a Biodiversity Conservation Action Plan that is comprehensive in its approach and applicable to all sectors that have a bearing (directly or indirectly), upon the status of biodiversity. The method used involved a careful individual perusal of all available policies, and the identification of the respective gaps.

61. A total of 32 policies, strategies and action plans produced or utilized in Sri Lanka are in existence reflecting the variety of currently available documents concerning conservation of biodiversity in Sri Lanka. In addition policy papers, regulations and many other documents produced by experts, regional and international agencies, as well as by other countries have been reviewed. On the basis of these studies policies and strategies that must be considered are presented in this Chapter.

10.2 Gaps and Issues

62. A significant shortcoming is the absence of an integrated policy approach. At the highest level there has to be an over-arching policy framework, which must be strengthened with a legal framework. The capacity of existing institutions for promotion of a holistic and integrated policy in biodiversity conservation has not been considered.

63. Strategies and policies are not in place to establish conditions needed for compatibility between present use and the conservation of biodiversity, and sustainable use of its components. It is also clear that the necessity for national policies on specific issues such as germplasm conservation, information management, ex situ conservation, biosafety, and access to genetic resources and benefit sharing have not received adequate attention. Further national policies do not provide for information on conservation and sustainable use of biological resources that could facilitate national planning and decision-making.

10.3. Recommendations

64. In order to address the above concerns the following recommendations have been made:

i. Ensure the formulation of a policy for ex-situ conservation.

ii. Formulate a National Policy on Access to Genetic Resources and Benefit Sharing.

iii. Formulate well-defined projects to implement policy on access to genetic resources.

iv. Strengthen the capacity to undertake policy analysis studies, and the introduction of economic incentives for biodiversity conservation.

v. Provide the mechanism to facilitate the integration of biodiversity indicators into policy monitoring, evaluation and predictive scenarios, to improve policy effectiveness in promoting conservation objectives.

vi. Formulate a clearly defined Biosafety Policy, and ensure the implementation of the National Biosafety Framework.

vii. Integrate as far as possible national policies, plans and programmes into the education system.

Pachlipta jophon **- Gray Ceylon Rose (Endangerd, Endemic)**

CHAPTER 11

Monitoring and Coordination

11.1 Introduction

Summary based on the task force report prepared by -

Dr. Nihal Attapattu.
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Ms. S. Nazeema
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65. Institutionalization of appropriate structures and the development of indicators for monitoring biodiversity components, and coordination of action plans must be an integral part of a national implementation strategy for biodiversity conservation. Monitoring comprises intermittent surveillance to ascertain the extent of compliance with a predetermined standard. It also implies an assessment of the degree of deviation from an expected norm. Coordination on the other hand comprises integration and linking mechanism of institutional and operational aspects of biodiversity conservation that ensure coherence in the implementation of the action plans.

66. Monitoring of biodiversity is carried out through the development and use of indicators covering all cross cutting issues of thematic areas. Thus the information developed in this review has been translated to provide both a basis for monitoring national commitments, and a reference for meeting international obligations. On the other hand the discussion and recommendations on coordination are inward looking, referring explicitly to the adequacy of local institutions to fulfill the roles and responsibilities arising from the national work program for biodiversity conservation.

11.2 Gaps and Issues

67. The BDFAP provided a broad framework for action and prioritized sets of activities to be undertaken in the conservation of biodiversity in Sri Lanka. It however, failed to provide guidelines for institutional accountability, financial and other resource allocation, and the timeline for the implementation of recognized activities. However, in the implementation plan, BDFAP has identified targets to be met during specific time intervals, and also provided a conceptual basis for coordination among the various implementing agencies. Nevertheless the need to assess and establish the baselines for monitoring, and the need to identify and develop relevant indicators has not been recognized.

68. There is a need to determine the range of monitoring activities to be carried out, and by whom and when. The information necessary should be collected for the development of indicators and fed back into management decision. In order to undertake such activities, training and capacity building would be necessary, and these should be identified and prioritized for implementation.

11.3 Recommendations

69. Based on the above discussion, the following recommendations are made:

i. Establish biodiversity monitoring indicators within a common, flexible and transparent framework, and periodically review indicators

ii. Integrate biodiversity indicators into planning and policy monitoring and evaluation

iii. Contribute and cooperate with other international initiatives related to developing biodiversity indicators, especially those under the Convention on Biological Diversity.

iv. Develop a monitoring system with information on EIA related to exploiting genetic resources, which should be made available to relevant national authorities.

Plant Genetic Resources Centre - Gannoruwa

Botanic Gardens - Peradeniya

CHAPTER 12

Institutional Aspects and Capacity Building

12.1 Introduction

Summary based on the task force report prepared by-

Mr. Mahen Watson
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Mr. Sarath Fernando
Mr. Leslie de.S Wijesinghe
Prof. C. M. Madduma Bandara
Mr. H.D. Rathnayake

70. Institutional analysis is considered a critical first step in the implementation of National Biodiversity Strategies and Action Plans (NBSAPs), to identify institutional impediments, requirements and capacity enhancement. In most biodiversity rich developing counties, resource constraints in institutions tend to be a major restraining factor in implementing biodiversity conservation actions. In order to circumvent such situations, the common remedy has been to establish new institutions, which by itself leads to further drain on scarce resources

71. It is now generally accepted that implementation of NBSAPs should be through strengths in existing institutions independent of any external funding, which often tends to favour a project – driven approach rather than a nationally committed plan of activities. Such an implementation framework will also facilitate the integration of NBSAPs into sectoral and cross-sectoral plans, programmes and policies.

12.2 Gaps and Issues

72. An over-arching coordination mechanism is a necessity for implementation of BDFAP recommendations, and the identification of mechanisms to facilitate this process as well as to integrate biodiversity into cross–sectoral plans and programmes must be recognized. There is also a need to identify institutional arrangements, key institutional needs and capacity building for implementation of recommended actions i.e. the actions in the BDFAP and new actions recommended through this Addendum.

