Proposal for Review

PROJECT TITLE:	**SRI LANKA: CONSERVATION AND SUSTAINABLE USE OF MEDICINAL PLANTS**
GEF FOCAL AREA:	Biodiversity
COUNTRY ELIGIBILITY:	Ratified CBD on March 23, 1994
TOTAL PROGRAM COST:	US $25.8 million
GEF GRAND TOTAL FINANCING:	US $ 5.415 million
GEF FINANCING:	US $4.6 million
COFINANCING:	US 20.4 million
ASSOCIATED IBRD PROJECT:	None
GEF IMPLEMENTING AGENCY:	World Bank
GEF OPERATIONAL FOCAL POINT:	Ministry of Transportation, Environment and Women's Affairs
EXECUTING AGENCIES:	Ministry of Indigenous Medicine-Department of Ayurveda, Forest Department, Department of Wildlife, Provincial Councils and Local Government.
ESTIMATED APPROVAL DATE:	October 1997
PROJECT DURATION:	Five years
GEF PREPARATION COSTS:	US $345.000 PDF Block B Grant

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

South Asia
Country Department 1

Project Concept Document

Sri Lanka
Conservation and Sustainable Use of Medicinal Plants Project

Date: March 20, 1997 [ ] Draft [x] Final
Task Manager: Malcolm Jansen/Nadim Khouri Country Manager: Roberto Bentjerodt
Project ID: LK-GE-35828 Sector: Environment POC:
Lending Instrument: PTI: [x] Yes [ ] No
Project Financing Data [ ] **Loan** [ ] **Credit** [ ] **Guarantee** [x] **GEFGrant** **Other [Specify]**

For Loans/Credits/Others:

Amount (US$m/SDRm): US $ 4.57 million
Proposed Terms: [x] To be defined [ ] Multicurrency [ ] Single currency
Grace period (years): [ ] Standard Variable [ ] Fixed [ ] LIBOI
Years to maturity:
Commitment fee: %
Service charge: %

Financing plan (US$m): [ ] To be defined

Source		Local	Foreign	Total
Government		0.49	0.01	0.50
Cofinanciers				
IBRD/IDA				
GEF	x	1.98	2.92	4.91
Other(specify)				
Other (specify)				
Borrower:				
Guarantor:				

Responsible agency(ies): Ministry of Cooperatives, Provincial Councils, Local Government and Indigenous Medicine

For Guarantees: [ ] Partial Credit [ ] Partial risk

Proposed coverage:
Project sponsor:
Nature of underlying financing:
Terms of financing:
Principal amount (US$m)
Final maturity

Amortization profile

Financing available without guarantee:] Yes [ ] No

If yes, estimated cost or maturity:

Estimated financing cost or maturity with guarantee:

Block 1: Project Description

1. **Project development objectives** (see Annex 1 for key performance indicators):
The objective of the 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 to a protected area system which contributes to conservation of the island's biological resources. This project, which is part of a $25 million medicinal plant conservation and use program, 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 medicine.

The project's linkages with other efforts in the sector:
The project is an increment 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. Forest reserves fall under the management of the Forest Department which spends approximately $25,800 (SLRs 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. T contribution of the Wildlife Department as a cofinancier of parallel activities in the sector amounts to approximately $24,000 (SLRs 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 (SLRs 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 in charge of Indigenous Medicine 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. In addition to the collective contribution of all these efforts in the sector, the Department of Ayurveda would provide additional funding of $14.15 million for improving community assess to ayurvedic treatment, quality control and standardization clinical research and drug preparation operations. Another noteworthy contribution to the sector is made by the Town and Country Planning Department ($27,624 per annum) which maintains a medicinal plant garden at Kataragama.

In addition to GOSL's contribution to the sector, the program for conservation of Sri Lanka's medicinal plants receives support from donors. They address several vital aspects of the sector such as skills enhancement on biodiversity, nursery development, community participation in natural resources management and technical assistance[1]. These projects focus on other 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 and $130,000 from MacArthur Foundation 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

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

model for the proposed project to develop further. Other projects such as the IUCN 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.

This project furthers the activities of the current and proposed projects through supplementing current conservation efforts with activities aimed at promoting 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 participatory resource management and 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 sustainable use of plants by 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.

2. **Project components:**

Component	Category	Indicative Costs (US$M)	% of Total
Expansion of In situ conservation: this will include demarcation of five botanical reserves in five areas (Bibile, Ritigala, Naula, Rajawaka and Kanneliya) where there is active collection from the wild.	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. 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. Investigations to promote 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 (through training of a cadre of local professionals, curriculum development and research for documentation of knowledge).	approximately US $ 2.81 million	55.4%

	7. Ecological tourism to promote awareness and contribution to financial sustainability through technical expertise and workshops, for dissemination of best practices. 8. Promotion of village development activities for 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). Technical support for market strategy development and product processing. 10. Establishment of medical and information center 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's agro-ecological zones. 2. Home garden 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. Promotion of cultivation through training, dissemination of research information and awareness.	approximately US $ 0.46 million	9.2 %
Information and institutional support	1. Promotion of appropriate legal and policy environment for promotion of conservation and sustainable use through studies and draft regulations 2. National survey and establishment of information network on medicinal plants. 3. Training and mass awareness on medicinal	approximately US $ 1.8 million	35 %

	plants through post-graduate training and production of education ,materials and awareness programs. 4. Monitoring and evaluation of project achievements.	
PDF Block B Grant	US$ 345,000	
Total	US$ 5.415 million	100%

