Fax to: Ricardo Ramirez
From: Roslin Broadfield

THE WORLD BANK/IFC/M.I.G.A.

OFFICE MEMORANDUM

DATE: October 6, 1997

TO: Mohamed T. El-Ashry, Chairman and Chief Executive Officer, GEF

FROM: Lars Vidaeus, Executive Coordinator, GEF Operations

EXTENSION: 3-4188

SUBJECT: **Sri Lanka Medicinal Plants Project: Council Clearance and CEO Endorsement**

1. Attached please find two copies of the final project document for this operation for the Secretariat's clearance to circulate to the Council and seek your endorsement.

2. The comments of Council members have been addressed as follows: Cultivation of medicinal plants - the project includes a farm extension and demonstration program for species that research has shown are suitable for farming and also supports research on the potential for ex-situ propagation of plants currently found only in the wild (see Project Component summary, Project Design Summary and Detailed Description). Avoidance of adverse effects on other plants and animals - the in-situ conservation component follows an ecosystem and habitat-based approach to achieve this objective. The monitoring and evaluation system will check that this is working. Economic analysis and justification - as explained in paragraph 40, the data required for a detailed economic analysis of the project and/or medicinal plants are not available. As this paragraph states: (a) a systems analysis of the medicinal plant conservation areas will be undertaken; (b) the project will gather and analyze the information needed to fully understand the socio-economics of medicinal plants in Sri Lanka; and (c) its conservation costs are not unreasonable. Processing improvements - will be obtained at the community level (Annex 2, para 52) and through the establishment of traditional medicine centers (Annex 2, para 53-4).

3. In addition to raising the economic analysis issue, the Secretariat also requested that the final document: (1) explain the project's linkages to related parallel financed and UNDP activities, which is done in paragraphs 2, 3 and 4; and (2) provide details of the medicinal plant species present in the conservation areas, which are summarized in Annex 16.

4. Believing that we have addressed all the major issues that were raised on this project, I hope we can shortly send the 75 copies required for dispatch to the Council.

cc. Messrs/Mmes. Duda and Mishra (GEFSEC); Ali, Khouri, Jansen, Omar-Chowdhury (Asia Region); Broadfield, MacKinnon, Suter, Nikolov (ENVGC).

SRI LANKA

CONSERVATION AND SUSTAINABLE USE OF MEDICINAL PLANTS PROJECT

PROJECT APPRAISAL DOCUMENT

October 3, 1997

Rural Development Unit
South Asia Region

Currency Equivalents
(January 31, 1997)

Currency unit-Sri Lankan Rupee (SLR)
US$ 1.00 = SLR 57.19
SLR 1 million = US$ 17, 486

Fiscal Year
January 1 to December 31

Weights and Measures
Metric Unit System

Metric Unit	=	British/US Equivalent
1 centimeter	=	0.39 inch
1 meter	=	39.37 inches
1 kilometer	=	0.62 mile
1 hectare (ha)	=	2.47 acres
1 square (km^2)	=	0.386 square mile
1 cubic meter (m^3)	=	35.31 cubic meter
1 liter (l)	=	0.264 gallons
1 kilogram (kg)	=	2.205 pounds
1 metric ton (m ton)	=	2,205 pounds

Abbreviations and Acronyms

ADB	=	Asian Development Bank
BAP	=	Biodiversity Action Plan
BMARI	=	Bandranaike Memorial Ayurvedic Research Institute
CAS	=	Country Assistance Strategy
CBO	=	Community Based Organization
CISIR	=	Ceylon Institute for Scientific and Industrial Research
GEF	=	Global Environment Facility
GOSL	=	Government of Sri Lanka
LOI	=	Letter of Invitation
MFE	=	Ministry of Forestry and Environment
MIM	=	Ministry of Health and Indigenous Medicine
MoU	=	Memorandum of Understanding
CAMC	=	Conservation Area Management Committee
NEAP	=	National Environmental Action Plan
NGO	=	Non-governmental Organization
NTFP	=	Non timber forest products
PA	=	Protected Area
PD	=	Project Director
PMU	=	Project Management Unit
PPMC	=	Provincial Project Management Committee
SNR	=	Strict Nature Reserve
STAP	=	Scientific and Technical Advisory Panel
UNDP	=	United Nations Development Program
VPMC	=	Village Project Management Committee
WHO	=	World Health Organization

SRI LANKA

CONSERVATION AND SUSTAINABLE USE OF MEDICINAL PLANTS PROJECT

Project Appraisal Document

Table of Contents

LIST OF ANNEXES

Note: Annexes marked with an asterisk (*) are included in the Project File and are available on request.

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

South Asia
Country Department 1

Project Appraisal Document

Sri Lanka
Conservation and Sustainable Use of Medicinal Plants Project

Date: August 18, 1997 [x] Draft [ ] Final
Task Manager: Nadim Khouri/Malcolm Jansen Country Manager: Roberto Bentjerodt
Project ID: LK-GE-35828 Sector: Environment
Lending Instrument: PTI: [x] Yes [ ] No

Project Financing Data [ ] **Loan** [ ] **Credit** [ ] **Guarantee** [x] **Other (GEF grant)**

For Loans/Credits/Others:

Amount (US$m): 4.57
Proposed Terms: [ ] Multicurrency [ ] Single currency
Grace period (years): [ ] Standard Variable [ ] Fixed [ ] LIBOR-based
Years to maturity:
Commitment fee: % Not applicable
Service charge: %

Financing plan (US$m):

Source	Local	Foreign	Total
Government	0.41	0.09	0.50
Cofinanciers			
IBRD/IDA			
GEF	3.22	1.35	4.57
Other (specify)			
Other (specify)			
Borrower:			
Guarantor:			
Responsible agency(ies):			

Estimated disbursements (Bank FY/US$M):	1998	1999	2000	2001	2002	2003
Annual	0.43	0.96	0.99	0.90	0.87	0.42
Cumulative	0.43	1.40	2.38	3.28	4.15	4.57

For Guarantees: Not applicable [ ] Partial Credit [ ] Partial risk

Proposed coverage:
Project sponsor:
Nature of underlying financing:
Terms of financing:
Principal amount (US$)
Final maturity
Amortization profile
Financing available without guarantee?: [ ] Yes [ ] No
If yes, estimated cost or maturity:
Estimated financing cost or maturity with guarantee:

Expected effectiveness date: January 1, 1998 Closing date: December 31, 2002

Block 1: Project Description

A. Project Development Objectives (see Annex 1 for key performance indicators):

1. The objective of this project is to conserve globally and nationally significant medicinal plants, their habitats, species and genomes and promote their sustainable use. For its size Sri Lanka supports high levels of biodiversity, and especially high levels of endemic species. Sri Lanka (especially the southwest) is one of the 18 global hot spots for endemic species and more than one-seventh of Sri Lanka's native plants are unique to the island. In spite of a high population pressure and high demand for land, Sri Lanka has allocated 12% of its land area and a $20.72 million program for a protected area system which contributes to conservation of the island's biological resources. This project will contribute further to conservation and sustainable use of biodiversity, including many endemic plants, by encouraging sustainable use of plant resources in the broader landscape. Medicinal plants provide a vital contribution to health services throughout South Asia and are especially important to the rural poor. Many medicinal plants, especially those which are rare or limited in range, are threatened by overharvesting. By addressing issues such as sustainable methods and levels of harvesting and ex situ propagation and cultivation of medicinal plants this project contributes to sustainable use of biodiversity, sustainable development, poverty alleviation and rural health. Its lessons and benefits are applicable throughout Sri Lanka and elsewhere in South Asia where there is a high dependence on Ayurvedic[1] medicine.

The project's linkages with other efforts in the sector:

2. The project is an advancement on other activities in the sector financed by Government of Sri Lanka (GOSL) and donors. GOSL's activities have been aimed at establishment and maintenance of a protected areas system which serves to protect threatened populations of medicinal plants in the wild. Protected areas fall under the management of the Forest Department which spends approximately $ 25, 800 (SL Rs 1.4 million) on the maintenance and enforcement of protected area status, forest research and education and extension services related to medicinal plants. The Wildlife Department performs a similar function through the maintenance of national parks. Its mandate also includes the protection of plant species and carrying out research to ascertain the status of rare populations. The contribution of the Wildlife Department as a cofinancier of parallel activities in the sector amounts to approximately $ 24,000 (SL Rs 1.3 million). Some targeted research on medicinal plants is undertaken currently by the Ceylon Institute for Scientific and Industrial Research. CISIR's contribution to the sector, although valued only at $1, 841 (SL Rs 100,000) per annum, creates an appropriate enabling environment through providing a background for targeted research which will be undertaken by the proposed project. The most important contribution to the sector is from the Department of Ayurveda under the Ministry of Health and Indigenous Medicine (MIM) which has established medicinal plant gardens, demonstration plots for the cultivation of medicinal plants and a research institute to gather and analyze information on medicinal plants. The collective contribution of all these efforts in the sector by the Department of Ayurveda amounts to $ 14.15 million. Another noteworthy contribution to the sector is made by the Town and Country Planning Department ($ 27, 624) which maintains a medicinal plant garden at Kataragama.

3. In addition to GOSL's contribution to the sector, the program for conservation of Sri Lanka's

[1] Indigenous form of herbal medicine originating in the Indian sub-continent.

medicinal plants receives support from donors. Donor supported activities address several vital aspects of the sector such as skills enhancement on biodiversity, nursery development, community participation in natural resources management and technical assistance[2]. These projects focus on some key aspects of the sector for example, the GEF grant of $ 4,087,130 to the Development of Wildlife Conservation and Protected Area Management Project by UNDP has strengthened Protected Areas through management planning, and skill enhancement. Similarly, an IDF grant of $ 198,000 from the World Bank finances a program for enhancement of Skills and Institutional Capacity for Biodiversity Conservation. Community involvement for conservation of medicinal plants is being carried out under the USAID funded Ritigala Community Participatory Program which provides a valuable model for the proposed project to develop further. Other projects such as the Knuckles and Sinharaja Conservation Program and WHO/UNDP supported Medicinal Plant Technical Assistance Project and Opanaike Medicinal Plant Nursery Assistance Program aim to address specific aspects of the sector.

4. This project furthers the activities of other projects through supplementing current conservation efforts with the promotion the sustainable use of plants. Projects which have focused only on strengthening the protected area system, such as the GEF/UNDP project, have side stepped the wider issue of sustainable use of plants, the reasons and solutions for which lie outside the protected areas and are closely related to the policy, legal and socio-economic structures. Other projects in the sector have focused on specific aspects of the sector or taken a site specific approach - none has taken a comprehensive approach to the conservation of plants in the wild or promoted their sustainable use by increasing supply through cultivation and propagation, improving policy and legal framework, research to determine the root causes of plant loss and methods for sustainable extraction and cultivation of species. This project, therefore, takes a holistic approach to conservation of medicinal plants by linking conservation efforts with sustainable use to address the wider aspects of plant loss.

B. Project Components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

Component	Category	Cost Incl. Contingencies (US$M)	% of Total
Expansion of in situ conservation: this will include the installation of five ethnobotanical reserves[3] in five areas (Bibile, Ritigala, Naula, Rajawaka and Kanneliya) where there is active collection from the wild; and support for educanal site visits at the medicanal plant	1. Community organization for planning and implementation of project activities through training and social mobilization support. 2. Inventories of medicinal plant resources and their use to provide the information needs for planning at the resource level.	approximately US $ 2.07 million	41%

[2] For a list of other projects financed by donors, please see section 9.

[3] The term ethnobotanical reserves is used interchangeably with Medicinal Plant Reserves throughout the PAD and Annexes. Both terms refer to the five medicinal plant conservation areas (MPCAs) to be set up under the project.

garden located at Kataragama.

3. Management planning for conservation within botanical reserves and surroundings through the provision of national and international technical support, data collection and analysis.

4. Support for improving cultivation of plants through nursery development and production of planting materials, enrichment planting in reserves and buffer zones and maintenance of these plantations.

5. Promotion of sustainable utilization of medicinal plants (training, international and national technical support to build local capacity and research).

6. Ethnobotanical research to salvage and preserve critical indigenous knowledge of medicinal plants.

7. Enhancing environmental awareness and financial sustainability through promotion of educational site visits.

8. Promotion of village development activities in five ethnobotanical reserves, that meet agreed criteria and directly or indirectly contribute to alternative income generation.

9. Promotion of financial stability for collectors/gatherers and their dependents through improved access to market information and development of value added activities (e.g grinding, improved storing, grading etc).

	10. Establishment of medical and information centers to demonstrate the sound processing of medicinal plants and awareness of the importance of conservation. 11. Education and extension activities to demonstrate the cultivation of medicinal plants in farms.		
Expansion of ex situ cultivation and conservation	1. Nursery level research on the propagation of medicinal plants representative of Sri Lanka. 2. Home garden, farm and plantation level research on the cultivation of medicinal plants. 3. Improvement and enhancement of gene banks and nursery capacity of Department of Ayurveda and related institutions. 4. General promotion on cultivation through training, research information and awareness campaigns.	approximately US $ 0.48 million	9%
Information and institutional support	1. Promotion of appropriate legal and policy environment through studies and draft regulations 2. Design and development of a medicinal plant database. 3. Capacity building, training and awareness campaigns on medicinal plants. 4. Monitoring and evaluation of project achievements 5. Support for Project Management	approximately US $ 2.52 million	50 %

Total US$ 5.07 million 100%

C. Benefits and Target Population:

5. The project's benefits accrue at both global and local level. Global benefits of this project will include the conservation of rare and endemic medicinal plants. At least 189 species of the 1,414 medicinal plants used in Sri Lanka are endemic to the island. 79 species of plants are threatened in Sri Lanka. These 79 species are either endemic to the island or geographically restricted to the Indian sub-continent. Even among the non-endemic species found in Sri Lanka, the indigenous populations often represent eco types that are distinct from those found elsewhere. Conservation of these plants will secure the continued existence of these rare and endemic species of plants. Another global contribution of the project will be the preservation of knowledge on medicinal plants. Through preserving traditional knowledge on medicinal plants, the project will ensure that practitioners knowledge of plants and their uses is globally recognized and that the source of this knowledge is easily identifiable. Laboratory research on plants and their uses will also augment the world's information on this subject. Research on identification of methods and levels of sustainable extraction will help to improve global knowledge on sustainable cultivation of medicinal plants.

6. Benefits at the local level will include increased choices of livelihood and better income opportunities for people who will be involved in home gardening and plant cultivation. Further, ethnobotanical reserves will attract an increase in income. The project will also broaden people's choices of livelihood by promoting alternative sources of income generation. Management of ethnobotanical reserves and tourism will provide employment to local people. The project's focus on community participation will promote community involvement in resource conservation and more equitable sharing of natural resources and benefits. The project will also clarify the role of the community and governmental agencies in resource management.

7. National benefits of the project will include improved supply of medicinal plants. Improved information will be available on factors which affect the supply of plants and existing sources of knowledge will be compiled and preserved in-country to maximize national benefits. An analysis of market factors will promote greater efficiency in the production of traditional medicine and remove supply side inconsistencies which hinder their availability throughout the year. Further, the project will promote sustainable use of natural resources through managing critically endangered habitats and monitoring its rate of regeneration. The project will also build skills and increase awareness on conservation of medicinal plants.

8. **Target population**: The project will work in close collaboration with local people to devise a strategy for the planning and implementation of activities. Through its alternative income generating activities, the project will also target people inhabiting villages close to the five ethnobotanical reserves. The project will specifically target the growers of medicinal plants and improve their skills through a training and extension program. Additionally, the project will make every effort to include women, poor households and Indigenous People in project activities. Practitioners of traditional medicine will also form an important target group and their knowledge of plants and their uses will be compiled and preserved.

D. Institutional and Implementation Arrangements

9. **Institutional Arrangements**: A temporary project management unit (PMU) will be established at the Ministry of Health and Indigenous Medicine (MIM). The PMU will be headed by a Project Director (PD), supported by a Programme Officer reporting to the Secretary, MIM. The PMU will

implement the Project through line departments, provincial councils and other institutions. The implementation of project activities will be the responsibility of the respective cooperating agencies under the overall coordination of the Project Director. As this project involves a diverse set of stakeholders with a substantial involvement at the provincial level, the long term commitment of the provincial administration will be ensured by the MIM entering into a Memorandum of Understanding (MOU) with the Provincial Councils detailing the cooperation and collaboration required, together with the arrangements for disbursement of funds. The Provincial Commissioner of Department of Ayurveda will act as a focal point who will overlap with the PD and the implementing agencies in the provinces.

10. To facilitate the implementation of village based activities, the project will identify and organize Community Based Organizations (CBOs) to participate in the project. The CBOs will be structured to ensure full scale community involvement in the planning and, later, management of the reserves. The project will establish a Village Project Management Committee (VPMC) consisting of community representatives and representatives of the concerned State agencies for local planning. An umbrella organization, the Conservation Area Management Committee (CAMC) will oversee the management of the herbarium, nursery, dispensary and the information center based at each reserve. It will consist of representatives of the concerned State agencies, the Project Officer of the project management office established for the conservation area, and representatives of the relevant state organizations. The VPMC and CAMC will function in the five medicinal plant conservation areas only, and will be guided by a Provincial Project Management Committee. At the provincial level, the project will be coordinated by the Provincial Project Management Committee (PPMC). Comprising of representatives of government agencies and NGOs, the PPMC will meet quarterly to oversee the implementation of project activities including monitoring and evaluation, approve plans of action and other related matters.

11. The project will have a National Project Steering Committee (NPSC) to provide overall guidance for project implementation and to ensure that project activities are consistent with the agreed objectives. The NPSC will also approve annual work plans and budgets of the project. The MIM has suggested that the NPSC will be composed of the Secretaries in charge of Indigenous Medicine, Lands, Agriculture, Plantation Industries, Environment and Forests, the heads of the Departments of Forestry, Wildlife Conservation, the Commissioner of Ayurveda, representatives of the Department of External Resources, participating Provincial Councils, and other relevant institutions, NGOs and parties.

Implementation period: Five years

11. **Executing agencies**: The Ministry of Health and Indigenous Medicine will be the principal project executing agency with the Department of Ayurveda in charge of project management. Other agencies directly involved in implementation of project activities include the Forest Department and the Department of Wildlife. The project will link with the following entities (i) Provincial Councils of provinces where reserves will be established; (ii) the Agriculture Department's Extension and Communication Center in Peradeniya; (iii) NGOs established in the areas covered by the reserves.

12. **Project oversight** (policy guidance, etc.): Project Oversight will be provided by the National Project Steering Committee. The Committee convened by Ministry in charge of Indigenous Medicine

includes 15 experts from several different institutions including the Ayurveda Department, BMARI[4], Forest Department, Botanical Gardens, national universities, Natural Resources Science and Energy Authority and the IUCN[5]. The structure of the Committee is designed to ensure consistency of project proposal with governmental programs and policies.

13. A joint international/national advisory group will meet in years 1, 3 and 5 of the project and will hold workshops in those years to promote a forum for scientific and technical exchange of regional and global importance. All agreed safety measures will be applied to ensure that national and international criteria related to the protection of intellectual property rights are complied with during these meetings.

14. **Accounting, financial reporting and auditing arrangements**: Detailed accounts will be maintained by the Provincial Ayurveda Commissioners on activities implemented by the project. Accounts of central disbursement will be maintained by the Accountant of the PMU. Certification of Audit reports will be the responsibility of the Secretary, MIM, who will be the chief accounting officer. Auditing of accounts will be done by the Auditor General of Sri Lanka.

15. **Monitoring and evaluation arrangements**: An important aspect of the project will be the Monitoring and Evaluation of project activities. M& E will be the primary responsibility of Project Officer and staff . However, overall responsibility will lie with the Project Director who will head the Project Management Unit to be set up within the Department of Ayurveda. The M&E findings will be reported to the National Project Steering Committee by the Project Management Unit. The project will also assign a provincial officer for M&E at least on a part time basis. M&E at the community level is critical to the smooth operation of the project. Once project activities are in place, small committees will be formed at the community level, chaired by a person elected by the community itself for this purpose. The project will build capacity amongst the communities to monitor activities. M&E at the next level will be undertaken by the District Ayurveda Conservation Committees which will select representatives from the communities to monitor project activities. The Ayurveda Conservation Committee through its representation on the Provincial Project Management Committee will link communities at provincial level for M&E. In addition, the project will contract the impact monitoring of activities to an independent multi disciplinary team from an independent research institution or university.

Block 2: Project Rationale

A. CAS Objective(s) Supported by the Project:

16. This project fits in the CAS pursued jointly by GOSL and the Bank. In particular, the conservation of natural resources is one area of priority of this strategy. Other country strategies that this project will contribute to include: (i) poverty reduction by the potential increase and diversification of home gardening and plantation productivity; and (ii) institutional reform to ensure optimal cooperation and participation of private/public sectors and strengthening of institutions where there are clearly valid roles for them. The project is well integrated in Sri Lanka's NEAP and other related national development

[4] Bandranaike Memorial Ayurvedic Research Institute.

[5] International Union for the Conservation of Nature

plans (in Forestry and Indigenous Medicine mainly) and is one of the areas of priority covered in Sri Lanka's Biodiversity Action Plan (BAP) that is currently under preparation.

B. Main Sector Issues and Government Strategy:

17. Decreasing populations of medicinal plants is the key issue in the sector. The factors which contribute to this are as follows:

18. Unsustainable collection and cultivation practices: The number and quality of medicinal plants is adversely affected by overharvesting and lack of care to their habitat when collecting plants from the wild. Overharvesting of plants is directly linked to the high demand for Ayurvedic medicines. Currently 60% of the demand for medicinal plants is met through imports. The domestic production which meets the remaining demand, does so through over exploitation of indigenous plant resources. Since most of the supply for plants is from the wild, this has led to overharvesting of species in the wild. Nursery capacity and cultivation in home gardens, which has the potential to increase supply of plant and thus take the pressure off wild stocks, is too restricted at present to meet the demand without overharvesting wild populations of plants.

19. In addition, increased demand for agricultural land and unsustainable cultivation practices such as shifting cultivation and 'Chena" or slash and burn cultivation destroy plant habitat. As a result about 79 species of medicinal plants are immediately threatened with extinction.

20. Lack of information, awareness and technical skills on medicinal plants and their uses: Since no comprehensive analysis of social and economic causes of plant loss has yet been undertaken, the socio-economic causes and effects of plant loss are not clear. Further, the lack of comprehensive and authoritative information on medicinal plants hinders an assessment of their status, implementation of activities necessary for preserving their habitat and monitoring the effect of rehabilitative efforts. At present either the sources of knowledge are contradictory (e.g. several plants are identified under different names and uses by practitioners of traditional medicine) or are scattered and fragmentary. A shortage of skills on ethnobotany have also hindered effective conservation strategies.