73. Other important issues include the preparation of a Strategic Implementation Programme (SIP) and the formulation of a Strategic Coordinating and Monitoring mechanism through a high level task force. Finally a coordinated initiative must be taken to integrate biodiversity conservation concerns into sectoral, institutional and provincial programmes.

12.3 Recommendations

74. In order to address these concerns the following recommendations are made:

i. Enhance the capacity building of the present Biodiversity Secretariat to facilitate implementation of the recommendations of the BDFAP.

ii. Establish a separate unit within the Secretariat to deal effectively with the implementation of the BDFAP and preparation of a Strategic Implementation Programme.

iii. A Strategic Coordinating and Monitoring Mechanism for effective implementation of the SIP of the BDFAP should be set up within the Biodiversity Secretariat.

iv. The Biodiversity Secretariat should take direct responsibility for capacity building of NGOs to play an important role in biodiversity conservation; address as required the prevailing and emerging issues on access, biosafety, alien species etc. through participatory processes, and seek advocacy of international fora to help safeguard national interests; and Integrate biodiversity into other sectoral plans and programmes.

v. The Biodiversity Secretariat should urgently address eight key institutional requirements that have been identified for in-situ and ex-situ conservation. These include better coordination between the DWLC and FD for establishing an optimal protected area network of forests and updating of the biodiversity database; and conducting joint programmes for staff capacity enhancement and training in selected areas.

vi. The Biodiversity Secretariat should take the initiative to enhance institutional capacity for research at the Forest Department, and the Research Division at Head Office of DWLC, and take a strong advocacy role to establish a special unit within the CEA to take the lead role in wetland conservation with the collaboration of FD and DWLC, as well as to establish a unit within NARA to take lead role in regular monitoring, research and study of marine and freshwater biodiversity.

vii. The Biodiversity Secretariat should strengthen the coordinating and monitoring role of the CCD in managing coastal habitats/bio-resources; facilitate establishment of a special unit at the VRI for genetic characterization of the indigenous animal genetic resources on par with the PGRC, and to be responsible for conservation; and facilitate establishment of a central mechanism at the Ministries dealing with Agriculture and Livestock, to ensure conservation of agri-biodiversity. The Secretariat should also establish an experts committee to advise on ex-situ collections/ conservation/ captive breeding/ rearing and rehabilitation of illegally held captive animals in association with the National Zoological Gardens.

viii. To facilitate and ensure implementation of recommendations, the Biodiversity Secretariat should prepare a SIP and assign responsibilities and timeframes for action in respect of promoting biodiversity conservation holistically; promoting BDFAP actions in coastal and marine and agricultural systems by ensuring the integration of these recommendations into the work plans, work programmes and research plans of mandated ministries and departments; establish a task force on integration to integrate and facilitate biodiversity conservation concerns on sustainable use, benefit sharing and technology transfer into the private sector, NGO activities and community actions, and make these stakeholders as partners in biodiversity conservation; establish a task force to critically examine impacts of all new cross sectoral laws/ policies/ trade and access agreements, and major development efforts on biodiversity conservation to guide formulation of new policies; establish a task force to promote devolution of biodiversity conservation (either jointly, with integration or separately) at regional/ local levels to facilitate the process; facilitate training and awareness programmes jointly with the Task Force an Education, Awareness and Communication, to facilitate devolution of biodiversity conservation responsibility.

ix. As a special activity the Biodiversity Secretariat should establish a National Center for Traditional Wisdom where cultural aspects of biodiversity may form an essential part.

***Ceratophora stoddartii* - Rhinohorn lizard, (Endangerd, Endemic)**

CHAPTER 13

Legal Framework on Biodiversity

13.1 Introduction

Summary based on the task force report prepared by -

Mr Ravi Algama
Mr. Sanjiv de Silva

75. This Chapter seeks to support the conservation objectives highlighted, and actions recommended, by outlining changes necessary in the existing legal framework to facilitate these actions. It is further seen through experience that the existence of a legal framework will in itself not guarantee the achievement of conservation objectives, unless it recognizes the practical dimensions that define each conservation issue.

76. Whilst formal conservation legislation has been in operation in Sri Lanka since the late 19th Century, the conservation challenges are arguably more severe and numerous today. The reason for this may lie partly in external factors. A key lesson that should be recognized in future legal conservation frameworks is the inextricable link between ecosystems and people. A population density of over 300 people/km2, and the high exposure to global markets, has increased the competitive use of resources between people and other biodiversity functions to a critical scale.

77 Appropriate regulation and prohibition will need to be combined with rules that strive to promote more participatory approaches for the stewardship of our natural heritage to enable sustainable trade-offs between people's needs and aspirations, and the evolution of conservation objectives.

78. To achieve the objectives and targets of relevant policy documents of conservation and sustainable use of biodiversity, the recommendations related to cooperation and partnership building have been developed with a view to ensure how all stakeholders, including public, private and NGO sector representatives, civil society, academia and individuals can be encouraged and supported in becoming involved in species conservation.

79. Although there are over 10 –15 enactments directly or indirectly influencing biodiversity conservation out of over 100 enactments influencing environmental conservation, the current legal framework is often misunderstood and inadequate, whilst sometimes at cross purposes. When considered overall the key features to be resolved in the present laws include the following;

(a) Jurisdictional Overlaps and Uncertainties have resulted in multiple jurisdictions which often overlap the management of a natural system.

(b) Inability to Balance Conservation and Developmental Priorities primarily due to the emphasis on development the key feature of the regulatory regimes for conservation.

(c) Poor Governance resulting from political patronage and administrative inefficiencies serve to undermine the rule of law.