3. **Benefits and target population**:
The benefits from the project accrue primarily at the global level although some benefits will also be generated for the local economy and people. At the local level, the project will increase the overall supply of plants to domestic markets to better meet the demand for Ayurvedic medicine. Another benefit will be the promotion of environmentally sustainable livelihoods which will contribute to enhanced conservation of Sri Lanka's natural resources. Further, ethnobotanical reserves will attract a marginal increase in income through tourism although the extent of this increase is not likely to be considerable.

The global benefits of this project will be considerable. The conservation and sustainable use of Sri Lanka's medicinal plants will contribute to the GEF's global effort to protect and enhance biodiversity. Medicinal plants comprise nearly half of the Sri Lanka's 3,350 species of higher plants and are an important part of global biodiversity resources because of their high rate of endemism. At least 189 species of the 1,414 medicinal plants used in Sri Lanka are endemic to the island. In addition, a number of other medicinal plants are restricted to Sri Lanka and the southern part of the Western Ghats in South India, and are therefore of important global significance. Even among the non-endemic species, the indigenous populations often represent eco types that are distinct from those found elsewhere. Some plants which have proven to be valuable for traditional medicine are likely to have important use in modern medicine globally. Several modern medicines have plant derived compounds some of which cannot be produced chemically.

Another global contribution of the project will be the preservation of knowledge on medicinal plants. Through preserving the 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 and inventory for identification of methods and levels of sustainable extraction will help to sustain and maintain wild plant populations for global benefit.

Target population: To improve the economic conditions of the people in rural areas who form the bulk of the gatherers, collectors and processors of medicinal pants, the project incorporates village level activities. The project will work in close collaboration with local people to devise a strategy for the planning and implementation of project activities. The project will also target practitioners of traditional medicine to conserve their knowledge of plants and their uses.

4. **Institutional and implementation arrangements:**

Executing Agencies: The ministry in charge of Indigenous Medicine (MIM)- Ministry of Co-operatives, Provincial Councils, Local Government 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 the implementation of the project activities include the (i) Forest Department (ii) 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 biological reserves.

Institutional Arrangements: A temporary project management unit (PMU) will be established at the MIM. The PMU will be headed by a Project Director reporting to the Secretary, MIM. The PMU will coordinate and administer the Project, which would be implemented through line departments, provincial departments and other institutions. Project oversight will be provided by a multi disciplinary National Project Steering Committee which has been guiding the development of the project during the preparation phase. Chaired by the Secretary MIM, the Steering Committee consists of 15 representatives of key line agencies, universities, research institutes, the private sector and NGOs.

Block 2: Project Rationale

5. **CAS objective(s) supported by the project**: Document number and date of latest CAS discussion:

15633-CE. May 21, 1996.

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

The project is consistent with the Convention on Biological Diversity since it promotes sustainable use and will also address issues such as equitable sharing of benefits of genetic resources with local communities. It is consistent with the GEF Operational Strategy especially the Operational Program for Forest Ecosystems. The project is consistent with guidance from the Conference of the Parties in that it promotes conservation and sustainable use of endemic species and vulnerable ecosystems and habitats. It will identify and monitor wild biodiversity components, including those under threat, promote sustainability and innovative measures to encourage sustainable use and strengthen the involvement of local communities and indigenous peoples by integrating social dimensions including those related to poverty.

The project responds specifically to guidance from COP 3 by building capacity, especially at the local level, for identification and monitoring, for supporting sustainable use of biodiversity important to agriculture (medicinal plants), for collation and use of traditional knowledge and by providing economic incentives to local communities for conservation and sustainable use. The project will make a specific contribution to linking conservation and sustainable use of biodiversity with sustainable development and provide useful models for replication elsewhere in the region and globally.

In documenting indigenous knowledge on medicinal plants, the project will apply the guidance provided by O.D. 4.20 on Indigenous People. The project will ensure that the collection of knowledge takes place with the consent of parties concerned. Further, this knowledge will form part of the database of information to be maintained by the Department of Ayurveda and will ensure that Ayurveda practitioners who have shared their knowledge can claim intellectual property rights if their knowledge is used for commercial purposes.

6. **Main sector issues and Government strategy:** The decrease in the number of plants is the key issue in the sector. The factors which contribute to this are as follows:

1. 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. 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 is too restricted at present to meet the demand without overharvesting wild populations of plants.

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, the habitat for medicinal plants has suffered considerably. About 79 of these plants are immediately threatened with extinction.

2. 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 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.

Sri Lanka is fortunate to have a rich stock of indigenous knowledge on medicinal plants largely 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 or use it widely. 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.

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. The Ministry of Indigenous Medicine 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. Despite the population and development pressures on its land resources, Sri Lanka has reserves 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. These activities demonstrate a significant commitment on the part of the Government to conserve medicinal plants.