21. Sri Lanka is fortunate to have a rich stock of indigenous knowledge on medicinal plants due to a large number of practitioners of traditional medicine. However, this important source of knowledge is currently under threat as little effort has been made to understand and document their knowledge. As a result, the death of a practitioner signifies a net loss to the pool of this important source of information. Unless a concerted effort is made to record the knowledge of plants used by practitioners of indigenous medicine, it is very likely that vital information on plant uses, their characteristics and habitats will be lost.

22. **Government Strategy**: Realizing the value of medicinal plants, GOSL has taken several steps to conserve them, for instance, through formation of medicinal plant gardens and Protected Areas. However, efforts in this direction are hindered by lack of resources and technical expertise. Efforts to conserve plants have included measures for both *in situ* and *ex situ* conservation. In situ conservation is undertaken by various Departments through a system of Protected Areas. Despite the population and development pressures on its land resources, Sri Lanka has reserved 12% of its land area in the form of Protected Areas. Managed by the Forestry and Wild-life Conservation Departments, PAs play an important role in conservation through maintaining natural habitats of wild plants. Ex situ conservation has included the formation of medicinal plant gardens and nurseries. The Department of Ayurveda has established three medicinal plant gardens, some with support form the UNDP, WHO and WWF, and two extension centers. Smaller gardens are maintained at district Ayurvedic hospitals. In addition, a 100

hectare medicinal plant garden has been established at Kataragama which is now under the administration of the Department of Town and Country Planning. Other efforts in this sector include demonstration plots set up by the Forest Department.

23. Despite Sri Lanka's commitment to the sector, its ability to provide increased resources and attention to conservation and sustainable use of medicinal plants is limited due to other political and economic priorities. Consequently, funding for key ministries dealing with the conservation of medicinal plants, such as the Ministry of Forestry and Environment (MFE) and MIM, is expected to maintain current expenditures roughly adjusted for inflation. These are inadequate for a comprehensive effort to conserve and promote sustainable use of medicinal plants. Lack of funds has been a key factor preventing GOSL from further developing activities for conservation and sustainable use of plants. As a result several globally important species are threatened. While conservation in the wild is an important means of addressing plant loss, other factors such as lack of skills, information, improved ex situ conservation, research and methods to increase the supply also merit close attention. Through addressing these concerns, the project will enhance and augment the sector strategy pursued so far and complement ongoing conservation projects by GOSL and donors.

C. Sector Issues to be Addressed by the Project and Strategic Choices: The project will address several critical issues in the sector. These will include:

24. Inadequate management of habitats where medicinal plants are found in the wild: Through creation of five ethnobotanical reserves, the project will sustain wild populations of plants, monitor their populations, harvesting and regeneration patterns and implement programs to conserve threatened species. The reserves have been mainly proposed in sites which are either Protected Areas or contain populations of threatened and endemic plants. All sites have been part of some previous or ongoing activities related to conservation, training, extension and awareness building on forest and biodiversity conservation. Two sites are situated in Strict Nature Reserves (SNRs). The project will implement improved management of plants through enhancing existing efforts in the PAs by Forest Department, CBOs and other donors and targeting them for the conservation of medicinal plants. Management planning for reserves will identify key areas of priority and remedial measures for habitat regeneration. Plant populations will be monitored to ascertain the effect of habitat management on plant populations.

25. Overharvesting of medicinal plants from the wild: Management of reserves will include enrichment planting to increase the number of plants. Enhancement of nursery capacity and support for home gardening and community cultivation of plants will reduce overharvesting while increasing overall supply. The project will also promote sustainable harvesting of plants through research to ascertain sustainable levels and methods of harvesting and application of this research to species management in reserves. Research will also identify plant uses and characteristics and it is likely that this information will be useful in substituting overused plants with those readily available to minimize the threat to overharvested species. Further, training and awareness building activities will provide information and upgrade skills in monitoring of plant populations.

26. Lack of knowledge and awareness on the conservation of medicinal plants: Building public awareness on the importance of medicinal plants and their conservation is a key aspect of the project. Preliminary assessment has shown that general awareness in this area is lacking. The changes in consumption pattern and public support for the conservation of plants can be attained through greater public awareness.

27. A key aspect of the project's research component will be a comprehensive analysis of the social

and economic analysis of the demand and supply for plants to determine the root causes of over extraction of plants. In addition, the project will compile the existing databases on medicinal plants and upgrade them so that comprehensive information is available to guide project implementation. Another important element of research will be to identify species for propagation and cultivation in home gardens. Combined with better training on the cultivation of these plants, this will improve the overall supply of plants, especially of threatened species, and contribute to reduction of harvesting of wild populations. Research will also allow for the possibility of substituting heavily used species in Ayurvedic medicine with those that are easily cultivated and/or readily available.

28. Inadequate technical skills to allow the cost-effective conservation of species, natural habitats and knowledge related to medicinal plants: Addressing the lack of technical skills is an important aspect of the project. The upgrading of skills in ethnobotany will serve to improve monitoring of plant populations and implementation of conservation strategies. In addition, improved skills will promote informed data gathering and collection of traditional knowledge on medicinal plants.

D. Project Alternatives Considered and Reasons for Rejection

29. Extending and supporting the existing network of Protected Areas to conserve medicinal plants in the wild was the primary alternative to the project. This may have resulted in increased populations of plants in the wild but not addressed the threat to plant populations due to unsustainable use. Current activities by GOSL and other donors in the sector already encompass the conservation of plants in the wild through formation of PAs. Instead, the proposed project manages the threat to wild populations of plants through increasing their supply. The formation of reserves to propagate and cultivate species, building of nursery capacity and conducting targeted research on plants will contribute to increasing the supply of plants without placing pressure on wild stocks. In addition, the project strengthens the policy and legal instruments for the promotion of sustainable use of plants. The project's approach, therefore, consolidates the "gains" made by PAs in conserving plants in the wild and ensures increase in plant populations by addressing the issues of sustainable use.

30. Support to individual components of the project (nursery development, for example) would have increased the supply of plants but not made an overall impact on the demand, supply and usage of plants. Additionally, the larger socio-economic, policy and legal issues would not have been addressed. Cost effectiveness considerations which have led to the rejection of alternative activities are mentioned below.[6]

31. The without project alternative would have led to further depletion of medicinal plant populations given the present and projected demand levels. This would mean a permanent loss in the country's natural resources. The project aims to stop the decrease in wild populations of plants and aims to conserve threatened species which would be lost in a "without project" scenario.

[6] For a fuller discussion, please see Page 13, Block 3, section on Fiscal Impact.

E. Major Related Projects Financed by the Bank and/or Other Development Agencies (completed, ongoing and planned).

32. Donors have shown a keen interest in supporting and furthering GOSL's commitment to biodiversity conservation through the implementation of various projects. The proposed project furthers the current strategy for conserving medicinal plants by broadening the geographical and ecological scope for their conservation. Most projects on biodiversity conservation support PAs which help to protect plant populations in the wild. However, biodiversity conservation projects have lacked the specific focus on conservation of medicinal plants which is the scope of the proposed project. Other projects on medicinal plants have addressed isolated aspects of their conservation (e.g. Medicinal Plant Technical Assistance Project and Opanaike Medicinal Plant Nursery Program). Only the Ritigala Community Program has aimed to link natural resource conservation with community involvement and successfully introduced home gardening of medicinal plants to encourage alternative livelihoods. The site specific, targeted approach to conservation taken by Ritigala Community Participatory Program needs to be extended beyond the pilot phase for a more comprehensive conservation of medicinal plants. The proposed project's emphasis on sustainable use of medicinal plants coupled with conservation activities and its emphasis on skill upgrading, research and information gathering and community involvement in conservation activities provide a multi faceted approach to arresting the decline in plant populations. Current projects provide a useful background for the proposed project's activities through creating an enabling environment and implementing targeted conservation. A list of current projects in the sector appears below:

Sector Issue	Bank Project	Latest form 590 ratings (Bank financed projects only)
Sustainable forestry, enhancement of technical skills	Forest Sector Development Project (Completed/World Bank)	S
Enhancement of technical skills, institutional development, awareness building.	Environmental Action I Project (Ongoing/World Bank).	
Training and skills enhancement.	Biodiversity Skills Enhancement Program (Ongoing/World Bank and MacArthur Foundation).	
	Other development agencies	
Community involvement in forest management.	Participatory Forestry Project (Ongoing/ADB)	
Institutional development, sustainable cultivation of plants.	Ritigala Community Participatory Program (Ongoing/USAID-Asia Foundation).	
Skills enhancement	Medicinal Plant technical assistance	

	project (Completed/WHO/UNDP)
Sustainable cultivation of plants	Opanaike Medicinal Plant Nursery Program (Ongoing/GEF Small Grants)
Skills enhancement, capacity building and expansion of protected areas	Wildlife Conservation Project (Ongoing/GEF-UNDP).
Conservation through community involvement.	Knuckles and Sinharaja Conservation Program (NORAD/IUCN)

F. Lessons Learned and Reflected in Proposed Project Design. The proposed project has benefited from several lessons from above mentioned projects. These include:

33. Consensus on project objectives: The project has been sensitive to the need for developing a stakeholder consensus on project objectives. A series of workshop and brainstorming session with government agencies, Ayurveda practitioners, research institutions and NGOs were held to clarify key issues and arrive at a common understanding of objectives. Project objectives will be communicated to local communities who will be closely involved in developing management plans to implement project objectives.

34. Community involvement and inclusion of disadvantaged groups: The Ritigala Program has provided a recent example of community involvement in the management of natural resources. This lesson has been applied in the proposed project by means of adopting a participatory approach, instead of "top down" planning. Local communities will be fully involved in the planning and implementation of conservation activities around reserves. Village level institutions which represent all segments of communities, including women and Indigenous People, will be formed to coordinate and plan activities, monitor the impact of implementation activities and mobilize local support. Using the key lesson that a project cannot be worthy of support from local communities until it addresses their basic needs, the project incorporates a strategy for supporting communities in pursuing alternative livelihood strategies which are not damaging to plant habitat. To facilitate community involvement, NGOs and CBOs will be involved to discuss and outline with communities their choices on alternative livelihoods, raise awareness on the importance of conservation and disseminate cultivation practices and home gardening. The implementation of alternative livelihood strategies will be based on the active cooperation of local communities and NGOs.

35. Inter-agency collaboration: A key lesson learnt and applied by the project is the need for effective interagency cooperation and coordination. Since the project will involve various governmental agencies such as the Ministry of Health and Indigenous Medicine, Department of Agriculture, Department of Wildlife Conseration and the Ministry of Forestry and Environment, inter agency coordination is vital for its success. The project has sought to develop interagency coordination through representation of the concerned governmental agencies in the Project Management Team and the National Steering Committee during the preparation phase. Continuing this approach during the implementation phase, the project will establish a Village Project Management Committee (VPMC) consisting of community representatives and local representatives of the concerned State agencies for local planning. An umbrella organization, the Conservation Area Management Committee (CAMC) consisting of representatives of the concerned State agencies, the Project Officer of the Medicinal Plant Reserve, and representatives of

the relevant state organizations will oversee the management of the herbarium, nursery, dispensary and the information center based at the reserve. The VPMC and CAMC will be guided by the Provincial Project Management Committee (PPMC) which will comprise of representatives of government agencies and NGOs. To ensure inter-agency collaboration, MIM will enter into a Memorandum of Understanding with other provincial councils and departments involved in the functioning of the five medicinal plant conservation areas.

36. Sustainability of project investments: A common drawback of community level projects is that with the exhaustion of project funds, the activities associated with the project cease to function. Projects such as these have a relatively weak impact on the local communities and their commitment to continuing the activities initiated. The proposed project will avoid this situation through designing appropriate mechanisms to replenish the funds to finance village level activities. To foster local communities' ownership of the project, the funds will also receive their contribution. These measures will be important means of ensuring ownership and sustainability of project investments.

G. Indications of Beneficiary Commitment and Ownership

37. Through the formation of a NEAP[7], and environmental institutions such as MFE and MIM, GOSL has demonstrated its commitment to environmental issues in general. GOSL's commitment to and ownership of the proposed project is evident from the proactive role played by MFE and MIM in overseeing project preparation, keen participation in the Biodiversity Working Group and related workshops organized for the project. As mentioned above, MIM as the implementing agency has also formed a Project Management Unit and a Steering Committee to guide project development and implementation. GOSL's committment is also evident from the willingness to review legislation related to IPR.

H. Value Added of Bank Support:

38. GEF's support for the project will add value to the current projects on conservation of medicinal plants in Sri Lanka in several ways. Firstly, GEF support will enable the project to target globally valued and threatened plants for conservation. As a result, the medicinal plant reserves have been proposed for areas which are rich in threatened and endemic plants but with high levels of extraction. Propagation programs have also targeted threatened and endemic species which have, hitherto, not received adequate attention. Secondly, GEF's support will enable the project to supplement conservation activities with those aimed at promoting sustainable use of plants. Given the demand for Ayurvedic medicine, increasing supply through wider cultivation is necessary to promote sustainable use of plants. However, in accordance with the GEF Operational Strategy which states that "biodiversity and sustainable use must also be achieved outside the designated PAs", the project supplements the activities aimed at increasing supply with policy and legal changes necessary for preventing the loss of globally valued plants. GEF's support for "conservation of biodiversity and its sustainable use" will enable this project to address the reasons for plant loss through a multi faceted approach. Thirdly, GEF support will be instrumental in gaining valuable knowledge of plants through data collection. Targeted research on threatened plants will enrich the activities of the current project but also be valuable for the world at large. Lastly, GEF's support for preserving indigenous knowledge will be valuable in ensuring that the

[7] National Environmental Action Plan

originators of this knowledge are recognized at a global level. The documentation of their knowledge will ensure that communities which are the source of this information are able to reap the economic benefits that may occur from it.

39. The Bank will add value to the project through coordinating and ensuring the support of government agencies and donors that have been active in the sector. The Bank has played an active role in developing the NEAP and has supported the Biodiversity Action Plan which will emerge shortly. It also extends the Bank's current efforts in the sector such as Environmental Action I Project and Forestry Sector Project which have aimed at conservation and strengthening of environmental institutions. The Bank's recent involvement at policy level, will therefore, provide a useful background for further policy development in relation to medicinal plants.

Block 3: Summary Project Assessments (Detailed assessments are in the project file. See Annex 8)

A. Economic Assessment (see Annex 4):	[ ]	Cost-Benefit Analysis : NPV=US$ million; ERR= %	[ ]	Cost Effectiveness Analysis:	[x]	Other (Incremental cost analysis)

Economic Analysis:

40. As a stand-alone GEF project, the principal economic evaluation criterion to be considered was the "incremental cost" justification as discussed at the end of this section. In addition, the economic analysis included a least cost analysis early in the selection of strategy and investment options (see section 8). In addition, a systems analysis of the proposed MPCAs is now under preparation to explicate the relationships between medicinal plants, communities and the primary features of their environments. Using the graphic formalism of object relationship modeling, this analysis aims to describe the 'system' of incentives that govern the supply, demand, over- or under-exploitation of medicinal plants within the broad natural and man-made contexts that are of interest to the project. The object relationship model (ORM) developed for the MPCAs will concretely indicate the points of contact between the project and this 'system' and portray how the system should change as a consequence of the project's implementation. It should also aid the interpretation of the data to be collected as part of the project. At present, their is little reliable data on the supply or demand of various plants and plant products: the growth and yield studies and the socio-economic surveys to be conducted throughout the project period will be critical for filling this gap. These data will help determine whether a modified system as described in the ORM is indeed sustainable. Only when these data are available, along with a fuller understanding of the pharmaceutical and ecological values of the plants, would it make sense to judge whether the investment costs proposed in the project are high, or not, as compared to the value of maintaining the option of studying the plants in their natural environment. Even if one were to consider all project costs as being related directly or indirectly to the establishment of the MPCAs, the economic cost of the project would then total less than US$500 per hectare of the MPCAs over the life of the project. Such a cost would not be so great as to require expectations of implausibly high future returns to maintaining the areas' biodiversity -- especially by comparison to the pharmaceutical prospecting values that have been estimated for other similar biodiversity 'hotspots'. Pharmaceutical prospecting value, moreover, is not the sole source of the biodiversity value of such areas.

Incremental Cost Analysis:

41. Regarding incremental benefits to the domestic economy, the proposed project is not expected to lead to an increase over the baseline scenario in the overall number of families who will enjoy an

improvement in income through participation in village economic development. The proposed project would not add to currently planned development activities: it would influence the prioritization of the location of village development without relevant distributional consequences. The number of villages and households that would be so affected is indeterminate, but for working figures up to 200 villages and 2000 households might participate in village economic development sooner under the proposed project than they would have under the baseline scenario. Also, there is no basis for assuming that the growth in incomes of families within the impact areas of the proposed botanic reserves would be higher than could be expected in general for families benefiting from village economic development without the project. Accordingly, the project should not lead to a significant change, from baseline expectations, in the overall level of net employment and should not have special, incremental impacts on any one particular sector of the economy; although, the project could contribute towards maintaining a certain quality of life by preserving the feasibility of traditional health care options.

Fiscal impact (for all projects):

42. The proposed project is not expected to have significant long run incremental fiscal impacts: as described in Annex 5, the management of the five proposed medicial plant conservation areas, the project's focus, is designed to be self-financing through the implementation of community participation and the development of educational site visits to the sites.

43. The community-based management strategy of the botanical reserves should strongly favor the long-term viability of this key component by developing incentives for surrounding villages to maintain their environmental integrity. This is also an approach that minimizes Government recurrent expenditures: the main recurrent costs are for the O&M of local botanical gardens/nurseries and of local Ayurvedic dispensaries and information centers. These costs are small and within the ability of local communities to support through economic activities that will develop around the reserves. As discussed above, several alternatives for the project's design were rejected for their fiscal implications. The botanical gardens established and improved to store genetic material representative of all eco-agricultural zones are intended to provide planting materials and stock at cost to private nurseries. Financed research will verify within the project period the direct applicability of technical options for implementation in the field or on the farm. Capacity building under the project will develop in-country technical expertise to facilitate the replication of activities in other area. Only temporary support is required for project management structures: the project from the start endeavors to implement activities through the multi-disciplinary planning and the strong coordination of existing organizations.

44. The formation of Strict Nature Reserves with vigilant enforcement of non extraction of plants was the primary alternative for the *in situ* component. This was rejected for being socially disruptive and fiscally expensive. Enclosure would not address the requirements of local inhabitants to supplies of medicinal plants and the recurrent costs following the completion of such a operation would be high and ultimately unsustainable. The present approach seeks to develop incentives for maintaining the integrity of the reserves by surrounding populations through their involvement in the joint management of areas. In contrast to enclosures, the recurrent costs of the participatory approach are expected to be modest and associated with essentially private sector activities that would be self-financing. The present approach would also seek to involve NGO assistance where available as a means of using the project's resources to mobilize additional outside resources to participating communities.

45. The *ex situ* component restricts activities mainly to areas of horticultural research that have a good promise of providing results that can be directed into existing extension networks in the country. The

pursuit of a nation-wide promotion of farming medicinal plants through the provision of input or output subsidies would have contravened present directions of national agricultural policy and costly to administer. Moreover, it would have been difficult to justify the use of subsidies to mitigate the risk of farmers learning to cultivate such crops. Extensive markets are also largely undeveloped for many plants that might be considered for cultivation.

46. Research under the project would not duplicate laboratory facilities already available in country, and would focus on strictly applied or adaptive research. Investments in bio-technology research were judged as not being cost-effective and requiring substantial financial support over the long term.

47. Under the information and institutional support component, the project will promote policy reforms only in those areas for which legislated regulatory authority has already been established. The drafting of new legislation would require substantially more resources for research and consultation than would the present focus of drafting regulations, and would offer a lower promise of delivered outputs by the time of the completion of the project. Training for departmental capacity building concentrates on individuals and skills most directly supportive of the project's participative strategy for in situ conservation. The project avoids wide-scale general training of staff in environmental awareness concerning medicinal plants to intensify resources on producing a corps of highly qualified professionals in sustainable management. These individuals are likely to have a much stronger and ultimately more pervasive impact on their institutions than broad institution-wide alternatives. The project's development of an information network on medicinal plants favors the use of resources to link existing databases rather than construct a new, independent structure. Considerable resources have already been sunk in the compilation of data at several sites. Linking these sites and facilitating access to them would be a more manageable output to deliver at minimum incremental cost than a wholly new, centralized data bank.

B. Financial Assessment (see Annex 5) NPV=US$ million; FRR= %

48. A chief concern of the project is to devise mechanisms for cost recovery. To ensure that this concern is adequately addressed, the project incorporates activities which are able to cover their costs such as botanical gardens, medical and information centers. The recurrent costs associated with these activities are not calculated to be high (estimated at $ 30,000, about 5% of MIM's non-development budget for Indigenous Medicine) and will be financed through user fees and other charges. Enhancement of nursery capacity will also recover its costs through sale of seeds, plants and other related planting materials. Through user fees, charges and other activities, ecological tourism also has the capacity to be financially sustainable. Ecotourism ventures will be developed according to observed demand for use of two reserves. The development of ecotourism will first be applied to Kanneliya and Ritigala and the lessons learnt from these (including mechanisms for cost recovery) will guide development of other reserves as ecotourism sites

C. Technical Assessment :

49. GEF's Scientific and Technical Advisory Panel's (STAP) first review of the project concept had indicated that one of the main technical contributions of this project would be in the determination of sustainable levels of harvesting and cultivation of medicinal plants. In addition to addressing Sri Lanka's national priorities, the STAP review indicated that the project "serves GEF's purpose as a meaningful activity to both people in rural areas as well as at institutions in urban centers, and serves as a model that can be propagated elsewhere. Over the next decade, it will become increasingly difficult for the ca. 3.5 - 4.0 billion people world-wide who require native plants for the provision of their primary health care to obtain these essential materials. Unless studies such as proposed in this project are implemented on a

significant scale, as we approach the third millennium there will be a severe shortage of plants utilized in primary heath care".

