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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

PROJECT PAPER

SRI LANKA
REFORESTATION AND WATERSHED MANAGEMENT

383-0055

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT IDENTIFICATION DOCUMENT FACESHEET
 TO BE COMPLETED BY ORIGINATING OFFICE

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 C A = ADD
 C = CHANGE
 D = DELETE

PID
 2. DOCUMENT CODE 1

3. COUNTRY/ENTITY SRI LANKA

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 A. SYMBOL ASIA B. CODE 04

7. PROJECT TITLE (MAXIMUM 40 CHARACTERS)
 REFORESTATION AND WATERSHED MANAGEMENT

8. PROPOSED NEXT DOCUMENT
 A. 3 2 = PRP
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10. ESTIMATED COSTS (\$000 OR EQUIVALENT, \$1 =)

FUNDING SOURCE		
A. AID APPROPRIATED		4350
B. OTHER		
C. U.S.A.I.R.		
D. HOST COUNTRY		10330
E. OTHER DONOR(S)		
TOTAL		14680

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION
 a. INITIAL FY 810 b. FINAL FY 811

11. PROPOSED BUDGET AID APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		C. FIRST FY		LIFE OF PROJECT	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	H. GRANT	I. LOAN
(1) FN	B-233	876	160	500	2000	950	3400
(2)							
(3)							
(4)							
TOTAL				500	2000	950	3400

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)

091 093 096 247 851 610

13. SPECIAL CONCERNS CODES (MAXIMUM SIX CODES OF FOUR POSITIONS EACH)
 BR ENV LAB PART TNG

14. SECONDARY PURPOSE CODE 743

15. PROJECT GOAL (MAXIMUM 240 CHARACTERS)
 Improve and conserve the physical environment and natural resources

16. PROJECT PURPOSE (MAXIMUM 480 CHARACTERS)
 Provide a renewable energy and commercial natural resource and conserve and stabilize watershed in highland regions of Sri Lanka

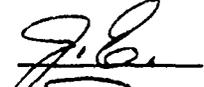
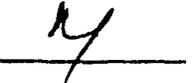
17. PLANNING RESOURCE REQUIREMENTS (staff/funds)
 \$ 65,500

18. ORIGINATING OFFICE CLEARANCE
 Signature: *S. Littlefield*
 Title: S. Littlefield, USAID Director
 Date Signed: 03/28/81

19. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
 04/24/81

PROJECT PAPER CLEARANCE SHEET

REFORESTATION AND WATERSHED MANAGEMENT

<u>POSITION</u>	<u>NAME</u>	<u>SIGNATURE</u>	<u>DATE</u>
Assistant Director	John R. Eriksson		<u>3/28/80</u>
Project Officer	J. W. Bonner		<u>3/28/80</u>
Program Officer	Clark H. Billings		<u>3/28/80</u>
Controller	Douglas S. Franklin		<u>3/28/80</u>
Project Development and Support	Ralph M. Singleton		<u>3/28/80</u>

PRINCIPAL ABBREVIATIONS AND ACRONYMS

AMDP	-	Accelerated Mahaweli Development Program
ACF	-	Assistant Conservator of Forests
AID/W	-	Agency for International Development - Washington D.C.
ADB	-	Asian Development Bank
APAC	-	Asian Project Advisory Committee
BTU	-	British Thermal Unit
CDSS	-	Country Development Strategy Statement
CP	-	Conditions Precedent
CF	-	Conservator of Forests
DCF	-	Deputy Conservator of Forests
DFO	-	Divisional Forest Officer
EOPS	-	End of Project Status
FAO	-	Food and Agricultural Organization
FY	-	Fiscal Year
FG	-	Forest Guard
GSL	-	Government of Sri Lanka
ISTI	-	International Science and Technology Institute, Inc.
IBRD	-	International Bank for Reconstruction and Development
IFB	-	Invitation for Bid
IRR	-	Internal Rate of Return
IEE	-	Initial Environmental Examination
MS	-	Master of Science
NORAD	-	Norwegian Agency for Development Cooperation
ODA	-	Overseas Development Administration
PES	-	Project Evaluation Summary
PP	-	Project Paper
PID	-	Project Identification Document
RFP	-	Request for Proposal
RFO	-	Range Forest Officer
STC	-	State Timber Corporation
TA	-	Technical Assistance
UMCA	-	Upper Mahaweli Catchment Area
UNDP	-	United Nations Development Program
USAID	-	United States Agency for International Development
USDA	-	United States Department of Agriculture

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REFORESTATION AND WATERSHED MANAGEMENT

PART I - Summary and Recommendations

A. RECOMMENDATIONS:

1. General Terms

It is recommended that a loan and grant with a combined total of U.S. \$4.35 million be authorized to assist the Government of Sri Lanka to finance the costs of a reforestation and watershed management project as described below. The total project cost is estimated at \$14.68 million of which \$950,000 is proposed for USAID grant funding, \$3.40 million loan funding and \$10.33 million (rupee equivalent) by the Government.

- (a) Proposed Grant - A grant in the amount of \$950,000 would cover the costs of technical assistance. Grant funding of technical assistance is deemed appropriate in view of Sri Lanka's low per capita income and growing foreign resource gap.
- (b) Proposed Loan - A loan in the amount of \$3,400,000 to fund the costs of project commodities and training will be provided.

Loan Terms:

Maturity: Forty (40) years including a ten (10) year grace period.

Interest: Two percent per annum during the grace period and three percent per annum thereafter.

Currency: Interest and principal repayable in U.S. Dollars.

- (c) Proposed Funding - While the Mission would prefer to fully fund this project in FY 1980, funding availabilities may necessitate tranche funding of both the grant and loan components over two years. In view of these limitations it is proposed to fund this project as follows:

	<u>Grant</u>	<u>Loan</u>	<u>Total</u>
1980	\$ 500,000	\$ 2,000,000	\$ 2,500,000
1981	<u>\$ 450,000</u>	<u>\$ 1,400,000</u>	<u>\$ 1,850,000</u>
	<u>\$ 950,000</u>	<u>\$ 3,400,000</u>	<u>\$ 4,350,000</u>

2. Borrower and Implementing Agencies

The Borrower is the Government of Sri Lanka and the Implementing Agency is the Forest Department, Ministry of Lands and Land Development.

3. GSL Contribution

The total GSL direct contribution is estimated to be U. S. \$10.33 million equivalent in local currency which is 70.4% of the total estimated project cost.

4. Source and Origin of US Financed Goods and Services

Source and origin will be Code 941 (U. S. and other selected Free-World countries) and the cooperating country (Sri Lanka) for the loan and U. S. Code 000 and Sri Lanka for the grant.

B. DESCRIPTION OF THE PROJECT:

WHY

Forest lands in Sri Lanka occupied about 44%(7.2 million acres) of the country's total land area in 1956. In 1976 it was estimated by the Sri Lankan Conservator of Forests that the total forest cover had dwindled to 22%(3.5 million acres) of the country's total area. Depending on source, estimates of deforestation range from 100 to 190 thousand acres per year. Moreover, these estimates do not include any deforestation resulting from the Accelerated Mahaweli Development Program which is estimated in the range of 400 to 700 thousand acres over life of the Project. If the present estimated rate of deforestation remains constant, Sri Lanka will be denuded of all forest cover within the next 30 years unless an aggressive reforestation program is undertaken.

The Upper Mahaweli River Catchment totals about 1.3 million acres. At present only about 110,000 acres are in stabilized forest cover. The largest part of non-stabilized land consists of abandoned or degraded tea estates, which provide little stabilization to this area. The GSL has identified 100,000 acres already under public ownership("Crown Lands") as being in most critical need of stabilization. Stabilization in this case means soil erosion control by permanent vegetation which ultimately results in an increase in the capacity of the "soil moisture bank"(water holding capacity). This is extremely important, because the mountainous areas provide catchment and storage for the bulk of the country's water supply. The Upper Mahaweli Catchment Area degradation has caused a decline in river levels during the drier months of the year and promotes the occurrence of flash floods that result in very substantial losses for the national economy.

The Government of Sri Lanka is making massive investments in irrigation works and hydroelectric power of the Mahaweli River. The non-availability of irrigation water in the needed quantities and the under-utilization of installed power station capacity resulting from reduced dry season water flow and erosion-caused siltation will seriously undermine the viability of the Accelerated Mahaweli Development Project.

The depletion of Sri Lanka's forests has also created severe shortages of fuelwood required to meet the rural population's domestic energy needs. Over 94% of the population in Sri Lanka use firewood for cooking. The total wood demand consumes an estimated 140 million cu. ft. annually. The share of fuelwood to total energy consumption in all sectors (household and industrial) was about 62% in 1975. With the recent increases in the price of oil and kerosene, the share of fuelwood to domestic energy consumption is increasing, especially in the rural sector. Given its existing scarcity, the increasing demand of fuelwood results in increased price, which is evidenced by the price doubling during the past two years.

The denuding of forests both licit and illicit, has been further aggravated by over-exploitation of the natural forests in order to meet the demand for timber. The timber inventory includes basic woods needed for construction as well as specialty woods such as teak, ebony and satin wood which are in great demand in the world market.

WHAT

This project constitutes USAID's initial project thrust aimed at the goal of conserving and replenishing Sri Lanka's physical environment and natural resources. The purpose of this project is to conserve and stabilize watershed areas in the highland regions and to enhance the natural renewable energy and commercial resource base of Sri Lanka. This involves both an institutional development component as well as five specific end-product activities.

The institutional development component of this project consists mainly of three national efforts: (1) expanding forestry training at all levels; (2) strengthening forestry research and development; and (3) establishing a Forest Extension Service. These programs include upgrading the planning, research and extension functions of the Forest Department to provide the institutional capability to plan and implement new national forestry programs. Institutional development will be further enhanced by the experience gained in undertaking a variety of operational programs directed at national objectives.

This project includes five such specific end-product activities during the life of project: (1) reforest and stabilize 15,000 acres of denuded watershed areas in the Upper Mahaweli Catchment Area; (2) establish and maintain 35,000 acres of fuelwood plantations; (3) develop a national forestry base-line map; (4) establish village-run fuelwood plots on a pilot basis in 50 villages and (5) establish a village charcoal production program. The project is designed to provide the capability within the Forest Department to continue and expand in line with national targets each of these activities beyond the life of project. The upper Mahaweli watershed and fuelwood activities will make significant contributions to GSL 10-year targets (1980-90) of 100,000 and 70,000 acres, respectively.

HOW

The Forest Department in the Ministry of Lands and Land Development (M/LLD) of the Government of Sri Lanka will be the principal implementing agency for this project. The department's central office is located in Colombo. Two project administrative organizations, one for watershed and the other for fuelwood development will be placed in locations central to each of these activities and will be responsible to the Forest Department. All other project activities, with the exception of the charcoaling effort which will be supervised by the State Timber Corporation (also in M/LLD), will be administered directly by the Forest Department's central office. This office will provide support and coordination at the national level for project activities and is responsible for overall supervision of field activities including project design, documentation and implementation.

AID will support this project with a grant to cover the cost of the technical assistance and a loan to cover the cost of the equipment, commodities, construction and training. GSL/USAID monitoring of the project, by frequent on-site inspections and project reviews will be administered by a joint GSL/USAID project committee. USAID staffing will consist of an American direct hire and one full-time foreign national employee.

C. SUMMARY FINDINGS OF THE PROJECT PAPER

This project was developed from a number of related requests from the GSL's Forest Department. A preliminary analysis of this sector by Mr. E. Rocky from the US Forest Service indicated a number of complementary activities which should be explored. A project design team from the International Science and Technology Institute, Inc. (ISTI) responded to Mr. Rocky's suggestions and developed a proposal for assistance to this sector. A joint GSL/USAID project committee was then formed and narrowed the focus to what were considered key elements for success in meeting newly developed national goals. The project committee now believes the project to be technically, economically, socially, financially, administratively and environmentally sound.

The project is designed to continue, expand and up-grade an effective on-going program of reforestation, provide rural employment, and provide renewable energy resources. An abbreviated environmental assessment was made (Annex G) and a negative Threshold Decision was rendered on January 9, 1980. Section 611(a) has been satisfied and the Section 611(a)-(e) determinations are in Annexes N & O. All other statutory criteria have been met.

The formentioned conclusions are based on careful review of the needs, institutional capability and past performance of the GSL forestry programs. This Project Paper (PP) incorporates various suggestions made by AID/W in its approval of the Project Identification Document (PID). The project is consistent with the GSL objectives as stated in the 1979 Amendment of the Forest Ordinance, current AID policies and the FY81 and 82 Country Development Strategy Statements.

D. PROJECT ISSUES

All the issues identified by AID/W in its approval of the PID by Asia Project Advisory Committee (APAC) on June 26, 1978 (Annex R) have been resolved in various parts of the PP. There are no outstanding issues. Issues previously raised are briefly paraphrased below:

1. Project Purpose: The purpose of this project has been revised and refined to realistically encompass the project activities (see facesheet).
2. Agroforestry Approach: This project is designed to experiment with various types of forest species and forest systems. Some of the species selected are leguminous plants that fix soil nitrogen and that may also be used as animal feed. Intercropping or rotation with agricultural crops will also be investigated.
3. Influence upon Mahaweli Development Area: The PP includes a detailed analysis of the positive influences of this project on and in relationship to the Accelerated Mahaweli Development Scheme.
4. High Proportion of Capital Equipment: This aspect of the project has been revised and now represents less than 13% of the total project cost.

5. Loss of Forest Access by Rural Poor: The PID was designed under the Forest Department policy of "no access" to Forest Reserve Systems. Although some of these reserves will be developed under the project, they will be in areas which are ecologically unstable or which need special attention, such as watershed landslide areas. However the majority of the reforestation activity will be designated as areas for multiple or village use.

E. PROJECT TEAM:

The project team responsible for preparing this paper is as follows:

GSL:

N. Abeywickrema	- Secretary, Min. of Lands and Land Development
R. Withana	- Sr. Asst. Sec., Min. of Lands and Land Development
V. R. Nanayakkara	- Conservator of Forests
S. B. Bandusena	- Dep. Director, Min. of Lands and Land Development
S. M. F. Marikar	- Dep. Director, Min. of Lands and Land Development
P. Sangaravel	- Dep. Director, Min. of Finance and Planning
Mrs. C. Cumarasinghe	- Asst. Director, Min. of Finance and Planning
A. D. R. Ratnarajah	- Dep. Conservator of Forests (Special Projects)
H. Perera	- Operations Manager, State Timber Corporation
W. S. Abeywardena	- Assistant Conservator of Forests
S. Fernando	- Assistant Conservator of Forests
K. Rajapakse	- Assistant Conservator of Forests
K. Wimaladharma	- Addl. General Manager, Mahaweli Development Board
N. W. B. Jayasiri	- Dep. Operational Manager, Special Projects, State Timber Corporation

USAID:

J. W. Bonner	- Project Officer
T. Samaranayake	- Economic Specialist
N. Mahesan	- Training Officer
S. de Silva	- Chief Accountant
C. H. Billings	- Program Officer
D. S. Franklin	- Controller
R. Kriegel	- Chief, Office of Rural Development
J. R. Meenan	- Capital Development Officer
R. Cummings	- Research and Evaluation Officer
J. Eriksson	- Assistant Director

II. THE PROJECT

A. BACKGROUND

Forest lands in Sri Lanka occupied about 44% (7.2 million acres) of the country's total land area (16.2 million acres) in 1956. It is estimated by the Sri Lanka Conservator of Forests that the total forest cover had dwindled to 22% (3.5 million acres) of the total land area by 1976: in the wet zone (lowland and mountainous) the forest cover accounts for 9%, and the dry zone, 23% of the total area. The forest cover included in these figures refers only to public (crown) land; the extent of privately held forested land is believed to be quite small, however. With only about 335,000 acres of the country's total mountainous watershed area under stabilized forest cover both soil and water conservation have become major problems.

The depletion of the forest results partly from opening land to sedentary agriculture. Within the next 8 to 10 years an additional 400 to 700,000 acres (depending on rate of progress) of dry zone forest under the Accelerated Mahaweli Scheme are expected to be cleared for irrigation and settlement. Slash and burn (chena) agriculture is continuing in the dry and intermediate zones on both private and public land and thus is reducing forest more rapidly than it can be replenished by the present level of natural regeneration. This deforestation is also being aided by encroachment of villagers for grazing, residential use and unlawful commercial timbering purposes. In an effort to stabilize watershed areas, the GSL has recently banned both conversion of high mountain land to agricultural purposes, and chena cultivation on state-owned lands. The mountainous region, however, remains without adequate forest cover and problems of soil and increased water run-off are critical.

Forests are also being depleted by both legal and illegal felling of timber for commercial purposes and fuelwood for rural families. About 94% of Sri Lanka's families use fuelwood for domestic cooking needs which alone consumes about 125 million cu. ft. of wood annually. Total wood consumption is about 140 million cu. ft. annually. The rate of exploitation of the forest, estimated at 150,000 acres per year, is between 2 and 3 times the maximum level compatible with sustained natural regeneration. If this rate remains constant and the current rate of reforestation by the Forest Department - 18,000 acres a year during the last 5 years - does not increase, Sri Lanka's forests would be totally depleted by the year 2010.

The Government of Sri Lanka has recently recognized the urgent need for accelerating the establishment of man-made forests to minimize the extent that the natural forests will be utilized. To this end Sri Lanka has increased the budget of the Forest Department in order to increase reforestation activities. Other major actions include the 1979 Forest Ordinance Amendment which enhances the authority of the Forest Department and increases the civil penalties for such offences as illicit felling and arson.

In the past there has been little interest in watershed management and reforestation projects by foreign donors. The United Kingdom through their Overseas Development Administration(ODA) in 1976-78 donated vehicles and forest nursery equipment to assist the present reforestation program and to become directly involved in the reforestation of about 6,000 acres. There also was a proposal by the Netherlands in the early 1970's to construct a needed seed cold storage facility, but construction was cancelled due to the lack of refrigeration skills in the country at that time.

B. RELATIONSHIP TO AID/GSL OBJECTIVES AND OTHER DONOR ASSISTANCE

In recognition of Sri Lanka's environmental problems and domestic energy requirements, the Government of Sri Lanka(GSL) has recently given high priority to replenishing and protecting its forests.

The GSL's 1979-83 Public Investment Plan states:

"The main long-term objectives of the forestry sector are:
(1) The reforestation of all steep, erodible, eroded and denuded lands in the mountain catchment of major rivers, in order to conserve water and soil resources. This is vital to the success of all river basin development schemes and not least the Mahaweli Scheme;(2) The planting of fast growing firewood species, particularly in the abandoned chenas of the Dry Zone, with a view to improving the supplies of domestic firewood; and (3) The development of forest plantations to meet industrial and other requirements".

The GSL's Forest Department has translated these national policies and objectives into a program to which this project will make a significant contribution. The national program targets include:

1. Arrest reduction of forest cover in order to conserve the remaining estimated 4.1 million acres of forest land(inclusive of the Accelerated Mahaweli Development Area);
2. Reforest over the next 10 years(may be accelerated to 5 years) 100,000 acres of the Upper Mahaweli Catchment Area to partially replace the estimated 214,000 acres of lands deforested since 1956;
3. Reforest 400,000 acres or more by 1990 outside the Upper Catchment Area for commercial timbering;
4. Establish 250,000 acres by 1996 in regenerative fuelwood plantations to supply urban, commercial and rural fuelwood demands of about 140 million cu. ft. per year; and

5. Establish a system of village wood lots totalling 300,000 acres (new and existing) to meet the rural demands for fuelwood, primarily in the Mahaweli settlement areas.

The importance of this project to AID objectives is highlighted by USAID's FY82 Country Development Strategy Statement (CDSS):

"It is clear that rural energy and environment problems are increasingly serious, closely related, and vital to maintaining and improving the resource base for agriculture as well as levels of household real income. The current, pioneering USAID-assisted effort to reforest denuded areas in vital watersheds and to establish fuelwood plantations is a first step. Even with proposed IBRD forestry assistance, we believe there is considerable need for additional assistance, including improving drainage and flood control in downstream areas. The close relationship of watershed protection, drainage and flood control to physical infrastructure and water management suggests the possibility of combining future water management, reforestation and watershed-drainage protection assistance into a sub-sectoral 'Natural Resource Management' approach".