13.2 Gaps and Issues

80. Within the broader aspects discussed above lie specific gaps and issues in the current legal framework. Many of these have been identified in the other chapters of this Addendum, and which are also listed below.

i. Lack of an explicit requirement and procedure for assessing species conservation status

ii. Newly discovered species are not automatically protected

iii. Low and inconsistent penalties for illegal collection of protected species. Currently the penalties for the same offence vary from one taxonomic group to another for which no conservation/ecological rationale is obvious

iv. Absence of provisions to regulate the over-harvesting of wild species population for trade, and the failure to introduce remedial measures to overcome direct threats to endangered animals and plants including a mechanism to regulate and monitor the collection of flora and fauna.

v. Lack of provisions regulating the release of alien species into natural ecosystems.

vi. Lack of a link between legislative texts and their actual application in teaching environmental law and other subjects relevant to bio-diversity.

vii. Inadequately address the integration of biodiversity concerns into E1A process

viii. Lack of awareness and comprehension on appropriate legal regime of regulated access to genetic resources.

ix. Lack of legal provisions for conservation and sustainable use of the indigenous crop plant resources

x. Inadequate/weak legal instruments to assure sustainability and assess viability of production from principle wild food plants

xi. Weak legislation for animal

xii. Weak and inadequate regulatory regime over development activities in biologically sensitive areas.

13.3 Recommendations

81. The recommended amendments to the existing legal regime and other steps listed below have direct reference to the respective gaps and issues listed above:

i. Make Schedules in the Fauna and Flora Protection Ordinance negative lists as appropriate, and all such Schedules in the Ordinance should also indicate synonyms and changes in nomenclature in relation to scheduled species.

ii. Amend S.30 to S.31B of the Fauna and Flora Protection Ordinance to increase and harmonize the penalties for illegal collection or any other activity relating to protected species

iii. Develop rules and guidelines for starting and operating ex-situ conservation centers, including the acquisition of specimens for breeding and the re-introduction of captive-bred specimens

iv. Amendment of the EIA procedure to include a mandatory ongoing updating system in the EIAs and to increase the time allocated for data gathering and in the event that this is not feasible, develop a central Clearing House of biodiversity data for various areas of the country.

v. Amend S.30 of the Fisheries and Aquatic Resources Act to require an EIA prior to the release of any alien species into natural ecosystems,

vi. Ensure that existing protected area categories in the Fauna and Flora Protection Ordinance, Forest Ordinance, Fisheries and Aquatic Resources Act and National Environmental Act are wisely utilized and effectively enforced to provide the legal protection necessary to nationally recognized and listed bio-diversity rich habitats in coordinated and holistic manner

vii. Introduce a practical learning component into all university environmental law and other bio-diversity related subject courses

viii. Establish immediately an interim legal measure to regulate import of GMOs and products and draft new law to regulate and monitor the applications of modern biotechnology including all GMOs, LMOs and products.

ix. Develop legal instruments or/and amend existing legislation or/and make regulations to protect biodiversity related regional identities and sentimentalities, and traditional knowledge and practices

x. Strengthen the protection of crop and domesticated animal genetic resources and farmers rights through appropriate legislative mechanism.

55 Kgs of Poached meat, skins, antler and assorted implements confiscated by the DWLC

***Exacum sessile* - Endemic Wild Plant**

Blue Ropeendal Mutant being patented

Education, Awareness and Training

14. 1 Introduction

82. Efforts to conserve biological diversity cannot succeed without the understanding and support of the general public. Public education and awareness have appropriately been considered as integral to specific actions and activities carried out under the Convention. Conservation and sustainable use of biological diversity include social issues that require cultural understanding and sensitivity. The important role of non-government organizations in developing and disseminating information on biological diversity, especially in reaching out to marginalized groups who have a significant role in conservation and sustainable use of biodiversity, must be recognized.

Summary based on the task force report prepared by -

Dr. B. M. P. Singhakumara
Dr. (Mrs.) U.A. D. P. Gunawardena
Mr. R. S. J. P. Uduporuwa
Dr .H.S.Amarasekara

14.2 Gaps and Issues

83. Resources to initiate training and awareness programmes are inadequate, while at the same time there is a dearth of opportunities for income generation as well as for suitable employment opportunities in biodiversity related spheres for graduates. In fact the absence of institutionalized linking mechanisms between training centers (e.g. NIE, schools, universities) and biodiversity conservation agencies (CEA, Forests Department, botanical gardens, national and international agencies), is a major constraint. The importances of training curriculum developers, and the need for a regular revision of educational curricula in order to incorporate new concerns, have not been recognized. It is also unfortunate that no consideration has been given to adult education on issues related to biodiversity conservation.

84. Dearth of experienced senior teachers/trainers in teaching and absence of an interdisciplinary outlook in biodiversity education, as well as a lack of information on local biodiversity for teachers are also issue of major concern. It is also to be noted that while forest biodiversity is fairly well represented, the ramifications of biodiversity in other sub-sectors and situations is inadequately covered in the existing curricula. Consequently forest ecosystems attract greater attention than other ecosystems.

85. Absence of a forum or mechanism for students and teachers to prepare and present reports on projects related to biodiversity is a lacuna. There is also a concern about the absence of documented information on the work undertaken by many NGO's on environmental as well as on biodiversity related issues.

14.3 Recommendations

86. In order to address the above concerns the following recommendations are made:

i. Review curricula of the formal education system at all levels to ensure that all aspects of biodiversity are covered with special emphasis on taxonomy.

ii. Provide resources for publishing biodiversity related materials, and establish a mechanism for easy access.

iii. Organize specific training programmes for the private sector, academia, policy makers, NGOs, etc. with emphasis on field training using biodiversity manuals. Special arrangements must be made for training and awareness creation among the senior citizens of the country.

iv. Establish environmental clubs in schools to enhance knowledge on biodiversity.

v. Expand responsible media coverage of biodiversity and disseminate information through print and electronic media.

vi. Establish a mechanism to link educational institutes with biodiversity conservation agencies and departments.

vii. Sponsor through the CBD national focal points, projects on biodiversity, with reference to capacity-building and public awareness.

viii. Prepare manuals, brochures, booklets to support the capacity-building efforts and public awareness on biological diversity, and make them available in school libraries and bookshops.

ix. Promote biodiversity-related communication, education and public-awareness activities across multilateral environmental agreements and programmes.

x. Promote awareness programmes with special relevance to economics of biodiversity, as well as legal and ethical aspects.

Agro-Technology Park - Gannoruwa

Research, Development and Technology Transfer

15.1 Introduction

87. The themes of research, development and technology transfer are clearly elaborated in the Convention on Biological Diversity (CBD). The role of research in biodiversity conservation must be considered under different perspectives, keeping in mind the need to ultimately seek holistic solutions to conservation and sustainable use.