50. Furthermore, the project integrates the following technical aspects that were identified by the earlier STAP review: (i) selection of medicinal plants is based on the degree of exhaustion of these plants in the wild as well as indications of increased demand by local markets; (ii) thorough ethnobotanical and ecological studies are essential for the determination of "sustainable" harvest in the wild; (iii) the project will try to promote the continued flow of economic benefits to local people following the completion of the project; (iv) an external advisory panel is important to guide the project and to help resolve difficulties, refine strategies, make connections with global efforts elsewhere, including sustainable harvesting and the promotion of traditional medicines; (v) within agreed criteria for the protection of intellectual property rights, it will be important to publish all data (negative and positive) resulting from this project; (vi) to keep the focus of the project on sustainable management strategies, the production of data base of medicinal plants will be based on filling the gap from existing data bases rather than an exhaustive and resource-intensive exercise; and (vii) some degree of assistance in inputs and instruction may be required by farmers involved in propagation and cultivation of the medicinal plants, but by the end of the project, no outside assistance would be required by these farmers/home gardeners.

D. Institutional Assessment:

51. An assessment of the institutions involved in this project revealed the following areas of strengths and deficiencies that were taken into consideration in project design. Areas of Strength: The Ayruvedic Department of MIM has been involved, at a pilot scale, in a number of actions that are directly related to the project. In particular, plant taxonomic work, data management, and interaction with collectors, growers, and processors of medicinal plants are all experiences that will benefit project implementation, especially concerning ex-situ conservation, propagation of processing. For in-situ conservation, the Forest Department, MFE has experience in joint management of forest resources with the private sector (leasing of plantations to private businesses) and local communities (through the Participatory Forestry Project mainly). For participatory village development planning, a number of rural NGOs have field experience that will be sought around the reserves component. As a condition for project appraisal, MIM and the preparation team are required to identify the specific NGOs and CBOs, with appropriate experience, that will be interacting with the Project, and to define the type of agreement for implementing the complementary village development activities and other sociological work.

Areas of Institutional Weakness:

52. They include the key areas of technical and administrative capabilities for sustainable harvesting and cultivation of plants. Weakness of skills in ethnobotany hinder the development of methods, implementation and monitoring of sustainable levels of harvesting. With respect to cultivation of plants, further research needs to be conducted together with skills enhancement for implementing wider propagation of plants and provision of extension services in agriculture sector. Finally, MIM does not have, at the moment, a PMU that is ready to take over project management nor does it have a group to monitor overall project impact. The project will address these institutional deficiencies by: (i) providing technical assistance and training in some key areas; (ii) establishing output-oriented, multi-sectoral, project management committees at the provincial and the reserve-level; (iii) creating institutional linkages for better inter agency cooperation, (iv) providing international support through the technical advisory committee; and (v) covering the contracting of an external institution for the monitoring and evaluation of overall project impact.

E. Social Assessment:

Socio-Economic characteristics:

53. An analyses of social and economic characteristics of the villages included in ethnobotanical reserves and their vicinity highlight the need to improve the economic conditions of the local people.

54. Preliminary analyses display fairly homogeneous socio-economic characteristics across villages. Except for Kanneliya, which has a relatively lower poverty rate and more opportunities for employment, all villages are characterized by high level of poverty, high dependency ratio and low level of literacy. The economy of these villages is largely agrarian and there is a high level of dependence on Non Timber Forest Products (NTFPs). In particular, agriculture is insufficient to meet the subsistence needs of the people. The main crop is rice although some tea is also grown. Paddy cultivation is rainfed and land holdings are small, leading to small yields which are insufficient for even subsistence needs. Yields are also effected by the absence of an assured supply of water for the crops which restricts cultivation to a single crop during the rainy season (except in Kanneliya). The lack of other employment opportunities combined with dependence on subsistence agriculture lead to high levels of poverty increasing people's dependence on forest products and other resources. However, the dependence on forest resources, which until recently was not restricted, has been curbed due to the formation of Strict Nature Reserves (SNRs) in Naula and Kanneliya. SNRs have reduced people's access to NTFPs although, collection still takes place sometimes in violation of legal restrictions. The key issue is that although formation of SNRs has reduced overall collection of NTFPs including medicinal plants, collection still takes place and leads to over extraction in areas which do not have restricted access or are not policed. The larger question of combining people's needs with natural resource conservation remain unanswered.

Poverty:

55. As mentioned above, all villages (except Kanneliya) are characterized by high evidence of poverty. Poverty is cyclical i.e. during the dry season when there are no agricultural incomes. Demographic characteristics of poverty include a high dependency ratio ranging from 0.34 in Karandugala in Bibile to 1.47 in Moragada in Ritigala. Average dependency ratio stands at 0.72 for Bibile, Ritigala and Kanneliya which is higher than the national average of 0.59. The dependency ratio is characterized by a high level of child dependency. The demographic characteristics adding to poverty are compounded by other factors such as land tenure. Nearly all land in these villages belongs to the State with limited freehold rights given to local people. There is a high level of encroachment on State land due to poverty and increased demand for agricultural land due to "Chena" or shifting cultivation. Encroachments are as large as 30 ha in Ritigala. Where land is owned, holdings are often less than 0.4 ha. Lack of access to land is a crucial factor leading to increased poverty and increasing people's access on NTFPs including medicinal plants. Since land holdings are small or non existent, people are forced to derive their income from off farm sources such as over extraction of medicinal plants. In most villages, all families receive money from the Public Assistance Program. All the above mentioned factors indicate that poverty is a major concern in the villages around reserves and that high dependence on the collection of medicinal plants is a primary cause of plant loss. In particular, land issues are central to poverty. The project will address this aspect by decreasing dependence on land through home gardening and supporting community plots for cultivation. The project has realized that roots between poverty and over exploitation of plants are strong and must be addressed if conservation initiatives are to receive local support.

Gender:

60. A key aspect of the project's village development program will be to involve both men and women in its activities. However, the project will follow a gender sensitive approach to identify the areas where stakeholders and their economic needs are influenced by gender. For example, the villages around Ritigala and Kanneliya have a higher number of women compared to men. This may indicate the presence of more female headed households which have fewer opportunities for employment and are poorer than male headed households. The project will identify the cases where gender and poverty are co related and assess if this should direct the thrust of village activities.

61. Collection of plants tends to be somewhat gender related and the project will aim to include a gender analysis in defining the target population of various activities. For example, field evidence indicates that women generally collect plants found in the forest peripheral areas while men are engaged in collecting plants found deep in the forest. This may necessitate skills training in plant collection and conservation according to varying requirements. Further, in Ritigala women have shown a keen interest in home gardening of medicinal plants. This has increased women's income without their having to venture out of home or engaging in intensive agricultural labor. Gender sensitive methods developed for the Ritigala Project can, therefore, be applied to other villages to involve more women in home gardening. Home gardening also has the potential to address the cyclical nature of poverty experienced by both men and women in these villages.

62. The project will also make specific efforts to include women in the decision making structure of the Medicinal Plants Village Project Management Committees and other institutions developed for project implementation. Women have shown active participation in the Samurdhi program and in the USAID funded Ritigala Community Participatory Program. The support of these organizations will be sought to maximize women's participation in project activities.

Indigenous People:

63. Of the proposed sites, indigenous groups (Veddhas) are found only in Bibile. At present about 35 families represent this group. They are the descendants of displacees from an earlier project in late 1940s. Their dependence on NTFPs including medicinal plants is very high compared to other villages since they do not rely on agriculture.

64. Project design is tailored to ensure that indigenous people are included in the village development activities and decision making structures. Due to their high level of poverty and dependence on medicinal plants for existence, they will form an important stakeholder group. NGOs with experience of working with Indigenous People will be co-opted for working with these groups. Their specific economic and social needs and religious beliefs will be incorporated in developing village based activities.

Social issues addressed by the project:

65. Project design is based on the premise that sustainability of ethnobotanical reserves depends on the nature of human interactions with the resources contained therein. As a result the project takes a participatory approach to involving local people in planning and management and will not lead to any resettlement. Project interventions are designed to reduce the negative and strengthen the positive impacts of these mutual interactions. The specific areas where the project will have an impact are outlined below:

66. *Project impact:* The project will have several beneficial impacts. Firstly, it will increase the income of local people by reducing the seasonal variation of income and dependence on extraction of species in the wild. This will be achieved through a planned system of cultivation of medicinal plants in home gardens and through their propagation. These activities will enable more people to increase their income through involvement in production, processing and other ancillary activities. As noted above, the agricultural economy of many villages is subject to the vagaries of weather. In the absence of off-farm employment on an appreciable scale, seasonal poverty is rampant . The project will be able to address this issue at least on a partial basis by way of income support during the slack season. In particular, the project will benefit women and female headed households. Studies have shown that female headed households are often the poorest ones. Through involving women in project activities, the project will benefit some of the poorest households.

67. Secondly, the project will reduce people's dependence on extensive use of land. Home gardening and community plots will make efficient use of land resources, the absence of which has led to encroachments on state land in the past.

68. Thirdly, the project's village based participatory management of resources will create a sense of ownership in the communities. This is envisaged as an essential outcome of alternative income generation activities as people realize the benefits that they can derive from the project. Further, participatory resource planning will resolve land management issues since the process will take into consideration not only conservation needs but also issues regarding communities rights, access to land and user rights. The assurance that they are the custodians of natural resources will foster the communities' sense of ownership over forests and their products.

69. *Negative impacts and their mitigation:* With the introduction of ethnobotanical reserves and project implementation, some controls are bound to be placed on people's use of forests, particularly in areas where species are over extracted. This is not likely to be welcomed by people who have had uncontrolled access to species and have extracted them in a destructive way. Awareness programs will be carried out which can change the attitudes of people through realizing that conservation is a sustainable means of assuring a continued income.

70. The proposed activities will also increase the work load of people. However, as economic benefits are felt by communities, households may use more members to increase production. There is the possibility that outside intervention may lead to over extraction of plants, without the consent of local people. This possibility is strong in case the propagation and home gardening of plants does not lead to increases in income for local communities. It is envisaged that community organization will lead to a greater sense of ownership and establish community rights. Additionally, a local system of marketing will ensure that communities recognize the importance of conservation over and above excessive extraction for short term gains.

71. Preliminary surveys have shown people's willingness to be involved in project activities. Further activities, such as the support of NGOs and CBOs, detailed social analyses and awareness programs are expected to increase people's initial acceptance. As agreed with GoSL during the pre-appraisal mission, additional social analysis has been undertaken before project appraisal and negotiations. In particular, this has included analyses of the socio-economic characteristics of Indigenous People and the need to address specific issues related to them. The project will include specific arrangements to monitor the social impacts and to provide feedback for continuous project adjustment and correction.

F. Environmental Assessment: Environmental Category [ ] A [x] B [ ] C

72. The project is classified as a "B" category project in accordance with the World Bank's Operational Directive 4.0 on Environmental Assessment because it is not expected to have major adverse environmental impacts. The project is expected to have a highly beneficial environmental impact. No large scale infrastructure improvements are envisaged under project activities to cause negative environmental impacts and adverse impacts are expected to be minimal because all investments are small, ecologically sound, and limited in scope.

73. Project preparation has included an environmental review which confirmed that project activities would produce wide scale beneficial environmental impacts, by improving productivity of protected areas and buffer zones, increasing the number of medicinal plants especially those which are threatened and reducing the pressure on wild populations of medicinal plants. Most of the project activities are focused on the conservation of medicinal plants in five ethnobotanical reserves and are expected to have beneficial results on plant populations. Other activities such as cultivation and enrichment in reserves and extension to demonstrate sustainable cultivation are small scale and widely dispersed and are not likely to cause major soil disturbance or exposure. In addition, these activities do not involve the use of agro chemicals or pesticides.

74. Complementary village level investments for alternative income generation activities will also have beneficial impact on the environment as the small scale low impact activities envisaged under this component will reduce people's dependence on wild habitats of plants. Similarly, value added activities will decrease harvesting of plants from the wild by increasing people's income.

75. Activities which are likely to have negative impact on the environment have been clearly considered and measures to mitigate adverse impacts have been arranged. For example, the construction of small scale dispensary and Ayurveda health information and treatment centers in each reserve will take place in the dry season so that the potential for soil erosion is reduced. Structures will be located in the buffer zones and areas around the dispensary will be replanted with medicinal plants to avoid plant loss. Further, the risk of ecoutourism causing over use of the reserves and pollution will be managed by outlining an ecotourism strategy that ensures the sustainability of tourism in the reserves. The emphasis of tourism ventures will be their social and environmental benefits to the reserves and local communities. Although the project will have no direct impact on the issues of Intellectual Property Rights and other issues related to genetic patenting, it supports the strengthening of legislation and policy so that adequate safeguards are in place to prevent the "piracy" of indigenous knowledge and plants in future. To ensure the protection of indigenous knowledge and plants, GOSL will establish a Committee to develop guidelines and implement controls on information and resources.

76. Further, environmental screening will take place through M&E, which will measure project success and include close review of the ecological impact of the project, beginning with carefully designed and reliable resource mapping and baseline studies. A detailed Environmental Analysis is presented in Annex 21.

G. Participatory Approach

77. Project identification and formulation has adopted a participatory approach to project preparation. Stakeholders have provided their input to the preparation process through workshops, consultation meetings, brain-storming meetings, and field consultations. Key stakeholders that have been consulted

include Ayurveda practitioners, traders, exporters and manufacturers, scientists, policy makers, technical specialists, NGOS, and local community representatives[8]. Consultations with stakeholders were intended to draw on expertise in the formulation of project activities, to identify constraints and issues needing action, to solicit the views of potential community groups to the concept of the project, to obtain consensus on the objectives of the project and proposed intervention, and to solicit the support of stakeholders in project implementation.

78. Project design entails a participatory approach to implementation and operation. It is anticipated that local level, site-specific planning would provide the basis for identifying project related interventions to be supported under the project, and the mechanisms for their implementation and monitoring. Local communities, NGOS, researchers, local government agencies, and line agencies would collaborate in the implementation of the project at the local level. The long-term sustainability of project investments are premised on the understanding that the operation and maintenance of activities beyond the life of the project, would be devolved to community level institutions that would be established during the project period, at the reserve level. Participation of various stakeholders at different stages of project preparation, implementation and operation can be summarized as follows (IS = information sharing; CON = consultation; and COL = collaboration.

	Identification/ Preparation	Implementation	Operation
Beneficiaries/community groups	IS/CON	COL	COL
Intermediary NGOs	IS/CON	COL	COL
Academic institutions	IS/CON	COL	COL
Local government	IS/CON	COL	COL
Other donors	IS/CON	IS	IS
Participating State Agencies	CON	COL	COL
National Steering Group	IS/CON	COL	COL
Advisory Group	-	IS	IS

H. Sustainability

79. The community-based management strategy of the botanical reserves will strongly favor the long-term viability of this key component by developing incentives for surrounding villages to maintain their environmental integrity. This is also an approach that minimizes Government recurrent expenditures: the main recurrent costs are for the O&M of local botanical gardens/nurseries and of local Ayurvedic dispensaries and information centers. These costs are small and within the ability of local communities to support through economic activities that will develop around the reserves. As discussed above, several alternatives for the project's design were rejected for their fiscal implications. The botanical gardens established and improved to store genetic material representative of all eco-agricultural zones are intended to provide planting materials and stock at cost to private nurseries. Financed research will verify within the project period the direct applicability of technical options for implementation in the field or on the farm. Capacity building under the project will develop in-country technical expertise to facilitate the replication of activities in other areas. Only temporary support is required for project management structures: the project from the start endeavors to implement activities through the multi-

[8] Several NGOs and research institutes participated in workshops organized by the project. They included Bandranaike Memorial Ayurvedic Institute, WWF, Environmental Foundation, NAREPP Project, IUCN and Ayuveda Conservation Committee.

disciplinary planning and the strong coordination of existing organizations.

I. Critical Risks (see fourth column of Annex 1):

Project outputs to development objectives

Risk	Risk Rating	Risk Minimization Measure
Biodiversity conservation (especially related to medicinal plants) continues to be valued by society.	2-3	Public awareness, promotion of educational site visits
Property rights are definable and enforceable	3-4	Adoption of suitable regulatory framework
In situ/ex situ conservation will preserve globally valuable and threatened plants.	2-3	Research to identify threatened species of global importance

Project components to outputs

Risk	Risk Rating	Risk Minimization Measure
Viable size of a botanical reserve	3	Interaction of joint local/international advisory group to review and other country experiences
Critical, highly impacting communities are receptive in sufficient numbers to permit effective management planning over the whole of selected sites	5	Peer pressure, linkage of project support to verifiable indicators of compliance/cheating.
Enrichment of reserves adversely affects ecological integrity	3-4	frequent monitoring of sustainability studies throughout implementation
Set of feasible and alternative village incomes linked to the reserves exists.	3	Detailed socio-economic field surveys that test the wider applicability of the experiences of the USAID funded Ritigala project prior to project start
Continued local interest to preserve transmission of Ayurvedic knowledge		

Overall project risk rating

Risk	Risk Rating	
Adequate in country technical capability	3-4	Strong TA inputs, links to external technical institutions and training

J. Possible Controversial Aspects:

80. Through increasing the supply of medicinal plants, the project increases the risk of increasing pressures on wild populations of endangered plants to meet even further increases in demands for Ayurvedic medicine. To manage this risk, the project incorporates targeted research on the uses and characteristics of plants to allow for the opportunity to substitute endangered plants with other plants that are not threatened or easily cultivated. Careful monitoring of plant species in reserves and formulation of policy instruments to regulate the use and trade of plants will enable the project to

mitigate the risks from further extraction of wild populations of plants.

81. The potential risk of 'piracy' of genetic material is a controversial aspect of this project. Adequate safeguards such as legal and policy instruments are not strong enough to avert this risk. The project has been sensitive to local ownership of genetic material and has made stringent efforts to ensure that a local consensus is achieved for information sharing on medicinal plants. Further, the draft regulations concerning standards, trade, property rights and land use will clarify and strengthen local ownership rights. The project has also made maximum use of local research institutions to gather information and conduct research. Further training will enhance local ability to preserve and patent genetic material as an indigenous natural resource.

Block 4: Main Loan Conditions

A. Conditions for Effectiveness:

(a) MIM shall have selected consultants for operational support to assist in the implementation of the project.

B. Other

MIM shall:

Project management

1 (a) establish a Project Management Unit and provide the agreed level of staff and technical assistance (Management) for its functioning no later than February 15, 1998;

1 **(b)** by February 15, 1998, confirm to the World Bank that all organizational and inter-agency coordination arrangements (with Provincial Councils, Wildlife and Forestry Departments, and other entities, as appropriate) are in place and operational, as per the MOUs agreed to at appraisal, and covering planning, implementation, research, study, and monitoring and evaluation activities;

Project Implementation

2 no later than February 15, 1998, ensure that the technical assistance (Operations) contract for operational support is finalized and key Consultants have started support to field activities according to the agreed Technical Assistance schedule of all project activities;

3 implement the project according to a Project Implementation Plan satisfying to the Bank and agreed at appraisal as the same may be revised from time to time in consultation between GOSL, other stakeholders and the Bank;

4. maintain polices and procedures adequate to enable it to monitor and evaluate on an ongoing basis, in accordance with benchmarks and indicators satisfactory to the Bank, the carrying out of the Project and the achievement of the objectives thereof;

5. prepare, under terms of reference satisfactory to the Bank, and furnish to the Bank, by January

15, 2000, a report integrating the results of the monitoring and evaluation activities performed on the progress achieved in carrying out of the project during the period preceding the date of said report and setting out the measures recommended to ensure the efficient carrying out of the project and the achievement of the objectives thereof during the period following such date; and

6. review with the Bank, by April 15, 2000 or such later date as the Bank will request, the report on monitoring and evaluation activities and thereafter, take all measures to ensure the efficient completion of the project and the achievement of the objectives thereof, based on the conclusions and recommendations of the said report and the Bank's views on the matter.

Block 5: Compliance with Bank Policies

[x] This project complies with all applicable Bank policies.
[ ] [The following exceptions to Bank policies are recommended for approval:
The project complies with all other applicable Bank policies.]

[signature]
Task Manager:

[signature]
Country Manager:

SRI LANKA

Conservation and Sustainable Use of Medicinal Plants Project

Project Design Summary

Narrative Summary	Key Performance Indicators[1]	Monitoring and Supervision	Critical Assumptions and Risks
CAS Objective To conserve the natural resources of Sri Lanka.	Stop or reduce deforestation. Stop or reduce threats to plant and animal species. Improved land use.	International environmental organizations. Research reports. Government research and analysis.	(CAS Objective to Bank Mission) World Bank/ GEF continue to support biodiversity conservation. Other political and economic priorities for Sri Lanka remain unchanged.
Project Development Objectives: Conservation of globally and nationally significant medicinal plants, their habitats, species and genomes nd promotion of their sustainable use.	Declining threats to plants and increased populations of species (especially threatened species).	Reports of international environmental watch organizations (IUCN Red Data Book etc, national statistics (Forestry Dept., MFE etc.); report of independent monitors.	(Development Objectives to CAS Objective) Other environmental projects are successfully implemented; Ministries, NGOs and local people cooperate in the implementation of environmental projects; GOSL continues to regard environmental conservation as a priority.
Project Outputs 1. A viable participatory management system for medicinal plants operating in MPCAs. 2. Increased production of selected medicinal plants species on farms and in home gardens.	1.1 Village harvest of species within sustainability limits definded by Village Action Plan in 30% of villages by mid-term and 100% by project end. 2.1 Increase in number of medicinal plants for which cost-effective propagation & cultivation techniques are available; 25 species trials completed by mid-term, 50 species trials by project end.	1. PMU reports of sustainability studies; sampling by independent technical monitors at mid-term and completion. 2. PMU research reports.	(Outputs to Development Objectives) Biodiversity conservation, especially related to medicinal plants, continues to be valued by society. Property rights are definable and enforceable. Candidates for training are appropriately selected and afterwards placed to realise the effective use of skills.

[1] Baseline and targeted values should be shown, with the latter divided into values expected at mid-term, end of project and full impact.