The project represents an initial, pilot effort to address deforestation and energy needs. It is intended that the various elements of the project will, in turn, stimulate much greater efforts by the GSL, assisted by various donors including possible AID follow-on assistance, that will arrest deforestation in time to preserve vital watersheds and provide an adequate supply of wood for energy and other economic purposes.

Although donor agencies have demonstrated little interest in Sri Lanka's deforestation, watershed and fuelwood problems in the past, there has been a sharp increase recently in the attention donor agencies are giving to these problems. The World Bank has funded two projects (The National Agricultural Diversification and Settlement Authority, and Tea Renovation Project in the Maskeliya Area) which have forestry components amounting at a minimum to about 14,000 acres. The United Nations Development Program (UNDP) has proposed Forestry Service assistance for a Forest Inventory Survey which could become active by 1981; ODA is considering a 10,000 acre watershed stabilization program in the Mahaweli Catchment Area; and preliminary assessments have been made by the Asian Development Bank (ADB), Food and Agriculture Organization (FAO), and Norwegian Agency for Development Cooperation (NORAD). USAID has collaborated with these other donor agencies so as to insure that this project will be compatible with any future donor activities in this sector. For example, the detailed Forestry Inventory Survey proposed for UNDP funding would use the Forestry Baseline Map included in the USAID project as a frame of reference.

C.

PROJECT DESCRIPTION

This project constitutes USAID's initial effort aimed at the goal of conserving and replenishing Sri Lanka's physical environment and natural resources. The purpose of this project is to conserve and stabilize watershed areas in the highland regions and to enhance the natural renewable energy and commercial resource base of Sri Lanka. This involves both an institutional development component as well as five specific end-product activities.

The institutional development component of this project consists mainly of three national efforts: (1) expanding forestry training at all levels; (2) strengthening forestry research and development; and (3) establishing a Forest Extension Service. These programs include upgrading the planning, research and extension functions of the Forest Department to provide the institutional capability to plan and implement new national forestry programs. Institutional development will be further enhanced by the experience gained in undertaking a variety of operational programs directed at national objectives.

This project includes five such specific end-product activities during the life of project: (1) reforest and stabilize 15,000 acres of denuded watershed areas in the Upper Mahaweli Catchment Area; (2) establish and maintain 35,000 acres of fuelwood plantations; (3) develop a national forestry base-line map; (4) establish village-run fuelwood plots on a pilot basis in 50 villages; and (5) establish a village charcoal production program. The project is designed to provide the capability for the Forest Department to continue and expand in line with national targets each of these activities beyond the life of project. The upper Mahaweli watershed and fuelwood activities will make significant contributions to GSL 10-year targets (1980-90) of 100,000 and 70,000 acres, respectively.

In pursuance of these objectives this project will generate about 4,500 jobs in rural areas over the next 5 years. The Upper Mahaweli Catchment Area will provide full time and day labor employment to landless estate workers and others, who are now employed or under-employed. The fuelwood plantations will provide rural employment to local villagers on both a full and part-time basis. Forestry activities usually take place during early spring and late summer and take advantage of excess labor during these slack agricultural periods.

The institutional development program will consist primarily of the following activities:

1. National Forestry Training

- Jointly develop with the Forest Department's Forest College at China Bay a program to increase the capacity and to strengthen the syllabus at the College. Emphasis will be

on tropical forest biology, with short-term foreign guest lecturers.

- Develop and implement a short-term (3/6 Mo) in-country refresher course on forestry management, protection and utilization by 1985, for 45 forestry personnel per year.
- Institute a 6 month specialized traineeship program for 19 outstanding non-professional (forest guards and beat officers) in foreign countries.
- Provide a program of international seminars or specialized short-courses for 20 outstanding non-professional staff.

2. National Forestry Research and Development

- Jointly develop with international consultants long and short-term research objectives and priorities with special focus on tropical forest plan selection, propagation, establishment techniques and methods for improving growth rates. Conduct a full review and analysis of native forest species, to develop more efficient planting/species recommendations.
- Institute a program of 6 month specialized coursework for 19 professional research staff members abroad in subject areas which will strengthen the national research effort.
- Provide college level training (advanced level degree) for 2 selected Forest Department and 1 State Timber Corporation staff in order to upgrade skills and broaden the technical base of these two institutions.

3. National Forest Extension Service

- Jointly develop by 1985, with international consultants and the Forest Department, the objectives, priorities, and operation of a National Forest Extension Service.
- Provide assistance to equip and train 7 mobile extension units (1 for each forest district) to contact villages and disseminate forest information through an audio-visual program including presentations, posters, films and radio programs.

- **Train 18 non-professional and professional personnel of the Forest Department in specialized extension skills to assist in orientation and training non-professional staff in order to increase their effectiveness in dealing with local farmers (training at China Bay).**
- **Upgrade to MS level 2 Forest Department professionals in extension skills so they may assist in the national program and maintain a departmental extension competency.**
- **Provide assistance to the China Bay Forest College in coordination with other donors to train the non-professional and selected village headmen in extension and conservation methodology and to provide the basis for a national awareness program regarding forest conservation.**

Improving the institutional capability of the Forest Department will not only enhance the attainment of the GSL's national objectives, but will, in turn, be enhanced by the pursuance of programs directed at specific objectives. The programs consist of the following activities:

1. Establishment of Fuelwood Plantations

- **Re-establish forest cover on 35,000 acres of degraded chena land by 1985 (expand through GSL efforts to 70,000 acres by 1990) in four specific sites: Puttalam, Pankulam, Mahaweli System 'C' (Rotalawela Reservoir) and Batticaloa (Pullumalai).**
- **The following species, areas and rotation periods will be utilized: 25% Eucalyptus spp (5-8 year rotation); 25% Casuarina equisetifolia (5 years); 25% Leucaena leucocephala (1½ to 3 years); 25% Sesbania grandifolia (3-5 years). Also Trema orientalis and Calliandria spp will be evaluated for their potential.**
- **Establishment of 6 nurseries near the plantation areas to provide needed seedlings.**
- **Upgrade nursery practices and techniques in order that the forementioned nurseries produce a total of 10 million seedlings per year.**

- Make investigations and recommendations on fertilizer, planting distances and production techniques.

2. Reforestation of the Upper Mahaweli Catchment Area

- Re-establish forest cover on 15,000 acres of degraded lands in the Upper Mahaweli Catchment Area, specifically in the Rambukpitiya and Dolosbage areas.
- The following species, areas and rotation periods will be utilized: 65% Pinus spp (15 years); 25% Albizzia falcataria (10-15 years); 10% Eucalyptus spp (10-15 years).
- Establish 3 nurseries to produce seedlings for planting 1000 acres per year per nursery.
- Upgrade nursery practices to develop an efficient method of producing a total of 3 to 3-1/2 million seedlings per year.
- Increase the efficiency of seedling transplanting and survival rate of transplanted materials by incorporating new methodologies which efficiently utilize necessary inputs.
- Physically monitor the quality and quantity of water in rivers down-stream of project areas to measure impact of the reforestation programs.

3. National Forestry Base-line Map

- Develop a national forestry inventory map by using satellite imagery presently available through the LANDSAT program. This will be supplemented by aerial photographs generated from the USAID/GSL Agricultural Base Mapping Project, and used to generate "base-line" forest cover data, as well as evaluate progress of the Project.

4. Village-run Fuelwood Plots

- Utilize designated land areas (by Mahaweli Development Board) to establish village fuelwood plots (less than 50 acres), for about 50 villages.
- Provide Forest Extension Service to help villagers establish, manage and harvest fuelwood plots.

5. Village Charcoal Production

- Assist the State Timber Corporation to evaluate the economic and technical feasibility of charcoal production techniques.
- Support the construction and operation of 24 portable kilns for use in the Accelerated Mahaweli Development Program.
- Establish, through the State Timber Corporation, a charcoal collection network to collect charcoal from village operated kilns.

III. PROJECT ANALYSIS

A. Technical Analysis

1. Background

The technical analysis of this project is divided into five major activities. These activities are interrelated to form an overall program which will integrate a watershed stabilization and management effort with a fuelwood plantation scheme along with strengthening the institutional development of the Forest Department. These components are designed to support the Mahaweli Development Project Area, provide a renewable energy resource (fuelwood and charcoal), generate rural employment, stabilize erosion and waterflow of the nation's watershed areas, and provide needed timber for commercial opportunities. The project will also support a national Forest Extension Service which is designed to reduce the excessive, unmanaged over-utilization of the natural forests, thus aiding their re-establishment.

Significant direct and indirect benefits will result from the project, including initiation of a comprehensive reforestation program geared to meet the new and long term needs of the country; the formation of relevant forestry training and of an extension service to implement the outreach program for fuelwood production and watershed preservation; generation of rural employment through planting and maintenance of forest reserves as well as village charcoal production.

2. National Forestry Training Program

The Forest Department is severely understaffed and lacks the trained personnel needed to handle all of its present and future responsibilities. In some instances, training should follow a traditional perspective such as silviculture,

forest ecology, soil conservation and plantation management techniques. However, the rapid rate of forest deterioration will require a new approach in applying scientific information to yield rapid results.

In view of the limited availability of basic training facilities there is a backlog of untrained personnel in the Forest Department. Of the 176 Forest Rangers, only 43 have been trained. The need for enhanced training facilities and opportunities is self evident.

The current training facilities available for the forestry staff are:

- 1 year in-service course for 12-15 Forest Guards per year at Sri Lanka Forest College at China Bay.
- 3 months orientation course for new recruits (Forest Rangers and Guards at the Forest College).
- 2 year training course, 2-4 Forest Rangers per year, at Indian Forest Ranger Colleges (Coimbatore and Dehra Dun).
- 2 year post-graduate course, 2-4 Assistant Conservators per year, at the Indian Forest College, Dehra Dun.
- A Masters' Degree or short-term refresher course at Oxford University for one Assistant Conservator per year.

Traditionally Sri Lankan Foresters were trained in India. However, in recent years only a very limited number of entries have been made into India's institutions due to the great demand to train India's own personnel.

Specific actions which will be undertaken in this project are the expansion of training facilities presently available at the Forest College, training officers abroad in selected forestry related fields, and participation in international seminars by senior officials.

The expansion of training facilities at the Forest College is primarily aimed at strengthening the training base for Forest Rangers. The Forest Department is constructing at China Bay a new building which will house lecture rooms, laboratories and a small library. The project will assist this effort by providing funds for construction of a dormitory to house 35-40 students, provide kitchen and dining facilities and a modest combination study-recreation room.

Assistance will be needed to widen the scope and quality of the present 1 year training course, and the 3 month orientation course. The Forest Department is going to initiate short-term training for STC officers in logging techniques, maintenance of tools and equipment, identification of species and familiarization with the logging rules as described by the Forest Department. A short term course describing Sri Lankan Forest Law, measurements and identification of species will be developed for non-Forest Department personnel, including village headmen("Gramasevakas"), Field Instructors and Colonization Officers. Under the provisions of the Forest Ordinance these headmen are also Forest Officers empowered to protect the forest resources. A minimum target effort in this activity will be providing quality training to 15 Forest Rangers and 15 Forest Guards for the first two years of the project. The numbers of trainees will then be increased to 45 (total) per year.

Consultant services will be essential to implement this project component. The following consultants are required:

- Forestry Training (12 pm) - advise and assist in developing the scope, content and syllabus for each training course.
- Forest Utilization/Methodology (3 pm) - to formulate training program for harvest (logging) techniques, and appropriate equipment needed for Sri Lanka forestry activities.

The training requirements can be divided into three categories: (1) short-term (3-6 month) for refresher information, (2) long term (3 yr) academic and (3) one year traineeships for non-professional (forest guards). Non-professional and short-term training will take place at the China Bay Forest College. The longer training program will be given outside Sri Lanka.

The scope of foreign traineeships will include upgraded training for the Forest College instructors and Forest Department officers. It will also include participation by senior officials of the Forest Department in international seminars designed to examine and adopt new technologies in forest management, development and protection. It is projected that 347 person months of short term training and 14 person years of long term training will meet the objectives of this project. A breakdown of the total project training activities including type and location is described in Annexes B and L.

The Divisional Forest Officer (DFO) is directly responsible for transferring technical information into the field (via field staff) for implementation. These individuals will be prime candidates for a 3-4 month training course to upgrade their skills in forestry and personnel management.

Training will take place in other tropical areas such as Costa Rica, Hawaii, or the Philippines. Significant new applied research on tropical trees

and tropical biology has been conducted in the past five years and this information is essential for the implementation of the reforestation and fuelwood programs. A collection of current books and publications in tropical biology will be added to the Forest College and the Agriculture Department's Research Station at Peradeniya.

3. Strengthening National Forestry Research

The successful implementation of this project requires an intensive research program. This broad-based program will support the major project activities and the existing developmental activities of the Forest Department.

The immediate research priorities must focus on species selection, varietal trials on both native and imported species, improved nursery techniques, improved planting methods, weed control, and fire control.

Research is critically needed in plant selection, propagation, improved establishment techniques and growth rates. Most of the native tree species in Sri Lanka require 60-150 years to reach maturity and virtually all selection and development of indigenous trees stopped over 30 years ago. With the recent advances in plant biology, many of these species could now be brought into productive use much earlier.

The Forest Department has experience with the following varieties: Pinus caribaea, Eucalyptus grandis and Albizia falcataria (synonymous A. moluccana) in the upper watershed areas; and Eucalyptus camaldulensis and Casuarina equisetifolia in the dry zone. There exists contradictory evidence in research papers which indicates the planting of Pinus and Eucalyptus can have serious ill effects on moisture and soil pH regimes in the soil. Research is needed to establish if these problems may arise in Sri Lanka. This is a priority under this project, as plants from these genera will be planted.

Other reasons, such as pest control, and species utilization and adaptation make diversification in this project necessary. Leguminous species such as Leucaena, Calliandra, Acacia, Sesbania and Glyricidia have the dual advantage of being rapid growing and enriching the soil by nitrogen fixation. In the project, all the forementioned species will be grown and evaluated for performance and incorporated into the master planting scheme.

Varietal improvement trials will be established to provide research into similar species selection, with particular emphasis placed on climatic and soil adaptation. There is often a marked growth variation within the same varieties. A good example of this is Pinus caribaea and Leucaena leucocephala in which specific lines, such as K8, K28 and K67, have been popularized.

Nursery techniques must be improved to sustain the necessary output of seedlings needed for the planting effort. Studies must be undertaken in

potting mixtures, fertilizer requirements, root pruning and pest control to maximize the output of healthy seedlings.

The project will also focus on improving the planting and seedling establishment techniques in the dry zone. Specifically, investigation must be made to determine optimum spacing distances for individual species for maximum production, fertilizer requirements for each planting site and species, and container size for efficient transplanting. The use of "tree bags" or other methods will be explored. Presently planting materials are carried to hilly sites in cane baskets by head loads. This is very laborious and time consuming and usually results in damaged seedlings.

The feasibility of utilizing small power augers for planting will be carefully studied. Planting holes are dug by hand tools during the first rains of the Maha monsoon season. If "holing" can be done before the monsoon rains start, planting could begin at the first rains, and the plants would derive the maximum benefits from the rain with larger acreages being planted in the same time frame.

Weeds such as Imperata and Cymbopogon are detrimental in forest plantations. They compete with the trees for nutrients and moisture and become an extreme fire hazard during the dry season. The project will study the use of herbicides, since the present practice is to remove weeds manually. This is time consuming, and often it is not possible to clear these areas in advance of the fire season. Forest fires are attributed to: willful burning of grasslands to promote a new flush for grazing; chena farming which becomes uncontrolled vandalism; and accidental fires along rail and motor roadways. Research will also identify the vulnerable areas, develop and plant suitable tree species to use as fire breaks and/or develop mechanical fire breaks.

The project will support a fully integrated pest management program. The introduction of new species and establishment of plant monocultures will increase the likelihood of greater incidence of pests and diseases. Research must include both natural biological control as well as chemical control of pests and diseases.

The national research activities of the Forest Department will also support the following studies in cooperation with other governmental departments:

- Hydrological Studies - quantify the effects of reforestation on the watershed areas in terms of siltation rates and dry weather stream flow.
- Energy value of biofuels - determine caloric values of fuel-wood plantation materials to help future planting efforts.

- Vegetative Propagation and Tissue Culture - In many species seed is very difficult to obtain. Promising species genotypes must be propagated through vegetative means or meristem tissue culturing.

4. National Forest Extension Service

The adaptation of extension activities to forest species or agro-forestry is relatively new. Traditionally, forestry has considered forest products (pulp or lumber) as the primary benefits and has ignored many "social" qualities of trees. Most villagers (urban and rural alike) do not appreciate the non-perceivable indirect benefits of a forest. The extension service will rectify this imbalance by demonstrating that forests require time to regenerate and describing the benefits of forest products.

The proper design and incorporation of a Forest Extension Service is essential to the success of a national fuelwood program. An extension service will help transmit tree management information, site selection, cultivation practices, and also will supply the seed or seedlings to local farming communities and villagers. Properly selected species (such as *Leucaena*, *Sesbania* or *Calliandra*) can meet necessary village fuelwood requirements.

Trained forest extension agents will provide chena cultivators with seed materials to interplant with their crops, thus potentially reducing some of the negative soil effects of slash and burn cultivation. If the Forest Extension Service is successful in introducing tree crops to the chena cultivators, the need to clear natural forest should be significantly reduced because the previously disturbed areas will be restored to reasonable productivity in less time than through natural regeneration.

The Forest Extension Service will require a variety of effective publicity and communication tools. Publicity tools such as tapes, posters, slide shows, and brochures of technical information will be a part of the communications programs. Proper integration and coordination of this extension effort into the agriculture planning for the Accelerated Mahaweli Development Project will be necessary to avoid duplication of effort.

The project activity will be implemented by a two-pronged approach: (1) additional training of forest extension techniques for Forest Guards and Beat Officers; and (2) establishing 7 mobile extension units manned by trained Forest Extension personnel.

The initial extension training for the lower grade officer (Forest Guards and Beat Officers) will be accomplished at the Forest College. This will

consist of short term training of these officers in proper extension methodologies and current forest management practices. Since recent government legislation has released these officers from their main "policing" duties, the plan is to retrain these officers to promote forest appreciation among the general population by contacting villagers on an individual basis.

The project will establish a mobile Extension Service Unit in each of the 7 Forest Divisions in the country. Each unit will consist of a Forester, assisted by 2 Forest Rangers, 4 Forest Guards, and 1 audiovisual equipment specialist. These 7 units will work under the direction of an Assistant Conservator of Forests(ACF). All the personnel of these units will receive up-graded training(both long and short term) on extension methodology and audiovisual techniques. The main target group of these units will be the rural villages.

These Extension Service Units will be responsive to a number of requirements. They must motivate the resettled villagers in the Mahaweli Development Area to establish, maintain and harvest the village fuelwood lots. They must also enlist the cooperation of the tea plantation sector to reforest all gullies, ravines and eroded lands in each estate. They must organize regular meetings, film shows, and poster presentations in each village to educate villagers on the benefits of growing more trees and protecting the existing forests from fire and illicit felling.

5. Site Selection

a. Upper Mahaweli Catchment Area

The total area for the Upper Mahaweli Catchment Area is approximately 1.3 million acres of which only about 12% is presently in forest cover or designated as forest reserves. This amount is inadequate to maintain a satisfactory watershed area and meet minimal soil conservation practices.

A program of watershed conservation will be initiated in two project sites(Hatton-Rambukpitiya- and Dolosbage) which cover approximately 15,000 acres (See Map 1). Both areas show high erosion potential, depletion of original forest cover and reduction of productive land. Elevations range from 3000-4000 ft. The soils in the selected sites are deep, well drained, moderately fine textured and acid in character. The important properties related to forest use and management include: medium to strong acidity; compacted subsoils; low base saturation; low water availability(water holding capacity); low fertility; and variable erosion potential. For a detailed description of each site see Table 1, page 23.