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. Projected expenditure levels for MIM and MTEWA are 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 have been a key factor preventing GOSL from further developing activities to promote 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, 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 and complement ongoing conservation projects by GOSL and donors.

7. **Sector issues to be addressed by the project and strategic choices**: The project will address several critical issues in the sector. These will include:

a. 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. Most sites have been part of some previous activities related to conservation, training, extension and awareness building on forest and biodiversity conservation. 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.

b. overharvesting of medicinal plants from the wild:. Combined with research to ascertain the sustainable levels and methods of harvesting and application of this research to species management in reserves, the project will promote sustainable harvesting of plants. In addition, the training and awareness building activities will provide information and upgrade skills in monitoring of plant populations, determining the degree of threat and identification of areas/ species requiring support through remedial measures. 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.

c. lack of knowledge and dissemination of knowledge related to the propagation and cultivation of medicinal plants in home gardens and plantations; 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 overextraction 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 (category 2, component 2). Combined with better training on the cultivation of these plants (category 11, component 1), 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.

d. 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 (category 3, component 3). 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.

8. **Project alternatives considered and reasons for rejection**: [ ] To be defined

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 the supply of plants used in Ayurvedic medicine by forming reserves to propagate and cultivate species, building nursery capacity and conducting targeted research on plants for the possible substitution of heavily used species with those not under threat and/or easily cultivable. 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.

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.

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

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 participatory 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 be 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.

9. **Major related projects financed by the Bank and/or other development agencies** (completed, ongoing and planned).

Donors have shown a keen interest in supporting and furthering GOSL's commitment to biodiversity conservation through various projects. Current projects provide a useful background for the proposed project's activities through creating an enabling environment. Most projects on biodiversity conservation support PAs which help to protect plant populations in the wild. Typically, 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 issues related to conservation of plants (e.g. Medicinal Plant Technical Assistance Project and Opanaike Medicinal Plant Nursery Program). The pilot project under Ritigala Community Participatory Program has been the only project aimed at site specific conservation of natural resources (including medicinal plants) through community based activities. This targeted approach to medicinal plant conservation needs to be extended beyond the pilot phase for a more comprehensive conservation of medicinal plants. More importantly, the project's emphasis on sustainable use of medicinal plants is an essential part of conserving plants which has not been addressed by any project. Coupled with skill upgrading, research, information gathering and community involvement in conservation activities, the project provides a multi faceted approach to arresting the decline in plant populations.. A list of current projects in the sector appears below:

Sector issue	Project	Latest Form 590 Ratings (Bank-financ

Bank-financed	Biodiversity Skills Enhancement Program (Ongoing/World Bank-and MacArthur Foundation). The project aims to provide basic training and skills enhancement in data collection, EIA, community participation and buffer zones managemnt through training workshops, seminars and field visits.	ed project s only)
	Participatory Forestry Project (Ongoing/ADB)	
Other development agencies		
	Ritigala Community Participatory Program (Ongoing/USAID-Asia Foundation). The Pilot Program has established village level insitutions to manage natural resources, created community awareness and support for conservation of natural resources and promoted alternate livelihoods, such as home gardening of medicinal plants. (The pilot program is expected to end shortly)	
	Medicinal Plant Technical Assistance Project (Completed[WHO/UNDP)	
	Opanaike Medicinal Plant Nursery Program (Ongoing/GEF Small Grants)	
	Wildlife Conservation Project (Ongoing/GEF-UNDP). The project has sought to establish two new protected areas and provide support through management planning to the protected areas system. It has also aimed to enhance skill and build capacity in the Department of Wildlife.	
	Knuckles and Sinharaja Conservation Program. Pilot participatory management programs (NORAD/IUCN)	

10. **Lessons learned and reflected in proposed project design:**

The project has benefited from several lessons from the above mentioned projects. These include:

1. Consensus on project objectives: The project has been sensitive to the need for developing a consensus between stakeholders 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 identify arrive at a common understanding of objectives. Project objectives will be communicated to local communities and project who will be closely involved in developing management plans to implement project objectives.

2. 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 by the proposed project by means of adopting a participatory approach, instead of "top down" planning, to project implementation. 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 will be formed to coordinate and plan activities, monitor the impact of implementation activities and mobilize local support. Realizing the key lesson that the project cannot be worthy of the support of 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. The implementation of alternative livelihood strategies will be based on the active cooperation of local communities and NGOs.

3. 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 Forest Department, Ministry in charge of Indigenous Medicine, Department of Agriculture, Department of Wildlife and Ministry of Environment, inter agency coordination is vital for the success of the project. The project has sought to develop interagency coordination through wide 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 Medicinal Plant Reserve Management Committee (MPRMC) consisting of representatives of the concerned State agencies, the Project Officer of the Medicinal Plant Reserve, 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 MPRMC will be guided 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.

4. 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 activities initiated by the project. The proposed project will seek to avoid this situation through designing appropriate mechanisms for cost recovery (user fees and other charges, product development, etc.) and to replenish 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 the sustainability of project investments.

11. **Indications of beneficiary commitment and ownership**:
Through the formation of a NEAP[2], environmental institutions such as Ministry of Environment 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 its proactive role in played by MoE and MIM in overseeing project preparation, keen participation in the Biodiversity Working Group and related workshops organized for the project. MIM as the implementing agency has also formed a Project Management Unit and a Steering Committee to guide project development and implementation.