	2.2 Increase in number and diversity of medicinal plants being propagated and grown in Dept. Ayurveda nurseries; production increased by 25% by year 3 and 50% by project end. 2.3 Increase in the number of farmers using propagation and agronomic information generated by the project; increase of 25% over the baseline by mid-term and 50% by project end.		
3. Enhancement of knowledge on medicinal plants and capacity building for their management and sustainable use.	3. 1Guidelines developed and implemented for the protection of traditional knowledge and plant resources related to project activities. 3.2 Recommendations developed for strengthening legislation and regulations related to conservation and use of medicinal plants. 3.3 National database for medicinal plants established and functioning; data from over 500 species entered by project mid-term and over 1000 species by project end. 3.4 Increase in number of schools and students exposed to educational materials produced by the project. 3.5 Increase in the number of persons with enhanced skills in medicinal plants; local training of over 25 staff by project mid-term and over 100 staff and post-graduate and/or placement training for 5 specialists by project end.	3. PMU/independent farm surveys before and during project interventions including copping patterns, yield samples, etc.), PMU documents, functional database and output documentation.	
Project Components	Input US$ 4.57 million total cost including contingencies		(Components to Outputs)
1. Expansion of in situ conservation.	1.1 US$ 2.07 million total. 10,000 -12,000 ha (1,000 ha		Lack of information on the

Selection and demarcation of five botanical reserves in the areas of Bibile, Ritigala, Naula (or Dolukanda) Rajawaka and Kanneliya. • Community organization and management planning for botanical reserves (including existing Kataragama reserve). • Enrichment planting of MPCAs (where necessary). • Promotion of alternative village incomes linked to maintaining the integrity of MPCAs. • Village training. • Site specific research	minimum per MPCA), constituting five MPCAs, identified, established and enriched within framework of participatory management planning involving local communities. 1.2 Technical advice and training provided on medical plant cultivation, processing and marketing. 1.3 Awareness of he linkages between biodiversity and Ayurvedic medical practice promoted in communities. 1.4 Portfolio of activities researched, tested, supported and adopted within cooperating villages. Research on the sustainable use of medicinal plants in reserves conducted using in part local participation. Ethnobotanical studies executed. 1.5 Adaptive farm research conducted to demonstrate technical/financial viability of cultivable species.	PMU project procurement and disbursement documentation. PMU semi-annual project implementation reports; documentation as output of project activities. Documentation of WB/GEF supervision missions inspecting field work. Project mid term and completion studies according to agreed WB/GEF technical TORs. PMU training records. Reports of joint local/international advisory group.	viable size of a MPCA. Adequate attention to key technical design and management concerns. Critical highly impacting communities are receptive in sufficient numbers to permit effective management planning over the whole of selected sights. Guidelines to ensure that site specific interventions do not adversely affect ecological integrity are implemented. Set of feasible and alternative village incomes linked to reserves exists. Continued interest to preserve transmission of Ayurvedic knowledge through apprenticeship, acquired knowledge and surveys etc. Set of criteria guiding information access is implemented by MIM. Sustained interest of key institutions (MIM, Provincial Councils, Forest Dept, MFE, NGOs to pursue project objectives).
2. Expansion of Ex Situ cultivation. • Strengthened protection of genetic reservoirs. • research in agronomy of selected species. • Promotion of cultivation of medicinal plants for harvest and trade.	2. US$ 0.48 million total. 2.1 Two new botanical gardens/nurseries established, 3 existing gardens/nurseries improved by end of project. 2.2 Research on propagation of plants representative of agro-ecological zones conducted. Home garden and plantation research completed. Research results disseminated through existing extension networks.		
3. Information and Institutional support.	3. US$ 2.52 million total		

• Promotion of appropriate legal and policy environment. • database development. • Departmental capacity building • Installation of multi disciplinary capacity to implement present environmental project.	3.1 Draft regulations regarding standards, trade, property rights and land use. Quality standards and control measures developed. 3.2 Training of departmental staff, professional education and mass awareness campaigns by end of project. 3.3 Support to temporary Project Management Unit in MIM, project coordination committees at national and provincial levels and joint local/international advisory group.		

SRI LANKA

Conservation and Sustainable Use of Medicinal Plants Project

Detailed Project Description

A. Component 1: Expansion of *in-situ* Conservation of Medicinal Plants (US$ 2.07 million)

Introduction and Background

1. Traditional nature reserves are often created with the underlying philosophy that the land areas in these conservation units should be essentially free from human disturbance, to the extent possible. Thus, there can be some degree of tension between local people living in a region and the development and operation of the reserve. New strategies have been developed that emphasize the possibility of utilizing some of the natural resources while protecting the area from degradation. The concept was advanced substantially in the late 1980's through the creation of a new category of forest reserve in Brazil known as the " extractive reserve", for the extraction of Brazil nuts, rubber and other non timber forest products (NTFP's). Local people can extract products on a small scale, obtain a cash income through the sale of these products, and be involved as stakeholders in the preservation of a largely intact ecosystem. In this type of reserve strict management guidelines must be observed, and these are usually developed by a collaborative effort between communities and local government agencies. Often the reserves are associated with an active social movement or NGO, and this has been essential to their success in areas where land tenure is not clearly established.

2. Maintaining an extractive reserve is not without its challenges, as the forest ecosystem may be damaged if economically important products are overharvested. Even if the resources are designated as communal property, there is the possibility that people will place personal needs over that of the community and engage in the overharvest of NTFP's or practices that are destructive to the species on which the NTFP's are based. Thus, an extractive reserve differs from a parcel of land that is simply public property, in that a social/legal structure is a key element of the reserve. Guidelines and a management plan are essential to the success of the reserve. If they are established with an understanding of the local people's needs, many such reserves can be viable over the long term.

3. The first reserve to be specifically devoted to medicinal plants was established in Belize, Central American in 1993. It was designated as a site to promote the conservation and use of medicinal plants, through their harvest, employment in primary health care and through apprenticeship and other educational programs to be carried out in the reserve. It was also established as a site to promote ethnobotanical and ecological research in efforts to define harvesting regimes for sustainable extraction, while at the same time promoting forest conservation. This new type of forest conservation unit was designated as an "ethnobiomedical" forest reserve, a term intended to convey the importance of people as stakeholders in local conservation, through their interest in having, among other things, a stable source of raw material for their own health care.

4. Since the establishment of the first medicinal plant reserve in the early 1990's, additional protected areas have been set up to allow for the harvest and conservation of medicinal plants in wildland areas. India has probably been the leader in recognizing this need, with multiple reserves established in the last years in areas with significant populations of plants that are important in local health care. The development of a series of medicinal plant conservation areas[1] (MPCAs) in Sri Lanka will be a major contribution to the effort to conserve medicinal plants at the national and global levels, through the in-situ conservation efforts proposed herein. Formal linkages should also be established with those institutions and individuals working on this concept in other parts of the world, and the inauguration of such conservation areas in Sri Lanka will be recognized as a major, positive action by the international conservation and health care communities.

The Concept of Medicinal Plant Conservation Areas Within the Project Context

5. Most protected areas in Sri Lanka are off-limits to local communities wishing to harvest medicinal plant species. In other state lands, which fall under the jurisdiction of the Forest Ordinance, the lack of secure tenure over forest areas, and competition between collectors has led to a breakdown in traditional management techniques and the over-harvest of species. Medicinal Plant Conservation Areas to be set up by this project will provide sites in which forests can be managed on a long-term basis for conservation and supplying medicinal plants and other NTFP's to the local communities, for their use and sale. Conservation Areas can also serve as the base for ethnobotanical, ecological and other research necessary to develop sustainable harvesting, cultivation and marketing initiatives, and for education and extension programs to outlying communities.

6. Conservation of threatened medicinal plant species will not occur through protected areas alone. Home gardens, farms, secondary forest and extractive reserves are the repository of genetic diversity of medicinal plants, and conservation efforts must be extended to these sites. The activities in the MPCAs and the associated communities are expected to extend beyond the conservation areas to its surroundings in the types of sites noted above. Research, demonstration, outreach and educational activities will thus have a major role to play in the conservation of medicinal plants, both in proximity to the MPCAs as well as in the areas beyond.

7. The MPCAs would be managed in joint partnership between local communities and the state agencies administering these lands. The state agencies that are likely to be involved with the project are the Forest and Wildlife Conservation Departments, and the relevant provincial councils. Although the Department of Ayurveda would be the principle implementation agency for the project, the above state agencies would be closely involved with the project.

8. The project will seek to achieve the objectives of this output by:

(a) Establishing Medicinal Plant Conservation Areas in locations where there is active collection from the wild.

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[1] The term Medicinal Plant Conservation Area is synonymous with Ethnobotanical Reserves and is used interchangeably in the PAD and Annexes.

(b) Establishing joint management of the conservation areas by the communities living adjacent to the conservation areas and the state agencies concerned.

(c) Providing financial assistance to the participating communities to enable them to establish their own medicinal plant gardens for commercial exploitation or to set up other income generating activities to reduce pressures on medicinal plant exploitation.

Project Activities

9. The above objectives would be established through a wide range of activities which have been designed in consultation with a multidisciplinary group of specialists, local communities and other stakeholders, and all of these are developed to support the success and long term viability of the MPCAs. The core of this activity will be the identification, demarcation and establishment of adequately sized medicinal plant conservation areas (MPCAs) in five new areas where there is active collection of medicinal plants from the wild. In addition, some project activities relating to in-situ conservation would also be implemented in an existing conservation area at Kataragama. The establishment and implementation of programs in the MPCAs would be done with the extensive participation and support of local communities. The conservation areas and associated facilities to be established would be jointly managed by state land agencies concerned and local communities, and would serve as: centers for conservation and sustainable harvest of medicinal plants; demonstration gardens; centers for extension with regard to harvest, cultivation, handling and use; sources of planting materials for both home gardens and the conservation areas; and centers for education. While the primary purpose of the MPCAs will be the conservation of medicinal plants, an equally important purpose will be to support the sustainable harvest of medicinal plant products to provide direct economic and health benefits to the local people. The economic benefits are required in order to ensure the continuation of the conservation areas and project activities following the five years of the project.

10. The selection of the MPCAs are determined primarily on the basis of their conservation value for endemic and threatened medicinal plant species, in addition to a number of other criteria. The following criteria were used to select the locations of the proposed new MPCAs:

- Importance of the area for endemic and threatened medicinal plant species.
- Inclusion of key bio-geographical zones.
- Areas are sufficiently large in extent to conserve a range of medicinal plant species and habitats.
- Degree to which local communities are dependent upon the collection of medicinal plants and other non-timber forest products from the forest.
- Inclusion of unique and historical sites for medicinal plants.
- Sites, where the existing legal status does not preclude sustainable use of resources.
- Likelihood of project success, on the basis of preliminary studies carried out in the localities.

11. Data needed for the selection of the areas come from a number of sources, including land use plans, the National Conservation Review, the National Survey of Traditional Uses of Forests, information collected from traders in medicinal plants, socio-economic surveys that

were done in the wet zone as a prelude to the preparation of management plans for conservation forests, and information collected from community development projects, notably the project in the Ritigala area.

12. Based on the application of the above criteria, the following five new areas are proposed as MPCAs for project support:

Bibile - savannah grassland/intermediate zone (Uva Province)
Ritigala - monsoon forest/dry zone (special physical characteristics) (North-Central Province)
Knuckles (Naula/Dolukanda)- montane forests/intermediate zone (Central Province)
Rajawaka - evergreen forest/intermediate-wet zone (Sabaragamuwa Province)
Kanneliya - lowland rainforest/wet zone (Southern Province)

13. At the center of the MPCA concept will be the core conservation zone, where the primary focus would be on the elimination of human activities that have a negative impact on the conservation of medicinal plants. Surrounding the core conservation zone would be sustainable use zones, and areas where cultivation of medicinal plants is possible. The final MPCA boundary will be established based on a number of considerations, including access to selected communities, agreement of local communities, and availability of land for associated MPCA facilities, as well as land for medicinal plant cultivation and village development activities. The implementation of the activities under the proposed project will be in accordance with the existing legislation governing each individual conservation area (i.e. Forest Conservation Act and Fauna and Flora Protection Act). Descriptions of the proposed MPCAs is provided in Attachment 1.

14. At the present time, some of the species to be found in the conservation areas are being overharvested or harvested in a destructive fashion, and activities such as these that are counter to the long term management of such biological resources will be replaced by those more compatible with the concept of sustainability. By effecting change in the style of extraction activities that are currently taking place, and imparting a sense of ownership of the conservation areas to the local communities living adjacent to the areas, combined with other activities in this project, the conservation enterprise will be enhanced. This will ultimately have a positive influence on conservation in areas outside of the MPCAs as well as the land that falls within the strict demarcation of the forest reserve.

15. The implementation of *in-situ* conservation component will take place within the five new conservation areas, and the existing area at Kataragama through the activities listed below.

Community organization for planning and implementation of project activities:

16. Planning at the village level will focus on strategies for the direct reduction of the negative interactions of local people on medicinal plants, and their habitats, and increasing the collaboration of local people in conservation effort. At the village level, the project will broadly aim at the following activities:

(a) conduct of participatory planning and provision of implementation support, using contracted local NGOs, technical specialists, workshops, materials, training, and operational support;

(b) implementation of programs that foster sustainable utilization of indigenous and naturally occurring medicinal plants and other associated minor forest products, including value addition processing and marketing;

(c) implementation of reciprocal commitments that foster alternative livelihoods and resource use, including farming of medicinal plants in village home gardens and farm lands, to be financed through the village development fund, and the identification of measurable and monitorable actions by local people to improve conservation of biodiversity and medicinal plants.

17. Village level plan preparation will be facilitated by conservation area-level teams comprising project staff, collaborating NGOs and villages. Local NGOs will be contracted to provide facilitation support to the conservation area teams in the planning and organizational development of community organizations. Specifically, this will involve support for community institutional development, microplanning, implementation, financial management and sustainability, including establishment of village accounts and revolving funding arrangements, and monitoring. The planning teams will assist village committees to develop and implement village-level microplans on a continuing basis, at least throughout the period of the project. The project will assist in the development of implementation guidelines, investment criteria, and provide training to ensure that plans meet project objectives and involve the active participation and commitment of local people.

18. To achieve the above, the project will develop and employ methodology to ensure the: (i) active participation of all segments of the village population in plan preparation, decision making and implementation of project activities; (ii) PRA is tailored or focused specifically on the interaction between local people (in particular forest dependents) and the MPCA; (iii) village plans are owned and authored by the local people; (iv) arrangements are made for cost and benefit sharing with local beneficiaries; (v) village development investment proposals meet eligibility criteria that ensure direct linkage with the conservation of biological diversity and medicinal plants within the conservation areas; (vi) administrative and financial arrangements are made that simplify and enable easy transfer of project funds to the local level to enable community implementation of project activities, and (vii) enhancement of community capacity and empowerment through training and management responsibility.

19. Village level activities will operate at the level of a single village constituted into a Village Project Management Committee (VPMC), except where other relevant and appropriate local level institutions exist in the village. Each VPMC will include at least one representative from each household in the village, so that there is the full participation of the village in the program. The Executive Council of the VPMC will comprise of representatives of each relevant existing village level organization (women and youth organizations, etc.), medicinal plant collectors and village medicinal plant traders, indigenous medical practitioners, and other village representatives, to be selected through village level consensus development. Typically, the Executive Council of a VPMC will include 10-12 members (at least three of whom should be women) and the relevant local state functionaries (beat forest officer, local agriculture worker,

etc.) and project staff. The three office bearers of the VPMC will be elected by the community. Only elected village representatives of the VPMC will have voting rights.

20. A parent organization for each MPCA would be established, comprising two representatives from each participating VPMC, representatives of relevant participating state agencies and NGOs, and the MPCA Project Officer. The office bearers of the committee would be elected by the community representatives. The project would encourage the setting up of these parent organizations as registered societies under the Cooperative Societies Act. The parent organization called the MIM will oversee the management and implementation of all project activities at the conservation area. The project would encourage the establishment of a revolving fund at each VPMC to support project activities. It is expected that the MIM would release funds to the VPMC based on the conservation area management plan and respective village level microplans. Although, funding arrangements need to be further defined, it is anticipated that the provision of funds to the VPMCs would be contingent upon the VPMC entering into an agreement with the MIM to participate in the program within the framework of the project objectives. Such agreements would also serve, where feasible, to secure village access to medicinal plant resources in the conservation areas; to gain community support for enrichment of medicinal plant populations through replanting and habitat improvement; to intensify agricultural production systems, including the cultivation of medicinal plants; and to carry out local village development activities to reduce impact on medicinal plant resources, that are identified through participatory planning exercises.

Inventories of medicinal plant resources and their use

21. Inventories of medicinal plant resources will be largely focused in the areas that are targeted for the MPCAs and later extent to forest areas in other ecological zones. This would provide the basis for management planning and monitoring in the MPCAs. During the first year of the project, such inventories will be carried out in the MPCAs, utilizing standard methodologies that will make the data comparable with other forest inventories in Sri Lanka and elsewhere in protected areas around the world. Trained data collectors would be employed in the MPCAs to interact with the villagers in the conduct of the resource surveys. This activity will follow, a preliminary exercise of definition of the boundaries of the proposed MPCAs, to be done by a team of sociologists and the Forest and Ayurveda departments, in consultation with the local villages.

22. The project will provide technical support, equipment and data collectors to enable the collection of biological, ethnobotanical, agronomic and socio-economic information for resource mapping at the MPCA level. These surveys will be provide the basis for defining the boundaries of the MPCAs, zoning of core, sustainable use, and buffer zones and provide the basis for preparation of the management plans.

Management planning for conservation within the conservation areas and surroundings

23. The implementation of the participatory conservation area programs will be on the basis of existing or planned management plans. These plans will provide broad operational guidelines for zoning of the conservation areas for different uses; for defining the types of activities that could be implemented in the different management zones; and for reaching agreement on the nature and extent of sustainable use that can be permitted within the conservation areas. Where

management plans exists, the project will make use of these as the basis for the implementation of the program. Where necessary, adjustments will be made to these plans to incorporate special considerations for medicinal plant conservation and use.

24. The project will support the preparation of participatory management plans for the MPCAs, where plans do not exists, and the refining of existing plans, during the first year of the project. International conservation area management and horticultural specialists and national experts with skills in management planning, medicinal plants, agronomy and sociology will facilitate the preparation of the management plans. This team will be supported by representatives of the relevant government agencies, such as the Departments of Wildlife Conservation, Forestry, Agriculture and Ayurveda. During the management planning process, specific effort will be made to integrate socio-cultural, medicinal plant conservation and utilization considerations and to broaden the participation and cooperation of stakeholder groups, including specifically forest dependents, disadvantaged and poor households, traditional practitioners and medicinal plant collectors. Plan preparation will be supported by extensive biological and socio-economic surveys, PRAs and workshops for obtaining consensus to the proposed management plans. The management plans will define broad strategies and actions for the management of each MPCA, arrangements for plan implementation, and outline the roles of local communities, local government, national agencies and NGOs.

Cultivation and enrichment with medicinal plants

25. The cultivation and enrichment of medicinal plant species will be undertaken in proximity to MPCAs during the project and through extension activities in the latter years of the project, province and then island-wide. The selection of species for propagation and cultivation will depend on a number of factors, including levels of endangerment, day to day use and market demand. Areas within the MPCAs, especially those subject to disturbance, will be enriched with species of medicinal plants that are produced as a result of nursery activities. The emphasis would be on species of that area currently being reduced from the wild. This will occur after the second or the third year of the project and include the forest areas and buffer zones. The cultivation of species in home gardens, farms, forest areas, buffer zones, gene banks and other selected sites, will complement protected areas and MPCAs in maintaining genetic diversity of valuable medicinal plant species. The species to be planted would vary depending on the sites selected. In degraded parts of the MPCA and buffer zones--species which are contained within the MPCA would be encouraged, with emphasis on those currently extracted from the forest and under threat; home gardens--species that are also useful as food or form home remedies; farms and production units (including agroforestry systems and planting under perennial tree crops)--economically viable species with preference given to mixed plantings; nurseries--species recommended for reforestation, home gardens, and for large scale planting; field gene banks--species selection will reflect local ecotypes; and medicinal plant gardens --species selected to reflect local ecosystem and value for seed collection and educational purposes.

26. This activity would be specifically focused within and around the conservation areas. Technical support and extension for this component would be provided by the project office and agronomic expertise from the local agriculture officer on a part time basis. In order to provide sufficient plant material for the planting program, two new nursery zones will be established in the Western and Southern Provinces and three existing nurseries at Bathgoda, Pattipola and Girandurukotte will be improved.

27. The cultivation of medicinal plants will help to conserve threatened species. This activity could be promoted through nursery development at the MPCA level, production of planting material for cultivation in home gardens, farms, buffer zones and other selected sites around the MPCAs. Cultivation, on both small and large scale, can also produce new sources of raw material for subsistence use and to supply markets, and thus eventually ease pressure on wild populations. Additionally, cultivation of economic species, in conjunction with processing and marketing, can form the basis for small enterprises with income generating potential to be carried out by local communities.

28. Since threatened species of plants have become rare even within the protected areas, a significant activity of the project will be in the reintroduction and enrichment of selected plant populations in the buffer zones and areas within the MPCAs, based on areas identified during the management planning process. The planting and enrichment, particularly of slow growing species, will help ensure a continued abundance of such plants during the next century.

29. In the buffer zones, the planting activities will be undertaken with due consultation and participation of the local communities. In the conservation forest areas, planting will be the responsibility of the Forest Department, and priority will be given to the planting of threatened species, with a special focus on those plants that take many years to reach maturity. Planning and needs assessments for the different buffer zones and conservation areas will start during the second year of the project. Planting in these areas will begin during the third year.

30. The project will focus ex-situ cultivation and conservation efforts on a range of medicinal plant species selected on the criterion that follow. An identified 208 commonly used medicinal plants in Sri Lanka and 79 of the most threatened species would provide the starting point for selection of species for cultivation. Additional selection criterion to be utilized for selection of actual species for cultivation would include: agronomic requirements; endemism and rarity; quantities used; impact of harvesting on the individual plant part used and mode of collection; price and market demand; extent of collection from the wild; distribution and range; time required for maturity; reproduction rate; quality of raw material; suitable for transport over long distances; availability of imported substitutes. The 208 species will be surveyed and ranked for their suitability for the propagation and cultivation studies; propagation will be attempted with a manageable number of species, while cultivation and more widespread use in the agronomic system will be limited to a more tightly focused group.

31. The project will also seek to encourage large scale planting of medicinal plants in leased-out state forest lands, agroforestry systems, plantation crop lands and in the private sector. Around the MPCAs, both planting material and technical advice will be provided by the Department of Ayurveda. The project will further seek state support for such planting in the form of subsidies or tax relief. Support for marketing medicinal plants will further strengthen this private sector involvement.

Investigations to promote sustainable utilization of medicinal plants

32. Currently, collection of medicinal plants from the wild is haphazard and unmanaged. A recent study has identified four types of forest users involved in the collection of medicinal plants. First, there are villagers who collect plants for home remedies and for domestic consumption. Second, there are traditional practitioners who collect material for their medical practice and who normally keep to themselves the information about the location and availability

of medicinal plants. Third, there are the practitioners of rituals who collect their requirements. Fourth, there are collectors of plants for sale. Unlike the first three categories of forest users who are inclined to collect material with least damage to the environment and in quantities typically replenishable, the commercial collectors often adopt destructive harvesting techniques. Commercial collection of some species for export in large quantities can pose a serious threat to the survival of these species in Sri Lanka. Destructive practices are very common, for example, uprooting the entire plant if only the bark or resin is required, or chopping branches to collect the fruits. The techniques used in harvesting plants and plant parts are primitive, and improved harvesting techniques and tools are not known.