The severely eroded areas within these sites are composed mainly of croplands that have lost their surface soil (devoid of the "A horizon") a portion of subsoil through sheet and/or gully erosion. For the most part,

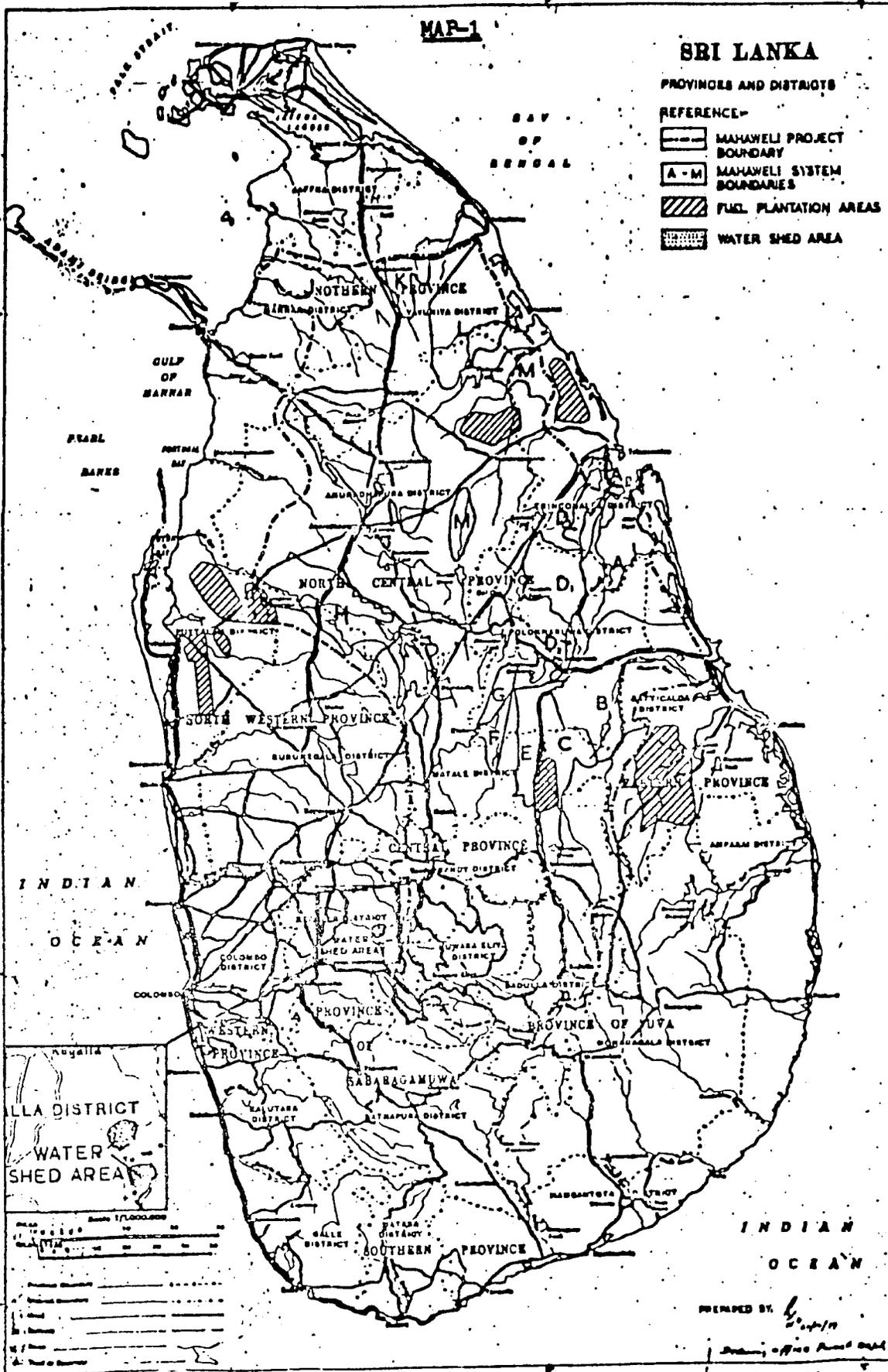
MAP-1

SRI LANKA

PROVINCES AND DISTRICTS

REFERENCE-

-  MAHAWELI PROJECT BOUNDARY
-  MAHAWELI SYSTEM BOUNDARIES
-  FUEL PLANTATION AREAS
-  WATER SHED AREA



those lands having any significant contiguous acreage are the "degraded" tea lands.

d. Fuelwood Plantation Program

Extensive forest areas in the dry zone have been diminished by slash and burn(chena) agricultural practices and are unproductive. Increased population pressure has reduced the normal fallow time between cropping periods from 25-35 years to as little as 7 years. With these shorter rotation periods soil fertility is never restored to an adequate productive condition.

The project will plant 35,000 acres of fuelwood plantation and is considered a minimal effort for initiating the national program for fuelwood production. Four areas were selected for fuelwood plantations: Puttalam area (40,000 acres); Pankulam area (40,000 acres); Pullumalai area (20,000 acres) and Mahaweli system "C" (10,000 acres). Prime considerations for site selection were: (1) lack of land use conflicts; and (2) the proximity to the Mahaweli Resettlement Program. Of the 110,000 acre total, 70,000 acres will be the target acreage for the GSL's Forest Department 10 year plan.

The exact planting sites for the GSL/USAID (5 year) effort are yet to be determined (See Map 1), however it is anticipated that about 15,000 acres each in the Puttalam and Pankulam areas along with about 2,500 acres each in the Pullumalai and Mahaweli "C" areas will be planted. These tentative percentages (by site) will be maintained for the remaining five years making a minimal ten year effort of 70,000 acres.

Puttalam is the driest of the four plantation sites and has the most severely damaged soils. The process of desertification has begun with xerophytic plants and weedy species now dominating what were once forested areas. In certain locations grasses totally prevail and completely cover the land. Natural tree regeneration is impossible under such conditions and areas of natural forest occur only as remnant scattered patches in all the sites.

6. Production Technology

a. Species, Planting and Rotation

Upper Mahaweli Catchment Area

About 15,000 acres of degraded tea and patna lands in Rambukpitiya and Dolosbage areas will be reforested over a 5 year period at an annual reforestation rate of about 3,000 acres per year. Species choice is based on the experience of the Forest Department. Due to the poor quality of the soil in the upper regions of the catchment areas, Pinus species appear to be well suited to these particular areas. On the lower slopes, Eucalyptus grandis and Albizzia moluccana will be grown. The percent of the total acreage to be planted annually (3,000 acres) under each species is as follows: Pinus caribaea - 65%; Albizzia moluccana - 25% and Eucalyptus grandis - 10%. Species of Calliandra and other appropriate leguminous

T A B L E 1

Detailed Project Site Description

SITE LOCATION	CLIMATE TEMPERATURE/ PRECIPITATION	PHYSIOGRAPHY	SOILS 1938 REV. CLASS	TAXONOMIC CLASS 7TH APPROX.	S O I L C H A R A C T E R I S T I C S			FERTILIZER REQUIRED	INFILTRATION
					EFFECTIVE DEPTH	MOISTURE STRESS	SOIL REACTION		
<u>Upper Mahaweli Reforestation sites</u>									
1. Dolosbage	70°F 100-125	Steep to very steep mountainous lands 40-80% slopes	Red-yellow podzolic soils	Rhodustalfs	Usually deep to very deep (36")	Usually 1 month	Very strongly acid (pH 4.5-5.0) to medium acid (pH 5.6-6.0)	Nitrogen and phosphorous with some need for calcium, magnesium & occasionally the need for Molybdenum and Boron	Moderate (usually not limiting)
2. Hatton Rambukpittiya areas	70°F 125-150"	3300-4000' elevation							
<u>Fuelwood Project Site</u>									
1. Lake Mundal (Puttalan Area)	81°F 45-50"	Flat to gently rolling plain, undissected, 0-8% slopes.	Reddish-brown earths, non-calcic brown soils, low humic gley soils	Rhodustalfs Haplustalfs Tropaqualfs	Variable (20-60") based on depth to subsoil	2-4 months common	Medium acid (pH 5.6-6.0) to neutral (pH 6.6-7.3)	Nitrogen and phosphorous	Moderate to medium-slow (may be limiting)
2. Puttalan area	- do -	- do -	Reddish-brown earths, low-humic gley soils	Rhodustalfs	Variable (20-60") based on depth to gravelly sub-soil	- do -	- do -	- do -	- do -
3. Pankulam Area	81°F 55-60"			Rhodustalfs Tropaqualfs	- do -	- do -	- do -	- do -	- do -
4. Pullumalai Area	- do -		Reddish-brown earths, non-calcic brown soils, immature brown loams, low humic gley soils	Rhodustalfs Haplustalfs Dystropepts Tropaqualfs	- do -	- do -	- do -	- do -	- do -
5. Mahaweli Area	81°F 65-75"	Undulating and rolling hills	Reddish-brown earths low humic gley soils	Rhodustalfs Tropaqualfs	- do -	- do -	- do -	- do -	- do -

1
80
60
1

trees will also be grown in the lower areas on an experimental basis, and, if successful, larger scale plantings will be implemented.

The recommended planting spacing for the forementioned species are as follows: Pinus caribaea - 8' x 8' (680 plants/acre); Albizzia moluccana - 10' x 10' (436 plants/acre) to provide for underplanting with other tree species (see below) and Eucalyptus grandis - 6' x 6' (1210 plants/acre) for fuelwood utilization and 8' x 8' for poles and timber.

Rotational age will vary with species and intended utilization. The projected rotation periods based on data available provided by the Forest Department are as follows:

Pinus caribaea - 15 years. About 30% of this species total will remain as protective forest, the balance can be harvested for pulpwood or tapped for oleo resin from the 7th to the 15th year, then harvested for pulpwood or fuelwood.

Albizzia moluccana - 10 to 15 years. This timber may be used for matchwood, packaging or plywood industries. Research has determined the feasibility of underplanting with cardamom (cardamon) and mahogany.

Eucalyptus grandis - 10 years if utilized as fuelwood; 15 - 18 years if used for transmission poles; and 40 years for timber.

Fuelwood Plantations

The Forest Department has recommended growing two species for fuelwood in the dry zone of Sri Lanka, Eucalyptus camuldulensis and Casuarina equestifolia. But due to the extreme demand pressure for all types of fuelwood it is recognized by the Forest Department that other fast growing species should also be planted. The first efforts in this process will be species selection and basic adaptive research to test the feasibility of these new species and the subsequent rapid utilization of the promising selections.

The four major species proposed for planting on a 25% acreage basis each are: Eucalyptus tereticornis; Casuarina equestifolia; Sesbania grandifolia and Leucaena leucocephala. Treina orientalis and Calliandra spp. will be planted on a trial basis. The actual acreage to be planted to each species will be adjusted after performance evaluations.

The total fuelwood planting effort will be about 7,000 acres per year. The target acreage for this effort is 70,000 (for 10 years) although USAID's input will be for the first five years (35,000 acres).

The planting density used for fuelwood species will be 6' x 6' (1210 plants per acre) which will provide an average estimated yield of 2500 cu. ft. per acre on short rotation period.

The following rotational periods will be used on the fuelwood plantations: Eucalyptus tereticornis (5-8 years); Casuarina equestifolia (5-10 years); Sesbania grandifolia (3-5 years); Leucaena leucocephala (1½ -3 years); Trema orientalis (3-5 years); Calliandra spp. (to be determined).

b. Nursery Operations

Nursery materials for the project will be supplied by nearby Forest Department operated nurseries. In the past these nurseries have been understaffed with little utilization of new production technology, potting mixtures, and inadequate basic production tools. Despite this, the quality and quantity of plant materials released by the present nurseries have been quite good; notably the production of Eucalyptus, Pinus and Albizzia species.

With the exception of teak, all reforestation is presently accomplished utilizing tube containers. These plastic tubes are 9" long and are produced locally. Generally, seedling survival increases with container length. Thus seedling containers 10-15" in length would be more suitable. Containers with interior corrugations to prevent improper root developments will be tested as the production of long vertical roots is often the major factor in successful seedling establishment. Bare root seedlings are not recommended in Sri Lanka due to increased handling difficulties. Direct seeding of traditional varieties does not appear to be a viable option because of the high post-planting maintenance requirements. The project will explore all planting alternatives to determine the most efficient planting method for each species.

Efficiency of planting and post planting maintenance are essential if the rate of reforestation is to be successfully achieved. The planting process (includes cleaning, site preparation, planting and weeding) presently requires up to ½ man hour of effort per seedling. Each planter carries approximately one dozen seedlings to a planting site. Improvement in this system is required to meet the minimum goals set for this project.

Small hand held power augers will be provided to substantially increase hole drilling efficiency. Even in rock soils, a driller and five planters could plant nearly 1000 seedlings per hour utilizing such tools. Tree carrying bags also provided by the project and worn around the waist will substantially increase the planter's present carrying capacity by reducing the number of trips made to the nursery for seedlings.

Upper Mahaweli Catchment Area

Seedling production nurseries will be needed near the designated reforestation areas, and sites near the villages of Ginigathena and Rambukpitiya are proposed to reduce transportation problems. Nurseries in adjoining areas

can produce seedlings for planting 700-1000 acres per year. At this rate of production 3-4 nurseries will be sufficient to produce the estimated 3 to 3½ million seedlings that are necessary to meet the goal of reforesting 3,000 acres annually.

Fuelwood Plantation Program

The project will require the formation of the seedling nurseries in site locations near the fuelwood planting areas. Locations selected because of transportation, access and availability of water are identified at Andigama, Mile 17 (Puttalam/Anuradhapura Road); Pankulam, Debarawewa; Pulaveli; and Mahiyangana areas.

A minimum of 7,000 acres to be planted annually, at a planting density of 1000-1200 plants to the acre, will require that the nurseries for this acreage produce upwards of 10 million seedlings annually. This level of production is attainable utilizing existing nursery techniques.

7. National Forest Base-Line Map

There are no updated forestry inventory maps of Sri Lanka. Aerial maps now in use were obtained from pictures taken in 1956. This lack of current data not only hinders accurately determining the present status of the forest cover, but also impairs developing a sound plan to identify damaged areas and to delineate areas to be reforested.

This activity will not develop a forest inventory map, per se, but rather by using digitized imagery from the LANDSAT satellite will construct a composite forest map of Sri Lanka. From this map the Forest Department will be able to construct area maps for determining acreage in forest and also patna lands which may be reforested.

A short term contractor will work with the Survey Department at their satellite data center to develop a digitized map of Sri Lanka. This map will provide the essential information about Sri Lanka's forest cover.

As the project progresses, more accurate data will become available through the USAID/GSL jointly sponsored Agriculture Base Mapping Project administered through the Survey Department which will develop new low level aerial maps of Sri Lanka.

8. Mahaweli Village Fuelwood Project

The resettlement of the Accelerated Mahaweli Development Area will cause localized demand for traditional cooking fuels. The typical village is composed of 75-125 family units and will generate a fuelwood requirement of 1.5 to 2.5 acres/yr.

A minimal forest fuelwood plantation for a village of this size would need to be between 8-12 acres based on a 5 year rotation period. Acreage this small cannot be effectively handled by the Forest Department. The direct planting efforts of the Forest Department will be on plots of 100 acres or more. Acreages less than this minimum will be handled by the newly established Forestry Extension Service.

The village fuelwood effort will be implemented by the Forest Extension Service. The agent will be trained in proper maintenance and management of the particular species with which he is working. He must also gain the respect and confidence of the villagers through a knowledge and sensitivity to the village political structure. Extension agents will supply seed and will train villagers in all aspects of forest management.

The State Timber Corporation will become involved with the village in the exploitation of other products (timber and charcoal). This system is explained in Section 9. The basic emphasis of this program is to provide local village employment through manufacture of "finished" forest products (bagged charcoal) at a competitive price.

9. Village Charcoal Production

Charcoal represents an extremely viable option for certain sectors of the Sri Lankan economy. Last year the STC produced about 20 metric tons of charcoal. This year's production is estimated at 50 tons. Tea and tobacco drying, steel, brick and ceramic production, plus other small industries presently utilize fuelwood or have begun the conversion to fueloil. If charcoal were present in sufficient quantities, such industries would use it. The State Steel Corporation (SSC) has informed the STC that they could utilize about 5,000 tons of charcoal per month.

Charcoal has approximately twice the heat (BTU) value and 6.8 times the energy value efficiency of wood on a per pound basis. The majority of rural home users will probably continue to use fuelwood for their domestic needs, however conversion of fuelwood plantations into charcoal for industrial and urban use could help reduce the impact of deforestation on the remaining natural forest, and to convert to "useful" energy much of the unused timber generated in clearing the Mahaweli Development Area.

Small scale charcoaling is presently done by the STC. In this scheme small village pits are constructed by village labor. Current average cost for a pit is about 300 Rs. for materials and 750 Rs. for labor (\$64.50 total). A pit holds about 10 cu.yds. of fuelwood, which is filled twice (or about 22-24 cu.yds./charge) and yields about 1.25 to 1.50 tons of charcoal per firing (approximately 18% effective conversion). The firing process takes 2 days, with 3 days needed to cool the pit, thus 5 days are needed between stoking

the kiln and removing the charcoal. Each village charcoal pit requires 48 person days to produce $1\frac{1}{4}$ to $1\frac{1}{2}$ tons of bagged charcoal. The STC provides the brick, barrels, gunny sacks and pays for the pit construction. The laborers are paid 950 Rs. (\$61) per ton of bagged charcoal.

The project will assist the STC in continuing this program with villages located in the Mahaweli Resettlement Scheme. Specifically the project will provide a foreign wood products utilization expert and the training of one STC personnel to the MS level in wood products utilization.

The project will also support the construction and operation of 24 portable kilns for use in the Accelerated Mahaweli Development Project. These kilns will be constructed locally and have a capacity of about 5 tons of wood each. They will require an estimated 17 person days of labor supplied from local villages to produce $\frac{3}{4}$ tons of bagged charcoal per firing. A similar kiln is under construction in Sri Lanka and its performance will be carefully monitored and redesigned if it can be used as a prototype for subsequent kilns. Detailed cost estimates are shown in Annex A.

B. ECONOMIC EVALUATION

1. Summary and Conclusions:

Most elements of this project are pilot in nature. Taken together they will nonetheless make a significant contribution to (1) reducing deforestation and its negative consequences for soil stability as well as for hydropower and irrigation potential, and (2) increasing the supply of renewable energy and commercial timber resources and reducing the use of scarce foreign exchange for costly petroleum and timber imports. We furthermore believe the various project activities will stimulate expanded programs which should go a long way toward addressing the direct and indirect economic and social problems created by deforestation.

Owing both to conceptual problems and lack of data, a quantitative estimate of total project benefits has not been attempted. What is perhaps the most important benefit, that of protecting the deterioration of Sri Lanka's natural ecosystem, is extremely difficult to quantify.¹ Yet this project will make a significant contribution to this objective, not only through planting and replanting of forests, but also through relieving the pressure on natural forests. The ecosystem benefits are multiple and include protection of agricultural production potential in watershed and downstream areas, as well as protection of hydropower generating capacity through checking siltation of reservoirs. The relevance of this project to protecting the viability of the Accelerated Mahaweli Development Program is obvious.

Reduced pressure on natural forests will also help to prevent the costs of ecosystem disequilibrium to wildlife -- both flora and fauna. Measurements of some of these costs, such as foregone potential benefits from tourism, can be attempted; measurement of others is virtually impossible. The Mid-Term Report of the Environmental Assessment of the Accelerated Mahaweli Development Program makes the point very eloquently:

The total value of the service rendered by natural ecosystems cannot be easily assessed in economic terms, but their importance for human welfare cannot be over-emphasized. More often than not the contribution of natural ecosystems to human welfare is realized only after they are destroyed.²

While the contribution of this project alone to these objectives should not be exaggerated and the data base is rather speculative, it will nonetheless be significant. The offset contributed by the project to net annual deforestation should be of the order of 10 to 14%. (See explanation of methodology below). The total offset of net deforestation from this project plus already existing GSL efforts could come to 28 to 38%. After allowing for expansion in reforestation efforts (including fuelwood) which this project should stimulate, the estimated offset could amount to about 55 to 74% of net annual deforestation. Similarly, this project alone will provide 10 to 14% of Sri Lanka's current annual total fuelwood requirements. Expansion in line with GSL goals could increase the contribution to 29 to 43% of total requirements and additional expansion could meet all current requirements (this assumes substantial expansion of charcoaling to meet fuelwood requirements). These estimates of contribution to fuelwood requirements could well be on the low side since a conservative estimate of wood yield has been assumed (2,500 cubic feet per acre).³

For two component activities, watershed reforestation and fuelwood plantations, internal rates of return (IRR's) have been calculated from streams of direct costs and benefits, where the latter are based on alternative estimates of wood yields and on-site values of timber and fuelwood to be harvested and sold.⁴ While the specific IRR values cannot command much confidence in view of the speculative nature of the benefit estimates, taken together they nevertheless give some basis for suggesting the potential direct economic viability of the two activities. With one exception (watershed reforestation assuming very conservative yields and site value), all IRRs are above the 10% opportunity cost of capital employed for project appraisal by the GSL. Based on quite conservative assumptions about yields and on-site values of timber and fuelwood, the combined IRR for watershed reforestation and fuelwood plantation activities has been estimated at about 11.4%. Incorporation of higher yields based on experience with each species raised the IRR to 16.6%. Incorporation in addition of higher but still plausible on-site values for timber and fuelwood results in an IRR of 20.6%. These IRR's as well as separate IRR's for the watershed reforestation and fuelwood plantations, respectively, are presented in tabular form and explained in greater detail below in section B-3, "IRR Calculations". In addition to the watershed

reforestation and fuelwood plantation activities, there are six other component activities in the project: inventory map, research, extension, training, charcoaling and village woodlots. Although benefits and IRR's have not been estimated for these activities in view of conceptual and data availability problems, their direct benefits in terms of timber, fuelwood and charcoaling production are believed to be substantial (see last section below on "Other Considerations").