Summary based on the task force report prepared by -

Dr. Channa Bambaradeniya.
Prof. Felix Amerasinghe
Prof. Nimal Gunatilleke
Prof. Savithri Gunatilleke.
Prof. Jayanthi Edirisinghe.
Prof. Ravi Sangakkara.

88. Research is necessary to document the status of biodiversity at ecosystem, species and genetic levels. Its significance is dependent on research devoted to determining effective ways of conserving valuable biodiversity, and management of protected areas. Research must also be directed to find methods to restore biodiversity in degraded areas. It is clear that sustainable use of biodiversity has to be based on research on sustainable levels of extraction and harvesting, and in an equal measure research must evolve methods to reduce or mitigate impacts resulting from exploitation of biodiversity for commercial purposes, and for development activities. Finally, the research agenda must also address measures related to economics and value of biodiversity in all its implications.

15.2 Gaps and Issues

89. Absence of a comprehensive analysis on applied research priorities for documenting and understanding Sri Lanka's biodiversity, and the inadequate attention on research related to threats to biodiversity, and development of relevant technology to mitigate such threats, have been identified as issues of major concern.

90. The need for an appropriate institutional framework to coordinate applied and practical research work on biodiversity conservation, and to collate existing research data for purposes of access have not been recognized. On the other hand an inadequate focus on developing the human resource capacity and infrastructure to strengthen taxonomy as a subject of study and research, and the lack of a strategy to communicate or transfer research findings or technology into planning and policy, and also to share the knowledge with end users/practitioners are major shortcomings.

91. Finally the need for a mechanism to facilitate the development of regional and international co-operation in technical and scientific issues relating to biodiversity does not appear to have received adequate attention.

15.3 Recommendations

92. The following are the recommendations to address the above gaps and issues:

i. Upgrade the status and capacity of bio-depositories to facilitate research on taxonomy, and facilitate the use of modern technology in research, including the establishment of digital databases.

ii. Initiate a national level taxonomic revision of plants and animals through collaborative research with foreign institutions and experts.

iii. Promote interdisciplinary research that focus on plant-animal interactions.

iv. Promote research on invasive alien species, with particular focus on documenting their impacts and determine efficient methods for their management.

v. Initiate an Island-wide survey on biodiversity in managed landscapes, including home gardens, urban areas and agricultural systems, and determine methods to link natural landscapes, and also increase connectivity between protected areas and managed landscapes.

vi. Improve the capacity of relevant government agencies on environmental flow analysis to facilitate river basin development.

vii. Provide adequate incentives to promote research on environmentally friendly technology, including waste and effluent treatment, and adopting such technology in industry.

viii. Initiate research and monitoring programmes on impacts of climate change and natural hazards on biodiversity.

ix. Facilitate research on developing renewable energy sources and commercial based fuel wood plantations, and enhance energy efficiency in urban areas.

x. Provide incentives/subsidies for the private sector to invest on research that focus on sustainable extraction of species, and for out-growers to cultivate/breed ornamental plants and fish.

xi. Promote research and technological advances pertaining to ex-situ propagation/breeding of commercially valuable plants and animals.

xii. Initiate research on native fibre crops (eg. Jute), low-impact eco-tourism, value addition and quality control of species subjected to export, fish stocks and sustainable harvesting of inland and marine (near-shore and off-shore) fishery, and sociological research to document traditional knowledge.

xiii. Investigate alternative eco-friendly income generating cottage industries and agro-industries, and develop their transport and marketing systems.

xiv. Establish a separate unit at NSF to facilitate scientific and technical cooperation at regional and international levels to address issues relating to biodiversity.

Field Excursion

CHAPTER 16

Biodiversity Information Management

16.1 Introduction

93. The biological resources management needs cultural, economic and scientific information. In addition, being a party to global and regional treaties, biodiversity information is required to respond to specific and implied requirements of these treaties. It is therefore necessary to collect, generate and systematically organize complex biodiversity related data which transcends conventional sectoral divisions.

Summary based on the task force report prepared by -

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Dr.Ranjith Premalal De Silva.

94. Within Sri Lanka various groups with broad and varied interests possess biodiversity related information. A sizeable volume of biodiversity information has been collected by both governmental and non-governmental groups, although the existence of some information is largely unknown. Most of this information is stored in its raw form in institutional libraries that were once coordinated by the Sri Lanka Scientific and Technical Information Center at NSF. There are hardly any information managers in the country who have been trained in digital data analysis. The available data sets are unbalanced, reflecting more on ecosystems, and less on gene and species level information. The flow of information is also inadequate, mainly due to lack of confidence between the providers and users of information. A strategy is therefore necessary to establish an efficient data management system in Sri Lanka.

16.2 Gaps and Issues

95. BDFAP has identified many issues related to biodiversity information management, and recommended 13 actions for information management. However, except for 5 recommendations, which address information management issues, the other 8 are meant to generate information. BDFAP also does not identify the organizations that should take responsibility for these activities.

96. The lack of a clear policy on information management and the lack of a central agency to co-ordinate, direct and provide advice on the necessity and availability of biodiversity information are issues of major concern. In addition there is a general belief that such information is confidential, and hence not accessible. The absence of trained information managers, and facilities in the governmental institutions for information management activities tends to worsen this problem.

16.3 Recommendations

97. The following recommendations are made:

i. Establish a separate biodiversity information management section within the Biodiversity Secretariat under an officer trained in information management.
ii. Formulate a national policy for biodiversity information management.
iii. Form a national biodiversity information management group with representatives from each stakeholder institutions, and establish an information management network.
iv. Establish biodiversity information management web sites, clearing house mechanisms, directories, compendiums and databases.
v. Develop an information management system and a database for access to genetic resources and benefit sharing.
vi. Establish a biodiversity meta database

Cropwild Relatives Information Management website for Sri Lanka (http://www.agridept.gov.lk/CWR)

CHAPTER 17

Agricultural Biodiversity

17.1 Introduction

Summary based on the task force report prepared by -

Prof Nimal Perera
Mr. Sujith S. Ratnayake

98. Agricultural biodiversity primarily refers to the sustainable and productive use of genetic resource variability in crops and livestock, and their progenitors and wild relatives, for agricultural development. It has a wide coverage in terms of genetic resource utilization and provision of ecological services. Apart from crop and livestock genetic resources, its resource base extends to aquatic life, avi-fauna, insects, microbes and soil based microbiological species, as well as to wild species.