12. **Value added of Bank and GEF support**:
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 (Annex 5). As a result, the medicinal plant reserves have been proposed for areas which are rich in threatened and endemic plants. Propagation programs have also targeted threatened and endemic

[2] National Environmental Action Plan

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 the plants. Given the demand for Ayurvedic medicine, increasing supply through wider cultivation is a necessary activity 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 formation of reserves and increase in nursery capacity and cultivation of plants with other activities necessary for preventing the loss of globally valued plants. These include development of a regulatory policy, legislative improvements and research to maintain usage of plants within sustainable levels. 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 on 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 owners and source of this knowledge are acknowledged 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.

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. 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: Project Preparation

13. **Has a project preparation plan been agreed with the beneficiary** (see Annex 2 to this form)	[x] Yes Date Submitted: June 6th, 1996	[ ] No Date Expected:
14. **Has the beneficiary drafted a project implementation plan** (See Attachment for suggested content)	[ ] Yes Date Submitted:	[x] No Date Expected: March 6th, 1997
15. **Advice/consultation outside country department**	[x] Within the Bank:	: [ ] Other development agencies

The project has benefited from comments provided by peer reviewers from other departments in the Bank. Reviewers include Susan Shen (EA1 AE), George Ledec (LAT EN) and John Dixon (ENV PE).

16. **Issues Requiring Special Attention**

a. **Economic**

[x](list issues below, e.g., fiscal impact, pricing distortions, etc.) [ ] To be defined [ ] None

Economic evaluation methodology:	[ ] Cost benefit	[x] Cost effectiveness	[x] Other [specify] Incremental costs
Cost effectiveness analysis and incremental cost analysis.			

Economic analysis for the project has included both a cost effectiveness and incremental cost analyses. Cost effectiveness has been ensured by selecting the least cost alternative which achieves project objectives and by avoiding duplication of activities. This consideration has directed the rejection of such components as biotechnology research which require substantial financial support over a long period of time. Other cost effective actions chosen for the project include (a) applied or adaptive research to benefit project implementation (b) policy reforms in areas which already have regulatory authorities (c) specialized training in medicinal plants; and (d) improved information sharing mechanisms to avoid duplication of research.

Incremental cost Under the baseline conditions, GOSL's expenditure on conservation of medicinal plants forms a small percentage of the budgetary allocation for environment, wildlife conservation, scientific research and forestry. Most of this expenditure is either incidentally related to medicinal plants or is concentrated on plants which have a high domestic value. The current conditions, therefore, do not provide for a comprehensive and sustainable conservation of a wide selection of globally important medicinal plants. The project's scope to conserve a wide variety of plants will, therefore, yield global and domestic incremental benefits. Global incremental benefits will include the conservation and sustainable use of plants which are not being targeted by current activities. Other components such as the creation of botanical reserves, institutional capacity building, training, awareness building and research will augment current programs for sustainable conservation of globally important medicinal plants. Increased information and awareness on the properties and uses of plants is another global incremental benefit from the project. Domestic incremental benefits from the project will include increase in tourism, relatively less expensive health care and in the long run, patented pharmaceutical products.. (For a detailed analysis of Incremental Costs, see Annex 5)

b. **Financial**

[x](list issues below, e.g., cost recovery, tariff policies, financial controls and accountability, etc.) [ ] To be defined [ ] None

A chief concern of the project is to devise mechanisms for cost recovery. Components such as botanical gardens, medical and information centers (component 1, category 10) are planned to recover their costs. Their recurrent costs are not calculated to be high and will be financed through user fees and other charges. Enhancement of nursery capacity (category3, component 2) will also recover its costs through sale of seeds, plants and other related planting materials. Through user fees, charges and other activities, ecological tourism (category 1, component 7) 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**

[x](list issues below, e.g., appropriate technology, costing, etc.) [ ] To be defined [ ] None

GEF's Scientific and Technical Advisory Panel (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 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".

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 re source-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**

[x](list issues below, e.g., project management, M&E capacity, [ ] To be defined
[ ] None
administrative regulations, etc.)

An assessment of the institutions involved in this multi sectoral 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, if 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 are all experiences that will benefit project implementation, especially concerning ex-situ conservation, propagation of processing. For in-situ conservation, the Forest Department has experience in joint management of forest resources with the private sector (leasing of plantations to private businesses) and local communities (through the Participation Forestry Project mainly). For participatory village development planning, a number of rural NGOs have field experience that will be sought around the reserves component. *Before project appraisal, MIM and the preparation team will have identified the specific NGOs and CBOS, with appropriate experience, that will be interacting with the Project, and defined the type of agreement for implementing the complementary village development activities and other sociological work.*

Areas of Institutional Weakness: They include the key areas of technical and administrative capabilities in the issue of 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 mass 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) providing international support through the technical advisory committee; and (iv) covering the contracting of an external institution for the monitoring and evaluation of overall project impact.