Two other important contributions of the project are foreign exchange saving and employment. Fuelwood may be slightly more economical than kerosene for a rural family, and charcoal more economical than kerosene for an urban (Colombo) family, even at the current subsidized price. The saving to the country as a whole is far greater since the unsubsidized cost is relevant in this case. Valued at this cost (Rs.25 per gallon), the saving in foreign exchange resulting from substituting fuelwood for the conservatively estimated annual amount of kerosene used for cooking would amount to Rs. 87.5 million, or almost 4% of Sri Lanka's 1979 oil import bill. The fuelwood plantation component of this project could more than supply the cooking heat now supplied by kerosene. Similarly, the annual amount of timber to be harvested from the Upper Mahaweli reforestation component of this project could more than offset recent timber imports, thereby saving foreign exchange, which amounted to Rs.29 billion in timber imports by the State Timber Corporation alone in 1979.⁵ This project will generate about 4,500 jobs a year during the 5 year life-of-project. Modest expansion could increase employment generation to 14,000 jobs and additional possible expansion could raise the total to 20,000. The greatest potential for employment generation would appear to be charcoaling owing to its relatively labor-intensive nature. For example, if charcoaling were added to all fuelwood activities included in the largest expansion cited above, the number of jobs generated could roughly double. Additional employment would be stimulated in lumber and paper mills and chemical manufacturing.

2. Project Costs

(a) Total Project Cost

The total cost of the project, including continuing operating costs, is estimated at almost \$20 million and will be incurred over a period of 20 years. (See Table II).⁶ The cost during the first five year "life-of-project" is estimated to be \$14.7 million. Of this cost, the Government of Sri Lanka will contribute approximately \$10.3 million and the balance of \$4.4 million is proposed for AID financing. The cost beyond the "life-of-project" (years 6-20) is estimated at \$5.0 million and primarily constitutes operating costs. All costs during years 6-20 will be incurred by the GSL.

(b) Investment and Operating Costs

The total investment or capital cost of the project is \$7.6 million

TABLE II

SCHEDULE OF INVESTMENT AND OPERATING COSTS

Cost Summary (U.S. \$ 000)

<u>Year</u>	<u>Investment Costs</u>		<u>Operating Costs</u>	<u>Total Costs</u>
	<u>USAID</u>	<u>GSL</u>	<u>GSL</u>	
1	1,232.6	1,236.8	1,087.1	3,556.5
2	695.9	332.2	1,647.8	2,675.9
3	1,227.8	339.4	1,659.3	3,226.5
4	654.7	330.3	1,660.0	2,645.0
5	539.0	335.5	1,701.9	2,576.4
	<u>4,350.0</u>	<u>2,574.2</u>	<u>7,756.1</u>	<u>14,680.3</u>
6-15	-	674.8	4,267.7	4,942.6
Total	<u>4,350.0</u>	<u>3,249.0</u>	<u>12,023.8</u>	<u>19,622.9</u>

and the total operating cost is \$12.1 million. During the 5-year life-of-project the investment costs account for \$6.9 million and operating costs account for \$7.8 million. The schedule of investment and operating costs, shown in Table III, describes their yearly breakdown according to source of financing.

The proposed AID financing of the project is for investment costs. Of the life-of-project investment cost, AID is expected to contribute \$4.4 million for foreign exchange and local currency costs, including (a) technical assistance (about \$1.0 million); (b) staff training (\$1.5 million); and (c) imports of commodities (\$1.9 million). The GSL will assume the balance of the local investment cost amounting to \$2.6 million during the life-of-project and about \$0.7 million beyond the life-of-project.

The operating costs, borne entirely by the GSL, comprise 3 categories: (a) land preparation, planting and maintenance of reforestation and fuelwood projects; (b) maintenance of buildings, vehicles and equipment; and (c) transport. The estimated expenditure of wages and allowances of manual labor for the first category is over 65% of overall operating costs and almost 60% of life-of-project operating costs, reflecting the labor-intensive nature of land preparation, planting and maintenance activities.⁷

3. IRR Calculations

As explained above, IRR calculations have been restricted to those activities where quantitative estimates of benefits were possible: namely, the reforestation of the Upper Mahaweli Watershed Area and the dry zone fuelwood plantations. Watershed reforestation provides commercial timber as a direct benefit.⁸ The benefits expected from the dry zone plantations are measured in terms of the value of plantation fuelwood, all of which is to be sold by the State Timber Corporation (STC) to urban and rural households as well as to industrial users.⁹

The monetary benefits of these two activities are the product of estimated yields and current site values for timber and fuelwood. Four alternative IRR's for each of these activities are shown in Table IV below. The alternatives vary according to assumptions made about yields and values. While these assumptions are believed to be fairly conservative, selling prices and site values for timber and fuelwood do vary among users and locations. A thorough study would be required to obtain definitive data. Moreover, markets have yet to be established in Sri Lanka for *Leucaena* and *Sesbania*.

The first alternative employs relatively low estimates of yields and values. Annual yields of timber and fuelwood are conservatively estimated at 2,500 cu. ft. per acre for all species, based on Forest Department

TABLE III

SCHEDULE OF PROJECT COSTS DURING THE LIFE OF PROJECT (Years 1-5)

(U.S. \$ 000)

<u>Project</u>	<u>Investment Costs</u>		<u>Operating Costs</u>	<u>Total</u>
	<u>USAID</u>	<u>GSL</u>	<u>GSL</u>	
Research	524.7	55.8	182.6	763.1
Watershed	545.3	556.8	971.6	2,073.7
Fuelwood	532.5	1,130.0	4,393.5	6,056.3
Extension	961.8	731.6	548.4	2,241.8
Training	565.5	28.1	376.1	969.7
Charcoal Research	343.8	6.5	1,182.6	1,532.9
Maintenance	85.7	64.5	101.9	252.1
Other ¹	<u>790.7</u>	<u>-</u>	<u>-</u>	<u>790.7</u>
Total	<u>4,350.0</u>	<u>2,573.6</u>	<u>7,756.7</u>	<u>14,680.3</u>

1 This figure includes provision made for (a) Landsat Map (U.S. \$75,000), (b) Forestry College Construction (U.S. \$175,000), (c) Extension Service (U.S. \$100,000), (d) Books and Periodicals etc. (U.S. \$2,500), (e) Fertilizer (U.S. \$275,000), and (f) Miscellaneous expenditure (U.S. \$117,000). These items total U.S. \$744,500. The balance of U.S. \$46,200 included is the cost of other technical assistance, not directly related to the above

TABLE IV
IRR ALTERNATIVES

<u>Alternative</u>	<u>Activities</u>		
	<u>Watershed Reforestation</u>	<u>Fuelwood Plantations</u>	<u>Combined Activities</u>
1. Low Yield, Low Value ¹	6.9	14.1	11.4
2. High Yield, Low Value ²	17.0	16.2	16.6
3. Low Yield High Value ³	15.5	14.8	15.3
4. High Yield, High Value ⁴	22.8	18.1	20.6

All alternatives include replanting costs through year 20. Benefits from replanting (through year 20) are included, which in some cases occur during years 21 - 30. Inflation is ignored in the calculation of IRRs, based on the assumption that inflation affects both costs and benefits to the same degree. Schedules of gross and net benefits for the Alternatives 1 and 4 are shown in Annex C tables 1 - 4, respectively. Additional discussion of the alternatives is in the text.

1. Uniform yield for all species of 2,500 cu. ft. per acre. Site values per cubic foot: timber Rs. 4.32 and fuelwood Rs. 1.00.
2. Different yields for each species based on plantation experience (see footnote 12 for details). Same values as Alternative 1.
3. Site values per cubic foot: timber Rs.7.45 and fuelwood Rs. 1.25. Yields same as Alternative 1.
4. Yields same as Alternative 2 and site values same as Alternative 3.

experience with traditional species. It has been assumed that about three-quarters of the planted acreage in the watershed project areas will be harvested and replanted on a selective basis while the balance on steep slopes will remain in permanent stands to ensure soil stability. The values of commercial timber and fuelwood at the site have been conservatively estimated at Rs.4.32 and Rs.1.00 per cu. ft., respectively. This excludes the cost of harvesting, gathering and transportation of timber from the site.^{10,11} In the second alternative yields for each species have been increased to averages experienced in actual plantation conditions in selected countries, including Sri Lanka.¹² The average of these yields (weighted by acreages to be planted in each species) is 3775 cu. ft. per acre compared to the uniform 2500 cu. ft. per acre yield assumed in the first alternative. The third alternative keeps yields at the low variant of 2500 cu. ft. per acre and increases timber and fuelwood site values from Rs.4.32 to Rs.7.45 a cu. ft. and Rs.1.00 to Rs.1.25 a cu. ft., respectively. The timber value includes the GSL royalty of Rs.3.15 a cu. ft. as well as contractor profit of Rs.4.32 a cu. ft. (see footnote 9 for further discussion and justification). The fuelwood value reflects prices paid by tile factories for "jungle wood" rather than for rubberwood (see footnote 10 for further discussion). The fourth alternative employs the higher variants for both yields and site values. It will be noted that all IRR values, except for the first alternative for watershed reforestation, are above 10%. Very low yield and site values have been employed for this alternative. (Compare 2,500 cu. ft. per acre with the yields shown for the first three (watershed) species in footnote¹²). Also, the first benefits from harvesting will occur only during the eleventh year in the watershed areas, in contrast to the third year in the fuelwood plantations (see Annex Table C-1).

4. Other Considerations

As indicated in the "Summary and Conclusions" section, there are several additional dimensions to project benefits. A somewhat more detailed discussion of these follows.

(a) Other Project Activities

Although not quantified in terms of an IRR, the research, extension, training, inventory map, charcoaling, and village woodlot activities will all have direct positive benefits to the project. Research benefits are always difficult to estimate with certainty, but efforts directed toward propagation of improved quick-yielding species, for example, could have a dramatic pay off relative to cost. The charcoaling and village woodlot activities, while relatively small and pilot in nature, will when expanded have a major impact on the problem of deforestation and fuelwood scarcity as explained below. The mapping, extension and training activities will improve the effectiveness of the Forest Department nation-wide.

(b) Problem Impact

IRR's do not describe the impact of the project on the overall problems of deforestation and fuelwood shortage. One way to do this is simply to compare rates of planting by the project to rates of deforestation and to fuelwood requirements. Gross deforestation is estimated to be occurring at the rate of 150,000 acres a year, 2 to 3 times the rate compatible with natural regeneration. This suggests that net deforestation ranges between 75,000 and 100,000 acres a year. The project forestation activities (upper Mahaweli watershed reforestation, fuelwood plantations and village woodlots) will plant 10,350 acres a year; in other words, they will given the above estimates, offset from 10 to 14% of net annual deforestation. This project is additional to the existing GSL reforestation program which has recently averaged a planting rate of 18,000 acres a year. Thus the total reforestation rate of 28,350 acres a year, including this project, would offset 28 to 38% of net deforestation. If, as expected, this project stimulates the achievement of longer-run GSL targets of 20,000 acres a year for upper watershed reforestation and 14,000 a year for fuelwood plantations, plus 10-fold expansion in village woodlots (from 50 to 500 villages), the combined reforestation rate of 55,500 acres a year would offset 55 to 74% of annual net deforestation. Further expansion of fuelwood plantations to the 20 year, 50,000 acre-a-year goal could more than offset estimated annual net deforestation.

Similarly, project fuelwood-related activities (plantations, village lots, and kiln and pit charcoaling in Mahaweli areas) will yield over 20 million cu. ft. a year or over 10 - 14% of Sri Lanka's current estimated total fuelwood consumption of 140 million cu. ft. When the interim GSL target of 70,000 acres in fuelwood plantations is reached and if village woodlot and charcoaling pilot activities were to expand (by ten-fold), 29 to 43% of national annual fuelwood requirements could be met. Further expansion of plantations to the 20-year target of 250,000 acres or limited expansion combined with expanded charcoaling could meet the entire current annual requirement. Since these estimates employ an assumed annual yield of 2,500 cu. ft. per acre, they could well be on the conservative side. (See footnote 3 for an explanation of the range of these estimates).

While the impact of this project on stabilization of the upper Mahaweli watershed will be small in terms of area, the 15,000 acres selected for reforestation represent some of the most badly degraded slopes. The GSL upper Mahaweli watershed reforestation target to 100,000 acres represents a substantial proportion of publicly held degraded

lands. The Forest Department is also undertaking forestation assistance for degraded portions of private and public tea estates in the region.

(c) Employment

The employment generating potential of the project has already been mentioned. The project itself will generate about 4,500 jobs a year during the life of project. Forestry and charcoaling activities could generate 14-15,000 jobs if watershed, fuelwood and village forestry efforts get expanded to a 10-year goal of 19-20,000 acres a year, and the bulk of this output as well as half the available residue wood from the Mahaweli Development Area is charcoaled. Whereas reforestation itself generates about .39 jobs per acre, charcoaling generates an additional 1.17 jobs per acre. As noted above, related lumber, paper and chemical manufacturing would create additional employment.

(d) Foreign Exchange Saving

At an unsubsidized current cost of Rs. 25 per gallon and a conservatively estimated annual kerosene consumption for cooking purposes of 3.5 million gallons a year, Rs. 87.5 million in foreign exchange could be saved by substituting fuelwood for kerosene for cooking purposes. The typical rural family would save Rs. 1.30 a month by making this switch even at the current subsidized price of Rs. 13.68. Further reduction in the subsidy would make fuelwood even more attractive.

About eleven million cubic feet of fuelwood could provide the same cooking heat as the total kerosene used for cooking. The annual yield of 17.5 million cubic feet (low yield alternative) for the fuelwood plantation activity in this project could more than supply this requirement. For the urban (Colombo) dweller, charcoal would at current prices be cheaper than fuelwood, and even cheaper relative to kerosene.¹³ In addition, charcoal represents an attractive potential for earning foreign exchange through exports (see p. 53 of the "ISTI Report").¹⁴ As noted above, harvested wood from the project's watershed reforestation activity will more than offset the current volume of timber imports, thereby saving additional foreign exchange.

C. SOCIAL SOUNDNESS ANALYSIS

1. Beneficiaries

There are three major beneficiary groups in this project: (a) the farmers who will benefit from the stabilization of the upland watershed, (b) the rural households who consume firewood for cooking, and (c) the rural villagers who will gain employment with the Forest Department and State Timber Corporation.

- a. There are approximately 175,000 farmers living in the dry zone who will benefit directly as a result of the stabilization of upland watersheds. Most of these farmers live in purana or traditional irrigation tank villages where the consequences of reduced forest cover in the uplands has resulted in a reduction in the extent and yields of paddy acreage cultivated. These irrigation tanks are used to store irrigation water needed to supplement the rainfall during the major cultivation season (Maha). In large systems, enough water is stored in the tank to permit some irrigated agriculture even during the dry season (Yala). Previously, much of the monsoonal rain was conserved in the highland forest soils and gradually released into the small streams which feed the tanks. With the destabilization of the watershed the rains do not percolate into the soil but rapidly run down the slopes causing severe flooding and erosion. The tanks become silted and are unable to withstand the flooding. Often irrigation water is lost through spillage and/or breaches in the main bund (dam). The reforestation of the highlands should, within 7 or 8 years help reduce this flooding and erosion and contribute to the revitalization of dry zone irrigated agriculture.
- b. The 35,000 acres of fuelwood to be planted under this project will help solve the problem of chena agriculture and provide for the fuelwood needs of some 44,000 households. This is a pilot project and the long term effects of this project, particularly in regard to the experimentation which charcoaling and village fuelwood lots (see "spread effect", See C2), should contribute significantly to the resolution of Sri Lanka's energy problems.
- c. A considerable amount of employment will be generated by this project. On the fuelwood plantations, an estimated 13,588 person years of labor will be needed and the watershed reforestation effort will require approximately 5,824 person years. Laborers will be comprised almost exclusively of the landless, near-landless, and unemployed.

2. Spread Effects

Reforestation for watershed management while not novel in Sri Lanka, is still confined to only a few geographic areas. It is only with the recent realization that the stabilization of the watershed is critical for agricultural production that increased emphasis has been placed on this effort. Similarly, as the supply of fuelwood dwindles rapidly and the cost increases, attention is now focused on creating a renewable supply of energy. The experience of this project should be easily transferable to other areas of the country, and it is reasonable to expect that the rate of reforestation in the near future will far exceed the planned reforestation rate of 35,000 acres annually.

The major impact of this project in terms of spread effects relates to the special experimentation with village fuelwood lots. It is estimated that a village of 100 households requires about 2 acres of fuelwood forest each year, or approximately 8-10 acres total utilizing a 3-4 year rotation period (e.g. with Ipil-Ipil). The Forest Department cannot economically or effectively manage a large number of such small-scale woodlots, and it is planned to assign these managerial responsibilities to the villagers themselves through guidance provided by the Forest Extension Service.

It is expected that about 500 acres of the total 35,000 acres planned for fuelwood cultivation will be set aside for this activity. The remaining acreage will be in plantations of more than 100 acres each, and will be managed by the Forest Department. The State Timber Corporation will have responsibility for the cutting and distribution of these plantations.

A number of organizational variables will be tested in 20-25 villages to determine what is the best way to manage these fuelwood lots including the utilization of existing organizations such as Rural Development Societies, Cultivation Committees, and farmer associations. It may be necessary to form entirely new organizational groups to manage the wood lots including women or school children.

Another area which has a potential for expansion is charcoaling. The State Timber Corporation currently has a program in which villagers convert timber into charcoal. The villagers are compensated on a per pound basis for the bagged charcoal produced. Most of the charcoal is used for commercial purposes. The majority of wood needed for this activity will come from the timber cleared for the AMDP. It is expected that approximately 50% of this charcoal conversion could be carried out by villagers. This would involve, given current information on productive capacity, approximately 50 villages (24 portable kilns and 26 village charcoal pits).

Experimentation will be undertaken to improve the efficiency of this conversion process. Charcoaling could be a source of income for villages which have sufficient highland areas on which to grow fuelwood beyond their own fuel requirements.

3. Social Impact

The social impact of this project is squarely on the rural poor. As noted, they are the largest consumers of firewood. They are likely to receive supplemental employment as both full and part-time Forest Department laborers.

In regard to the stabilization of the watershed, the beneficiaries will be the owners and tenants of irrigated paddy fields, most of whom are small-holders. Insufficient water in the village tank, whether from silting or flood damage, results in decreased yields, fewer second crops, and lower incomes. As the watersheds stabilize, more water should become available for irrigation during both planting seasons. Indirectly, the landless agricultural laborer will also benefit, since a more prosperous village economy will provide more employment opportunities.

The individuals who are likely to suffer somewhat under this project are those landless and near-landless villagers who depend upon chena (slash and burn) cultivation as a subsistence supplement. Increasing amounts of highland acreages under reforestation will result in less chena farming; however, a number of employment opportunities for these chena farmers should be generated by this project including work with the Forest Department, the State Timber Corporation, and in charcoaling. In addition, there appears to be good evidence that reliance on chena farming decreases as paddy yields increase. The increase in double-cropping and in productivity should also result in increased employment opportunities for those chena farmers who are landless.

4. Women in Development

Women do most of the gathering of firewood. As the forests dwindle, they must go further afield and spend more time and energy in obtaining fuelwood. For those who purchase firewood, each year the cost of these purchases takes an increasing percentage of the family's net income. Those who can afford to purchase their firewood should find that the costs are relatively lower as more fuelwood made available from the project is marketed. This will be especially true if some of the experiments concerned with converting fuelwood into charcoal are successful.