33. Investigations on the plant biology, reproductive biology and ecology will be undertaken on selected medicinal species in order to provide information necessary for sustainable management of populations in the wild. There are six steps necessary for exploiting NTFP's in a sustainable fashion. First, the species to be exploited should be carefully selected, after such factors as the ease of harvesting and resilience of natural populations to disturbance are considered. A tree valued for its roots will be harder to harvest than one valued for its fruits, and the harvest of a species that produces fruits in massive quantities at one time of the year will be easier to manage than the harvest of species that produces fruits sporadically throughout the year. Once the species has been decided upon, a forest inventory is undertaken to learn where the resources are found in greatest abundance and the number of productive plants per hectare. An assessment of the quantity of resource produced by the species in all of its size classifications helps direct the harvest of specific trees in specific habitats. As harvest begins, careful measurements of the species continues, seeking to monitor the status of the population for signs that the forest is being overharvested. For example, trees are examined to see whether or not flowers are being pollinated, whether large numbers of fruits are being consumed by predators, etc. If such problems arise, the harvest is to be adjusted to keep its level below the rate that would threaten sustainability. When necessary, enrichment activities will be undertaken in areas that do not seem to be regenerating, or open up forest canopies to allow more light to reach young plants and speed their regrowth. This notion of sustainable harvest involves the collection of very precise measurements, which must then be monitored to detect changes in floristic composition. The proper execution of this activity will necessitate the training of a cadre of people who can take the measurements and others who can monitor the data. Thus, a series of training courses in sustainable harvest techniques has been proposed as part of this project, and is discussed elsewhere.

34. The project will provide support for contracting a national level research institution or university for conducting the sustainability studies in the MPCAs, preferably as a single contract for the five MPCAs. The contracted institution will provide two research associates to each MPCA for data collection and analysis.

Ethnobotanical research to salvage and preserve critical indigenous knowledge of medicinal plants

35. The traditional knowledge of plant used for health care and other aspects of life is as endangered as the biological diversity itself, and one major focus of this project is to salvage as much of this information as possible, and preserve it for future generations who will be challenged with the task of coexisting with a changing and increasingly degraded environment. The bulk of traditional medicinal plant knowledge is in the custody of elderly villagers and

Ayurvedic practitioners, and the younger generations have limited opportunities--as well as desire--to continue on the traditions of their elders. While being an irreplaceable cultural treasure, this knowledge, developed over many generations and in proximity to the biodiversity and species which this project seeks to manage and conserve, is also an invaluable guide and foundation for all other project activities. This project will put together teams of investigators who will systematically work with traditional healers and others knowledgeable about forest plant use, to record this information for posterity.

36. This component will be supported through several other activities which are crucial to its success, namely training of a cadre of professionals who understand and are sensitive to the value of traditional knowledge, as well as a group of ethnobotanical specialists who are involved in the fieldwork. It also recognizes the need for local and national curriculum development to communicate the importance of traditional information about medicinal plants, even in the modern age, and the value of their preservation. Two week local training courses in ethnobotany and sustainable management would be conducted in the first three years of the project to build local capabilities with the support of international and national specialists, followed by technical support for the remaining two years of the project to review and guide the field work. The development of specific texts, based on sound scientific and clinical applications of the plants, for physicians and interested lay persons ensures communication and use to the largest audience possible, and is a crosscutting activity that will support other aspects of this project. Finally, the development of legislative activities and legal mechanisms for the conservation, sustainable use, and promotion of the value of medicinal plants will also support this endeavor.

37. The methodology employed in ethnobotanical studies is similar to that in other scientific disciplines in that it is slow and meticulous. Ethnobotanists learn about the plants that indigenous people use, catalog their knowledge about the useful ones and the poisonous ones, and collect plants for study and possible cultivation. Hundreds of hours of patient observation and experimentation are involved in these studies, along with the critical work of pressing and drying plant samples. Ethnobotany, is at its core an observational science, but it involves experimentation and a level of rigor that is common to all other sciences. Many insights are incorporated into ethnobotanical methodology, making it a true multidisciplinary science, and requiring of its practitioners a series of skills.

38. It will be necessary to develop a unified approach to the ethnobotanical studies to be carried out by this project, which will facilitate the research itself as well as allow for a series of comparative studies amongst the different villagers and healers. This requires that tight coordination of all studies be undertaken, as well as training of those involved in the fieldwork and bibliographic studies. Skills necessary for the translation and understanding of an old manuscript are quite different from those that are used in a field interview with an elderly practitioner.

39. Participatory approaches will be used not only in the gathering of information, but also in transmitting this knowledge to the younger generation within the communities. These ethnobotanical studies will be supplemented by attempts to impart site-specific information to local students, and to provide some measure of compensation to elderly practitioners to impart their knowledge to the younger generation within the local communities. The project will work specifically with schools and other local institutions and pursue such activities as training

activities in the curriculum, and encouraging the continuation of the "guru kula" system of apprenticeship.

40. Many earlier ethnobotanical studies in this region and elsewhere, whether of healing techniques or other plant uses, had as their aim the production of a list of plants deemed "useful" by the people of an area. The ethnobotanist often made little effort to understand how the indigenous people viewed the plants in their own culture. Although these older-style surveys contain much useful information, particularly since we know so little about the world's plant diversity, they are now in need of being repeated using newer techniques. These techniques have proven their value in studies of all kinds of plant uses.

41. In this study, the ethnobotanist will adopt the role of participant-observer, living with the people under study, observing their daily life and customs, and learning about their lifestyle, foods, disease systems, and myths and legends. In true participatory ethnobotany, the indigenous person becomes a teacher, a colleague, and a respected and valued friend. It will be essential to maintain objectivity while using this technique, as well as avoid unconsciously directing the flow and nature of the conversation. Hence, there is an inherent need for intensive training in contemporary techniques of ethnobotanical methodology if this project is to be a success. Another style of ethnobotanical methodology that will be employed is where the scientist asks their indigenous colleagues to re-create events, perhaps those that were once more common. Ethnobotanists may ask to see how a limb is splinted with a palm leaf, or how a medicine that is no longer widely used is harvested and prepared. In his type of work the ethnobotanist can take more detailed notes, and examine events in greater detail. The "artifact/interview" method will also be employed in the study, where the ethnobotanist queries local people about an item, such as a medicine, produced from plants. The investigator will gather information on where the plants come from, and return to the field together with them. Other studies will be carried out in order to understand the management strategies that indigenous peoples use for their native plant resources. Finally, another type of methodology that will be used as appropriate is known as "immersion ethnobotany" which reduces the distance between subject and observer still further, as the ethnobotanist submits to being treated by an indigenous practitioner and is thus able to learn first-hand about the profound effects of the traditional medical system in such a way that it can be described in great detail.

42. A national level university or research institution will be contracted to do the ethnobotanical research work in the five MPCAs. The contracted institution will have an expert group, consisting of a Social Anthropologist, a Botanist and an Ayurvedic Practitioner to provide technical guidance in this program. Two research associates for each of the five MPCAs, will be involved in field work in the conservation areas. These research assistants will be initially trained by qualified ethnobotanists and supervised in their work by the expert group. The research assistants and affiliated researchers will collect information that includes uses and names of a range of economic species, management and cultivation techniques for these species, and cultural and religious values for the forest. Each collection of use data will be vouched by an herbarium specimen, collected in sets of 4-6, to be distributed to specialists in-country and to centers of excellence, to ensure their permanent preservation. Reports will be prepared by the research assistants on each village and the plant resources they contain for review by the expert group and eventual publication and dissemination. These reports will provide data for the data base established at BMARI, and for the Information Center at the MPCAs.

Educational Site Visits to promote awareness and contribution to financial sustainability

43. The development of the Island's first MPCAs, one of the few such conservation units in the world, will present opportunities for visits by tourists and others interested in medicinal plants who are not necessarily involved in other aspects of this project. Over the lifetime of the project there will be the chance to develop areas in the MPCAs that are of interest to the public, such as a medicinal plant trail where certain species of medicinal plants are marked and opportunities offered by village residents or traditional healers to serve as instructors or guides to this group, as an additional source of income. Other outputs of this project, such as the booklets and guides to medicinal plants of Sri Lanka, would serve in this activity as well. The ecotourism program (educational site visits) would be implemented through the village committees, which would provide an additional incentive to MPCA neighbors to conserve the reserve resources. This activity would initially focus at one or two of the MPCAs (Kanneliya and Ritigala) and would include project support for national ecotourism specialists to develop ecotourism plans and workshops to identify and disseminate information on appropriate strategies and approaches for community based development of educational site visits for local and foreign tourists, and the preparation of information materials and brochures.

Promotion of complementary village development activities for the establishment of medicinal plant gardens and the promotion of alternative income generation activities

44. A village development fund will be established to provide financial assistance to selected communities to establish their own medicinal plant gardens for commercial exploitation and to provide them with other income generation avenues. This activity, beginning from the first year, will entail provision to the communities of a grant computed on the basis of about Rs. 1,000 per household annually to about 4,000 households in the six MPCAs. The grants may be used for planting medicinal plant gardens in homesteads, for processing medicinal plants, for enterprise development, for creation of alternative income development opportunities to existing destructive uses, or for essential infrastructure development to supplement the project activities.

45. The primary objective of the village development program is to provide alternative income generation opportunities to those who are currently dependent on MPCA resources for their livelihood and to find substitutes to currently destructive activities. In this respect, the village development program would be directly focused on investment activities that demonstrate a direct linkage to the conservation of biological diversity and medicinal plants in the conservation areas. Activities that are typically of a rural development nature would not be eligible for financing unless they can justify a conservation objective.

46. In order to ensure that proposed village investments are in keeping with the major conservation objectives of the proposed project, specific guidelines and procedures have to be defined. In order to qualify for project support, investments would have to meet the eligibility criteria and the procedures set out for ensuring their compatibility with project activities. The criteria must ensure that the investments broadly meet the following considerations:

(a) Directly or indirectly contribute to the conservation of indigenous medicinal plant resources, by creating sufficient incentives to warrant local community action to improve conservation

(b) Are identified and owned by the VPMCs

(c) Are socially and institutionally feasible; i.e. ensuring that the selected activity is culturally acceptable and that the institutional capacity exists at either the local level for development and maintenance of a selected activity

(d) Are financially feasible, i.e. that investments would generate returns to compensate for resources foregone, market linkages exists, cash flow requirements are viable, and returns compare favorably with alternative options available

(e) Are technically feasible, i.e. that technical competency exists, physical conditions are suitable and activity is technically sound

(f) Are environmentally sustainable.

(g) Ensure that benefit sharing is equitable and related to level of dependency on conservation area resources.

47. The MPCA project officers and village level planning teams, consisting of local-level NGOs will be responsible for planning, implementation and monitoring development activities and for applying the eligibility criteria to proposed investments. The VMPCs would assess these criteria using local indigenous knowledge and field experience, but would access technical expertise where necessary through the project. The MPCA Project Officer would then be responsible for ensuring that the village level plan proposals meet the criteria before authorizing their implementation.

48. Village activities, commencing from the first year, will entail provision to the communities of project funds computed on the basis of about Rs.1,000 (US$18) per household annually to about 4,000 households in the six MPCAs. The budget constraint per VPMC would be calculated on a per household basis, multiplied by the total number of households in the VPMC. For example, a fifty-household village would make decisions within a binding budget constraint of Rs.50,000 (US$900) for the first year, or Rs.250,000 (US$4,500) over a five-year implementation period.

49. These funds may be used for planting medicinal plant gardens in homesteads, for processing medicinal plants, for enterprise development, for alternative income generation activities, and village level infrastructure related to project development. Individual beneficiary income generation schemes would be supported by the provision of loans to be recovered by the VPMC and deposited in village bank accounts to be recycled for other village development programs. For investments that are generally of a community nature, the VPMC is expected to provide a substantial part of the investment cost, either in the form of cash, kind, or labor.

50. This activity will be jointly implemented by the Department of Ayurveda and local NGOs. In particular, very attempt will be made to identify existing government and NGO programs for village social development that are relevant to the project, so as to avoid overlap of activities.

Promotion of financial sustainability through market information and the development of value added activities to benefit local medicinal plant collectors and dependents

51. The medicinal plant trade and markets within the country experience over supply, wastage, and low prices to local collectors. Only a few major exporters and manufacturers have access to up-to-date market information, which is not available to the village producers and collectors. As a result, collectors often harvest more materials than the market can handle, or due to low prices at the village level, must harvest large quantities, often unsustainably, to even make a modest return. In addition, collectors, use destructive harvesting methods resulting in the depletion of medicinal plant resources. Due to the lack of technology, communities are unable to produce value-added products, and therefore are forced to trade raw materials. The project will undertake research and market analysis, post-harvest handling, processing and product development potential for medicinal plants. Market information will be made available to the participating communities for decision-making regarding species and product selection.

52. In order to provide additional income at the village level, value added activities will be developed that can benefit local plant collectors. For example, by drying a fruit crop in the village, rather than in a central factory, transport costs are reduced and additional income is possible for the villagers. The project would support research and development to introduce low cost production technologies based on the use of local medicinal plant resources and also make information available to local villagers on already available and proven value addition technologies in the country and elsewhere, and support the establishment of village based enterprises. Technical support and training, including study tours to neighboring countries to study market strategy development and value addition technology applications available in these countries.

Establishment of medical and information center to demonstrate the sound processing of medicinal plants and awareness of the importance of conservation

53. An Ayurveda medical center (in each MPCA) will be established in the communities surrounding the conservation area. Each will contain a physician and helper. The medical center will also house a processing unit, equipped by the project, for processing plant material and preparation of herbal medicines. An Information Center, for the building of public awareness in traditional knowledge, medicinal plant identification, cultivation and use, and market information will be established as part of the medical center.

54. The medical center and associated staff would be provided as part of the existing government program to develop a nation-wide network of indigenous medicine centers. The project would provide complementary support for the establishment of the value-addition and processing facilities, as well as for the information dissemination program. The information program would be geared towards providing information on the identification of species, processing and value-addition technologies, sustainable harvesting methods, etc. to the communities living around the MPCAs.

55. The medical and information centers would also serve as sites where apprenticeship training of future traditional healers will take place, becoming in effect the classrooms for communication of the traditional knowledge from the elder generation of healers to the younger. The knowledge that is recorded in manuscripts is generally less exhaustive than what is passed

on in an apprenticeship system within the village. Knowledge regarding the stage at which the plant provides the best material, the locations where it is available, how it may be harvested with minimal destruction, and other aspects is not clearly found in manuscripts, and it is essential that it is taught through an apprenticeship that will be based in the conservation areas. The value as well as fragility of this traditional knowledge, as well as its value at the global level, is recognized in this project. The project will encourage the continuation of the "guru-kula" system of apprenticeship, and include compensation for healers who are teaching students. In the reserves, rudimentary structures will be available, e.g. tables and simple shelters, that can be used in the instruction of the students and be incorporated into other activities, such as the guiding of educational tours in the area, when possible. The project will provide scholarships and program support financing to village youth for apprentice study under the guidance of Ayurveda Physician at the Medical Center.

56. The government has encouraged schools to establish medicinal plant gardens as part of their education and health care programs, and it has provided some funds for the establishment of these gardens. This project will complement existing activities of the government by providing small grants to schools around the MPCAs for establishing medicinal plant nurseries and gardens. The project will serve to greatly increase awareness of conservation of medicinal plants and their sustainable use in and around the conservation areas.

Education and extension activities to demonstrate the cultivation and conservation of medicinal plants

57. In order to promote habitat conservation and sustainable management of medicinal plant species, and generate new economic activities relating to medicinal plants, education must occur at both the national and local levels. Details of this will be provided elsewhere in this report. However, there will be site specific educational and extension activities undertaken in the MPCAs. These will include the availability of information and demonstration materials related to the cultivation of medicinal plants, in particular in farms and home gardens. The Department of Ayurveda will implement this component with the support of the Department of Agriculture. The involvement of local level women's groups will also be solicited to disseminate this information. The project will provide national technical support for preparation of dissemination materials and production of the materials.

B. Component 2: Expansion of *ex-situ* conservation (US$ 0.48 million)

Background and Justification

58. According to estimates by the World Health Organization, around 3-3.5 billion people on the planet depend on traditional medicine for some component of their health care, with the majority of the therapies utilized in traditional medicine derived from plants. Many of these plants are harvested from the wild, and due to factors such as unmanaged harvest and habitat destruction, supplies of many species are threatened.

59. A number of medicinal species are threatened due to habitat conversion and the destructive, or excessive harvest of populations in the wild. Traditional harvesting practices do not generally result in threats to wild populations, but increased commercial demand and the

breakdown of traditional management systems in some areas have led to serious threats to a number of medicinal plant species. These include *bim-kohomba* (*Munronia pinnata*), *ekaveriya* (*Rauwolfia serpentina*) and *amukkara* (*Withania somnifera*). In some cases, the sudden removal of Indian imports from the market has led to immediate overcollection locally. Examples of species which are particularly vulnerable as a result include *agil* (*Erythroxylum monogynum*), *welmadata* (*Rubia cordifolia*) and *sudunhandun* (*Santalum album*).

60. In Sri Lanka, the use of plants in medicine, cosmetics and health foods is on the increase. Medicinal plants such as *gotukola* (*Centella asiatica*), *mukumuwenna* (*Alternanthera sessilis*) and *kankun* (*Ipomoea aquatica*) are cultivated on a large scale for consumption as vegetables. Many Ayurvedic physicians have their own plots of commonly used medicinal plants, such as *polpala* (*Aerva lanata*), *adathoda* (*Adathoda justicia*), *thippili* (*Piper longum*) and *heen araththa* (*Alpinia galanga*). Other species are found in the villages where use is open to the community as a whole, for example, *nika* (*Vitex negundo*), *mee* (*Madhuca indica*), *kohomba* (*Azadiracta indica*), *athtikka* (*Ficus racemosa*) and *kumbuk* (*Terminalia arjuna*). Some trees that are found in sacred places such as temples (eg. the *bo* tree--*Ficus religiosa*-- and *na* --*Mesua ferrea*) are commonly used in Ayurveda, although they are subject to more strict conservation due to their location.

61. Thus, in order to reduce some of the pressure that is resulting in the loss of plants used for traditional medicine in Sri Lanka, the project plans to investigate ways of developing sources of cultivated plants and developing a better understanding of the propagation and agronomic requirements for cultivation of selected species of medicinal plants, concurrent with the reduction in wild harvested species that will occur once sustainable management practices are developed and put into place in the forests. This is in line with the contemporary thinking and recommendations expressed in the Convention on Biological Diversity, specifically in Article 9 which recommends the promotion of the propagation and cultivation of medicinal plants.

***Ex-situ* cultivation and conservation within the Project Context**

62. Lack of technologies for the mass propagation of medicinal plants, agronomic and cultural practices for the systematic planting of medicinal plants is recognized as some of the most serious constraints to popularizing this activity. The project will provide research support, extension information, training and dissemination for encouraging the planting of selected medicinal plants and for improving the capacity of the Department of Ayurveda to meet the increased demand for planting material. Although, the adaptive research activities would be focused around the five MPCAs, its findings are expected to have a catalytic effect on the cultivation of medicinal plants throughout the country.

Activities

63. The expansion of *ex-situ* cultivation and conservation component of the project would be achieved through the following four activities:

Nursery level research on the propagation of medicinal plants representative of Sri Lanka's agro-ecological zones

64. The project envisages supporting research for the development of techniques for the propagation of medicinal plants representative of Sri Lanka's bio-geographic zones.

Home garden, farm and plantation level research on cultivation of medicinal plants

65. The project would support research aimed at the investigation of field planting techniques for cultivable species. The program would consist of a series of experiments in home gardens and farmers' fields to test various parameters related to cultivation of medicinal plants, as a component of a farming system. Research would also be geared toward intercropping medicinal plants in tree crop plantations, such as rubber and coconut. Results of adaptive research on farmers' fields and plantation areas and detailed economic analysis of recommended package of practices will form the basis for providing these technologies to the end users.

66. Species selected for adaptive research in each site would be selected on the basis of their endangerment, demand and commercial value. Species selection will vary by site. For example, buffer zone area selection will emphasize the need to provide financial benefits to households and discourage excessive or destructive harvests in forest areas. Gene banks and medicinal plant gardens can provide basic knowledge about wild relatives and propagation material for cultivation. Species with very slow reproductive rates and limited availability of planting material will be mass propagated in vitro for ex situ cultivation.

Improve and enhance gene bank and nursery capacity of Department of Ayurveda

67. The Department of Ayurveda currently has three nurseries that produce medicinal planting material, at Bathgoda, Girandurukotte and Pattipola. However, these three existing facilities are not expected on their own to be able to meet the basic requirements of planting material and the diversity of species that may be required to meet the planting needs of the proposed project, in particular for the five MPCAs. The existing three nurseries do not cover the full complement of bio-geographic zones represented by the five MPCAs.

68. The project will provide additional funding support over and above the current base line to enable the existing nurseries to expand production and serve as the repositories of mother plants and selected stocks. In addition, the project will support the development of new nurseries in the two bio-geographic zones, where nurseries do not currently exist. One nursery will be at Miriswatte in the Western Province and one near Galle in the Southern Province. The additional two nurseries would provide repositories for mother plants of species of the two bio-geographic zones not covered by the three existing nurseries. It should be noted that in addition to these five major suppliers of planting materials, the project will establish smaller nurseries near each of the medicinal plant conservation areas which will serve to support increased cultivation of medicinal plants in those areas.

69. It should be recognized that the objective of this activity is not only to meet the planting needs of the country, but to support the maintenance of mother plants and quality planting stock of species of medicinal plants found throughout the country. These five parent nurseries would serve as a source of mother plants for the large number of private and public sector nurseries where replication and production will largely take place to supply the planting material needs of the country.

70. In addition, the project would investigate possibilities for improve medicinal plant material collections in existing gene banks in the country, notably that of the Ministry of Agriculture. This component will be discussed and finalized at Appraisal.

General promotion of cultivation through training, research information, dissemination and mass awareness

71. The project would support the dissemination of research information, training and awareness for the cultivation of medicinal plants to farmers and the public through existing extension channels. In particular, the project will provide training and materials for incorporation of information on medicinal plant cultivation into existing extension programs of the agencies dealing with the subjects of agriculture, plantations, and forestry.