Monitoring and Evaluation: An important aspect of the project (category 4, component3) will be the Monitoring and Evaluation of project activities which will be the primary responsibility of Project Officer and staff with the overall responsibility lying with the Project Director head of 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 apart time basis. M&E at the community level is critical to smooth operation of the project. Once the 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 at the community level. M&E at the next level will be undertaken by the District Ayurveda Conservation Boards which will select representatives from the communities to monitor project activities. The Ayurveda Conservation Board through its representation the Provincial Project Management Committee will link the communities with the provincial level for M&E. In addition, the project will contract impact monitoring of activities to an independent multi disciplinary team from an independent research institution or university.

e. **Social**

[x] (list issues below, e.g., gender, protection of indigenous [ ] To be defined

[ ] None
and other vulnerable groups, etc.)
The design of the project is based on the premise that sustainability of medicinal plant resource conservation in the reserves depends on the nature of human interactions with the resources contained therein. Project interventions are designed to reduce the negative and strengthen the positive impacts of these mutual interactions. The participatory approach of the project will enable the interventions to be planned and negotiated by each of the participating village communities based on site specific social and ecological needs. The pre-appraisal mission noted that the preparation team has initiated the social analysis of areas where in-situ conservation work will be implemented. This assessment includes stakeholder analysis, gender analysis, assessment of the community-reserve interactions, guidance on planning and implementation approaches for improving community level decision-making and participation and for mitigation of any potential social impact that may arise from the implementation of project activities. *It was agreed with GOSL that this additional social analysis will have to be completed prior to the initiation of project appraisal and negotiations.* The project will include specific arrangements to monitor the social impact of the project and to provide feedback for continuous project adjustment and correction.

f. **Resettlement**

[ ] (list issues below, e.g., resettlement planning, compensation payments.) [ ] To be defined
[x] None

g. **Environmental**

The project is expected to have a highly beneficial environmental impact. The main goal of the project is to conserve medicinal plants by protection in five selected biological reserves in different biogeographical areas of the country, by reducing the unsustainable exploitation of medicinal plants and improving their sustainable harvest form home gardens, farms, plantations and buffer zones. Adverse impacts are expected to be minimal because all investments are small, ecologically sound, and limited in scope. In order to measure project success, project monitoring would include close review of the ecological impact of the project, beginning with carefully designed and reliable resource mapping and baseline studies. The project will also include research, ethnobotanical and sustainable management studies aimed at improving the conservation and sustainable use of medicinal plant resources.

The project will also support the review of major legislative enactment's that have a bearing on medicinal plant conservation and use, import and export, harvesting, property rights on indigenous knowledge and plant resources, and the drafting of appropriate amendments or new legislation to tighten the control of indigenous knowledge, plant resources and products.

i. Environmental issues:	Major:		[ ] To be defined	[ ] None
	Other:			
ii. Environmental category:	[ ] A	[x B	[C]	

iii. **Justification/Rationale for category rating:**
The project is expected to yield primarily positive environmental impacts through conservation of medicinal plants, reduce pressure on their habitat and encourage community participation in conservation measures.

iv. Status of Category A assessment: EA start-up date:
Date of first EA draft:
Current status:

v. Proposed actions:

vi. Status of any other environmental studies:

vii. Local groups and NGOs consulted: (List names):

viii. Borrower permission to release EA: [ ] Yes [ ] No

ix. Other remarks:

h. **Participatory Approach:**

Project identification and formulation adopted a participatory approach with the stakeholders through workshops, consultation meetings, brain-storming meetings, and field consultations. The stakeholders included Ayurveda practitioners, traders, exporters and manufacturers, scientists, policy makers, technical specialists, NGOS, and local community representatives[3]. These consultations 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 the stakeholders in the later implementation of the project.

The project design entails a participatory approach to the implementation and operation of the project. 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.

	Preparation	Implementation	Operation
Beneficiaries/community groups	IS/CON	COL	COL
Intermediary NGOs	IS/CON	COL	COL
National NGOs	IS/CON	CON	CON
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

Sustainability :

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 about the reserves. As discussed above, several alternatives for the

[3] Several NGOs and research institutes participated in workshops organised by the project. They included Bandranaike Memorial Ayurvedic Institute, WWF, Environmental foundation, NAREPP Project, IUCN and Ayuveda Conservation Board.

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.

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

	Risk/Assumption	Risk Rating on a scale of 1-5 max	Risk Minimization Measure
Project outputs to development objectives			
	Biodiversity conservation (especially related to medicinal plants) continues to be valued by society.	2-3	Public awareness, facilitation of ecotourism.
	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			
	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 sustainablity 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 Auyrvedic knowledge		
Overall Risk Rating			
	Adequate in country technical capability	3-4	Strong TA inputs, links to

external technical institutions and training.

k. **Possible Controversial Aspects**:
Through increasing the supply of medicinal plants, the project increases the risk of further pressures on wild populations of endangered plants to meet the escalating demand 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 on wild populations of plants.