Women should also find increased employment with the Forest Department, especially within the nursery, planting and weeding operations. The majority of the women presently employed by the Forest Department are married and work to supplement their household income. The increased employment opportunities should assist many poorer households in meeting their basic subsistence requirements.

D.

ADMINISTRATIVE FEASIBILITY

Under the present forest utilization scheme in Sri Lanka the Forest Department has the responsibility of establishing, maintaining, and protecting forest reserves. This department will be the implementing agent of this project. The State Timber Corporation, charged with the responsibility of harvesting, distribution and sales of commercial timber products, including fuelwood, will assist this project in two efforts: harvest, transport and sales of fuelwood; and establish experimental village charcoaling units and the collection and sale of bagged charcoal.

Both the Forest Department and State Timber Corporation are within the Ministry of Lands and Land Development, and have established records for good work and technical standards, and share a strong sense of commitment to the purpose of this project and specifically to providing a renewable energy and commercial natural resource for Sri Lanka. The Ministry of Lands and Land Development has displayed great interest and commitment to ensure the successful management of the project. Much public interest has been generated by local press releases over the past 8 months.

The Forest Department has had considerable experience in the establishment of man-made forest plantations and their subsequent management. The rate of reforestation in Sri Lanka on a per capita basis is one of the highest in South East Asia. To date approximately 300,000 acres of high quality man-made forest plantations have been raised in Sri Lanka and are distributed throughout the country. The amount planted in calendar 1978 was 17,338 acres, and it is estimated that the 1979 planting target of 20,000 acres will be surpassed by at least 1,500 acres.

The management of the project is considered to be within the capacity of the Forest Department and is reinforced by a high level of commitment. An organizational chart and present component of staff are given in Annexes D and E. The experienced staff required at all levels for management of this project have been assigned by the Forest Department and new staff recruitment procedures are already underway. For example while this project paper was being prepared, 5 new ACF's were recruited by the Forest Department to fill long standing vacancies.

The research proposed for this project supports the current research of the Research Division of the Department. Active research into some of the species to be planted under this project has already been initiated including Ipil-Ipil, Calliandra and Sesbania species.

Annex F gives the administrative chart of the two reforestation efforts (watershed and fuelwood). As noted from these charts, two Officers-in-charge (one for each activity) will be the main project implementors from the Forest Department, and will hold the rank of ACF. These two men have already been designated and will be released from their normal obligations at the beginning of 1980 and begin project activities even before the Project Agreement is signed.

E. ENVIRONMENTAL CONCERNS

The project design is such that there is minimal construction component, and the majority of project activities involve regeneration of forest lands, thus the project will enhance the human environment. The Initial Environmental Examination (IEE) of the project was negative, however a Threshold Decision was not made by the Assistant Administrator at the submission of the PID. Dr. H. Bollinger, environmentalist, prepared an abbreviated environmental assessment. This assessment was submitted to AID/W. A negative Threshold Decision was received on January 9, 1980 (State 007574). The Threshold Decision and assessment by Dr. H. Bollinger may be found in Annex G.

PART IV - Financial Analysis and Plan

A. FINANCIAL SUMMARY

The total cost of this five-year project is estimated at \$14.6 million of which AID will fund \$3.40 million through a loan and \$0.95 million through a grant. The balance of \$10.33 million represents host country funding to be provided by the GSL over the life of the project. The Mission plans to request \$2.0 million in loan funds and \$0.5 million in grant funds for FY 1980 with the remaining \$1.4 million loan and \$0.45 million grant funds being provided in FY 1981.

AID will fund three primary inputs into the project: e.g. training, technical assistance and commodities. Anticipated funding requirements for each of the inputs are shown in Table 5, Summary Cost Estimate and Financial Plan. The detailed costing of each input is contained in Annexes H, I, J and J-1.

An estimate of disbursements by source, input and year is given in Table 6. This Table indicates fairly constant disbursement rates by both AID and the GSL as follows:

TABLE 5

SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US \$ 000)

INPUT	AID			GSL LC	AID		
	FX	LC	TOTAL		FX	LC	TOTAL
Training	\$ 1,489.2		\$ 1,489.2		\$ 1,489.2		\$ 1,489.2
Technical Assistance	950.0		950.0		950.0		950.0
Commodities	1,423.8	\$ 487.0	1,910.8		1,423.8	\$ 487.0	1,910.8
Investment (Capital) Items				\$ 2,574.2		2,574.2	2,574.2
Operational Items				7,756.1		7,756.1	7,756.1
Totals	\$ 3,863.0	\$ 487.0	\$ 4,350.0	\$10,330.3	\$ 3,863.0	\$10,817.3	\$14,680.3

TABLE 6
ESTIMATED DISBURSEMENT PLAN
(US \$ 000)

SOURCE/INPUT	Y E A R					TOTAL
	1	2	3	4	5	
AID - Training	\$ 176.6	\$ 304.4	\$ 305.2	\$ 395.5	\$ 307.5	\$ 1,489.2
Technical Assistance	249.0	255.4	219.3	123.8	102.5	950.0
Commodities	807.0	136.1	703.3	135.4	129.0	1,910.8
Total-AID	\$1,232.6	\$ 695.9	\$1,227.8	\$ 654.7	\$ 539.0	\$ 4,350.0
GSL - Investment Items	\$1,236.8	\$ 332.2	\$ 339.4	\$ 330.3	\$ 335.5	\$ 2,574.2
Operational Items	1,087.1	1,647.8	1,659.3	1,660.0	1,701.9	7,756.1
Total-GSL	\$2,323.9	\$1,980.0	\$1,998.7	\$1,990.3	\$2,037.4	\$10,330.3
Total - All Sources	\$3,556.5	\$2,675.9	\$3,226.5	\$2,645.0	\$2,576.4	\$14,680.3

Annual Inputs as a % of Total Inputs

<u>Year</u>	<u>AID</u>	<u>GSL</u>	<u>TOTAL</u>
1	28%	23%	24%
2	16	19	18
3	28	19	22
4	15	19	18
5	<u>13</u>	<u>20</u>	<u>18</u>
	100%	100%	100%
	====	====	====

The AID funding requirements in years one and three are slightly larger than other years due to start-up cost and commodity purchases in year one and to participant departures and consultancies in year three.

Table 7 presents the cost of each AID input into the eight separate project elements. Due to this project's significant impact on the Forest Department operations, it is necessary to provide financing for a wide range of project elements in order to insure the level of support needed to implement the project.

B. BUDGET ANALYSIS

The GSL agency having primary implementation responsibility for this project will be the Forest Department of the Ministry of Lands and Land Development. As stated in the 1979 GSL Budget, the main functions of the Forest Department are reforestation, conservation and protection, management of forest plantations, administration of the Forest Ordinance, silviculture research, timber utilization research, development of minor forest products, forestry education and public relations and regulations of fellings by the State Timber Corporation.

Although traditionally small, the Forest Department's budget has grown by almost 52% over the past two years (Table 8). This current growth and the size of the GSL counterpart to this project (\$10.3 million over 5 years), are clear evidence of an increasing GSL commitment to forest preservation and expansion. This project will have a very significant impact on Forest Department operations, both during and after Project implementation.

TABLE 7

AID INPUTS BY ELEMENT
(US \$ 000)

<u>ELEMENT</u>	<u>TRAINING</u>	<u>TA</u>	<u>COMMODITIES</u>	<u>TOTAL</u>
Research	\$ 333.0	\$ 74.5	\$ 117.2	\$ 524.7
Watershed	150.6	202.2	192.5	545.3
Fuelwood	170.4	196.7	165.4	532.5
Extension	367.8	152.3	441.7	961.8
Training	346.5	147.0	72.0	565.5
Charcoal Research	120.9	108.0	114.9	343.8
Maintenance	-	23.1	62.6	85.7
Other <u>2/</u>	-	46.2	744.5	790.7
T o t a l s	\$1,489.2	\$ 950.0	\$1,910.8	\$4,350.0

Note: 1/ Contingencies and inflation provisions included in element costs.

2/ See Annex J, page 2, for composition of "Other".

TABLE 8

**FOREST DEPARTMENT BUDGET 1977, 1978
AND 1979**

(US \$ 000) 1/

<u>Recurring Expenditures:</u>	<u>Actual 1977</u>	<u>Budgeted 1978</u>	<u>Budgeted 1979</u>
General Admin. & Staffing Services	\$ 88.6	\$ 85.3	\$ 103.3
Conservation & Protection	172.8	187.9	196.8
Reforestation & Development	89.8	105.7	131.4
Management of Forest Plantations	20.0	25.9	31.2
Research, Education & Training	24.0	34.0	38.2
Reforestation of Degraded Tea, Rubber & other lands	8.6	10.3	12.5
Land & Water Conservation - Upper Mahaweli	-	-	16.5
Protection of Forest Reserves	-	-	10.3
Total Recurring Expenditures	\$ 403.8	\$ 449.1	\$ 540.2
<u>Capital Expenditures:</u>			
Equipment Acquisition	\$ 630.9	\$ 868.2	\$ 653.2
Reforestation of Degraded Tea, Rubber & other lands	78.4	91.8	96.8
Land & Water Conservation - Upper Mahaweli	-	-	367.7
Protection of Forest Reserves	-	-	32.6
Total Capital Expenditures	\$ 709.3	\$ 960.0	\$1,150.3
Total Expenditures	\$1,113.1	\$1,409.1	\$1,690.5
Increase over base year 1977	-	26.6%	51.9%

1/ Converted at Rs.15.50 = US \$1.00

PART V - Implementation Plan

A. PROCUREMENT

1. **Technical Assistance** - The Forest Department will contract with a U. S. firm or university to provide the technical assistance, including arranging for training and assisting with commodity procurement. Both private U.S. consulting firms and universities will be invited to pre-qualify as the GSL wishes to give both types of organizations an opportunity to provide the required services. The procedures of Handbook 11, Chapter 1 will be followed.

2. **Training** - Although the training is to be financed under the loan, the GSL plans to have the consultant handle all arrangements for training out of Sri Lanka. This will reduce the burden on GSL and USAID personnel. Similar arrangements have been made in other grant/loan projects in Sri Lanka.

3. **Commodities** - All imported commodities will be procured under the procedures of Handbook 11. Two possible approaches being considered are: (a) procurement by the consultant or (b) use of services of a U.S. procurement service agent. Since GSL and USAID have not yet had any experience with procurement services agents, no decision has yet been made as to which method of procurement will be the most appropriate. This will be resolved by the time of or during negotiations for the host country contract for technical assistance. This project probably will not follow the previous practice of having the bids opened in Washington.

4. **Local Procurement** - The procedures of Handbook 11 concerning local procurement will be used for in-country purchases of a limited amount of items.

5. **Construction** - One building is to be constructed with AID funds. Plans have already been drawn up by a local architect. The building is a simple dormitory structure to house students, kitchen and study facilities. GSL rules for bidding and contracting for construction will be followed. The procedures of Handbook 11, Chapter 2 will be followed.

6. **GSL Implementation and Monitoring** - The project is to be implemented by the **Forest Department**. The day-by-day responsibility will be with the **Deputy Conservator of Forests (Special Projects)**, one of five deputy conservators who report directly to the **Conservator of Forests** (head of the **Forest Department**). Under the **Deputy Conservator** will be two assistant conservators, one for each of the two major areas of activity: upper watershed and dryland fuelwood (Annex D). The **State Timber Corporation** will be responsible for the charcoaling effort under the general guidance of the **Deputy Conservator**. All other project activities will be administered and/or monitored by the **Deputy Conservator**.

7. **USAID Project Monitoring** - The project officer will be an assistant agriculture officer in the **Rural Development Office** with a background in forestry. **USAID** is in the process of hiring a **Sri Lankan professional agriculturalist** with a forestry or cropping systems background to assist the **USAID project officer**. The project officer will also be assisted by the **USAID engineer** in the construction aspects and by the **USAID social scientist** in establishing the village-run fuelwood activities.

8. **Project Schedule**

<u>Activity</u>	<u>Responsibility</u>	<u>Date</u>
<u>PRE-IMPLEMENTATION</u>		
1. Project Paper approval	USAID	March 28, 1980
2. CN waiting expires	AID/W	April 18, 1980
3. Project (loan and grant) authorized	USAID	April 21, 1980
4. Project agreement signed	USAID/GSL	May 2, 1980
5. Initial CP met	GSL	June 30, 1980
<u>TECHNICAL ASSISTANCE CONTRACT</u>		
1. Notice for Commerce Business Daily	GSL-USAID- AID/W	April 20, 1980
2. Short List prepared	GSL	June 1, 1980
3. Request for Proposals issued	GSL	June 1, 1980
4. Proposals received and selections made	GSL	Aug. 1, 1980
5. Contracts negotiated and signed	GSL-Contractor	Sep. 1, 1980
6. First consultant arrives	Contractor	Oct. 1, 1980

INITIAL EQUIPMENT PROCUREMENT

1. IFB for Equipment issued	GSL	July 1, 1980
2. Bid Closing Date	GSL	Sept.1, 1980
3. Contracts awarded	GSL	Oct. 1, 1980
4. First equipment arrives	Suppliers	April 1, 1981

IMPLEMENTATION KEY DATES

1. Training of Forest Dept. staff begins	GSL-Contractor	Nov. 1, 1980
2. Satellite map composit finished	GSL-Contractor	March 1, 1981
3. Tree nurseries established	GSL	Oct. 1, 1981
4. Initial two mobile extension units activated	GSL	Dec. 1, 1981
5. Annual Review of Project	GSL-Contractor- USAID	Jan. 19, 1982
6. Annual Review of Project	GSL-Contractor- USAID	Jan, 19, 1983
7. Initial Participant Training completed	GSL-Contractor	June 30, 1983'
8. All project equipment received	GSL-Contractor	June 30, 1983
9. In-Depth Evaluation	GSL-Contractor- USAID	Jan. 15, 1984
10. Final Evaluation	GSL-Contractor- USAID	Jan. 15, 1985
11. Project Completed	GSL-Contractor	Feb.28, 1985

PART VI - Evaluation Plan

Evaluation will be used to assess the effectiveness of the project's implementation to achieve the following broad-based objectives;

- (1) Reforest 15,000 acres of denuded watershed in the Upper Mahaweli Catchment Area;
- (2) Establish and maintain 35,000 acres of fuelwood plantations;
- (3) Develop a national base-line map;
- (4) Establish village-run fuelwood plots on a pilot basis in 50 villages;and
- (5) Establish a village charcoal production program in 24 villages.

The first evaluation will be in-depth mid-term evaluation in December, 1983. The evaluation team will be comprised of members of the Forest Department, State Timber Corporation, USAID, a representative of the contracting technical assistance team and an impartial observer(possible USDA, Forest Service). This evaluation will focus on broad issues of project implementation in meeting the forementioned purposes, and to evaluate progress in the Forest Extension Service, and the village-run fuelwood and charcoaling activities. The timing of this evaluation was selected because the initial phase of this project should be completed at this juncture and Forest Extension Service will be changing from a regional to national focus during this period.

The second evaluation will be an end-of-project evaluation, in January 1985, which will review all project activities against project objectives.

PART VII - Conditions, Covenants and Negotiating Status

A. Initial Conditions Precedent for Disbursement for Loan and Grant

1. Legal opinion;
2. Authorized Representatives;
3. Evidence that adequate budgetary resources are being made available for 1980 and assurance that further budgets for 1981 - 1984 will provide adequate funding for the Forest Department adequately to implement the Project.

B. Additional Conditions Precedent for Disbursement

1. For Training: A comprehensive training plan for the development of GSL personnel directly associated with carrying out the project.

2. For Charcoaling Activities: A working agreement established between the Forest Department and the State Timber Corporation on operating procedures and guidelines to be followed in implementing the charcoaling activities.

C. Covenants

1. The usual project evaluation covenant;
2. Forestry Policy: GSL covenants that, the August 30, 1979 Amendment to the Forest Ordinance concerning conservation, management and protection of the natural forests and reforested areas of Sri Lanka will be continued in effect without modifications and will be strictly enforced during the life of the project.
3. Replanting and Maintenance: GSL covenants that by the end of the fourth year of the Project, it will have established and have in operation a satisfactory Project replanting and forest maintenance program financed by setting aside in a Special Fund an adequate portion of the proceeds of the sale of project generated fuelwood and/or timber products.

D. Negotiating Status

The various conditions and covenants have been discussed with the Forest Department and are acceptable to them. There should be no negotiating delays or problems.

PART VIII - FOOTNOTES

- 1 Annex F, "Analysis of Protective Value of a Watershed," of the ISTI Report, describes one attempt to estimate the value of the Upper-Mahaweli Watershed Area protection activity to agricultural production through enhanced soil stability and water retention capacity. In IRR terms, the estimated value was found to be equivalent to 3 percentage points. For reasons explained in that analysis, this value is probably an underestimate.
- 2 Democratic Socialist Republic of Sri Lanka, Ministry of Mahaweli Development, Environmental Assessment - Accelerated Mahaweli Development Program, Mid-Term Report, 1 February 1980, prepared by TAMS (Tippets-Abbet-McCarthy-Stratton) Colombo.
- 3 The range shown for fuelwood requirements derives from the existence of several estimates. For example, project provision of 14% of total annual fuelwood requirements is based on a Forest Department estimate of 140 million cu. ft. consumption a year (10 cu. ft. per capita). T.L. Sankar and G.B.A. Fernando, Towards an Energy Policy in Sri Lanka (UNDP & GSL, 1978) extrapolate a sample survey of fuelwood consumption in Colombo to 18 cu. ft. per capita nationwide or 252 million cu. ft. a year. It has been suggested that the latter may be an overestimate since urban per capita fuelwood consumption may exceed rural per capita consumption. Therefore, a range of 10 to 15 cu. ft. per capita consumption has been employed in calculating the project contribution to fuelwood requirements.
- 4 Estimates of replanting costs through year 20 are included in these calculations. Estimates of the resulting benefits from harvesting species replanted during the first 20 years are counted whenever they arise, including during years 21-30.
- 5 Oleoresin, now imported for paint, could also be manufactured locally from pine harvested from the project.
- 6 Replanting costs are not included in these figures. A rough estimate of these costs is included in Annex C, Table 1. A special covenant to this project (see Part 7) is that the Government develop a plan by the end of Year 1 for meeting replanting costs.
- 7 For purposes of the economic analysis, no adjustment has been made for differences between market or financial and "real" or economic costs (i.e. "shadow prices"). Fertilizers and diesel fuel, which are subsidized, are a small part of total project costs. Labor is costed at market prices which may be an over-estimate for unskilled labor. Market rates for skilled labor may be understated, however. Any net overstatement will make the resulting IRR a conservative estimate in any event.

- 8 As noted above, it also contributes to enhanced agricultural production, hydropower capacity, and ecological environment.
- 9 Major industrial users include tea estates (drying), coconut mills (dessication), and brick and tile-making. Data from one recent estimate suggests that urban household and industrial demand for fuelwood may run over 60 million cubic feet a year (assumes 45 cu. ft. per ton and $\frac{1}{2}$ tea energy demand from fuel oil). See H. S. Subasinghe and B. P. Sepalage, "Wood Fuel and Other Traditional Fuels Consumption Patterns in Sri Lanka," and the seminar on "Energy in Sri Lanka," January 10-12, 1980, Colombo. The exact shares of fuelwood plantation output to be accounted for by industrial, urban household and rural household consumers has yet to be determined. Transport distance is a major consideration in determining the economic viability of fuelwood plantations. The Puttalam and Mahaweli System C sites would appear well-located for the coconut, tile and tea industries. Significant clay deposits, plus increasing population enhance the economic potential for plantations in the Mahaweli areas. Size and location may have to be adjusted with improved information on the magnitude and location of demand.
- 10 Site value may be viewed as returns to the owners of forests plus some portion of the imputed profit from the sale of timber or fuelwood after deducting all other costs. In the case of commercial timber, the site value mentioned in the text was taken to be the current profit per cu. ft. of the contractor who brings Class I timber (which includes eucalyptus and cypress) an average of 50 miles (including round trip) to an STC depot. The current purchase price for this wood is Rs. 10.30 a cu. ft. To obtain the contractor profit of Rs. 4.32 a cu. ft., the following per cu. ft. costs were deducted from the Rs. 10.30 purchase price: road transport cost at Rs. 3.20 (for 50 mile trip, including round trip), 2 mile forest track transport cost at Rs. 0.60, loading and unloading cost at Rs. 0.38 and felling, converting and short haul ($\frac{1}{2}$ mile) cost at Rs. 1.80. This is believed to be on balance a conservative imputation of profit and returns to site value. While some portion of contractor profit could be viewed as a return to entrepreneurship rather than site value, this is more than offset by large STC margins, some portion of which should be imputed to site value. The STC gross selling price of Rs. 34.45 a cu. ft. of class I grade II (class I grade I is Rs. 35.86) in addition to the contractor purchase price of Rs. 10.30 and STC average overhead cost of Rs. 10.50, includes an average STC profit of Rs. 10.50 a cu. ft., and a 10% GSL "crown-land" royalty, or Rs. 3.15 a cu. ft. (10% of net STC selling price of Rs. 31.50 cu. ft.). This royalty can be viewed as a return to the land owner (the GSL in this case).