99. Although agro-biodiversity is linked to many of the themes presented in the preceding chapters, there are issues which are quite specific to agricultural biodiversity. These include the positive and negative impacts of agricultural practices on biological diversity in agro-ecosystems, and their interaction with other ecosystems; the conservation and sustainable use of genetic resources including crop wild relatives for their potential value in food and agriculture; and the fair and equitable sharing of benefits arising out of the utilization of such genetic resources.

17.2 Gaps and Issues

100. The Biodiversity Conservation Framework Action Plan (1998), has in general terms taken up issues of conservation of agro-biodiversity under objectives and recommendations in "Agricultural Systems", but has failed to make specific references to on-farm loss of genetic diversity and strategies for conservation. The specific policy issues and gaps in BDFAP for agriculture biodiversity conservation, and its utilization, are summarized below.

i. Absence of any references to policies and strategies for on-farm conservation of genetic diversity including indigenous crop and livestock, and lack of policy on effective sui generis and farmer's rights to recognize and reward farming communities for their knowledge and innovations.

ii. Inadequate stress on the need for a quarantine policy for the import and export of seeds and breeding material, and other biological materials.

iii. Limited research emphasis and incentives for conservation and sustainable use of native lesser known and underutilized crops, landraces and indigenous faunal species, pollinators and soil microorganisms as well as ethno-biological aspects of agricultural biodiversity (agro-ethno botany, medical-ethno botany).

iv. Absence of a focus on market support and price policy for products from indigenous crops and livestock to encourage conservation of native species.

v. Absence of a concern for informal seed supply of traditional varieties to support livelihood of farming communities. Present legal regime favours certification and quality control of modern varieties at the expense of native lesser known crops and local landraces.

vi. Absence of policy and advocacy to integrate traditional agro-biodiversity conservation methodologies into the formal education system, which is presently geared only towards modern methods.

vii. The importance of credit, crop insurance and other policy incentives for traditional on-farm conservation of agriculture, has not been highlighted.

viii. The need to promote diverse traditional culinary foods as a source for better nutrition, and as an incentive to conserve agro-biodiversity has not been emphasized or highlighted.

ix. The indiscriminate introduction of alien genetic material through artificial insemination (AI) and other modern approaches for livestock breeding leading to the erosion of indigenous genetic resources has not been adequately discussed.

x. The need for a specific reference to conservation agriculture in a National Land Use Policy has not been discussed or emphasized.

xi. Genetic erosion in indigenous biota and the risk of extinction is a matter of grave concern, while the narrow range of selected varieties and strains in the National Crop Breeding/ Hybridization Programmes leading to a reductive erosion of genetic diversity

xii. Great risk of extinction of indigenous crop wild relatives due to habitat fragmentation and over exploitation of indigenous wild terrestrial and aquatic species.

xiii. Development of resistance to chemical pesticides by pests and pathogens; and elimination of natural enemies due to indiscriminate use of chemicals.

xiv. Climate change and increased ambient temperature and CO2 concentration in the atmosphere causing unprecedented changes in weather patterns, and the possible induction of physico-chemical disabilities in plant and animal physiology, affecting the food production process and the environment.

xv. Introduction of synthetic or hybrid varieties, and their domination over indigenous varieties.

xvi. Introduction of alien species which become invasive, and displace indigenous varieties / species and contribute to decline of pollinator population.

xvii. Promotion of monoculture agricultural production systems, which narrow species diversity, and threaten the traditional systems of sustainable mixed agricultural cropping.

xviii. Perverse incentives and low farm gate prices for indigenous varieties, which discourage commercial scale production.

xix. Diminishing trend in the use of traditional wisdom in agricultural production, and the depletion of systems such as home gardens, forest gardens, shifting cultivation, kitchen gardens, etc.

xx. Induced consumerism through promotion of processed and artificial food products.

xxi. Introduction and promotion of genetically modified food products, whose long-term effects are not known.

17.3 Recommendations

101. In order to address these issues the following recommendations were made:

i. Recognize the existence of agricultural biodiversity and its importance in conservation, and ensure integration of these in national policies, plans and action programs.

ii. Formulate, adopt and enforce appropriate regulatory and other related legal measures to conserve agricultural biodiversity, ensure rights of holders of traditional knowledge, and facilitate access, sustainable use and equitable sharing of benefits in agricultural production systems.

iii. Develop institutional and legislative mechanisms to support conservation of agricultural genetic biodiversity under in-situ and ex-situ conditions through the establishment of field gene banks and cryo-preservation centers.

iv. Conserve, document and ensure the sustainable use of crop wild relatives, traditional agricultural knowledge, and propagate the tenets of conservation through the education system and agro-eco-tourism.

v. Identify and remove any obstacles that hinder or limit genetic conservation of agro-biodiversity, and provide suitable incentives to promote traditional agriculture through facilitating markets and value added products.

vi. Establish a mechanism for capacity building, participation and empowerment of farmers through policy, advice, legislative measures and strengthening of farmer's societies for conservation and utilization of such genetic resources.

vii. Promote research on traditional agro biodiversity systems, and establish a public information dissemination system. Popularize R & D findings on the significance of conserving agricultural biodiversity, and enhance the scientific understanding of such conservation efforts.

viii. Encourage partnerships (stakeholdership) of the private sector with rural community, to promote and sustain the traditional agro biodiversity for mutual benefits

ix. Establish the Farmers' Rights for fair trading of traditional agricultural products, and ensure sustenance of the traditional technology through mutual benefit shearing.

x. Promote and popularize traditional foods, food products and methods of preparation, and facilitate traditional food habits using formal and informal awareness programmes.

xi. Promote agriculture biodiversity with user-friendly technologies, by integrated management (soil, water, plant nutrient pest and gene) and farming (agro forestry, mixed aquaculture/ agriculture, agro-silvi-pastoral and home garden) systems, and introduce policy changes to support such interventions.