The potential risk of 'piracy' of genetic material is a controversial aspects 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: Conditionality Framework

17. [ ] [Identify the critical policy and institutional reforms sought, and where appropriate, the likely areas of conditionality.] [ ] To be defined

Block 5: Checklist of Bank Policies

18. This project involves (check applicable items):

[x]	Indigenous peoples	[ ]	Riparian water rights
[ ]	Cultural property	[ ]	Financial management
[ ]	Significant environmental impacts	[x]	Financing of recurrent costs
[x]	Natural habitats	[ ]	Local cost sharing
[ ]	Gender issues	[ ]	Cost-sharing above country three-year average
[ ]	Involuntary resettlement	[ ]	Retroactive financing above normal limit
[x]	Significant consultation	[ ]	Disputed territory
[x]	Significant participation	[ ]	Other

19. **Describe issue(s) involved**:
Through conserving medicinal plants and their habitat, the project is in compliance of the OD 4.04 on Natural Habitats which states that "the Bank supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development the conservation of natural habitats and maintenance of ecological functions". The project also complies with O.D. 4.20 on Indigenous People by recognizing that Ayurvedic practitioners knowledge is an indigenous resource which merits preservation. Through documentation of their knowledge, and draftin of legal procedures on intellectual property rights, the project ensures that rights associated with indigenous knowledge are safeguarded. Significant consultation and participation are also integrated in project preparation and implementation. The project maintains a balance between consensus building at the institutional level and involving local communities in project implementation. Through workshops, consultation and social assessment/ appraisal, project preparation has elicited the views of various stakeholders.

Block 6: Task Team/Review Arrangements/Management Decisions

20. Composition of Task Team (see Annex 2)

21. Review Arrangements and Schedule (see Annex 3)

22. Management Decisions

Issue	Action/Decision	Responsibility

Total Preparation Budget: GEF Project Preparation Advance US$ 320,000
Cost to Date:

GO [ ] NO GO [ ] Further Review [Expected Date]

[signature]
Task Manager:

[signature]
Country Manager:

Annex 1

Project Design Summary

Narrative Summary	Key Performance Indicators[4]	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 plant, their habitats, species and genomes and 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., MTEWA 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 management system for medicinal plants. 2. Increased production of selected medicinal plants species on farms and in home gardens. 3. Indigenous information on medicinal plants preserved. 4. Technical capacity to conserve plants improved.	1.1 Harvest of species in wild within established sustainability limits. 2.1 Trials of 50 species completed by mid-term, 108 species by project end; recommendations for suitable species published; 2.2 Production of medicinal plants in buffer zones increased over 25% by year 3, over 50% by project end and over 100% at full development. 3.1 Published documentation accessible according to criteria safeguarding	1. PMU reports of sustainability studies; sampling by independent technical monitors at mid-term and completion. 2. PMU research reports 3. PMU/independent farm surveys before and during project interventions including copping patterns, yield samples, etc.) 4. PMU documents, databases.	(Outputs to Development Objectives) Biodiversity conservation, especially related to medicinal plants, continues to be valued by society. Property rights are definable and enforceable.

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

	intellectual property rights. At least 2GB of data recorded by project end.		
Project Components **1. Expansion of in situ conservation;** • Selection and demarcation of five botanical reserves in the areas of Bibile, Ritigala, Nuala (or Dolukanda) Rajawaka and Kanneliya. • Community organization and management planning for botanical reserves (including existing Kataragama reserve). • Planting of reserves. • Promotion of alternative village incomes linked to maintaining the integrity of reserves. • Village training. • Site specific research **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.	Input US$ 4.57 million total cost including contingencies 1.1 US$ 2.57 million total. 10,000 -12,000 ha (1,00 ha minimum per reserve), constituting five reserves, 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. 2. US$ 0.53 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	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.	(Components to Outputs) Lack of information on the viable size of a botanical reserve. 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, MTEWA, NGOs to pursue project objectives).

	completed. Research results disseminated through existing extension networks.		
3. Information and Institutional support • Promotion of appropriate legal and policy environment. • database development. • Departmental capacity building • Installation of multi disciplinary capacity to implement present environmental project.	3. US$ 1.97 million total 3.1 Draft regulations regarding standards, trade, property rights and land use. Quality standards and control measures developed. National survey conducted and information network 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.		

Annex 1

Project Design Summary

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LETTER OF COUNTRY ENDORSEMENT
BY DESIGNATED OPERATIONAL FOCAL POINT

ORIGINAL

Office 588274
Fax 94-1-502566 583280

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போக்குவரத்து, சுற்றாடல், மகளிர் விவகார அமைச்சு
MINISTRY OF TRANSPORT, ENVIRONMENT & WOMEN'S AFFAIRS

P.O. Box 1583
පරිසර අංශය சுற்றாடல் பகுதி ENVIRONMENT DIVISION

6th Floor,
Unity Plaza Building,
Bambalapitiya,
Colombo 4.

My No

Your No.

Date

FAX MESSAGE

To: Mr. Nadim Khouri Fax: 202-522-1778
World Bank, Washington

From: Cecil Amerasinghe
Secretary/TEWA Fax: 941 687284

Re: GEF MEDICINAL PLANT CONSERVATION PROJECT

The Ministry of Co-operatives, Provincial Councils and Indigenous Medicine and Ministry of Transport, Environment and Women's Affairs support the GEF Medicinal Plant Conservation project and request you to submit documentation to the GEF Council.

Regards.

Cecil Amerasinghe

cc: - Dr. Sumith Pilapitiya
Sri Lanka Resident Mission WB

- Mr. Obadage
Secretary
Ministry of Co-operatives, Provincial Councils
& Indigenous Medicine
- Reference discussion today.