11 Site value was derived by deducting Rs. 0.29 per cu. ft. for harvesting and gathering from the current prevailing Rs. 1.29 cu. ft. cost of rubberwood fuelwood purchased at the estate by Colombo (Angoda) area tile manufacturers. This estimate is also likely to be conservative in that dry zone junglewood used in tile factories north of Negombo commands a 25% premium in price over rubberwood, reflecting the higher calorific content of the former. Leucaena to be grown in the dry zone fuelwood plantations, is rated at 6970 BTU/lb. (ISTI Report, P.A-45) while rubberwood is rated at 6120 BTU/lb (Ceylon Institute of Scientific and Industrial Research). Cost data from Mr. Sunil Siriwardene, Honorary Secretary, Tile Manufacturers Association of Sri Lanka. Another piece of fragmentary evidence suggests special species may command premium prices. A small tea factory in Welimada (Wemulla Estate) pays Rs. 1.85 a cu. ft. for Albizzia at the STC depot compared to Rs. 0.92 for "low quality" jungle wood.

12 The individual yields in cu. ft. per acre are: Pinus - 6750; Albizzia - 4330; Eucalyptus (15 year rotation for watershed areas) - 6750; Eucalyptus (8 year rotation for fuelwood plantation) - 3600; Casurina - 4050; Sesbania - 3100; and Leucaena - 2325 (yield expected to be higher on second round of coppiced growth). Sources are: National Academy of Sciences (NAS), Tropical Legumes: Resources for the Future (Washington, D.C. 1975); NAS, Leucaena: Promising Forage and Tree Crop for the Tropics (Washington, 1977); and GSI, Forestry Department, Sri Lankan Forester, January-December 1972 (for Pinus).

13 The above analysis used the following coefficients drawn from the ISTI Report, pp. A-21 and 45:

	(1)	(2)	(3) = (1) x (2)
	BTU/LB	Average Household efficiency	Efficiency BTU/LB ^a
Firewood	6,970	7.5%	523
Charcoal	12,980	27.5%	3,570
Kerosene	18,910	42.5%	8,037

a = Leucaena (dry); b = from Leucaena.

59 cubic feet fuelwood = 1 ton cut fuelwood

45 cubic feet fuelwood = 1 ton uncut fuelwood

5.5 tons fuelwood required for 1 ton charcoal

14 A GSI ban on export of wood charcoal to prevent further depletion of forest reserves was announced March 19, 1980. This illustrates concern over shortage of forest resources as well as the attractiveness of exporting charcoal.

KILN CHARCOAL PRODUCTION

An estimated 75,000 acres of forest area under development in Systems B and C of the Accelerated Mahaweli Development Project will be deforested and leave behind a vast amount of debris, top and bottom ends of trees and smaller size trees and shrubs, suitable only to be used as firewood. Unless this wood is removed from the area before releasing the land for cultivation purposes, it will be burned by settlers or will decay thereby losing a valuable source of energy.

The conversion of firewood to charcoal is an appropriate and economic solution to salvage this potential energy source, particularly when transportation is required.

Taking into consideration that charcoal is 6.8 times more efficient than fuelwood, the projected requirements of charcoal to cater to the household needs and tea industry is estimated at 139,500 tons. The expected production from clearing the Mahaweli areas if all fuelwood is converted to charcoal is 140,616 tons of charcoal annually, for the next 6-10 years. A detailed cost analysis of the portable kiln method follows.

COST ANALYSIS FOR 1 TON OF WOOD CHARCOAL PRODUCED BY PORTABLE KILN METHOD

1. Cost of cutting, stacking, burning and unloading a single charge - 5 people of 2½ days - Assume 13 mandays @ Rs.15 per manday	=	195.00
2. Seiving and bagging ¾ ton of charcoal - 3 mandays	=	45.00
3. Loading of 40 bags - 1 manday	=	15.00
4. Cost of 30 numbers coir bags @ Rs.6.50 a bag	=	195.00
5. Depreciation of the kiln per charge - Assuming 5 year life with 144 charges per year	=	24.00

Cost of kiln = Rs. 17,000

Cost of ¾ ton of charcoal at pit site = 474.00

Therefore cost of one ton of charcoal at pit site = $\frac{474 \times 4}{3}$ =Rs. 632.00

Transport cost for 1 ton charcoal

1. Cost of transport to Colombo from Mahaweli Systems B/C - 170 miles @ Rs.15 per mile (7 tons transported)	$\frac{2550.00}{7}$	=	364.28
2. Unloading charges and stacking charges (4 mandays for 7 tons) @ Rs.15 per manday		=	<u>12.00</u>
Total cost per ton in Colombo		=	1,008.28
3. Overheads 10%		=	<u>100.83</u>
			<u>Rs.1,109.11</u>

LOCATION OF TRAINING 1/

Extension and Training

- TC (1) - Ext. Training - College of Forestry, Laguna, Philippines
- TC (10) - Forestry Training -
- (1) College of Forestry, Laguna, Philippines
 - (2) Institute of Tropical Forestry, Puerto Rico
 - (3) Forest Research Institute, Selangor, Malaysia
 - (4) Forest Research Institute, Dehra Dun, India
- TC (5) - Logging -
- (1) Forest Research Institute, Selangor, Malaysia
 - (2) Forest Research Institute, Dehra Dun, India
- US (2) - Soil Program - University of Hawaii
- TC (3) - Soil Program -
- (1) Tropical Science Center, Costa Rica
 - (2) Forest Research Institute, Selangor, Malaysia
- TC (3) - Silviculture -
- (1) Institute of Tropical Forestry, Puerto Rico
 - (2) Forest Research Institute, Selangor, Malaysia
- US (2) - Silviculture - USDA
- TC (10) - Special Extension Training
- (1) Research and Training Center for Tropical Agriculture, Costa Rica
 - (2) Institute of Tropical Forestry, Puerto Rico
 - (3) Forest Research Institute, Selangor, Malaysia
 - (4) Forest Research Institute, Thailand
- US (2) - MSC -
- (a) University of Georgia
 - (b) University of Utah
- TC - Orientation for Principal
- (a) India
 - (b) Thailand
 - (c) Philippines
 - (d) Malaysia

1/ These locations are suggested institutions and are illustrative, GSL will submit formal plan after arrival of US consultants.

ANNEX C1

SCHEDULE OF GROSS BENEFITS - REFORESTATION AND FUELWOOD PROJECTS INCLUDING
BENEFITS FROM REPLANTING (LOW YIELD, LOW VALUE ALTERNATIVE)
(US \$ Million)

	Pinus	Reforestation		Eucalyptus	Fuelwood			Total
		Albizzia	Eucalyptus		Casurina	Sesabania	Leucaena	
1.	-	-	-	-	-	-	-	-
2.	-	-	-	-	-	-	-	-
3.	-	-	-	-	-	-	0.3	0.3
4.	-	-	-	-	-	0.3	0.3	0.6
5.	-	-	-	-	-	0.3	0.3	0.6
6.	-	-	-	-	-	0.3	0.3	0.6
7.	-	-	-	-	-	0.3	0.6	0.9
8.	-	-	-	0.3	-	0.6	0.6	1.5
9.	-	-	-	0.3	0.3	0.6	0.6	1.8
10.	-	-	-	0.3	0.3	0.6	0.6	1.8
11.	-	0.5	-	0.3	0.3	0.6	0.9	2.6
12.	-	0.5	-	0.3	0.3	0.9	0.9	2.9
13.	-	0.5	-	0.3	0.3	0.9	0.6	2.6
14.	-	0.5	-	0.3	0.3	0.6	0.6	2.3
15.	0.9	0.5	0.2	0.3	0.3	0.6	0.6	3.4
16.	0.9	-	0.2	0.6	0.3	0.6	0.6	3.2
17.	0.9	-	0.2	0.6	0.3	0.6	0.3	2.9
18.	0.9	-	0.2	0.3	0.6	0.3	0.3	2.6
19.	0.9	-	0.2	0.3	0.3	0.3	0.3	2.3
20.	-	-	-	0.3	0.3	0.3	0.3	1.2
21.	-	-	-	0.3	0.3	0.3	-	0.9
22.	-	0.5	-	0.3	0.3	-	-	1.1
23.	-	0.5	-	0.3	0.3	-	-	1.1
24.	-	0.5	-	0.3	0.3	-	-	1.1
25.	-	0.5	-	0.3	0.3	-	-	1.1
26.	-	0.5	-	-	0.3	-	-	0.8
27.	-	-	-	-	0.3	-	-	0.3
28.	-	-	-	-	-	-	-	-
29.	-	-	-	-	-	-	-	-
30.	0.9	-	0.2	-	-	-	-	1.1
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	5.4	5.0	1.2	6.0	6.0	9.0	9.0	41.6
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

NOTES:

- (1) All yields estimated at 2,500 ft.³ per acre based on GSL Forest Department practice.
- (2) Only 65% of the pinus will be commercially exploited. The balance will be kept as watershed protective cover.
- (3) Commercial timber is given an on-site value of Rs.4.32 or US \$0.28 per ft.³ and fuelwood is given an on-site value of Rs.1.00 or US \$0.06 per ft.³
See Economic Evaluation Section for further discussion.

ANNEX C2

SCHEDULE OF NET BENEFITS - REFORESTATION AND FUELWOOD PROJECTS (LOW YIELD - LOW VALUE ALTERNATIVE)

<u>Year</u>	<u>Total Cost</u> <u>(US \$ Million)</u>	<u>Gross Benefits</u> <u>(US \$ Million)</u>	<u>Net Benefits</u> <u>(US \$ Million)</u>
1.	2.1	-	-2.1
2.	1.6	-	-1.6
3.	1.6	0.3	-1.1
4.	1.5	0.6	-0.9
5.	1.5	0.6	-0.9
6.	0.5	0.6	0.1
7.	0.5	0.9	0.4
8.	0.5	1.5	1.0
9.	0.8	1.8	1.0
10.	1.1	1.8	0.7
11.	1.1	2.6	1.5
12.	1.1	2.9	1.8
13.	1.2	2.6	1.4
14.	1.2	2.3	1.1
15.	1.2	3.4	2.2
16.	0.9	3.2	2.3
17.	0.9	2.9	2.0
18.	0.8	2.6	1.8
19.	0.5	2.3	1.8
20.	0.9	1.2	0.3
21.	0.3	0.9	0.6
22.	-	1.1	1.1
23.	-	1.1	1.1
24.	-	1.1	1.1
25.	-	1.1	1.1
26.	-	0.8	0.8
27.	-	0.3	0.3
28.	-	-	-
29.	-	-	-
30.	-	1.1	1.1
	<u>21.6</u>	<u>41.6</u>	<u>20.0</u>

NOTES:

- (1) Replanting costs of Pinus, Albizzia and Eucalyptus in the watershed project and Eucalyptus and Casurina in the fuelwood plantations are included in the total cost column from the 9th year (total replanting cost is estimated at US \$ 8.5 million). Replanting costs are not included for Sesabania and Lecucena in the fuelwood plantations because of the coppicing ability of the two species.

ANNEX C3

**SCHEDULE OF GROSS BENEFITS - REFORESTATION AND FUELWOOD INCLUDING
REPLANTING BENEFITS (HIGH YIELD, HIGH VALUE ALTERNATIVE)
(US \$ Million)**

	Pinus	Reforestation		Eucalyptus	Fuelwood		Leucaena	Total
		Albizzia	Eucalyptus		Casurina	Sesabania		
1.	-	-	-	-	-	-	-	-
2.	-	-	-	-	-	-	-	-
3.	-	-	-	-	-	-	0.3	0.3
4.	-	-	-	-	-	0.4	0.3	0.7
5.	-	-	-	-	-	0.4	0.3	0.7
6.	-	-	-	-	-	0.4	0.3	0.7
7.	-	-	-	-	-	0.4	0.6	1.0
8.	-	-	-	0.5	-	0.8	0.6	1.9
9.	-	-	-	0.5	0.6	0.8	0.6	2.5
10.	-	-	-	0.5	0.6	0.8	0.6	2.5
11.	-	1.6	-	0.5	0.6	0.8	0.9	4.4
12.	-	1.6	-	0.5	0.6	1.2	0.9	4.8
13.	-	1.6	-	0.5	0.6	1.2	0.6	4.5
14.	-	1.6	-	0.5	0.6	0.8	0.6	4.1
15.	4.1	1.6	1.0	0.5	0.6	0.8	0.6	9.2
16.	4.1	-	1.0	1.0	0.6	0.8	0.6	8.1
17.	4.1	-	1.0	1.0	0.6	0.8	0.3	7.8
18.	4.1	-	1.0	0.5	1.2	0.4	0.3	7.5
19.	4.1	-	1.0	0.5	0.6	0.4	0.3	6.9
20.	-	-	-	0.5	0.6	0.4	0.3	1.8
21.	-	-	-	0.5	0.6	0.4	-	1.5
22.	-	1.6	-	0.5	0.6	-	-	2.7
23.	-	1.6	-	0.5	0.6	-	-	2.7
24.	-	1.6	-	0.5	0.6	-	-	2.7
25.	-	1.6	-	0.5	0.6	-	-	2.7
26.	-	1.6	-	-	0.6	-	-	2.2
27.	-	-	-	-	0.6	-	-	0.6
28.	-	-	-	-	-	-	-	-
29.	-	-	-	-	-	-	-	-
30.	4.1	-	1.0	-	-	-	-	5.1
	<hr/> 24.6	<hr/> 16.0	<hr/> 6.0	<hr/> 10.0	<hr/> 12.0	<hr/> 12.0	<hr/> 9.0	<hr/> 89.6

NOTES:

- (1) Per acre yield estimated as follows: (a) Pinus 6,750 ft.³; (b) Albizzia 4,300 ft.³; (c) Eucalyptus 6,750 ft.³; (d) Leucaena 2,325 ft.³; (e) Sesabania 3,100 ft.³; (f) Casurina 3,600 ft.³; (g) Eucalyptus 4,050 ft.³;
- (2) Commercial timber is given an on-site value of Rs. 7.45 or US \$ 0.48 per ft.³ and fuelwood an on-site value of Rs. 1.25 or US \$ 0.08 per ft.³.
- (3) Only 65% of Pinus will be commercially exploited. The balance will be kept as watershed protective cover.

ANNEX C4

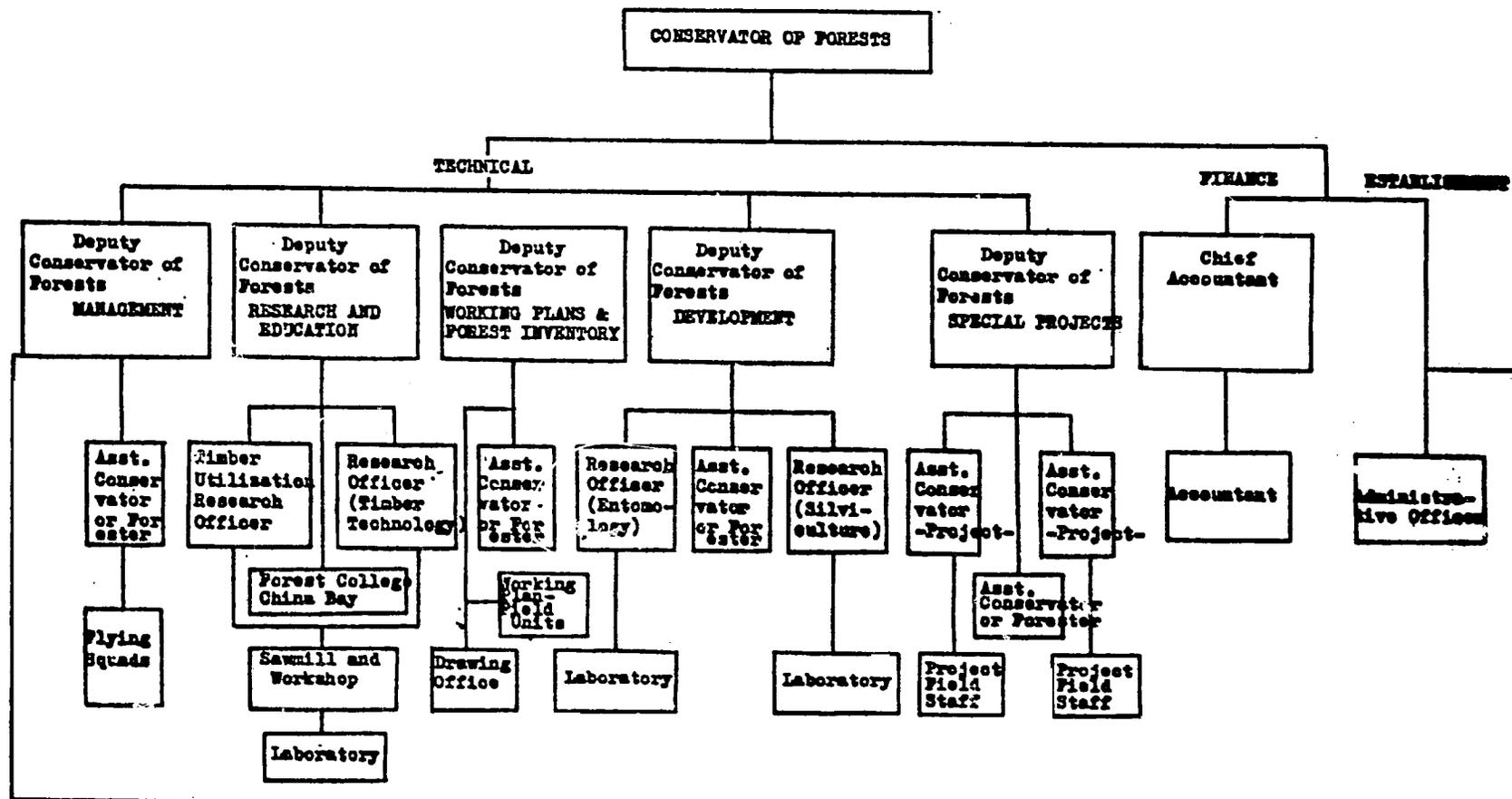
**SCHEDULE OF NET BENEFITS - REFORESTATION AND FUELWOOD
PROJECTS INCLUDING REPLANTING BENEFITS
(High Yield, High Value Alternative)**

	Total Cost (US \$ Million)	Gross Benefits (US \$ Million)	Net Benefits (US \$ Million)
1.	2.1	-	-2.1
2.	1.6	-	-1.6
3.	1.4	0.3	-1.1
4.	1.5	0.7	-0.8
5.	1.5	0.7	-0.8
6.	0.5	0.7	0.2
7.	0.5	1.0	0.5
8.	0.5	1.9	1.4
9.	0.8	2.5	1.7
10.	1.1	2.5	1.4
11.	1.1	4.4	3.3
12.	1.1	4.8	3.7
13.	1.2	4.5	3.3
14.	1.2	4.1	2.9
15.	1.2	9.2	8.0
16.	0.9	8.1	7.2
17.	0.9	7.8	6.9
18.	0.8	7.5	6.7
19.	0.5	6.9	6.4
20.	0.9	1.8	0.9
21.	0.3	1.5	1.2
22.	-	2.7	2.7
23.	-	2.7	2.7
24.	-	2.7	2.7
25.	-	2.7	2.7
26.	-	2.2	2.2
27.	-	0.6	0.6
28.	-	-	-
29.	-	-	-
30.	-	5.1	5.1
	----- 21.6 -----	----- 89.6 -----	----- 68.0 -----

NOTES:

- (1) Replanting costs of Pinus, Albizzia and Eucalyptus in the watershed project and ~~Eucalyptus~~ Eucalyptus and Casurina in the fuelwood plantations are included in the total cost column from the 9th year (total replanting cost is estimated at US \$8.5 million). Replanting costs are not included for Sesabania and Leucaena in the fuelwood plantations because of the coppicing ability of the two species.