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Piper sylvestre **- Wild Pepper**

© Leel Randeni

Traditional Rice Variety

© Nimal Perera

Vos gaurus **- Gavara**

© Nimal Perera

Vos indicus **- Tamankaduwa White Cattle**

Voluta (Lyria) cloveriana Weaver **- Clover's Lyria (Rare)**

Activity Plan

102. The compilation of recommendations made by the 16 Task Force Teams led to the listing of 102 recommendations. Some of these were of a general nature, while others were specific. The thematic areas considered for this Addendum were not only cross-cutting on a discipline basis, but were also largely inter-sectoral in functions. Hence it was inevitable that a significant number of recommendations should be partly or fully repetitive. In order to resolve these issues, and screen or re-formulate over-lapping recommendations, a workshop was organized by the Biodiversity Secretariat on 4th March 2005. At this workshop many of the over-lapping recommendations were screened, and a priority list of 45 recommendations were selected. Subsequently these recommendations were reviewed, and 31 out of the 45 were identified as falling into a high priority category. In the following sections the high priority recommendations and the remaining recommendations are presented in two separate lists.

The List of High Priority Recommendations Based on Chapter Recommendatons

Recommendations	Responsible Institutions*	Time frame		
		1st 3yr	2nd 3yr	3rd 3yr
• Identify critically important BD hotspots and linkages outside PA network and bring them under protection	DWLC, FD, CCD, Fish.D DOA	*	*	
• Prepare and implement recovery plans for threatened species	DWLC, FD, DOA, MPBZG, DAPH,	*	*	*
• Establish more ex-situ conservation facilities such as botanical gardens and Zoological gardens and rescue and rehabilitation centres in suitable areas under relevant state institution	MAIMD, MPBZG DBG, DZG, DOA, DAPH	*	*	*
• Develop a database and register of all local and foreign institutions and their collections dealing with ex-situ conservation	DOA, DZG, DBG, DAPH, DWLC, FD	*	*	
• Develop a national policy, regulations, procedure, guidelines (MTA, PIC, Sui generis system), Benefit sharing mechanisms etc for access to genetic resources	MEn, DOA IPR, DAPH	*	*	*
• Develop and implement consultative process, including public consultation on access regulatory mechanisms for access to genetic resources	MEn, DOA, DAPH	*	*	*
• Regional identities and sentimentalities be harnessed to biodiversity conservation and living in harmony with nature	MEn, MCNH, PCs, DNM.	*	*	

Recommendations	Responsible Institutions*	Time frame 1st 3yr	2nd 3yr	3rd 3yr
• Establish a national register of Traditional Knowledge including agricultural Biodiversity (Adopt Defensive Documentation)	MEn, MCNH, DOA, DNM, DAPH	*	*	*
• Legal protection to be provided to custodians of traditional knowledge	MEn, MCNH, DNM		*	
• Establish an Invasive Species Specialist Group	BDS, MEn, DAPH, DOA	*		
• Prioritise invasive alien species including GMOs, terrestrial and aquatic species	ISSG, DOA	*		
• Prepare a National database on Invasive Alien species	BDS, MEn, ISSG, DOA	*		
• Provide funding for research on methods to control the spread of prioritised invasive alien species	BDS, MEn DOA	*	*	*
• Establish a task force to critically examine the impacts of all new cross-sectoral laws/policies/trade and access agreements and major developmental efforts on biodiversity conservation	BDS, MEn, DAPH, DOA	*		
• Formulate new policies to address conservation outside forests, integrating in-situ biodiversity concerns into land policy and wetland policy, and to bring in legislation for wetland conservation	MEn	*	*	
• The Minister of Environment and Natural Resources to appoint a National Biodiversity Information Management Committee to implement the computerized networking and establishment of a meta-database on the following: - Protected Areas and forest management data - Medicinal plants and crop wild relatives - Threatened animal species - Herbarium and museum inventories relevant to biodiversity - Invasive species - Traditional knowledge relevant to biodiversity conservation and sustainable use	MEn, MFP, DNP	*		

Recommendations	Responsible Institutions*	Time frame 1st 3yr	2nd 3yr	3rd 3yr
• Cabinet to appoint a National Biodiversity Valuation Committee to formulate policies and procedures for the purpose of assessing economic benefits from biodiversity (giving due consideration to ethical and cultural values), proposing also a framework of tariffs and incentives designed to strengthen biodiversity conservation and assure the equitable sharing of benefits: - Aquatic resources - Genetic resources - Carbon and emissions trading - Atmospheric emissions	MFP. MEn, Univ., DOA, MST	*		
• The Ministry of Environment and Natural Resources to appoint a Expert Working Group to harmonize existing and proposed sectoral policies relevant to biodiversity conservation, including: - In and ex situ conservation - Access to genetic resources, traditional knowledge and benefit sharing - Information management - Wetlands,	MEn, FD, DWLC. MPBZG, NARA, PGRC, BDS, CEA, Univ. DAPH	*		
• The human resources, technical capacity and infrastructure of the Biodiversity Secretariat of the Ministry of Environment and Natural Resources should be strengthened, so as to provide capacity to coordinate and monitor a comprehensive set of biodiversity indicators and programmes, including the following: - Threatened species - Impact of climate change - Integrity of critical conservation areas - Environmental pollution - Invasive species	MEn, BDS	*		