TECHNICAL REVIEW
SRI LANKA: CONSERVATION AND SUSTAINABLE USE OF MEDICINAL PLANTS

REVIEW OF GEF -- SRI LANKA: NATIONAL STRATEGIC PLANNING AND CONSERVATION OF BIODIVERSITY PROJECT

JUSTIFICATION AND INTRODUCTION

Sri Lanka is an excellent location for this project, due to its high degree of floristic endemism as well as manageable numbers of species of higher plants. Many of these species are used in a very ancient and widely accepted medical system known as Ayurveda, and there are numerous practitioners who depend on biological diversity to obtain the raw materials used to produce the formulas distributed to their patients. The project comes at a crucial time in Sri Lanka's development as much of the local biological diversity is endangered through deforestation and over-harvest. A national strategy for the conservation of biological diversity is absolutely essential. Specific comments and concerns on the project are as follows:

QUESTIONS, CONCERNS AND COMMENTS

1. It is important to determine where the plants used in Ayurvedic medicine in Sri Lanka are obtained from. Are they cultivated, wild harvested, imported, etc.? Certain widely used species that are cultivated might be in little danger of exhaustion and perhaps might not be appropriate candidates for further study. On the other hand, a number of wild harvested species are currently being extracted to exhaustion, and it would seem that these would be primary candidates for this study. In addition, what plants are imported, if any, and can local production substitute for this? What are the export needs of the region, such as in India, where at least 400 - 600 million people use plants prescribed in Ayurvedic or Unani medicine for a significant portion of their health care system. If one could obtain a better understanding of the export requirements, perhaps sustainable harvest and/or cultivation strategies could be developed to meet these needs.

2. The term sustainable is of some concern, as it is often hard to define exactly what is required for different species. For example a plant used for its bark, but taking 30 years to mature must be treated quite differently then an herb that is harvested for its roots, such as *Asparagus racimosus*, a common species in Ayurvedic medicine. Fruit tree crops such as *Terminalia chebula* are very well suited for orchard or agroforestry cultivation either on a small scale or large scale. On the other hand *Guggul* (*Commiphora wrightii*) must grow to a very old age before the resin can be harvested. As such, with the latter, there could be greater stress placed on the wild resource, and some degree of priority given to the development of sustainable extraction technologies of a species with such characteristics. These are very serious resource management issues that must be addressed by ecological and ethnobotanical studies.

3. The study will need to focus on how to link up the factories that consume raw materials used in traditional medicine with those harvesters who provide sustainably produced material. All too often, factories procure resources that are offered for the lowest price, rather than working with sources that can guarantee sustainable harvest. Several factories must be identified that are willing to work only with sustainably harvested materials. There are legal trusts that have been established with certain Ayurvedic factories in India, and these assure that a portion of the profits are used for the public good, and such institutions would seem optimum working with the sustainable harvest issue. It is also important to establish whether cultivated species are equally powerful therapeutics as compared to wild harvested species. Do cultivated species that are grown in industrial zones have toxic components, e.g. lead?

4. What are the goals of the Biodiversity Action Programme? Will it focus on resource management from the perspective of harvesting non-timber forest products, reforestation, sustainable logging, etc.? Will its development involve a top down approach, authored by the Forestry Department, or will there be a mechanism for community participation and input built in at the earliest stage? I have seen one BAP fail because it was written in a top down fashion, and focused totally on improving technology for logging secondary forest, rather than coming up with economically viable community level activities undertaken in a sustainable fashion.

5. It is important to plan for the continued flow of economic benefits to local people and to the factories, following the completion of the project. One strategy for increasing markets and profits would be to promote the export of Ayurvedic materials, specifically to a country such as the United States where the practice of Ayurveda is being increasingly accepted in health care treatments. It would be possible for the factories involved in the project to link up with U.S. distributors of Ayurvedic health care products, as well as those in Germany, France, Italy, etc. where Ayurveda is known and utilized.

6. In view of the diverse numbers of local organizations that are involved in the project (a dozen at least), I am concerned that the organizing committees may have to make many compromises on serious strategy decisions. Thus, I feel that an outside panel with no agenda of its own could be useful in helping to guide the project, as well as generating additional ideas when called upon. I do not view this as a management committee, but rather as an advisory group that could help resolve difficulties, refine strategies, as well as making the connections with global efforts elsewhere, including sustainable harvesting, preparation of biodiversity action plans, and the promotion of Ayurvedic medicines. There is still a growing market outside of Asia for the promotion and sale of Ayurvedic medicines, and certainly an outside group could help give this project the advantage of their experience and connections.

7. It is not clear what the mechanism will be for publishing the results of this program, both the positive and negative results. Attempts at the sustainable harvest of medicines will involve both successes and failures, and the latter need not be repeated elsewhere. All too often researchers are hesitant to publish negative results for fear of interrupting funding, professional embarrassment, etc. But I think it is very important that the sum total of the experience involved in this project be available for inspection and as a learning tool for elsewhere.