ORGANIZATIONAL CHART - FOREST DEPARTMENT



SEVEN TERRITORIAL FOREST DIVISIONS AT GALLE, RATHAPURA, NUWARA ELIYA, KURUNEGALA, TRINCOMALEE, BATTICALOA AND VAVUNIYA
25th January, 1980.

SDC/.

ANNEX D

ANNEX EFOREST DEPARTMENT -
CADRE DESCRIPTIONPresent Cadre

Conservator of Forests	-	1
Deputy Conservator of Forests	-	5
Assistant Conservator of Forests	-	19
Administrative Assistant (Clerk Supra)	-	1
Timber Utilization Research Officer	-	1
Research Officers	-	3
Accountants	-	2
Clerks	-	135
Foresters	-	39
Range Forest Officers	-	176
Forest Guards	-	402
Technical Assistants	-	6
Store Keepers	-	2
Lab. Attendants	-	1
Workshop Foreman	-	1
Photographers	-	1
Carpenters	-	3
Mechanic	-	1
Woodworking Machinists	-	13
Boiler Attendants	-	4
Electricians	-	1
Saw Mill Machinists	-	2
Polishers	-	1
Pump Operators	-	15
Lorry Drivers	-	13
Lorry Cleaners	-	13
Tractor Cleaners	-	8
Tractor Greezers	-	1
Plantation Watchers	-	29
Office Watchers	-	14
Circuit Bungalow Keepers	-	10
Cooks	-	2
Plantation Laborers	-	239
Translators	-	1
Librarian	-	1
Typists	-	14
Shroff	-	1
Draughtsmen	-	8
Head Office Staff	-	1
Office Staff	-	24
Telephone Operators	-	1

Present Cadre

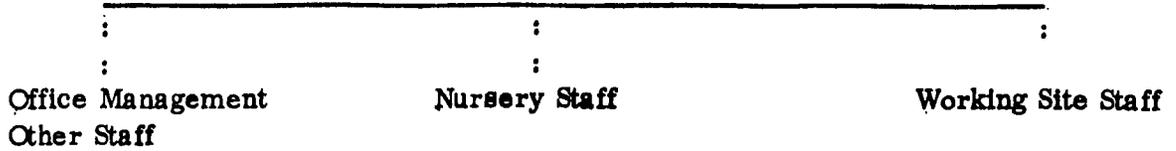
Roneo Operators	-	1
Book Binders	-	1
Laborers - Office, Sanitary etc.	-	41
Camp Laborers	-	1
Publicity Officers	-	-
Jeep Drivers	-	32
Cycle Orderly	-	1
Book Keepers	-	2

PROJECT ORGANIZATIONAL CHART

Watershed Reforestation Activity

Assistant Conservator of Forests
(Officer-in-Charge of this Project)

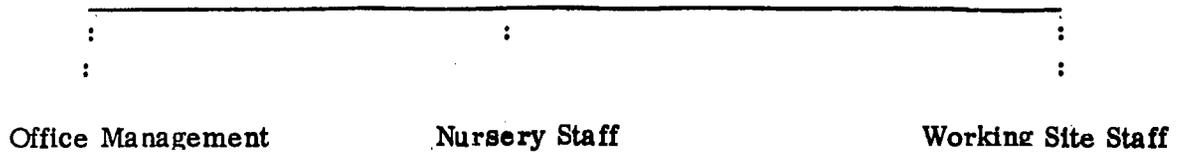
:
:



Fuelwood Reafforestation Activity

Assistant Conservator of Forests
(Officer-in-Charge of this Project)

:
:



ENVIRONMENTAL ASSESSMENT

AND

MITIGATION RECOMMENDATIONS

FOR

USAID UPLAND REFORESTATION

AND

FUELWOOD DEVELOPMENT PROGRAM

SUBMITTED BY

DR. HUGH BOLLINGER, Ph.D.

ENVIRONMENTAL CONSULTANT

EDITED BY

DR. JAMES W. BONNER, Ph.D.

USAID/SRI LANKA

NOVEMBER 1979

C O N T E N T S

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A. PROJECT DESCRIPTION	2
B. ENVIRONMENTAL IMPACTS	2
C. OTHER ENVIRONMENTAL CONCERNS	5
1. WATER RESOURCES	
2. WILDLIFE RESOURCES	5
D. CONCLUSIONS	6

SUMMARY AND RECOMMENDATIONS

The reforestation and fuelwood development program is planned specifically to assist in environmental improvement. As Sri Lanka is experiencing a massive rate of deforestation with increased forest conversion to crop utilization as part of the Accelerated Mahaweli Development Program (AMDP), this project is designed to develop and demonstrate innovative techniques in nursery production and management, plantation design, fuelwood and charcoal energy, new species selections, research and training. The proposed forest extension service could have immediate and long range positive impacts on deforestation resulting from fuelwood collection if properly designed and implemented.

The program is a broad based, integrated environmental and economic development plan. As this project affects only approximately 85,000 acres, when the need is to reforest 250 to 300 thousand acres, the project must be considered a prototype demonstration for increased reforestation efforts in the future.

Any adverse impacts from specific elements or improvements in efficiency or results will be accommodated by project implementation of the following:

- * extensive testing of indigeneous and introduced tree species for their utility and adaptability to reforestation in Sri Lanka,
- * incorporation of cultural acceptance and the appropriate presentation of technical information for the institution building activities of the forest extension service,
- * extensive testing of poly culture and enrichment planting management techniques as more ecologically sound forestry practices,
- * planning of forestry plantations to coincide with proposed wildlife corridors or buffer zones,
- * introducing the use of fast growing legume species into existing slash and burn (chena) practices to restore soil fertility,
- * monitoring impacts on soils and water resources from replanted areas, and
- * conducting effective public relations activities to encourage community involvement in reforestation activities and effective utilization of forest resources.

It is therefore concluded that while there may be some negative impacts, specifically the unknown soil reactions of Eucalyptus species in Sri Lanka, the overwhelming positive impacts of the project far outweigh any negative consequences on the environment.

A. PROJECT DESCRIPTION

The stated purpose of this watershed reforestation and fuelwood development program is to conserve and stabilize part of the eroded watershed and to help provide a renewable source of energy for Sri Lanka. It will be accomplished by replanting 15,000 acres of upland terrain within the Mahaweli River catchment and 70,000 acres for fuelwood within the dry zone. These acreages represent a small percentage of the total which should be reforested; thus the project is considered a pilot effort. Specific program elements include research and training, improved species selection and planting techniques, a demonstration of charcoal production, a forest extension service and the emphasis on rural forestry development.

The objectives of this program are to provide sound environmental management. Sri Lanka is experiencing a rate of deforestation greater than 100,000 acres/year. If such trends continue, essentially all forests will be removed by the 1990's. Associated environment impacts to water quality, soil stability, and wildlife, not to mention the economic losses from depleted forest resources and energy will be substantial if not tragic. Properly implemented, this program could demonstrate important, innovative procedures for combating further forest deterioration. The overall consequences would be environmentally positive.

The size of this program and its rate of implementation should not and cannot be expected to solve all the problems associated with deforestation and environmental deterioration. This is particularly true in the light of the national Accelerated Mahaweli Development Program (AMDP) which plans to remove a total between 450,000 and 700,000 acres of remaining forest on the island. This represents between four and six times the rate of reforestation planned for this project. The cumulative impacts associated with this removal could be counter to the goals established for this program of reforestation. However, the environmental impact relationship between the AMDP and this reforestation program is outside the scope of this assessment, and the Mahaweli Development Authority is now setting aside areas of the AMDP to be designated as forest reserves.

B. ENVIRONMENTAL IMPACTS

The primary positive or negative impacts from the proposed project will relate to soil resources. Secondary impacts on water resources and wildlife will also be addressed.

Tree species selection is a critical element in reforestation planning and implementation. The estimated economic rates of return are determined by a given species performance. For the upland Mahaweli reforestation elements, the 15,000 acres will be replanted as follows; 65 per cent to Pine, 25 per cent to Albizzia and 10 per cent to Eucalyptus. While the original forest cover was a diverse mixture of evergreen species, this program will initially consist of replanting a mono-culture of the three species. Statements from the Government of Sri Lanka indicate that the soils of the upper catchment area are considered too degraded to restore a mixed forest cover. Increasing the number of adaptive species trials and their management will be emphasised as a potential way to expand diversity on the deforested slopes. The project plans to provide for intensified, multipurpose fuelwood plantation management. More mixed species forests will resist disease, pest and fire better than the initial mono-cultures of Pine, Eucalyptus and Albizzia and will be reviewed as the program proceeds.

The 70,000 acres selected for fuelwood development are located in the Sri Lankan dry zone. The four demonstration localities were selected on the basis of present degraded condition, proximity to the Mahaweli Development Area, and proximity to fuelwood markets and lack of competing land uses. The landscapes can be regarded as basically "wildland" or undeveloped land.

The fuelwood plantations are planned to supply wood biomass for both commercial and home consumption. Species composition include 25 per cent Casuarina, 25 per cent Ipil-Ipil and 25 per cent Sesbania. The inclusion of two fast growing legumes (Ipil-Ipil and Sesbania) could have a net beneficial impact on the soils environment as the plants have the ability to regenerate soil fertility through nitrogen fixation and leaf litter decay. Eucalyptus and Casuarina, however, could cause net environmental deterioration. In semi-arid environments, some species of Eucalyptus produce growth inhibiting compounds which collect in the soils. The internal environment within a Eucalyptus stand is virtually sterile due to this process. This is already occurring in Sri Lanka within existing Eucalyptus stands in certain areas. Eucalyptus species selected to minimize this effect are presently under study by the Forest Department. One interesting positive side benefit to this effect, however, is control of noxious weeds within the Eucalyptus stand, thus lowering the incidence of fire.

Casuarina tolerates salty soil, but some of these species also increase the soil salt content when grown in a plantation manner. This species has been primarily used in coastal sand stabilization programs where salt resistance is critical. However the planting areas selected for this project are a long distance from the coastal areas and the utilization of Casuarina is therefore open to question.

In zones of constant rainfall, such as the uplands, the negative characteristics of both these species' biology can be managed. However this is much more difficult in arid and semi-arid landscapes such as in the dry zone. The Forest Department indicates that these species are recommended due to their familiarity with them but

there is a growing appreciation of the shortcomings of both species. Intensive testing of alternative species, particularly fast growing legumes, should be encouraged to replace the emphasis on Eucalyptus and Casuarina in later reforestation efforts. The potential for continued soil deterioration must be considered to have both short and long term economic and ecological ramifications when related to the objectives of fuelwood program.

The role of the Forest Extension Service could have a major positive impact on the rate of deforestation resulting from fuelwood collection. Properly designed and implemented at the village level, the potential exists to make a large number of families and villages self sufficient in fuelwood within 3 to 5 years. This will have immediate and positive impact on adjacent forests.

Effective communications tools will be required to realize this goal. Rural farmers and villagers must realize the benefits to themselves that are to be received from cultivating and harvesting wood from fast growing trees. Again, the emphasis on legumes will have hidden but potentially valuable environmental benefits. The leaves and pods from the legume trees (Ipil-Ipil, Sesbania, Calliandra, etc) will in addition provide fodder for livestock and green manure and mulch for garden plots. This will improve garden soil structure. As the trees supply nitrogen through the roots' nodules the soils will increase in fertility. Proper communication of this technical information to the villagers will be required if the associated social and environmental benefits are to be realized from the forest extension service. Adaptation of the information into a culturally acceptable context will be required from the outset of program implementation.

The demonstration of charcoal development will have both a positive and a negative impact on forest resources. If properly designed, success of the charcoal demonstration could reduce demands on firewood from urban households and industry. Charcoal production is more energy efficient and less wood consumptive than normal wood burning. If proper controls on illicit felling are not enforced, deforestation to produce charcoal could increase in Sri Lanka. Much recent attention on deforestation and new laws banning illicit felling and transport of timber products should help control unauthorized exploitation for any purpose. In toto, the net benefits of the properly managed charcoaling activity will be positive.

The emphasis on research could have long range positive environmental consequences. The impact of alternative species (indigenous or introduced) on soils, watersheds and general reforestation efforts in Sri Lanka could produce major advances in the forestry practices. Studies on the indigenous (native) trees selected for varietal improvement will assure the conservation of valuable and endemic species. Improvement in nurseries, planting techniques and plantation management practices should help to produce more ecologically sound forestry practices in Sri Lanka.

Multi-species and enrichment planting techniques should be given a high priority in all research efforts, as well as new methods of propagation to reduce the time required for reforestation. Emphasis on sustained forest development, rather than extraction, will have a long range positive impact on forest resources and related environmental impacts. These and other specific research and demonstration programs are proposed during the five year project.

Since this project will impact upon 85,000 acres, the successful demonstrations could serve as models for other national efforts in reforestation.

C. OTHER ENVIRONMENTAL CONCERNS

1. Water Resources - As the Upper Mahaweli Catchment reforestation element is designed specifically to help stabilize the watershed, the benefits to water resources should be direct. Reduction in sediment loads, runoff intensity and improvement in flows should result from the project. While the acreage (15,000) is only a small portion of the entire catchment (1.4 million acres), a successful demonstration should encourage increased planting in other catchment areas. Continued runoff monitoring and the continued detailed economic analysis determining adverse impacts from deforestation should assist in determining the quantitative positive impacts of this watershed reforestation effort.

In the fuelwood growing areas, the water balance in the soils could improve as the tree cover moderates the soil temperature, evaporation rate and increases organic matter. This will be especially true in the area where leguminous species are used. Where Eucalyptus and Casuarina are utilized, the impact on water resources should be negligible.

2. Wildlife Resources - Deforestation in Sri Lanka has a direct and negative impact on wildlife habitat. As this program aims at improving tree cover, the benefits to wildlife could be positive particularly in areas near Wilpattu National Park. Present experience in Sri Lanka however, indicates that wildlife and bird species avoid Eucalyptus plantations for lack of proper or sufficient food. Mixed species plantations and enrichment planting programs planned for research would have a far more positive impact on wildlife resources than mono-culture plantations.

D. CONCLUSIONS

The environmental impacts from this reforestation and fuelwood development program should be on the balance substantially positive. As the program will work on degraded lands, the benefits will be realized both in the short and long term as specific elements are incorporated in national forestry development. The potential exists to make farms and villages energy sufficient within 3-5 years if the forest extension service is successful in its efforts. This will have an immediate impact on deforestation caused by fuelwood collection. Wildlife will directly benefit by increased habitat particularly if diverse species composition and structure are implemented in the plantation schemes. Soils and water will directly benefit from improved structure, fertility and moisture holding capacity.

ENVIRONMENTAL THRESHOLD DECISION

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FM SECSTATE WASHDC
TO AMEMBASSY COLOMBO IMMEDIATE 2158
BT
UNCLAS STATE 007574

AIDAC

E.O. 12065: N/A

TAGS:

SUBJECT: IEE FOR REFORESTATION AND WATERSHED MANAGEMENT
(383-0055)

1. SUBJECT IEE'S THRESHOLD DECISION OF NEGATIVE DETERMINA-
TION APPROVED BY AA/ASIA ON 9 JANUARY. VANCE

BT
7574

ESTIMATED COST OF TRAINING

<u>Extension and Training</u>		US \$
TC (1)	Ext. Training - 1 (6x1500+1500)	10,500
TC (10)	Forestry Training - 10 (6x1500+1500)	105,000
TC (5)	Logging Techniques - 5 (6x1500+1500)	52,500
US (2)	Soil Program - 2 (6x4500+3000)	60,000
TC (3)	Soil Program - 3 (6x1500+1500)	31,500
TC (3)	Silviculture - 3 (6x1500+1500)	31,500
US (2)	Silviculture - 2 (6x4500+3000)	60,000
TC (10)	Special Extn. Training - 10 (6x1500+1500)	105,000
US (2)	MSc(Extension) - 2 (36x2400+3000)	178,800
TC (1)	Principal Orientation - 1 (3x1500+1500)	6,000
	<u>39</u>	<u>640,800</u>
	===	
US (10)	Seminar - 10 (4500+3000)	75,000
TC (10)	Seminar - 10 (1500+1500)	30,000
	<u>20</u>	<u>105,000</u>
	=====	
<u>Research</u>		
(2)	Tissueculture - 2 (6x4500+3000)	60,000
US (2)	Soil & Plant culture - 2 (6x4500+3000)	60,000
US (2)	Biometrics - 2 (6x4500+3000)	60,000
US (4)	Lab. Technicians - 4 (6x4500+3000)	120,000
US (2)	Instant tree planting - (3x4500+3000)	33,000
	<u>12</u>	<u>333,000</u>
	===	
<u>Watershed</u>		
US (3)	Management - 3(6x4500+3000)	90,000
US (1)	M.Sc. (Forest Econ.) - 1 (24x2400+3000)	60,600
	<u>4</u>	<u>150,600</u>
	=====	
<u>Fuelwood</u>		
US (1)	M.Sc. (Wood Tech.) - 1(36x2400+3000)	89,400
US (1)	M.Sc. (Forest Genetics) - 1 (36x2400+3000)	89,400
US (2)	Forest Technology - 2 (6x4500+3000)	60,000
TC (2)	Forest Technology - 2 (6x1500+1500)	21,000
	<u>6</u>	<u>259,800</u>
	=====	
	Total	<u>1,489,200</u>

COSTING OF TECHNICAL ASSISTANCE REQUIREMENTS

EXPERTISE	ESTIMATED PERIOD OF SERVICE		NUMBER	DESCRIPTION OF DUTIES	PERSON MONTHS	COST/ MONTH*	TOTAL
	From	To					
Project Manager (Team Leader)	8/80	3/85	1	Overall charge of project	55	\$ 7,600	\$ 418,000
Extension Service Consultant	8/80	4/81	3	(1) Organization	9	6,400	57,600
	9/80	11/80		(2) Communication/Promotion	3	6,400	19,200
	9/83	11/83		(3) Monitor/Review	3	6,400	19,200
Fuelwood Consultant	9/80	8/81	1	Charcoal Technology	12	6,400	76,800
Watershed Consultant	9/80	8/81	1	Soil Science Expert	12	6,400	76,800
Watershed Consultant	7/82	9/82	1	Conservationist	3	6,400	19,200
Training Consultant	10/81	9/82	1	Designing syllabus on forest education	12	6,400	76,800
Training Consultant	7/82	9/82	1	Logging Techniques	3	6,400	19,200
Research Consultant	3/81	2/82	<u>1</u>	Siviculture	<u>12</u>	6,400	76,800
Totals			10		124		
							\$ 859,600
						Contingencies	90,400
						Grand Total	\$ 950,000

* Represents total costs including salaries, travel & transportation, housing, overhead @ 40% allowances, etc.