Recommendations	Responsible Institutions*	Time frame 1st 3yr	2nd 3yr	3rd 3yr
• Cabinet to direct the Legal Draughtsman, in consultation with the Ministry of Environment and Natural Resources and other relevant Ministries and through a legal task force to identify the requirement of new legislation if any, and review the existing biodiversity related legislation with holistic approach for conservation and sustainable use of biodiversity and draft necessary bills and/or effect the necessary amendments.	MEn together with line Ministries	*		
• Implement the National Biosafety Framework	BDS, MEn	*		
• Establish interim measures for biosafety until regulations and resources are in place	BDS, MEn	*		
• Identify and improve laboratories for testing GMOs - Food Feed & Procescsed Products	BDS, MEn together with line Ministries, DOA	*	*	*
• Ensure biodiversity valuation and use in national income accounts and project evaluation	MFP, DNP, MEn	*		
• Ensure innovative and sustained financing mechanisms for biodiversity conservation.	MFP, DNP, MEn	*	*	
• Establish a strategic coordinating mechanism within Biodiversity Secretariat for implementation of BCAP (coordination should include integrating biodiversity into sectoral plans and programmes)	MEn, MFP	*		
• Strengthening systematic & institutional capacity to implement BDFAP actions at policy & middle institutional level.	MEn	*		
• Establish a coordinating body incorporating (NGO's) universities & NIE for human resource development (formal & informal sectors) in relation to all biodiversity related aspects.	MEn, NIE	*	*	
• Establishing a special coordinating body under BDS to promote research on biodiversity related issues to ensure that all intra- and inter-disciplinary aspects are addressed	MEn, BDS	*	*	*

Recommendations	Responsible Institutions*	Time frame 1st 3yr	2nd 3yr	3rd 3yr
• Propagate the tenets of conservation agriculture through the education and agro-eco-tourism.	MEn, MAIMD, Univ., DOA, DAPH, SLTA	*		
• Formulate, adopt and implement appropriate legislative, regulatory and other related legal measures in order to conserve agricultural biodiversity and facilitate the Access, Sustainable Use and Equitable Sharing of Benefits of it.	FD, DWLC, DOA, DAPH, MEn	*		

**** Institutions as of November 2007***

Other Priority Recommendations

- Ensure information collection and reviewing (Workshops & surveys):
  - International conventions and arrangements
  - Exploitation of genetic resources
- Develop a National Policy for access to genetic resources.
- Establishment of a centre for traditional wisdom of biodiversity.
- Encourage the infusion of biodiversity knowledge into education, culture and technology
- Initiate research on; native fibre crops (eg, Jute), low-impact eco-tourism, value addition and quality control of species subjected to export, fish stocks and sustainable harvesting of inland and marine (near-shore and off-shore) fishery and sociological research to document traditional knowledge.
- Conserve, document and ensure the sustainable use of traditional knowledge systems.
- Develop a monitoring system, including information on EIA, related to exploiting genetic resources
- Develop and implement long-term plans to mitigate elephant-human conflicts
- Establish, Maintain and regularly update the National Database on Biosafety and link up with the relevant regional and international databases and biosafety-clearing house.
- Develop a benefit sharing mechanism for buffer zone communities.
- Implement legislative mechanism and institutional developments to conserve agricultural genetic biodiversity under in-situ and ex situ conditions (crops, farm animals & other wild relatives) through the establishment of field gene banks and cryo-preservation centres.
- Identify and rectify any obstacles that hinder or limit the conservation efforts of agricultural biodiversity by providing incentives and other policy and legal measures to promote and conserve traditional varieties / breeds (of agro biodiversity) and crop /animal wild relatives through facilitating markets and value added products.
- Establish a mechanism for capacity building, participation and empowerment of farmers through policy, advice and legislative measures for utilization of such genetic resources
- Establish a public information dissemination system and popularise through awareness raising programmes of R & D findings on the significance of conserving agricultural biodiversity

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Cyathea sinuata **- True Fern (Endemic, Threatened)**

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Huperzia phyllantha **- Fern Allie (Rare, Threatened)**

Second National Experts Committee on Biodiversity

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Dr Siril Wijesundara

Glossary of Terms

"Alien Species" (Non-native, non-indigenous, foreign, exotic) is a species, subspecies, or lower taxon occurring outside of its natural range and dispersal potential (i.e. outside the range it occupies naturally or could not occupy or could not occupy without direct or indirect introduction or care by humans) and includes any part, gametes or propagule of such species that might survive and subsequently reproduce.

"Biodiversity" is commonly used as to mean ***"Biological Diversity"*** as defined in the article 2 of the Convention on Biological Diversity and the sustainable use of its resources (Biological and genetic).

"Biological Diversity" as defined in the article 2 of the Convention, means the variability among living organisms from all sources including, *inter-alia* terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

"Biological resources" includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use of value for humanity.

"Biotechnology" means any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use.

"Biopiracy" refers to the appropriation of biological resources without the prior informed consent of the local people and/or of the competent authority of the respective state, for access and benefit sharing, without any agreed terms. With the implementation of national and international laws governing access to genetic resources and the development of *sui generis* Intellectual Property laws for indigenous and local knowledge, biopiracy therefore is becoming identified easily in legal terms. [An interpretation given by The Crucible II Group in "Seeding Solutions" Vol. I (2000)].

"Bioregion" A territory defined by a combination of biological, social and geographic criteria, rather than geopolitical considerations; generally, a system of related, interconnected ecosystems.

"Biosafety" According to the Catagena Protocol on Biosafety, it is a concept that refers to the need to protect biodiversity, human health and the environment from the possible adverse effects of the products of modern biotechnology.

"Cryopreservation" A method of preserving living tissue by freeze-drying.

"Domesticated or Cultivated Species means species in which the evolutionary process has been influenced by humans to meet their needs.

"Endemic" Restricted to a specified region or locality.

"Ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

"Ex-situ conservation" means the conservation of components of biological diversity outside their natural habitats.

"Ethnobotany" The study of the relationships between people and plants in the broadest sense. It requires a multidisciplinary approach, incorporating anthropology and ethnology, botany, linguistic and in some cases economics pharmacology, medicine and agronomy.

"Gene bank" A facility established for the ex-situ conservation of individuals (seeds), tissues, or reproductive cells of plants or animals.

"Genetic material" means any material of plant, animal, microbial or other origin containing functional units of heredity.

"Genetic resources" means genetic material of actual or potential value.

"Germplasm" The protoplasm of germcells containing the units of hereditary, the chromosomes and genes.

"Habitat" means the place or type of site where an organism or population naturally occurs.

In- situ conservation" means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties.