8. One objective of the project is to catalog the available information on the medicinal use of plants in Ayurvedic medicine in Sri Lanka. This is a very important task, that given the funding limitations to be discussed elsewhere, it is a task that, if poorly defined, could serve to take up a great deal of the resources involved in this project. Because Ayurveda is a science that has been written and is taught in numerous medical schools in the region and elsewhere, I believe it is important to focus project activities on work that has not yet been done, e.g. work on the sustainable harvest and utilization of the plant species.

9. It is not clear how many species will be selected for conservation during the survey work. It is also important to focus on a broad scale of species to be surveyed and conserved as part of this project, e.g. trees, herbs, root crops, lianas, etc. based on what is in use in Ayurveda and what is in shortest supply in the market.

10. As pointed out in an above comment, producing a data base of the useful plants is an interesting exercise, and an important focus, but one has to be careful that this not consume a great deal of the resources to be supplied to the project. It must be made clear the level of depth to which the data base will be developed, whether it is a new endeavor, or simply builds on a previous effort.

11. In the ex situ efforts to preserve medicinally important plant species in botanical gardens and other areas, it is important to have a certain focus to define the scope of the activity. Once again, it might be quite consumptive of resources to set up medicinal plant gardens in many different areas when much of the real work needs to be done on the issue of sustainable harvest and production.

12. In the section on propagation and cultivation of medicinal plants, it seems to me that farmers will undertake these activities themselves, with little or no subsidy from outside sources. As the species are used in Ayurvedic medicine, and there is a guaranteed market for the sale of the product, farmers should be able to produce the required commodity. A small loan program and some instructions may be required.

13. My final concern is that the preparation of a biodiversity action plan, and a study that will involve the development of sustainable levels of harvest and utilization of medicinal plants is quite an ambitious undertaking for a $6 million budget. It would be helpful for me to see the budget details in order to evaluate whether this is truly a reasonable level of support or not. Again, some activities, such as documenting what has previously been accomplished could be undertaken in such a way as to overconsume scarce resources, and caution is advised.

CONCLUSION

The project seems very well conceived as written, and a great deal of information and on the ground results promise to be derived from it. The caveats above are rather minimal, and I have every expectation that this will be a successful project in terms of its goals and intentions, and the fact that there are so few studies on the sustainable production of medicinal plants. Thus, it will serve GEF's purpose as a meaningful activity to both people in rural areas as well as at institutions in urban centers, and serve 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 who require native plants for the provision of their primary health care to obtain these essential materials. Unless studies such as the one 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 health care. This project is not only timely, but has a significantly sharpened focus in order to have an impact in dealing with such shortages.

February 21, 1997

Dr. Nadim Khouri
SA1AN
The World Bank
1818 H Street, Rm. 17004
Washington, DC 20433

Dear Nadim:

I was pleased to receive a copy of the aide-memoire resulting from our most recent World Bank Mission to Sri Lanka in connection with the GEF proposal on the conservation and sustainable utilization of medicinal plants.

I felt that the team made a great deal of progress in working with local institutions to formulate the project plan, which was much improved from the earlier version. In particular, a number of the issues addressed in my earlier report have been worked out, such as focusing the project objectives on issues of relevance to global biodiversity conservation. It is essential that the threatened plant species, as well as the traditional knowledge concerning their use, be conserved and made available for wider use. The methodology that will be employed in this project will, I believe, be applicable to the broad issue involving conservation of medicinal plants and ethnomedical knowledge around the world. By employing a field-oriented approach, the project activities will be sustainable beyond the five year period of the Bank's support, and again, be suitable for application internationally. I was also gratified to see the level of GOSL support for this project, and the interest and understanding shown by the IUCN group that will help implement it.

In summary, this project has the potential to become a model for other GEF endeavors involving people's use and protection of their environment. If you

need any further assistance in its formulation or evaluation, please feel free to contact me.

Sincerely,

MJB/ep

cc: Malcolm Jansen
Geraldine Burnett
Salma Omar-Chowdhury

CALCULATION OF INCREMENTAL COST

SRI LANKA: CONSERVATION AND SUSTAINABLE USE OF MEDICINAL PLANTS

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 realisation of export-oriented comparative advantage. The Government are aware that the pursuit of rapid, decentralised, 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 institutionalising 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 (MCPCLGIM), the Forest Department; 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 Environment Division of MTEWA, 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 Environment Division of MTEWA 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 factory, a training unit and a research unit with a standardisation 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 popularise 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 MCPCLGIM 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 per year in 1996 terms, would be utilised 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. 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 centres, 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 specialised 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 realise 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 realise 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 organisation, 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

[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

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.

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.

SRI LANKA
Conservation and Sustainable Use of Medicinal Plants Project
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		

ANNEX 5: Justification for the selection of sites for conservation areas by availability of threatened and endemic medicinal plant species

From Table F-1 in Investment Proposal for the Conservation of Medicinal Plants Project

No	Botanical Names	Propagation Technology	Habitat Degradation	Env. threat	Non. sus harvesting	Endemism	LOCATION (SITES)				
							LW Kan	MW Raja	DL Riti	MI Bibi	I 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 Wlld	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
Bibile	6	3	9
Naula	9	2	11

It is likely that most of the non-endemic threatened species listed above have also very restricted distribution (Sri Lanka and South India)