72. Selection of species for information dissemination would be based on the following criteria: (i) extent of availability of information on propagation and agronomy; and (ii) demand for cultivation; (iii) degree of threat. Currently, some information exists for the propagation and cultivation of 22 medicinal plant species, although this may not be complete in relation to agronomic practices. The project would support the production of extension materials and training of a few priority species as a demonstration, and would be extenuated to other species as information is generated on these species through the applied research program.

C. Component 3: Information and Institutional Support (US$ 2.52 million)

Background and Justification

73. National and international law and policy provide a framework within which harvesting, marketing, export, and associated activities in relation to medicinal plants occur. Conservation and development activities associated with medicinal plants cut across many sectors, and are affected by a range of legislative and policy areas. Information on medicinal plants, their sustainable use and propagation and cultivation are critical for the overall conservation of medicinal plants. In particular, systems for gathering, organizing and storing information; distribution systems that provide access to information; and analysis and application of information to decision-making are characteristics that are fundamental to the conservation of any important biological resource, like medicinal plants. Institutions that are charged with conservation and management have a fundamental responsibility to apply the appropriate policy and legal instruments and information to guide and manage these valuable biological resources.

Informational and institutional activities within the project context

74. The conservation and sustainable use of medicinal plant resources is affected by national and international law and policy; the availability of information on medicinal plants; and institutional capacity. The project will provide support to ensure that the protection of medicinal plants and their products and traditional knowledge on medicinal plants would be protected, as far as their intellectual property is concerned. For example, what is the value of the information given to a specific plant by an individual healer, and what are that individual's rights to a claim of any profit made on the sale or use of that information, through publication and/or value added activity by a commercial venture. Legislative and other legal activities will be undertaken as a component of the project to bring up to date, as far as possible, local laws and practices dealing with this type of intellectual property.

75. Similarly, the project will support the improvement of data on medicinal plants, for improving data analysis and management, and for enhancing the national capacity for improving the conservation and sustainable use of medicinal plants, including strengthening the national capacity to effectively manage intellectual property issues related to the conservation of medicinal plant resources and information on them.

Activities

76. The following activities would be supported under the project:

Promotion of appropriate legal and policy environment through studies and regulations

77. In order to address the issues relating to conservation of medicinal plants, their cultivation, regulation of harvesting, regulation of their import and export, safeguard of traditional knowledge and plant genetic resources, introduction of standards for Ayurveda products and raw materials and to reduce the loss of habitat of medicinal plants, legislative and policy changes are necessary. There are a number of unclear areas relating to the import and export of medicinal plants. It is essential that, when working with materials such as the old manuscripts as well as the original field work with traditional practitioners, that all parties involved be protected as far as their intellectual property is concerned.

78. The project will support technical assistance and studies to review policy and legislation relating to conservation of medicinal plants under different legislation dealing with conservation of biodiversity, as well as obligations and issues related to the Convention on Biological Diversity; review of regulations establishing standards and prescribing a code relating to the manufacture, sale, supply, distribution or dispensing of medicinal plant products and articles; regulations regarding the collection, export and import of medicinal plants and their parts; and the feasibility of preparing laws for the protection of indigenous knowledge and the legal issues related to intellectual property rights as they relate to medicinal plants. In addition, the project would provide support for consultation with the World Intellectual Property Rights Organization and workshops on this important theme.

Design and development of a database of medicinal plants

79. Although a systematic inventory of the medicinal plants of Sri Lanka has not been undertaken, a large volume of information based on floristic and phytosociological studies is available in the country. This information is scattered in floras, books on medicinal plants, the National Herbarium, relevant post-graduate theses, data bases in the National Conservation Review, and Wetland Project site reports. Some information is present with BMARI and in the National Conservation Review completed by the Forest Department, however, the latter is restricted to woody plants, and the surveys are limited to some parts of the country. BMARI has largest amount of information on medicinal plants and is a living base, but, it is still rudimentary.

80. These data sources will be searched to pull together information on medicinal plant species as they occur in their natural habitats, to improve the level of information collected for this section.

81. The project will also support the establishment of a data processing and information services center at the Department of Ayurveda to organise information necessary for medicinal

plant conservation, including botanical and local names, distribution and ecology. chemical characteristics, and market information. This center will facilitate the establishment of databases at relevant institutions by providing technical support, training and ensuring compatibility between different databases. A relational database will be established at the BMARI, and will consist of data sets compiled by different institutions and agencies. These datasets have been set up independently within each program (NCR, Wetland Project, National Herbarium, etc.) under the management of the relevant institution to serve internal needs. Information contained within the data base will be accessible on the basis of procedures to be drawn up by the Department of Ayurveda. As part of the information development program, the Department of Ayurveda will investigate ways in which access to information contained within the system can be controlled and managed to ensure that benefits resulting from any commercial use are equitably shared with practitioner's association, communities, BMARI and other groups which have contributed information.

82. The traditional knowledge found in the hundreds of old manuscripts written on palm leaves by practitioners of Ayurveda have not been interpreted, thus a valuable source of information remains untapped. Some of the palm leaf manuscripts at BMARI are up to 700 years old, containing a plethora of ancient wisdom on plant use for diseases of humans and domestic animals. To date, some 100 of these manuscripts have been transcribed and published by BMARI, and the project will endeavor to transcribe and interpret, using specialists contracted for this phase of the work, a manageable number (about 50) of the 500 old manuscripts housed within BMARI, and will promote the study of these and other old manuscripts. An expert group on ethno-medicinal studies will be commissioned by the Department of Ayurveda to oversee the project. Digitization of the original materials will be undertaken to safeguard the information and to make it more widely available without risk to the fragile manuscripts themselves.

Training and mass awareness on medicinal plant conservation

83. In addition to the specific training needs identified for the implementation of the in-situ conservation and ex-situ cultivation and conservation components of the project, training in specialized disciplines will be supported under the project. The Project will finance four to six specialized post-graduate level training positions (doctoral or masters) in ethnobotany and sustainable management in suitable institutions outside the country. This training will be available to staff of the Departments of Ayurveda and Forestry, universities and research institutions.

84. Although environmental matters have steadily increased in importance as part of the formal education system, medicinal plants do not feature prominently in environmental education at present. However, by reaching the more then 10,000 schools in the country, perceptions of and activities relating to medicinal plants can be significantly affected. Medicinal plant curricula developed as part of this project will be designed to supplement traditional subject areas such as agriculture, botany, biology, social studies, etc., and will be built into the teacher training programs. Teacher training would be contracted to a national level NGO, and would include the development of teaching material, discussions and review of materials by curriculum developers for integration into existing syllabi, teacher orientation through seminars and workshops, publication of material, and evaluation of the program.

85. The project would also support the development of social publicity programs and materials for public television and radio. The preparation of these materials will be contracted to a qualified communication specialist or institution.

86. There is a tremendous need for educational materials for use in the training and upgrading of the skills of Ayurvedic and other physicians, and this project will endeavor to produce such materials through the activities of the BMARI. This will include the development and promotion of standards for medicinal plant material, aided with the pharmacognostic analysis of some samples, which will be distributed to practitioners as well as the public, collectors, cultivators, traders and manufacturers. In addition, a manual covering the 208 most widely used species of medicinal plants will be prepared, with sections on the botany, traditional uses, medical uses, clinical studies, biological activity and chemical composition, supplemented with black and white line drawings of the plants, will be produced. It is expected that publication will be in multiple language versions, in order to have as wide an impact as possible, including at the international level, as it would also be useful to the worldwide community of Ayurvedic and other physicians whose practice involves the use of herbal materials.

Monitoring and evaluation of project achievements

87. In addition to the regular progress monitoring which will be undertaken by the Department of Ayurveda, the project would support impact monitoring to assess the ecological and socioeconomic impacts of the project so as to determine whether there is agreement with those anticipated. Impact monitoring would also assess the effectiveness of project institutions and processes in meeting project objectives. Impact monitoring would be contracted to a multi-disciplinary team from an independent research institution or university.

88. The monitoring of project impact would be based on a conceptual framework to be developed at the beginning of the project. The framework would embrace medicinal plant values in the MPCAs, anticipated changes, sampling methods, analytical methods, mechanisms for feedback and project adjustment, and roles and responsibilities for monitoring. Monitoring would be done at periodic intervals through a consistent set of measures or indicators that reflect values for which the MPCAs are being managed, the control and mitigation of threats to the conservation areas, and the effectiveness of institutions and processes.

Support to Project Management, Project Coordination and Advisory Functions

89. The implementation of the project will require very specific arrangements for project management, coordination and advisory support. These arrangements would facilitate the smooth operation of the project and would be established as a temporary measure for the life of the project. These are discussed below:

90. *Project* Management. The Ministry of Health and Indigenous Medicine (MIM) will be responsible for project execution, and will work in close collaboration with the relevant government agencies, provincial councils, NGOs and communities. A project management unit (PMU) will be established within MIM for the management of the project. The PMU will be headed by a Project Director, reporting to the Secretary, MIM. The PMU will implement the project through the line agencies, provincial institutions, and local community institutions, as appropriate.

91. In addition to the Project Director, the PMU would include core staff comprising a Program Officer, Administrative Assistant, Accountant and few Support Staff. The PMU would be located at Colombo.

92. The implementation of project activities will be the responsibility of the respective cooperating agencies, under the overall coordination of the PMU. Since, the project will involve a substantial involvement of the provincial councils in the implementation of activities in the MPCAs, the long-term commitment of the respective provincial administration will be ensured by MIM entering into a Memorandum of Understanding (MOU) with the relevant Provincial Councils (represented by the Chief Secretary) detailing the cooperation and collaboration required.

93. The project will support the staffing and functioning of the PMU to provide logistical, administrative and financial support services for various activities to be undertaken by the participating government agencies, NGOs, community organizations, and individuals.

94. *Project* Coordination. Since there is a diverse set of stakeholders involved with the project, at the national, provincial and local level, coordination arrangements are needed. At the MPCA level, the MIM will guide and oversee the implementation of activities. Provincial Project Management Committees (PPMCs) will be established at each of the provinces where the MPCAs are located. These committees will be chaired by the Chief Secretaries of the respective participating provinces and will include representatives from the state and provincial agencies, and NGOs who are directly participating in the conservation area programs. These committees will oversee the implementation of project activities, including monitoring and evaluation, approve plans of actions and work programs and other related matters. The Project Officer of the relevant MPCA will serve as the convener of this committee.

95. At the national level, the existing national project steering committee on medicinal plants (NPSC) with some additional members, will provide overall policy and strategic guidance for project implementation and to ensure that project activities are consistent with the project objectives. It will also approve annual work plans and budgets. This Committee is chaired by the Secretary, Ministry in charge of the subject of indigenous medicine. The Project Director will serve as the convener of the NPSC.

96. *Project Advisory* Group. This technical group of international and local scientists will interact regularly (during the first, third and fifth years of the project) at international workshops to be supported under the project to share experiences on similar types of projects. This group will review the technical aspects of the project.

ANNEX 3

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Conservation and Sustainable Use of Medicinal Plants Project

Estimated Project Costs

(US $: million)

Project Component	**Local**	**Foreign**	**Total**
	----------US $ million----------		
1. Expansion of *in situ* conservation of medicinal plants	1.20	0.64	1.84
2. *Ex situ* conservation and cultivation within the project context	0.25	0.19	0.44
3. Information and institutional activities within the project context	1.81	0.46	2.27
Total Baseline Cost			
Physical Contingencies	0.11	0.06	0.17
Price Contingencies	0.26	0.09	0.35
Total Project Cost	**3.63**	**1.44**	**5.07**

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Conservation and Sustainable Use of Medicinal Plants Project

Incremental Costs and Global Environmental Benefits

1. The objective of the GEF alternative is to secure the active conservation of globally and nationally significant medicinal plants, their habitats, species and genomes. The proposed project aims at furthering Sri Lanka's overall strategy for natural resource conservation by advancing the implementation of international cooperation to conserve biodiversity. Specific outputs of the proposed project include: (i) A viable and participatory management system for medicinal plants operating in prime natural habitats and peripheral areas; (ii) Comprehensive identification of culturable medicinal plant species and establishment of best practices for their propagation and cultivation; (iii) A sustainable system for the collection and preservation of information on medicinal plants, including ethnobotanical information.

The Country Context and Broad Development Goals

2. Sri Lanka is actively pursuing a strategy of rapid economic development, in which the private sector will have a substantial role, through the expansion of its infrastructure and the growth of industry. The transformation of subsistence agriculture is a complementary objective to the country's development strategy, focusing on the improvement of land productivity, crop diversification and the realization of export-oriented comparative advantage. The Government are aware that the pursuit of rapid, decentralized, economic growth might occasion the degradation of natural resources, which would ultimately disturb the growth process itself, and have acknowledged the need to incorporate sufficiently aspects of environmental sustainability into the execution of its development strategy. At the same time the Government wish to maintain a balanced approach towards environmental protection that integrates environmental concerns into the development process without hampering development itself. Formally, one way to strike this balanced approach is to discuss openly developmental and environmental agendas in the vetting of development projects at various levels in Government. MTEWA have made considerable progress in institutionalizing this dialogue within Government.

3. The operational effectiveness of such a dialogue, however, will depend upon in-country capacity for environmental analysis and management. The Government has undertaken several measures over the past few years to strengthen the institutional capacity of the public sector to assess the implications of sustainable environmental management, but further institutional strengthening will represent a considerable additional burden on the present allocation of resources available to the Government. Further allocation of resources to institutional strengthening would come chiefly at the expense of other social and developmental priorities. The current compromise is to accept that, in view of the increasing pressures on land and the lack of institutional capacity for environmental management, some degradation will be inevitable and that existing institutional capacity should be used to the greatest extent to limit the breadth and degree of irreversibility of the damage.

Baseline

4. At present, several government agencies implement activities that can be regarded as contributing to the conservation of medicinal plants or to their sustainable use. They are the Department of Ayurveda (MIM), the Forest Department, MFE, and the Department of Wildlife Conservation (MALF). In the absence of GEF facilities, Sri Lanka would be expected to continue some allocation of capital expenditures for medicinal plant conservation through these agencies, but the commitment of resources would continue to be low, as in the example of the Forestry Department of MFE, in view of more pressing domestic environmental priorities of flood control, forest protection, solid waste management, development of drinking water and sanitation. Even among these high priority areas, the actual utilization of funds for capital and recurrent expenditures has been somewhat erratic over the last five years. The pattern of the utilization of funds over the last six years suggests that the current trend for actual expenditures by the MIM, MFE and MALF is to maintain present spending levels roughly adjusted for inflation. While resources to the division are not expanding in real terms, it is doubtful, in view of currently underfunded commitments, that there would be significant changes in the allocation of funds specifically for the benefit of medicinal plants.

5. Department of Ayurveda. Current development plans for the department specify the establishment of an Ayurvedic complex at Karagoda in Matara district. These plans include the establishment of an Ayurvedic hospital, a herbarium, a drug factor, a training unit and a research unit with a standardization and quality control central laboratory, a botanical research unit and a clinical research unit. By extending the availability of Ayurvedic medicine these activities would also aim to popularize an awareness of their value to Sri Lankan society, and so strengthen a national consensus to give the conservation of medicinal plants a more prominent status among the country's environmental priorities. Although extending an appreciation of Ayurvedic practices and developing the knowledge base of the medical system's use of plants have a role to play in securing a sustained effort at conserving medicinal plants, these activities physically do not entail the conservation of plant habitats or the determination, in the interests of operations for the management of habitats, of their sustainable use. The development plan for MIM has earmarked a total of Rs 154 million ((US$ 2.83 million) in current terms, beginning in 1997 through to the end of 2000, for the Karagoda complex. Incidentally, the department also has plans to establish 63 Ayurvedic hospitals in 19 administrative districts at a cost of Rs 614.8 million ($ 11.32 million) over the period of 1996 to 2000.

6. Forest Department. The Forest Department's main activities involve the development and management of plantation forests as well as the conservation and management of natural forests. Naturally in many instances protected forests incorporate medicinal plant habitats. In these sites, the policing operations of forest management, although perhaps not primarily aimed at the production of non-timber forest products, would also in principle benefit the integrity of at-risk plant populations. The Forest Department, moreover, can be expected in the future to undertake as part of its management operations in such areas some cultivation, conservation and extension specifically directed toward medicinal plants. In the plantation forests as well, the Forest Department can be expected to be more active in ex situ cultivation of plants. Based on average Forest Department investments in period of 1995-1997, it is possible to identify that one percent of the current department's budget, or about Rs. 1.4 million ($ 25,783) per year in 1996 terms, would be utilized under the categories of the conservation and management of forests, and forest research, education and extension services primarily for the conservation management of medicinal plants.

7. Department of Wildlife Conservation. The mandate of the Department of Wildlife Conservation extends to the protection of flora and to carrying out research to ascertain rare plant populations. The department also is charged with providing national park services for tourism. In as much as park areas also encompass medicinal plant habitats, the wildlife department particularly can be expected to allocate resources that enhance the potential contribution of medicinal plants to the tourism value of some park areas. The current level of expenditure by the department on conservation services is estimated at about Rs. 1.3 million ($ 23,941). In the absence of the GEF opportunity, the department would have been expected to maintain this level of expenditure.

8. To a much lesser extent a few other institutions have been involved in activities related to the conservation of medicinal plants in areas of interest to the present project. These include the Ceylon Institute of Scientific and Industrial Research and the Town and Country Planning Department.

9. Ceylon Institute of Scientific and Industrial Research (CISIR). The Ceylon Institute of Scientific and Industrial Research has been conducting studies on medicinal plants over the past several years. The institute at present spends about Rs. 100,000 ($1,841) per year on medicinal plant research. Although the institute might be expected to continue this level of funding, the current state of medicinal plant supplies does not justify an expansion of research expenditure in this area.

10. Town and Country Planning Department. The Town and Country Planning Department was involved in the establishment of the medicinal plant garden at Kataragama and presently maintains it. In the absence of the GEF alternative, annual expenditures by the Town and Country Department on the garden would likely to amount to Rs 1.5 million ($27,624).

Global Environmental Objective

11. As a consequence to the current course of action, regarded as the baseline, Sri Lanka will probably preserve *ex situ* a very limited number of the most commonly used medicinal plants. The plants that would most likely survive would be those which are presently cultivable and have demonstrated an adequate profitability relative to other farm production. Given the present pressures of agricultural and other competing demands on the use of land, and the present level of institutional capacity, catastrophic loss of habitat areas will likely continue and gravely diminish the quality of *in situ* biodiversity over the next ten to twenty years. The GEF alternative would aim to install sufficient institutional capacity in Sri Lanka to increase the probability that a wider spectrum of medicinal plant species would be preserved over the long term.

GEF Alternative

12. As part of this capacity strengthening, the GEF alternative would undertake the establishment of botanical reserves in areas representative of the country's agri-ecological zones to institutionalize the *in situ* conservation of medicinal plants and to establish operating procedures defining their sustainable use.

13. In an effort to reduce the pressures of populations adjacent to the areas enclosing the botanical reserves, the GEF alternative would actively link the development of village incomes outside forest areas to preservation of the integrity of the reserves. This type of village

development would be a targeted channeling of resources that are planned to made available for regional development initiatives in the central northern and southern areas. The establishment of the botanical reserves under the GEF alternative would also tie into ongoing plans to expand the provision of Ayurvedic medicine in rural areas. The GEF alternative would add other functions to the currently planned medical centers, allowing them to serve as facilities providing training not only in Ayurvedic practice, but also in adding value to the cultivation or processing of medicinal plants or in activities associated with the conservation of plants in the reserves.

14. The GEF alternative would accelerate research on the propagation of plants *ex situ* and expand agronomic research of those species that may be suitable for production on farms or in plantation forests. The GEF alternative would also intensify current efforts to expand knowledge of the botany of medicinal plants and their use in Sri Lanka. Resources would be committed to raising local and international public awareness of the position of medicinal plants in Ayurvedic culture to encourage the development of eco-tourism, which would aid the sustainability of the conservation efforts.

System Boundary

15. The primary impact of the GEF alternative, implemented in the period of 1998-2002, is to increase the number of medicinal plant species that would be preserved over time in Sri Lanka, both *in situ* and *ex situ*. The GEF alternative would achieve this in installing the institutional capacity for a specialized form of environmental management which is not high among Sri Lanka's development priorities. The local population would benefit from the option of continued availability of a wide range of medicinal plants that would have been lost without the project. This domestic benefit may partly take the form, in the short run, of relatively less expensive health care, and, in the long run, of patented pharmaceutical products. The country may also realize additional international as well as domestic eco-tourism.

Domestic Benefits

16. In terms of village development, the GEF alternative should achieve the same level of domestic benefits as would have been achieved under the regional development plans now in preparation for the central northern and southern areas of the country. The chief difference of the GEF alternative is that some of the funds that would have been committed for communities typical of those impacting medicinal plant habitats would now be directed for the development of alternative village incomes that would contribute to the easing of population pressures upon forest areas. The benefits from incremental eco-tourism are not expected to be large, but would offset the recurrent operational and opportunity costs of maintaining the botanical reserves.

17. In terms of the avoided loss of plant species, Sri Lanka should realize some value in preserved biodiversity as mentioned in the preceding section. The domestic benefit of the foregone loss in biodiversity value of medicinal plants provides an incentive for continued public participation in the proposed project.