"Living Modified Organism (LMO) (LMO) means any living organism that possesses a novel combination of genetic material obtained through the use of modern biotechnology.

"Meta-data" Data about data. A second level of information about other data sources. Thus, a dictionary of all those who hold datasets on different aspects of biodiversity would be called a meta-database.

"Mutually Agreed Terms" The access to genetic resources where granted shall be on mutually agreed terms and subjected to the provisions of the CBD. Each contracting party(suppliers and recipients) shall take legislative, administrative or policy measures in terms of type and quantity of genetic resources, limitations on use, recognition of sovereign rights of the country of origin, capacity building in identified areas, benefit sharing, transferring to the third party etc.

"Material Transfer Agreement" is a system of legal, technical and administrative mechanisms set in place to address safety in the field of modern biotechnology.

"Prior Informed Consent" The access to genetic resources shall be subject to prior informed consent(PIC) of the contracting party providing such resources, unless otherwise determined by that party, according to the CBD. The phrase PIC is not defined. Generally it refers to obtaining the consent of the Government or relevant stakeholder or authority providing genetic resources. "Prior" implies that such consent should be obtained before the initiation of access procedure.

"Protected area" means a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.

"Sui generis" means "of its own kind". However, it can mean different things to different people. The Agreement on Trade Related Aspects of Intellectual Property Rights(TRIPS) does not give a specific definition to it. In respect of indigenous communities it signifies a new system of legal rights encompassing concepts such traditional rights, and the right to self determination.

"Sustainable use" as for biodiversity means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations.

"The Cartagen Protocol on Biosafety" is an international regulatory framework to ensure an adequate level of protection in the fields of safe transfer, handling and use of LMO resulting from modern biotechnology that may have adverse effects on conservation and sustainable use of biological diversity, taking into account risks to human health, and specifically focusing on transboundary movements. It is an enabling environment for the environmentally sound application of biotechnology, where countries can harness the immense potential of this powerful tool whilst making sure that possible risks to biodiversity, environment and to human health are minimized.

"The Precautionary Principle" At present the potential adverse effects of genetically modified material are not known with certainty possibly due to insufficient relevant information and knowledge. This shall not prevent a country from taking appropriate steps/ precautions with regard to imports of such material, in order to avoid or minimize such potential adverse effects.

Bibliography (Selected)

1. Arudpragasam, K.D. (2003). *Coastal and Marine Resources: Natural Resources of Sri Lanka. 2000,* National Science Foundation, Colombo, pp 167-193.
2. Bandaratilleke, H.M. (2000). *Man and the Biosphere Reserves and the Developing Scenario on Protected Areas under the Forest Department. Proceedings Workshop on Biosphere Reserves,* Colombo (Unpublished).
3. Carew-Reid, J. (2002). Analysis of Lessons. In *"Biodiversity Planning in Asia"* (Ed. Jeremy Carew-Reid), IUCN, Sri Lanka.
4. Central Bank (2001). *Annual Report for 2000,* Central Bank of Sri Lanka, Colombo.
5. Dela, J.D.S. (2003). *Periodic Review of the Sinharaja Biosphere Reserve by the National MAB Committee for UNESCO,* National Science Foundation, Colombo (Unpublished).
6. Dela, J.D.S. (2003). *Tracking Schedule for Institutional Analysis for Biodiversity,* Conservation. Coast Conservation Department, Colombo (Unpublished).
7. Deraniyagale, P.E.P. (1963). Some Mammals of the Extinct Ratnapura Fauna of Ceylon(Part II), *Spolia Zeylanica,* Vol.24, 161-171.
8. Emerton, Lucy. (2001). *The Use of Economic Measures in National Biodiversity Strategies and Action Plans: A Review of Experiences, Lessons Learned and Ways Forward,* IUCN, Sri Lanka.
9. Gaines,W.L., Harrod,R.J. and Lehmkuhl, J.F. (1999). *Monitoring Biodiversity: Quantification and Interpretation.* USDA, Forest Service
10. Greller, A.M. and Balasubramaniam, S. (1980). A Preliminary Floristic – Climate Classification of the Forests of Sri Lanka. *The Sri Lanka Forester,* 14 (3/4), 163-169.
11. IUCN/WMC/FAO (1997a). *Designing an Optimum Protected Area System for Sri Lanka's Natural Forests (I),* IUCN Sri Lanka (Unpublished).
12. IUCN/WMC/FAO (1997b). *Designing an Optimum Protected Area System for Sri Lanka's Natural Forests (II),* IUCN Sri Lanka (Unpublished).
13. Kotagama, H.B. (2002). Financing Environmental Conservation: A Case Study in Sri Lanka, *Sri Lanka Journal of Agricultural Economics 2002.*
14. Kotagama, H.B. (2003). *Text Book on Environmental Economics,* (In Sinhala). In Collaboration with H.M. Gunatilake. Published by Environmental Economics Policy Support Project for South East Asia, IDRC.
15. *Mahawamsa* (1958). Pali Text Society (Ed. W. Geiger), London.
16. Ministry of Agriculture, Lands and Forestry (1995). *Sri Lanka Forestry Sector Master Plan,* Ministry of Agriculture, Lands and Forestry, Colombo.
17. Ministry of Environment and Natural Resources (2002). *State of the Environment-2002:* A National Report Prepared for the South Asian Association for Regional Cooperation, Colombo.
18 MTE&WA (1996). *An Investment Proposal for Conservation and Sustainable Use of Medicinal Plants of Sri Lanka,* IUCN Sri Lanka.
19. Pethiyagoda, R. (1991). *Fresh Water Fishes of Sri Lanka.* Wildlife Heritage Trust of Sri Lanka, pp 362.
20. Ranasinghe, J. (1986). *Lakdiva Eth Veda Potha* (In Sinhala), In "Ayurveda Shameeksha" (Ed. L. Ramanayake and A. Ponnamperuma), Vol. I (PartII), pp 103-109.
21. Sanjeeva, S. (2003). *Gap Analysis of Biodiversity Conservation in Sri Lanka: A Framework for Action.* Report Prepared for the Ministry of Environment and Natural Resources, Colombo.

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