Costs

18. The baseline activities undertaken by the institutions described above and the GEF alternative can be grouped into the following categories: *in situ* conservation; *ex situ* cultivation; research, education, training and extension; and village development. The GEF alternative

would expand current *in situ* conservation through the establishment of botanical reserves, and would involve village social organization, the development of village-based management plans, reserve enrichment and investments to improve the management of the forests hosting medicinal plant habitats. The total cost of *in situ* conservation under the GEF alternative is estimated at US$0.99 million, as compared to US$0.26 million over the project period[1]. In the present context, ex *situ* cultivation refers to physical investments in nurseries and gardens. As noted earlier, the Government have already made significant commitments to the financing of such types of infrastructure. The GEF alternative would make additional investments to expand the capacity of such 'gene banks', providing approximately US$2.81 million over the project period as compared to a baseline estimate of US$ 2.76 million. Rather than add much more to already planned investment in gardens or herbaria, the GEF alternative would provide resources to encourage and facilitate *ex situ* cultivation on farms and other areas through intensified research, education, training and village extension. The GEF alternative would provide (incrementally) approximately US$ 0.30 million for research on the propagation of medicinal plants, home garden and plantation cultivation and the dissemination of research results to existing provincial extension networks. The GEF alternative would also provide approximately US$ 50,000 to enhance the education and eco-tourism potential of the existing botanical garden at Kataragama. Village extension and education would also be key elements affecting the sustainability of the botanical reserves that would be established under the GEF alternative, and would incorporate existing commitments to expand Ayurvedic medical facilities into rural areas. The GEF alternative would provide approximately US$ 1.13 million in incremental resources for education and extension in villages about the reserves, financing, among other activities, medicinal plant farming, product processing and marketing. The GEF alternative would augment other research, capacity building and institutional strengthening, identifying approximately US$ 0.83 million for sustainability studies and other research set within the proposed botanical reserves, and approximately US$ 1.07 million for the promotion of changes in legal and regulatory policy influencing the conservation or cultivation of medicinal plants, the development of a national survey and information network of medicinal plant botany and use, the undertaking of line agency capacity building and training, the development of quality standards and the promotion of quality control, and general public education. In total, the GEF alternative would allocate for research, education, training and extension approximately US$ 20.74 over the project period as compared to US$ 17.43 of the baseline. Village economic development, which is programmed in more than one regional development plan, does not change in total under the GEF alternative. The GEF alternative would ensure that programmed resources would be directed to villages that are stakeholders of the proposed botanical reserves and would be linked to their participation in maintaining the integrity of the reserves. These resources for village economic development amount to approximately US$ 0.27 million. Finally, the GEF alternative would enhance project management capacity and project monitoring and evaluation with the commitment of approximately US$ 0.48 million over the project period.

[1] Domestic costs from planning documents here and elsewhere were converted to US dollar equivalents using the following mid-year exchange rates (Rs/US$):

1998	1999	2000	2001	2002
60.86	64.48	67.07	69.75	72.54

19. Total financing requirements of the GEF alternative, including contingencies, over the period of 1998-2002 would amount to about US$ 25.29 million as opposed to a baseline US$ 20.72 million. The present value of the GEF alternative, using a LIBOR rate estimated at 5.15 percent, totals approximately US$ 21.80 million.

Incremental Cost Matrix

20. The total incremental cost of financing the GEF alternative is estimated at US$ 4.56 million. Operationally, this would mean that the Government would provide counterpart financing of about US$ 0.5 million for development commitments that would have occurred in the absence of the GEF alternative. These commitments include US$ 0.27 million for village economic development, and other funds for the civil works of Ayurvedic medical centers, Ayurvedic drug supplies, staff allowances, taxes and duties.

Incremental Cost Matrix

Component	Cost Category	US$ Million	Domestic Benefit	Global Benefit
In Situ Cultivation	Baseline (Govt development priority)	0.26	Limited preservation of unrepresentative sample of surviving species; severely restricted resources for medicinal alternatives.	
	with GEF Alternative	0.99	Preservation of representative samples of species in each major ecological zone through the establishment of botanical reserves; improved scope for popularizing medicinal alternatives.	Preservation of unique pool of genetic information of potential, future medicinal value.
	incremental	0.73		
Ex Situ Cultivation	Baseline (Govt development priority)	2.27	Continued cultivation of current set of known cultivable species	
	with GEF Alternative	2.81	Expansion of number of cultivable species; expansion of cultivation over baseline; reduced pressure on species *in situ*; improved scope for popularizing medicinal alternatives.	Preservation of unique pool of genetic information of potential, future medicinal value.
	Incremental	0.54		
Research, Education, Training & Extension	Baseline (Govt development priority)	17.43	Efficiency and long-term effectiveness of the implementation of local rural development initiatives.	
	with GEF Alternative	20.74	As above with emphasis & additional efforts targeting the sustainable use of botanical reserves established under the project.	Improved long-term sustainability of global efforts through increased local capacity for biodiversity conservation, enhanced local appreciation of the preservation value of domestic resources & the equitable definition of intellectual property rights.
	Incremental	3.31		

Village Development	Baseline (Govt development priority)	0.27	Promotion of local income opportunities.	
	with GEF Alternative	0.27	Promotion of local income opportunities linked to medicinal plant cultivation and the *in situ* integrity of habitats.	Sustainability of conservation efforts through the enhanced local appreciation of the preservation value of domestic resources.
	Incremental	0.00		
Project Management & M&E	Baseline (Govt development priority)	0.00		
	with GEF Alternative	0.48	Capacity to coordinate & implement resource management project activities.	Increased capacity for the management of biological reserves.
	Incremental	0.48		
Total	Baseline	20.72	rural development & continuation of ayurvedic traditions.	
	with GEF Alternative	25.29	Same as baseline except substantially larger number of medicinal plants conserved & cultivated; enhanced capacity to sustain conservation initiatives (including improved opportunities for eco-tourism).	Considerably improved likelihood of potentially globally significant habitats, species & genomes conserved; enhanced operational experience of projects involving intellectual property rights.
	Incremental	4.56		

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Conservation and sustainable Use of Medicinal Plants Project

Financial Summary

Years Ending
(Currency : US $)
million

	Implementation Period					Operational Period
	1998	1999	2000	2001	2002	
Project Costs						
Investment Costs	0.87	1.14	0.99	0.97	0.92	
Recurrent Costs	0.00	0.04	0.04	0.04	0.05	
Total	0.88	1.18	1.03	1.01	0.97	
				Total	**5.07**	
Financing Sources (% of total project costs)						
IBRD/IDA						
Co-financiers						
Government					9.9%	
Central						
Local						
User Fees/Beneficiaries						
GEF					90.1%	
Others						
Others						
Others						
Others						
Total						

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Conservation Sustainable Use of Medicinal Plants Project

Procurement and Disbursement Arrangements

Procurement

A. Works:

- **Package of works:** Due to the small size of these contracts (less than US $ 40,000) and as these are geographically scattered, these can be awarded by inviting bids from at least three qualified contractors in the area of the project site.

- **Procurement of Schedules:** Detailed procurement schedules for works is presented in the Project implementation Plan.

- **Design and specification:** The design and specification of building to be constructed will be prepared by MIM and approved by the Bank.

- **Bidding Documents:** Simplified bidding documents based on the Bank's Standard Bidding Documents for Procurement of works (Smaller Contracts, January 1995) and adjusted to satisfy requirements that are acceptable to the Bank and already agreed with GoSL will be used and contracts will be concluded following procedures acceptable to the Bank. In general, works under the project will be small and geographically scattered, and are not likely to be of interest to outside bidders.

- **Land:** MIM will enter into an MOU with Provincial Councils and Forest Departments to acquire land for works.

B. Goods, Equipment, Machinery, Supplies, Vehicles:

- **Procurement packages:** Convenient procurement packages have been defined for each category of goods, machinery, equipment and vehicles, and agreed with the Bank. Competitive Bidding is not expected to be required due to the size and propriety nature of the packages. The packages will include field equipment for planned studies under the project, processing equipment for village information centers, some office equipment for village information centers, dispensary equipment, fencing, planting materials for botanical reserves and gardens, training equipment whose use will be coordinated at the national level, office and other O&M (except for vehicles), and items to be purchased for village development activities. The goods procurement account does not include items that may be purchased or rented under the contracts for studies or research that are described below.

- **Procurement Schedule:** Detailed procurement schedules for all packages have been provided in Project Implementation Plan.

- **Design and specification:** The design and specification for goods for National Shopping

procedures will be prepared by MIM and approved by the Bank.

- **Invitation Documents:** Standard bidding documents agreed with MIM and based on the Bank's Standard Bidding Documents for Procurement of Goods, January 1995, will be used and contracts concluded using procedures acceptable to the Bank. Contracts for other goods, including special equipment, which can be grouped together to make large packages will be procured following international shopping procedures. Items or groups of items estimated to cost less than the equivalent of US $ 25,000 for each contract will be procured following International and/or National Shopping Procedures up to an amount of US $ 350,000 calling for at least three quotations from reputed suppliers. All transport under the project will be hired locally as necessary.

C. **TA, Training, Studies & Services:**

- **Procurement packages:** Consultants services will include both internationally and locally recruited consultants. The contract packages shall consist of: (i) an operations support contract to assist the PMU in implementing various project activitities -- primarily those in the MPCAs; and (ii) a number of small local contracts for carrying out studies/surveys and the preparation of training and educational materials.

Local and international training for staff and officers of MIM will be based on detailed plans that will be prepared by MIM. These plans will outline the areas of study, the number of personnel to be trained, training institutions and the years in which training will take place. Local training will be arranged by MIM and procured using National Shopping procedures. Where the purchase of materials for training is required, items will be grouped, if feasible, into appropriately sized packages to facilitate national shopping. Stipends for students studying under Ayurvedic trainers at the medical/information centers established by the project may be paid by Force Account.

There will be five bundles of contracts to execute studies, research and other professional services under the project: (i) plant propagation & on-farm research, agricultural systems study, home garden and plantation research; (ii) ethnobotanical surveys, medicinal plant inventory in the MPCAs, growth and yield studies in the MPCAs; (iii) database design and development; (iv) monitoring and evaluation; and (v) development of training and educational materials. Bundles (i) and (ii) involve a number of different tasks and may be carried 9out as one or more contracts. Items (iii) and (v) will likely be subitted as single contracts. Monitoring an devaluation, as it includes the costs of an advisory group involving experts abroad, will consist of one contract for actual M&E activities in country and then possibly several ad hoc arrangements defined under a Memorandum of Understanding with participating institutions to cover travel and subsistence expenses of convening advisory group members. Bidding procedures for the studies will be similar to those established for contracted research under other Bank projects in Sri Lanka.

Miscellaneous services include the rental of office and building space, the rental of computers and other equipment, the purchase of professional office services for word processing, report production and replication, etc. These will be procured through National Shopping procedures.

- **Procurement Schedule:** Detailed procurement schedules for all TA inputs and studies have been provided in the Project Implementation Plan.

- **Design and specification:** All TORs for TA and studies will be drafted by MIM and approved by the Bank.

- **Bidding Documents:** Consultants will be recruited following the Bank's Guidelines, Selection and Employment of Consultants by World Bank Borrowers, January 1997 and using the Bank's Standard Form of Contract for Consultants Services, June 1995. Consultants will be hired through normal quality and cost based Bank procedures. A request for sole sourcing of the TA contract to the IUCN has been received from MIM and approved by the Bank. The Bank approved the sole sourcing request after fulfilment of the following conditions: (i) receipt of a formal request from GoSL containing IUCN's understanding with a regional and international entity of excellence in the areas covered by the draft ToRs; and (ii) assurance of financial management expertise. Sole-sourcing is decided on fair technical grounds and is awarded to an entity that has the best expertise to provide technical assistance.

  All studies will also follow the Bank's guidelines defined for the selection and employment of services and use the standard Bank form of contract established for consultants services. Training expenditures and other services, to the extent that they can be packaged will be documented as appropriate for National Shopping procedures (see section C above).

D. Miscellaneous:

- **Procurement packages:** Miscellaneous procurement items include: land surveys and labor for improvements in the botanical reserves and gardens; project management personnel at the reserves; and staff allowances. The labor required for land improvements at the reserves may be grouped according to specific tasks and arranged through local Direct Contracting. Project management personnel for the reserves will be hired through Direct Contracting. Staff allowances are not financed by GEF under the project.

- **Procurement Schedule:** Detailed procurement schedules for all packages have been provided in the Project Implementation Plan.

- **Design and specification:** MIM will consult with the Bank regarding the methodology and documentation of the data of the land surveys to be conducted over the proposed sites of the botanic reserves.

- **Bidding Documents:** The land surveys for the five botanical reserves may be grouped to form one package that may be documented as appropriate for National Shopping (see section C above).

E. Prior/post Review:

- As most contracts will be below the threshold amounts, the Bank will review only the first two contracts to ensure compliance with the Bank's thresholds and Standards Bidding Documents for Procurement. Contracts will be subject to post review by the Supervision missions on a selected basis. As regards Consultants Services, contracts in excess of US $

100,000 will be subject to prior review, but ToRs in respect of all contracts, irrespective of amounts, will be subject to the Bank's prior review.

Table A: Project Costs by Procurement Arrangements

(in US$million equivalent)

	Procurement Method			
	Other	Consulting Services	N.B.F.	Total
A. Works				
1. Civil Works /a	0.18	-	-	0.18
	(0.18)			(0.18)
B. Goods				
1. Vehicle Rent	0.15	-	-	0.15
	(0.12)			(0.12)
2. Machinery & Equipment Purchase and Rental /b	0.14	-	-	0.14
	(0.14)			(0.14)
3. Materials /c	0.43	0.15	0.43	1.01
	(0.43)	(0.15)		(0.58)
C. TA, Training, Studies & Services				
1. Institutional Development				
TA Operations	-	1.40		1.40
		(1.40)		(1.40)
TA Management /d	0.13	-	-	0.13
	(0.13)			(0.13)
2. Local Training /e	0.15	-	-	0.15
	(0.15)			(0.15)
3. Development of Educational Materials	-	0.14	-	0.14
		(0.14)		(0.14)
4. Specialised External Training	-	0.29	-	0.29
		(0.29)		(0.29)
5. Studies/Research/Service Contracts				
Propagation Research, On-Farm Research, Agricultural Systems Study, Home Garden and Plantation Research	-	0.38	-	0.38
		(0.38)		(0.38)
Ethnobotanical Surveys, Medicinal Plant Inventory, Growth and Yield Studies	-	0.14	-	0.14
		(0.14)		(0.14)
Database Design and Development	-	0.14	-	0.14
		(0.14)		(0.14)
Monitoring & Evaluation	-	0.07	-	0.07
		(0.07)		(0.07)
6. Misc Services /f	0.19	-	0.03	0.22
	(0.19)			(0.19)
D. Miscellaneous				
1. Labor for Improvements in Reserves & Gardens /g	0.14	-	-	0.14
	(0.14)			(0.14)
2. Project Management Personnel /h	0.38	-	-	0.38
	(0.38)			(0.38)
3. Staff Allowances /i	-	-	0.01	0.01
Total	**1.90**	**2.70**	**0.47**	5.07
	(1.87)	(2.70)	-	(4.57)

Note: Figures in parenthesis are the respective amounts financed by GEF
\a Includes some new & existing botanic garden & nursery structures;
\b Includes medical/information center processing, office, dispensary equipment; fencing for gardens.
\c Includes planting materials; items for village workshops & meetings; items for village development activities; office, garden & information center O&M.
\d Staffing of PMU.
\e Village study tours, employment of Ayurvedic trainers, village apprentice stipends and village para-forester stipends, local staff training.
\f Includes cartography, the rental of space, computers & other equipment; report production & replication; office services; village staff for information centers; ola manuscript transcription, research publication, chemical analysis.
\g Implemented by FD.
\h Staffing of offices in the five project areas.
\i TADA to be provided as Government contribution.

Table B: Thresholds for Procurement Methods and Prior Review

(US$: million)

Expenditure Category	Contract Value (Threshold)	Procurement Method	Contracts Subject to Prior Review
1. Works			
Civil works		Local Shopping	
2. Goods			
Vehicles		Local Shopping	
Machinery		International Shopping	
Materials and consumables		Local Shopping	
3. Services			
Consulting Services	300,000	International Selection	100,000
4. Miscellaneous			
		Local Shopping	
		Force Account	

Note:
IS: International Shopping
ICB: International Competitive Bidding

Table C: Allocation of Grant Proceeds

(US $: million)

Expenditure Category	Amount in US$million	Financing Percentage
1. Works	162,600	85 %
2. Goods	982,100	100% of foreign expenditures; 100% of local expenditures (ex-factory cost) and 85% of local expenditures for other items procured locally.
3. Services	3,276,100	100 %
4.Unallocated	151,900	
TOTAL	4, 572,600	

SRI LANKA

Conservation and Sustainable Use of Medicinal Plants Project

Project Processing Budget and Schedule

A. Project Budget (US$000)	Planned (At final PCD stage)	Actual
	N/A	157

B. Project Schedule	Planned (At final PCD stage)	Actual
Time taken to prepare the project (months)		8
First Bank mission (identification)		02/27/1995
Appraisal mission departure		09/07/1997
Negotiations		09/24/1997
Planned Date of Effectiveness		01/01/1998

Prepared by: Ministry of Transport, Environment and Women's Affairs and Ministry of Cooperatives, Provincial Councils and Indigenous Medicine with consultancy assistance from International Union for the Conservation of Nature (Sri Lanka).

Preparation assistance: PDF (Block B) grant of US $ 320,000.

Bank staff who worked on the project included:

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Sumith Pilapitiya (SASRD),
Mohammed Bekhechi (LEGEN),
Jose P. Correia da Silva (LEGSA),
Vimala Abraham (LOAAS),
Hung Kim Phung (LOAAS).

Bank consultant staff included:

Barry Deren (Economist),
Michael Balick (Ethnobotanist),
Charles Peters (Forester/Conservation Specialist), joined the Appraisal mission
Salma Omar-Chowdhury (Social Scientist)

Project Name

Documents in the Project File*

A. Project Implementation Plan

B. Bank Staff and Other Assessments

1. Background report on environmental analysis for the project:
   (a) Threatened medicinal plants of Sri Lanka.
   (b) Commonly Used Medicinal Plants of Sri Lanka
   (c) Heavily Used Medicinal Plants of Sri Lanka
   (d) Selection of sites for establishment of Ethnobotanical reserves.
   (e) Working Paper: Economic Analysis

2. Environmental Review

3. Social Assessment.
   (a) Report on Indigenous People

4. Technical reviews from GEF's Scientific and Technical Advisory Panel.

C. Other

*Including electronic files.

Annex 9
Statement of Loans and Credits

Status of Bank Group Operations in SRI LANKA
IBRD Loans and IDA Credits in the Operations Portfolio
(As of December 31, 1996)

Project ID	Loan or Credit No.	Fiscal Year	Borrower	Purpose	Original amount in US$ millions IBRD	IDA	Cancellations	Undisbursed	Difference between expected and actual disbursements[a]
Number of Closed Loans/Credits:	69								
Active Loans									
LK-PE-10526	C29820	1997	GOSL	HEALTH SERVICES DEV		18.80		18.66	
LK-PE-42266	C28810	1996	GOSL	TEACH ED& DEPLOYMENT		64.10		61.68	-0.94
LK-PE-42263	C28370	1996	GOSL	TELECOM REG. & PUBL.		15.00		13.84	2.51
LK-PE-10517	C28800	1996	GOSL	PVT. SECTOR INFRAS. DEV		77.00		75.94	
LK-PE-10467	C27570	1995	GOSL	COL. ENVIRON. IMPROVE.		39.00		32.42	3.25
LK-PE-10420	C24950	1993	GOSL	COLOMBO URB. TRANSP.		20.00		11.95	7.16
LK-PE-10419	C24840	1993	GOSL	PRIVATE FINANCE DEV.		60.00		13.29	-2.33
LK-PE-10409	C24420	1993	GOSL	COMMUNITY WATER SUPP		24.30		14.07	4.95
LK-PE-10398	C23800	1992	GOSL	2ND AGR. EXTENSION		14.34		10.32	2.27
LK-PE-10386	C22970	1992	GOSL	POWER DISTRIBUTION		50.00		42.77	34.07
LK-PE-10378	C22600	1991	GOSL	IRRIG. REHAB.		29.60		22.36	13.90
LK-PE-10374	C22500	1991	GOSL	SMI IV		45.00		3.56	0.71
LK-PE-10373	C22490	1991	GOSL/CEB	TELECOMS II		57.00		33.45	32.92
LK-PE-10368	C22310	1991	GOSL	POVERTY ALLEVIATION		57.50	9.21	19.88	27.93
LK-PE-10363	C21830	1991	GOSL	3RD ROADS		42.50		17.97	11.42
LK-PE-10308	C19090	1988	GOSL	SMALLHOLDER RUBBER		23.50	5.18	6.17	8.86
TOTAL					0.00	637.64	14.39	398.33	146.68

	Active Loans	Closed Loans	Total
Total disbursed (IBRD and IDA)	236.97	1372.97	1609.94
Of which repaid	0.00	157.04	157.04
Total now held by IBRD and IDA	623.25	1175.15	1798.40
Amount sold	0.00	3.59	3.59
Of which repaid	0.00	3.59	3.59
Total undisbursed	398.36	11.45	409.81

a. Intended disbursements to date minus actual disbursements to date as projected at appraisal.

Note:
Disbursement data are updated at the end of the first week of the month.

Annex 9
Statement of Loans and Credits

Sri Lanka - Statement of IFC Investments
Committed and Disbursed Portfolio
As of December 31, 1996
(In US$ Millions)

		Committed				Disbursed			
		IFC				IFC			
FY Approval	*Company*	*Loan*	*Equity*	*Quasi*	*Partic*	*Loan*	*Equity*	*Quasi*	*Partic*
1980	Lanka Orix	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1981	Lanka Hotels	0.00	0.64	0.00	0.00	0.00	0.64	0.00	0.00
1984	Lanka Orix	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1985	Lanka Orix	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1988	Union Assurance	0.00	0.48	0.00	0.00	0.00	0.48	0.00	0.00
1992	CKN Fund Mgmt.	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00
1992	Pyramid Trust	0.00	0.25	0.00	0.00	0.00	0.25	0.00	0.00
1993	Lanka Cellular	0.00	1.36	0.00	0.00	0.00	1.36	0.00	0.00
1994	Lanka Cellular	0.00	0.67	0.00	0.00	0.00	0.67	0.00	0.00
1995	Union Assurance	0.00	0.50	0.00	0.00	0.00	0.50	0.00	0.00
1996	Lanka Orix	10.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00
	Total Portfolio:	10.00	3.96	0.00	0.00	2.00	3.96	0.00	0.00

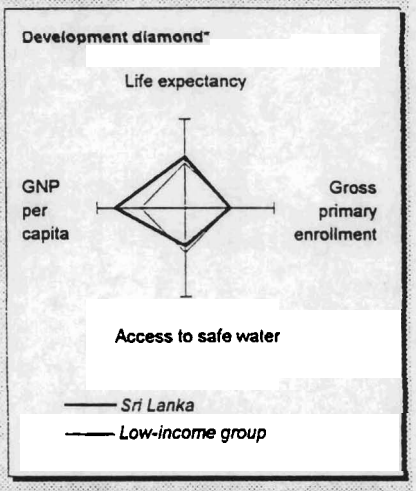
		Approvals Pending Commitment			
		Loan	*Equity*	*Quasi*	*Partic*
1996	ASIA POWER	10.00	2.50	2.50	20.00
	Total Pending Commitment:	10.00	2.50	2.50	20.00

Annex 10
Country at a Glance

Sri Lanka at a glance

2/13/97

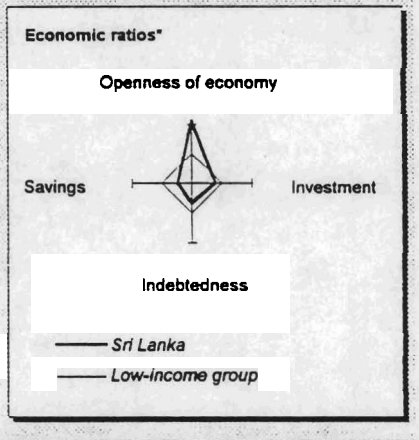
POVERTY and SOCIAL	Sri Lanka	South Asia	Low-income
Population mid-1995 *(millions)*	18.1	1,243	3,180
GNP per capita 1995 *(US$)*	700	350	440
GNP 1995 *(billions US$)*	12.6	435	1,399
Average annual growth, 1990-95			
Population *(%)*	1.3	1.9	1.7
Labor force *(%)*	2.0	2.1	1.7
Most recent estimate *(latest year available since 1989)*			
Poverty: headcount index *(% of population)*	22	..	..
Urban population *(% of total population)*	22	26	29
Life expectancy at birth *(years)*	72	61	63
Infant mortality *(per 1,000 live births)*	16	75	69
Child malnutrition *(% of children under 5)*	38	62	41
Access to safe water *(% of population)*	57	63	67
Illiteracy *(% of population age 15+)*	10	50	34
Gross primary enrollment *(% of school-age population)*	106	100	105
Male	106	110	112
Female	105	87	98



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

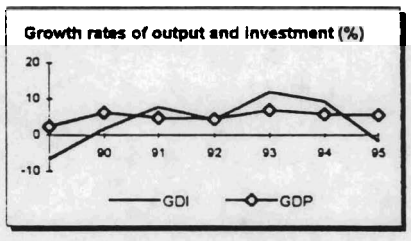
	1975	1985	1994	1995
GDP *(billions US$)*	3.8	5.9	11.7	12.9
Gross domestic investment/GDP	15.6	22.6	27.0	25.1
Exports of goods and non-factor services/GDP	27.5	26.4	33.8	35.9
Gross domestic savings/GDP	8.1	10.4	15.2	14.1
Gross national savings/GDP	9.4	19.2	20.6	19.6
Current account balance/GDP	-2.9	-7.1	-6.4	-4.2
Interest payments/GDP	0.5	2.0	1.1	1.0
Total debt/GDP	21.5	60.2	67.3	63.7
Total debt service/exports	26.1	16.5	8.2	7.3
Present value of debt/GDP	..	..	40.8	43.1
Present value of debt/exports	..	..	99.7	99.5

	1975-84	1985-95	1994	1995	1996-04
(average annual growth)					
GDP	5.3	4.4	5.6	5.4	4.9
GNP per capita	3.7	2.7	3.9	4.4	..
Exports of goods and nfs	4.7	9.0	13.0	6.4	7.3



STRUCTURE of the ECONOMY

	1975	1985	1994	1995
(% of GDP)				
Agriculture	30.4	27.7	23.8	23.0
Industry	26.4	26.2	24.7	25.1
Manufacturing	20.1	14.7	15.4	15.7
Services	43.2	46.1	51.5	51.9
Private consumption	82.6	79.2	75.1	74.0
General government consumption	9.3	10.4	9.7	11.8
Imports of goods and non-factor services	35.0	38.6	45.6	46.9



	1975-84	1985-95	1994	1995
(average annual growth)				
Agriculture	4.3	1.8	3.3	3.3
Industry	5.3	5.6	8.1	7.7
Manufacturing	4.1	7.6	9.1	9.2
Services	6.6	4.8	5.2	5.1
Private consumption	6.1	4.1	5.7	7.1
General government consumption	4.1	3.5	12.2	-1.1
Gross domestic investment	14.4	2.3	9.2	-1.7
Imports of goods and non-factor services	13.2	5.5	14.2	3.8
Gross national product	5.5	4.1	5.3	5.9

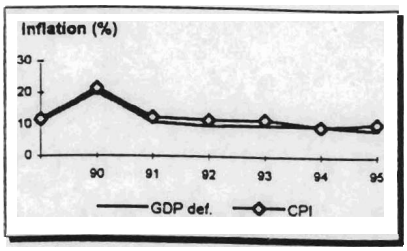
Note: 1995 data are preliminary estimates. Figures in italics are for years other than those specified.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

Annex 10
Country at a Glance

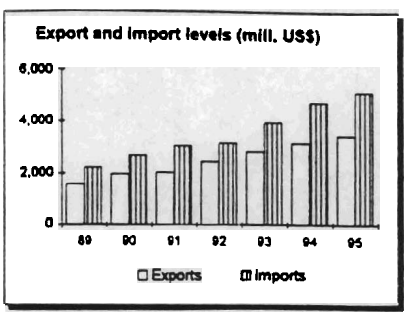
PRICES and GOVERNMENT FINANCE

	1975	1985	1994	1995
Domestic prices				
(% change)				
Consumer prices	6.6	1.5	9.5	10.4
Implicit GDP deflator	5.4	-1.1	9.7	8.4
Government finance				
(% of GDP)				
Current revenue	..	22.7	19.0	20.7
Current budget balance	..	2.3	-2.9	-2.0
Overall surplus/deficit	..	-11.9	-10.0	-9.7



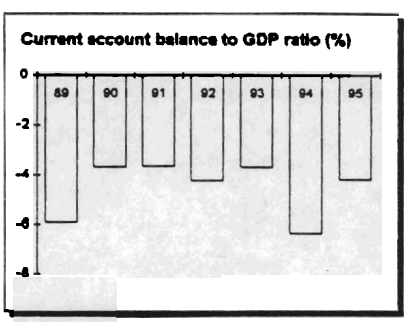
TRADE

	1975	1985	1994	1995
(millions US$)				
Total exports (fob)	..	1,333	3,189	3,472
Tea	..	442	420	383
Other agricultural goods	..	94	278	295
Manufactures	..	233	2,131	2,440
Total imports (cif)	..	1,948	4,768	5,145
Food	..	217	589	631
Fuel and energy	..	404	296	321
Capital goods	..	382	1,358	1,430
Export price index *(1987=100)*	..	96	119	121
Import price index *(1987=100)*	..	86	148	155
Terms of trade *(1987=100)*	..	111	80	78



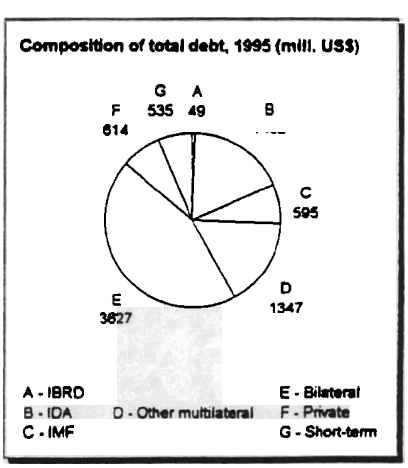
BALANCE of PAYMENTS

	1975	1985	1994	1995
(millions US$)				
Exports of goods and non-factor services	632	1,561	3,955	4,629
Imports of goods and non-factor services	804	2,296	5,335	5,876
Resource balance	-172	-734	-1,379	-1,247
Net factor income	-18	-127	-167	-138
Net current transfers	80	443	794	841
Current account balance, before official transfers	-110	-419	-753	-544
Financing items (net)	84	304	1,001	450
Changes in net reserves	26	115	-248	94
Memo:				
Reserves including gold *(mill. US$)*	57	472	2,035	1,910
Conversion rate *(local/US$)*	7.0	27.2	49.4	51.3



EXTERNAL DEBT and RESOURCE FLOWS

	1975	1985	1994	1995
(millions US$)				
Total debt outstanding and disbursed	815	3,540	7,891	8,230
IBRD	36	61	54	49
IDA	39	397	1,339	1,463
Total debt service	169	320	392	409
IBRD	6	9	13	12
IDA	0	3	16	19
Composition of net resource flows				
Official grants	56	151	160	174
Official creditors	61	297	288	317
Private creditors	-22	44	-49	15
Foreign direct investment	0	26	166	195
Portfolio equity	0	0	112	61
World Bank program				
Commitments	30	137	0	39
Disbursements	19	79	78	106
Principal repayments	3	5	15	15
Net flows	16	74	63	92
Interest payments	3	8	15	16
Net transfers	14	66	48	76



ANNEX 16

JUSTIFICATION FOR THE SELECTION OF SITES FOR RESERVES BY AVAILABILITY OF THREATENED AND ENDEMIC PLANT SPECIES

No	Botanical Names	Propagation technology	Habitat degradation	Env. threat	Non. sus harvesting	Endemism	Sites for Reserves				
							Kaneliya	Rajaw	Ritig	Bibile	Naula
1	Acacia ferruginea DC	No		yes			-	-	-	-	
2	Adansonia digitata	no		yes			-	-	-	-	
3	Adenanthera bicolor Moon	no	yes				yes	yes	-	-	
4	Aegle marmelos	yes			yes				yes	yes	yes
5	Albizzia ammara (Roxb) Biovin	no	yes	yes		yes					
6	Arreca concinna Thw	no	yes	yes			yes	yes			
7	Artabotrys hexapetalus (L.f.)	no	yes						yes		
8	Balanophora fungosa J.R&G	no	yes				yes				
9	Begonia tenera Dry.var.tenera	no	yes			yes					yes
10	Berberis aristata	yes	yes	yes	yes						
11	Broussonetia zeylanica Thw	no	yes			yes	yes				
12	Caeslpinia crita L	no	yes	yes			yes	yes			
13	Caesalpinia major	no	yes	yes			yes	yes			
14	Callophyllum cuneifolium Thw	no	yes	yes		yes	yes				
15	Capparis moonai Wight	no			yes				yes		
16	Cassia Senna L	yes	yes	yes	yes				yes		yes
17	Celastrus paniculatus Wild	no	yes	yes			yes				
18	Ceropegia candelabrum L	no	yes	yes						yes	yes
19	Cinnamomum litseaefolium Thw	no		yes		yes			yes		
20	Cleidion javanicum Bl	no	yes	yes			yes				
21	Claestanthus collinus (Roxb)	yes		yes	yes					yes	
22	Coleus elongatus	yes		yes	yes	yes				yes	
23	Coscinium fenestratum (Gaertn)	no	yes		yes		yes				
24	Cotylelobium scabriusculum Thw	no	yes			yes					
25	Cryptocarya membranacea	no	yes			yes	yes				
26	Cryptocoryn spiralis (Retz) F	no	yes		yes		yes				yes
27	Crptocoryne walkeri Schott	no	yes		yes	yes	yes				
28	Curculigo orcoiides Gaertn	no	yes		yes				yes		yes
29	Cynometra iripa Kostel	no	yes	yes							
30	Dendrobium maccarthiae Thw	no		yes	yes	yes	yes		yes		
31	Desmodium ganageticum (L) DC	no	yes		yes				yes	yes	yes
32	Diaspyros atrata Alston	no		yes	yes	yes	yes		yes		
33	Diospyros attentuata Thw	no		yes	yes	yes				yes	
34	Diospyros oppositifolia Thw	no	yes		yes	yes	yes				
35	Diospyros quaesits Thw	yes			yes	yes			yes		
36	Elaeocapus montanus Thw	no	yes			yes					
37	Eriocaulon zeylanicum Korn	no	yes	yes		yes				yes	yes
38	Ficus trimenii King	no	yes						yes		yes
39	Gynura hispida Thw	no	yes	yes	yes	yes	yes	yes	yes		
40	Hippocratea macrantha Korth	no	yes	yes			yes				
41	Hopea cordefolia (Thw) Trimen	yes	yes	yes		yes	yes				
42	Hoya ovalifolia wight & Arn	no	yes		yes				yes		
43	Hoya pauciflora Wight	no	yes	yes				yes			
44	Hunteria zeylanica (Retz)	no	yes		yes		yes	yes			
45	Impatiens repens Moon	no		yes		yes			yes		
46	Ipseia speciosa Lindel	no		yes	yes	yes	yes		yes		
47	Kalancho laciniata DC	no	yes	yes							
48	Kokoona cylanica Thw	yes	yes		yes		yes				
49	Marsdinina tenacissima (Roxb)	yes	yes		yes				yes		
50	Memecylon grande Retz	yes	yes		yes	yes		yes			
51	Munronia pinnata	yes	yes		yes		yes	yes	yes	yes	yes
52	Nymphoides aurantiaca (Dalz)	no		yes							
53	Olea paniculata R.Br	no		yes							
54	Oxystelma esculentum (L.f)	no		yes	yes				yes		
55	Palaquium thwaitesii Trim	no	yes	yes		yes					
56	Pentapetes Phoenecea L	no	yes	yes							
57	Pericopsis mooniana (Thw)	yes			yes		yes				
58	Polyialthia periscaefolia Thw	no		yes	yes	yes			yes		
59	Pterocarpus santalinus L.f.	yes			yes						
60	Pterygota thwaitseii (Mast)	no	yes	yes		yes					
61	Putranjiva zeylanca (Thw)	no	yes			yes					
62	Rauvolfia serpentina (L) Benth	yes			yes						

63	Rhaphidophora decursiva (Roxb)	no		yes							
64	Rhynchostylis retusa Blume	no	yes	yes			yes				
65	Ribia cordefolia L	yes	yes	yes	yes						
66	Santalum album L	yes	yes		yes						
67	Saraca asoca (Roxb) De Wilde	no	yes		yes		yes		yes	yes	yes
68	Scirpodenderon ghaeri (Gaertn)	no	yes	yes							
69	Shorea disticha (Thw) Ashton	no		yes	yes	yes	yes				
70	Shoreaovalifolia (Thw) Ashton	no		yes		yes	yes				
71	Tacca leontopetaloides (L)	no	yes								
72	Tricalysia erythrosporsa	no		yes	yes	yes					
73	Valeriana moonii Arn.ex Clarke	no	yes		yes	yes	yes				
74	Vatica obscura Trim	no	yes		yes	yes			yes		
75	Withania somnifera (L) Dunal	yes	yes		yes						
76	Xanthium indicum Keonig	no		yes							
77	Xylocarpus moluccensis Roem	yes		yes	yes						
78	Xylopia nigricans Hook f. & Thms	no		yes	yes	yes			yes		
79	Zeuxine regia (Lindl) Trim.	no	yes	yes	yes	yes	yes	yes	yes		
	TOTAL	61=no;18=y	52	43	40	32	30	10	22	9	11

Threatened and endemic species at each site

Site	Non-Endemic	Endemic	Total threatened
Kanneliya	15	15	30
Rajawaka	3	7	10
Ritigala	7	15	22
Biblie	6	3	9
Naula	9	2	11

SRI LANKA

Conservation and Sustainable Use of Medicinal Plants Project

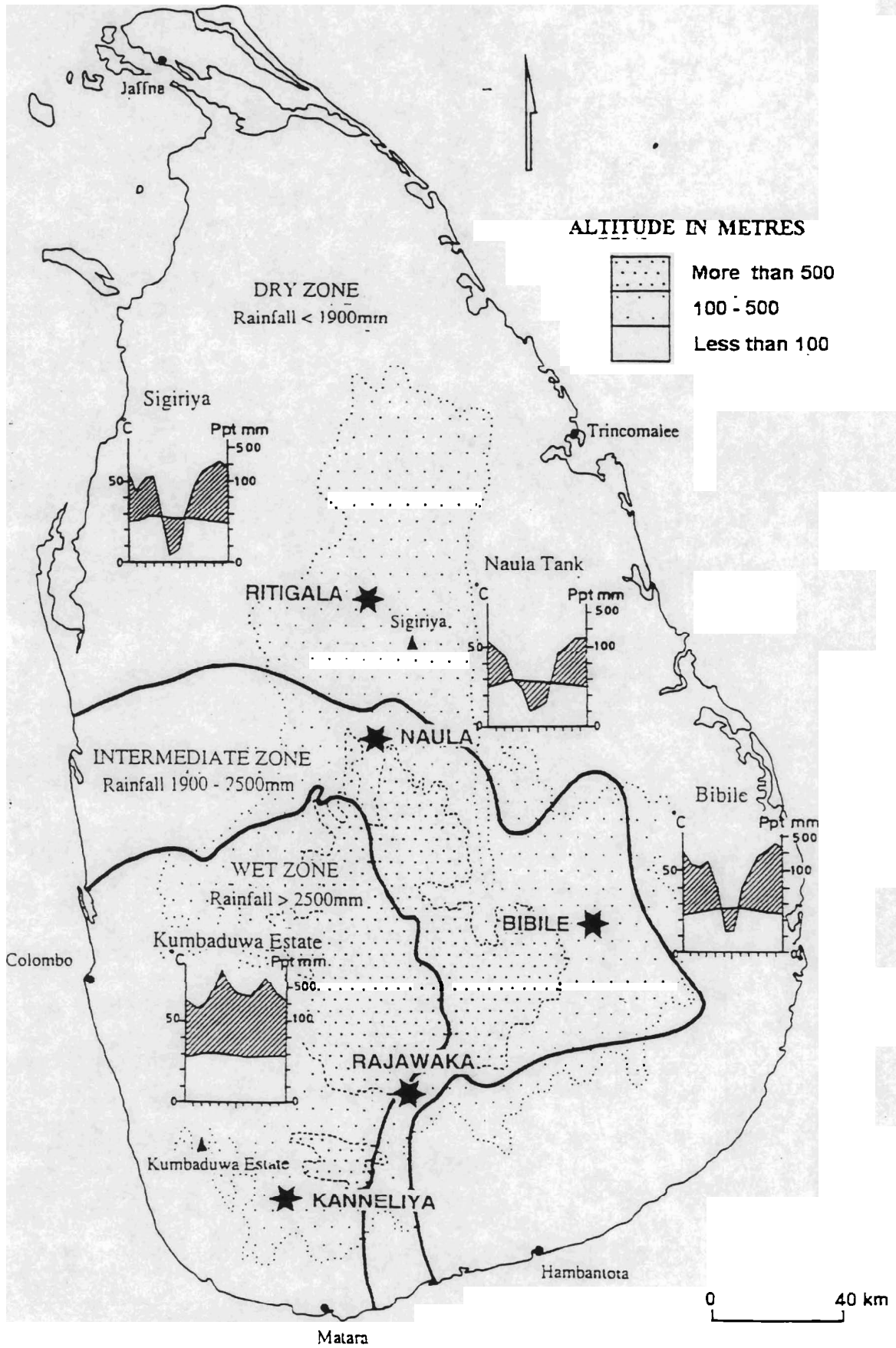
Selected Heavily Used Species for the Development/Improvement of Technology for Propagation and Cultivation

Ref No	Local names	Level of threat	Market demand	Econ. value for comm cultiv'n	Suitable for home gardens	Suitable for forestry	Suitable for mix cropping
2	Amukarra	V.High	High	High	Med	Good	High
3	Aralu	High	High	Low	Low	Good	Med
5	Asoka	V.High	High	Low	Med	V.Good	High
9	Binkonumba	V.High	V.High	High	Good	V.Good	Good
16	Ekaveriya	V.High	High	High	Good	V.Good	Good
17	Elabatu	High	V.High	High	Good	V.Good	Good
25	Ingurupiyali	Med	High	High	Good	Med	Good
30	Kapukimsso	Med	High	High	Good	Med	Good
31	Katuwebatu	Med	High	High	Good	Good	Good
33	Kumburuwel	High	High	Low	Low	Good	Good
34	Malitha	V.High	high	Med	Good	Good	Good
35	Nelli	High	High	Med	Good	Good	Good
37	Polpala	High	V.High	High	Good	Good	Good
40	Ratnitul	High	V.High	V.High	Good	Good	Good
42	Savendara	High	High	High	Good	Goos	Good
43	Senehekola	Med	High	High	Good	Med	Good
44	Suduhandun	V.High	V.High	Med	Good	V.Good	Good
45	Thippili	Med	High	High	Good	Good	Good
47	Wadakana	High	High	High	Good	Good	Good
48	Weniwel	V.High	High	Low	Low	Good	Low
49	Wel madata	V.High	High	Med	Low	Good	Low
50	Wel Kahambiliya	High	High	Good	Low	Good	Good

Note: The reference number for species corresponds to the table in Annex I (c) entitled 'Heavily Used Medicinal Plants of Sri Lanka'.

ANNEX 18

PROPOSED MEDICINAL PLANT RESERVES AND THEIR CLIMATIC CHARACTERISTICS



SRI LANKA

Conservation and Sustainable Use of Medicinal Plants Project

Indigenous People

Compliance with Bank Operational Directive 4.20

Operational Directive	Project activities which address the OD
Full consideration of options preferred by the effected indigenous people.	• **Indigenous People to be given full information on village development activities** • **Indigenous People will be represented in the Village Project Management Committees**
Anticipate adverse trends likely to be induced by project and identify mitigation measures.	• **Monitoring and Evaluation arrangements will include social assessment specifically related to Indigenous People.** • **Through their representation on Village Project Management Committees, representatives from Indigenous People can identify adverse trends.** • **Research studies on sociological aspects of the project will also identify adverse trends.** • **Community mobilization will create awareness of the importance of conservation,** • **Management planning for ethnobotanical reserves will include the input from Indigenous People.** • **Creation of a Board to review Intellectual Property Rights to avoid the piracy of information from Indigenous People.**
Institutions responsible for interaction with indigenous peoples should involve NGOs with expertise in matters relating to indigenous people	**The project will use NGOs and CBOs which are already existing in the villages, have experience of working with Indigenous People and are aware of the issues concerning them.**

Local patterns of social organization, religious beliefs and resource use should be taken into account	• **The project has already conducted a social assessment of villages. Further field based exercises will be conducted to ascertain the nature of social and religious patterns which may be relevant to the project.** • **Collection of indigenous knowledge will be sensitive to the concerns of Indigenous People and will be clearly identified and recorded in accordance with intellectual property rights.**
Production systems should be well adapted to the needs and environment of indigenous people.	• **Indigenous People will be involved in management planning of reserves through which they can identify the appropriate adjustments in alternative income generating activities which satisfy their needs.**
Avoid dependency and include management skills	• **Training for home gardening, extension and skills upgrading will target Indigenous People.** • **Value added activities will be introduced to increase income levels and reduce dependency,** • **Access to market information will be supported to increase the choices of sellers/producers.**
Adequacy of preparation and follow up	• **Thorough research and information gathering and the compliance of project activities with the Bank's O.D 4.20 will be undertaken before project activities are launched.** • **Setting up of a comittee to review the issues of intellectual property rights.**