COSTING OF COMMODITIES REQUIREMENTS
(US \$)

<u>Program</u>	<u>Unit Cost</u>	<u>Program Cost</u>	<u>Total Cost</u>
1. <u>Research</u>			
1 Jeep (Diesel)	10,000	10,000	
1 Lorry (Diesel-5 ton)	20,000	20,000	
1 Tractor & Trailer	10,000	10,000	
- Field & Lab Equipment	-	50,000	
- Office Requisites	-	4,000	
- Lab Requisites	-	<u>4,000</u>	98,000
2. <u>Watershed</u>			
3 Jeeps (Diesel)	10,000	30,000	
2 Lorries (Diesel - 3 ton)	17,500	35,000	
3 Tractor & Trailers	10,000	30,000	
6 Prismatic Compasses	500	3,000	
10 Tapes	20	200	
- Seeds	-	27,500	
- Office Requisites	-	5,000	
- Power Augers	-	<u>20,000</u>	150,700
3. <u>Fuelwood</u>			
3 Jeeps (Diesel)	10,000	30,000	
3 Lorries (Diesel - 5 ton)	20,000	60,000	
3 Tractor & Trailers	10,000	30,000	
10 Prismatic Compasses	500	5,000	
15 Tapes	20	300	
- Office Requisites	-	2,700	
- Seeds	-	<u>10,000</u>	138,000
4. <u>Extension</u>			
7 Jeeps (Diesel)	10,000	70,000	
7 Lorries (Diesel - 5 ton)	20,000	140,000	
7 Tractors & Trailers	10,000	70,000	
7 Cinema Vans	10,000	70,000	
17 Knapsack Sprayers	150	2,550	
- Audio Visual Equipment		<u>18,000</u>	370,550
5. <u>Training</u>			
1 Jeep (Diesel)	10,000	10,000	
2 Vans (15 Seater)	15,000	30,000	
- Training Equipment	-	20,000	
- Office Requisites	-	<u>1,300</u>	61,300
6. <u>Charcoal Research</u>			
2 Lorries (Diesel - 5 ton)	20,000	40,000	
24 Kilns	1,167	28,000	
10 Testing Equipment	400	4,000	
- Briquetting Equipment	-	<u>24,000</u>	96,000

	<u>Program</u>	<u>Unit Cost</u>	<u>Program Cost</u>	<u>Total Cost</u>
7.	<u>Maintenance</u>			
	2 Lorries (Diesel - 3 ton)	17,500	35,000	
	- Parts & Spares	-	14,850	
	- Tools & Kits	-	<u>800</u>	50,650
8.	<u>Other</u>			
	- Provision for LANDSAT Map	-	75,000	
	- Provision for Forestry College Construction *	-	175,000	
	- Provision for Extension Service*	-	100,000	
	- Books, Periodicals etc. *	-	2,500	
	- Provision for Fertilizer*	-	275,000	
	- Miscellaneous*	-	<u>117,000</u>	744,500
	Contingencies			<u>201,095</u>
	Total			<u>1,910,975</u>

* Contingencies and Inflation provision included
in element costs.

PHASING OF EXPENDITURE OF VEHICLES & EQUIPMENT

Items	Fiscal Year					Total
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	
Jeeps	80,000	-	70,000	-	-	150,000
Lorries	157,500	-	172,500	-	-	330,000
Tractor & Trailers	70,000	-	70,000	-	-	140,000
Tapes	200	-	300	-	-	500
Prismatic compasses	5,000	-	3,000	-	-	8,000
Cinema vans	20,000	-	50,000	-	-	70,000
Vans	-	-	30,000	-	-	30,000
Power Augurs	-	20,000	-	-	-	20,000
Knapsack sprayers	300	-	2,250	-	-	2,550
Audio visual equipment	5,000	-	13,000	-	-	18,000
Training equipment	-	-	10,000	10,000	-	20,000
Testing equipment	4,000	-	-	-	-	4,000
Kilns	28,000	-	-	-	-	28,000
Brigting equipment	24,000	-	-	-	-	24,000
Field & Lab equipment	25,000	-	15,000	10,000	-	50,000
Parts & Spares	1,150	3,300	3,800	3,800	3,800	14,850
Tools & Kits	800	-	-	-	-	800
Lab requisites	1,000	1,000	1,000	500	500	4,000
Office requisites	6,000	2,000	2,000	2,000	1,000	13,000
Landsat	75,000	-	-	-	-	75,000
Forestry college construction *	175,000	-	-	-	-	175,000
Extension *	20,000	20,000	40,000	10,000	10,000	100,000
Books *	-	-	1,500	500	500	2,500
Seeds	7,500	7,500	7,500	7,500	7,500	37,500
Fertilizer *	37,000	59,500	59,500	59,500	59,500	275,000
Miscellaneous *	<u>16,000</u>	<u>21,000</u>	<u>26,000</u>	<u>26,000</u>	<u>28,000</u>	<u>117,000</u>
Sub total	758,450	133,300	577,350	129,800	110,800	1,709,700
Contingencies	<u>48,550</u>	<u>2,800</u>	<u>125,945</u>	<u>5,600</u>	<u>18,200</u>	<u>201,095</u>
Total	807,000	136,100	703,295	135,400	129,000	1,910,795

* Contingencies and inflation provision included in element costs.

ANNEX J-1

GSL COSTS OF REFORESTATION PROJECTS AND RELATED ACTIVITIES (US\$ 000)

	<u>Year</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6-15</u>	<u>Project</u> <u>Costs</u>	<u>Total</u>
1. <u>Research Program</u>									
<u>Investment Costs</u>									
i. Motor Cycles		5.2	-	-	-	-	-	5.2	
ii. Water Pump & Accessories		3.2	-	-	-	-	-	3.2	
iii. Building (Field Station & Tissue Lab)		19.4	-	-	-	-	-	19.4	
iv. Office Requisition		.3	.3	.3	.3	.4	-	1.6	
v. Nursery Work		3.2	1.9	1.3	1.3	1.3	-	9.0	
vi. Planting Work		2.0	5.2	5.2	3.2	1.9	-	17.5	
<u>Sub Total</u>		<u>33.3</u>	<u>7.4</u>	<u>6.8</u>	<u>4.8</u>	<u>3.6</u>	-	<u>55.9</u>	55.9
<u>Operational Costs</u>									
i. Salaries & Allowances etc.		25.8	29.0	32.3	35.5	38.7	-	161.3	
ii. Stationery & Requisites		1.3	1.3	1.3	.7	.6	-	5.2	
iii. Fuel & Lubricants		2.0	2.6	2.6	3.2	3.2	-	13.6	
iv. Maintenance of Buildings		-	.3	.6	.7	1.0	-	2.6	
<u>Sub Total</u>		<u>29.1</u>	<u>33.2</u>	<u>36.8</u>	<u>40.1</u>	<u>43.5</u>	-	<u>182.7</u>	182.7
2. <u>Watershed Project</u>									
<u>Investment Costs</u>									
i. Motor Cycles		19.4	-	-	-	-	-	19.4	
ii. Buildings, Quarters, etc.		129.0	-	-	-	-	-	129.0	
iii. Surveys		6.5	6.5	6.5	6.5	6.5	-	32.5	
iv. Nurseries		74.1	72.2	72.2	72.3	72.3	-	363.1	
v. Office Equipments		2.6	2.6	2.6	2.6	2.6	-	13.0	
<u>Sub Total</u>		<u>231.6</u>	<u>81.3</u>	<u>81.3</u>	<u>81.4</u>	<u>81.4</u>	-	<u>557.0</u>	557.0
<u>Operational Costs</u>									
i. Salaries, Allowances etc.		32.3	38.7	38.7	38.7	38.7	193.6	380.7	
ii. Stationery & Supplies		1.3	1.3	1.3	1.3	1.9	38.7	45.8	
iii. Fuel & Lubricants		3.2	4.8	6.5	7.1	7.7	64.5	93.8	
iv. Maintenance of Buildings		-	.6	1.3	1.3	1.9	25.8	30.9	
v. Planting of Forests		-	177.4	180.7	187.1	193.6	200.0	938.9	
vi. Maintenance of Plantation		-	.3	.6	1.3	1.9	35.5	39.6	
<u>Sub Total</u>		<u>36.8</u>	<u>223.1</u>	<u>229.1</u>	<u>236.8</u>	<u>145.7</u>	<u>558.1</u>	<u>1,529.6</u>	1,529.6

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6-15</u>	<u>Project Costs</u>	<u>Total</u>
3. <u>Fuelwood Project</u>								
<u>Investment Costs</u>								
i. Motor Cycles	45.2	-	-	-	-	-	45.2	
ii. Office & Nursery Equipment	96.8	-	-	-	-	-	96.8	
iii. Buildings-Office & Quarters	258.1	6.4	6.4	6.5	6.5	-	283.9	
iv. Surveys	13.5	13.5	13.5	13.6	13.6	13.6	81.3	
v. Nurseries	122.6	122.6	122.6	122.6	129.0	645.1	1,264.5	
vi. Road Construction	3.2	3.2	3.2	3.9	3.9	16.1	33.5	
<u>Sub Total</u>	<u>539.4</u>	<u>145.7</u>	<u>145.7</u>	<u>146.6</u>	<u>153.0</u>	<u>674.8</u>	<u>1,805.2</u>	1,805.2
<u>Operational Costs</u>								
i. Salaries, Allowances etc.	64.5	64.5	64.5	64.5	64.5	322.7	645.2	
ii. Stationery & Supplies	6.4	6.4	6.4	6.4	6.4	32.6	64.6	
iii. Fuel & Lubricants	19.3	19.3	19.3	25.8	32.3	161.4	277.4	
iv. Maintenance of Buildings	-	6.4	6.4	12.9	12.9	64.6	103.2	
v. Planting	767.7	767.7	767.7	780.6	780.6	3,096.9	6,961.2	
vi. Maintenance of Planting	-	3.2	4.5	5.2	6.5	32.3	51.7	
<u>Sub Total</u>	<u>857.9</u>	<u>867.5</u>	<u>868.8</u>	<u>895.4</u>	<u>903.2</u>	<u>3,710.0</u>	<u>8,103.3</u>	8,103.3
4. <u>Forestry Extension</u>								
<u>Investment Costs</u>								
i. Motor Cycles	54.2	-	-	-	-	-	54.2	
ii. Buildings	193.5	-	-	-	-	-	193.5	
iii. Raising 3 mil. Plants	96.7	96.8	96.8	96.8	96.8	-	483.9	
<u>Sub Total</u>	<u>344.4</u>	<u>96.8</u>	<u>96.8</u>	<u>96.8</u>	<u>96.8</u>	<u>96.8</u>	<u>731.6</u>	731.6
<u>Operational Costs</u>								
i. Salaries, Allowances etc.	51.6	54.8	58.1	61.3	64.5	-	290.3	
ii. Stationery & Requisites	9.6	9.7	9.7	9.7	9.7	-	48.4	
iii. Fuel & Lubricants	16.1	19.4	22.6	25.8	29.0	-	112.9	
iv. Maintenance of Buildings	-	3.2	3.2	4.5	5.2	-	16.1	
v. Other	16.1	16.1	16.1	16.1	16.2	-	80.6	
<u>Sub Total</u>	<u>93.4</u>	<u>103.2</u>	<u>109.7</u>	<u>117.4</u>	<u>124.6</u>	<u>-</u>	<u>548.3</u>	548.3

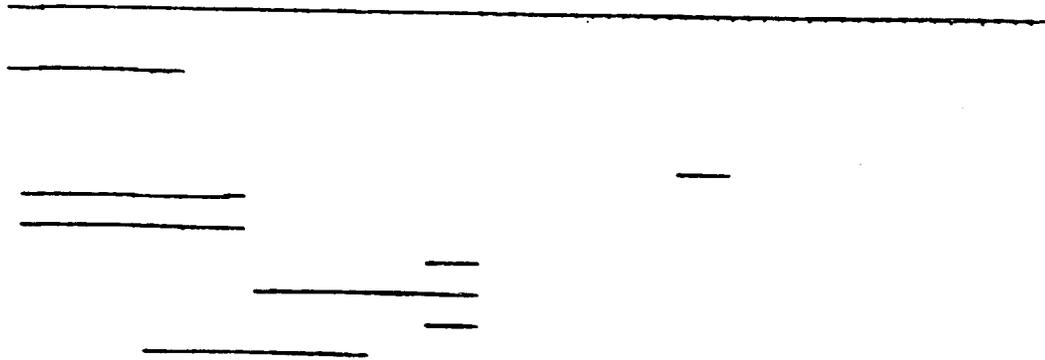
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6-15</u>	<u>Project Costs</u>	<u>Total</u>
5. Forestry Training								
<u>Investment Costs</u>								
i. Motor Cycles	5.2	-	-	-	-	-	5.2	
ii. Cutlery, Crockery etc.	.9	-	1.0	-	-	-	1.9	
iii. Lab, Field & Nursery	3.2	-	-	-	-	-	3.2	
iv. Books & Periodicals	.9	.9	1.0	1.0	1.0	-	4.8	
v. Equipment & Aids	<u>6.4</u>	-	<u>6.5</u>	-	-	-	<u>12.9</u>	
<u>Sub Total</u>	<u>16.6</u>	<u>.9</u>	<u>8.5</u>	<u>1.0</u>	<u>1.0</u>	-	<u>28.0</u>	28.0
<u>Operational Costs</u>								
i. Salaries, Allowances etc.	38.7	40.0	41.3	42.5	45.2	-	207.7	
ii. Allowances for Trainees	25.8	26.2	26.4	26.8	27.1	-	132.3	
iii. Stationery & Requisites	.6	.6	.6	.7	.7	-	3.2	
iv. Cost of Fuel & Lubricants	4.8	5.8	6.5	7.1	7.7	-	31.9	
v. Maintenance of Equipment	-	-	.2	.2	.3	-	.7	
<u>Sub Total</u>	<u>69.9</u>	<u>72.6</u>	<u>75.0</u>	<u>77.3</u>	<u>81.0</u>	-	<u>375.8</u>	375.8
6. Charcoal Research								
<u>Investment Costs</u>								
i. Buildings	<u>6.5</u>	-	-	-	-	-	<u>6.5</u>	
<u>Sub Total</u>	<u>6.5</u>	-	-	-	-	-	<u>6.5</u>	6.5
<u>Operational Costs</u>								
i. Salaries, Allowances etc.	-	58.1	61.3	6.4	9.7	-	135.5	
ii. Fuel & Lubricants	-	5.8	6.5	7.1	7.7	-	27.1	
iii. Payment for Charcoal	-	245.1	251.6	258.1	264.5	-	1,019.3	
iv. Maintenance	-	-	-	.5	-	-	.5	
<u>Sub Total</u>	-	<u>309.0</u>	<u>319.4</u>	<u>272.1</u>	<u>281.9</u>	-	<u>1,182.4</u>	1,182.4
7. Maintenance Unit								
<u>Investment Costs</u>								
i. Buildings	<u>64.5</u>	-	-	-	-	-	<u>64.5</u>	
<u>Sub Total</u>	<u>64.5</u>	-	-	-	-	-	<u>64.5</u>	64.5
<u>Operational Costs</u>								
i. Salaries, Allowances etc.	-	3.8	3.9	4.5	4.9	-	17.1	
ii. Maintenance Requisites	-	32.3	16.1	16.1	16.1	-	80.6	
iii. Stationery, Supplies etc.	-	2.6	.6	.6	.7	-	4.5	
<u>Sub Total</u>	-	<u>38.7</u>	<u>20.6</u>	<u>21.2</u>	<u>21.7</u>	-	<u>102.2</u>	102.2
GRAND TOTAL								<u><u>15,273.0</u></u>

IMPLEMENTATION SCHEDULE

	1980	1981	1982	1983	1984	1985
	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND

CONSULTANTS

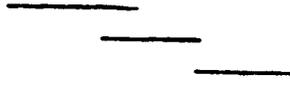
- (1)Project Manager
- (1)Extension Service Consultant
Organizational MGT
- (1)Extension Service Consultant Media
- (1)Extension Service Consultant
Monitor/Review
- (1)Charcoal Tech/Econ
- (1)Soil Scienties
- (1)Watershed/Soil Conservation
- (1)Forest Education (Design Syllabus)
- (1)Logging Tech Consultant
- (1)Silviculturist



TRAINING

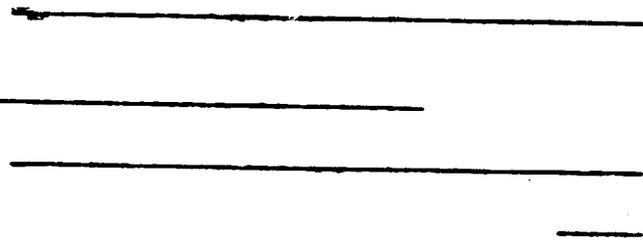
Watershed

- (3)Watershed MGT
 - WS-1-
 - WS-1-
 - WS-1-
- (1)MSc. Forest Economics
US-1-



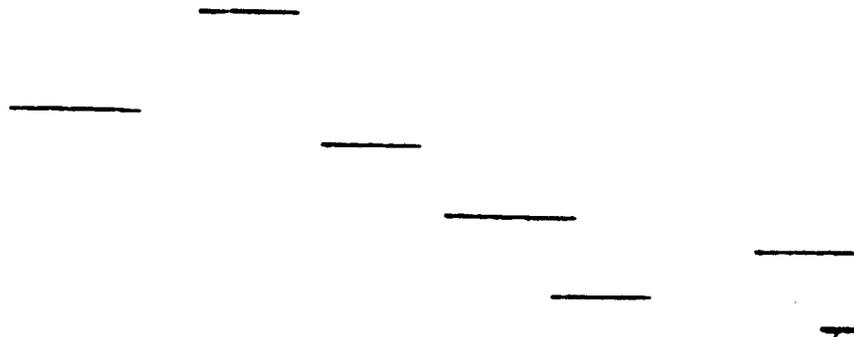
Fuelwood

- (1)MSc. Wood Utilization
US-1-
- (1)MSc. Forest Genetics
US-1-
- (4)Forest Technology
US-2-
TC-2-



Research

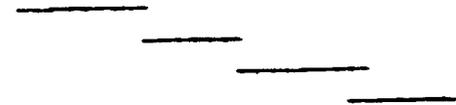
- (2)Tissue Culture
 - US-1-
 - US-1-
- (2)Soil & Plant Culture
 - US-1-
 - US-1-
- (2)Biometrics
 - US-1-
 - US-1-



1980	1981	1982	1983	1984	1985
JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND

(4)Laboratory Tech

- US-1-
- US-1-
- US-1-
- US-1-



(2)Instant Tree Planting

- US-2-



Extension

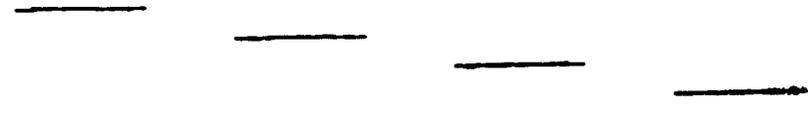
(1)Extension Training Methodology

- TC-1-



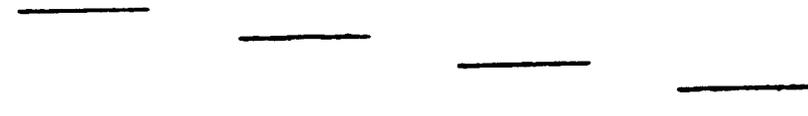
(10)Forestry Training

- TC-2-
- TC-2-
- TC-2-
- TC-4-



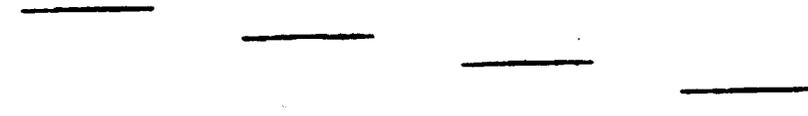
(5)Logging Tech

- TC-1-
- TC-1-
- TC-1-
- TC-2-



(5)Soil Program

- US-2-
- TC-1-
- TC-1-
- TC-1-



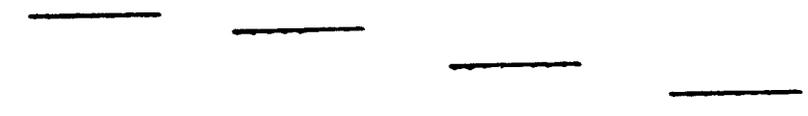
(5)Silviculture

- TC-3-
- US-1-
- US-1-



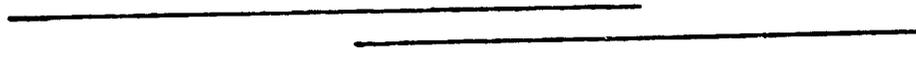
(10)Specialized Extension Training

- TC-2-
- TC-4-
- TC-2-
- TC-2-



(2)MSc.Extension Specialist

- US-1-
- US-1-



(1)Principal (Forest Col) Orientation

- TC-1-



- Seminar Participation (20MM-TBD)

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS																					
Improve and conserve the physical environment and natural resources.	The physical degradation and establishment of forests on lands in the project area by 1990	<ul style="list-style-type: none"> - Joint GSL/USAID land surveys - Aerial photography - Satellite imagery 	<ul style="list-style-type: none"> - Continued GSL commitment to protect and improve the natural resources - Environmental parameters within norms. 																					
<ul style="list-style-type: none"> - Conserve and stabilize watershed areas in the highland regions of Sri Lanka - Provide a natural renewable energy and commercial resource for Sri Lanka 	<ul style="list-style-type: none"> - 15% increase in stabilized ground cover (forests) in designated Upper Mahaweli Catchment Area by 1990 - 2.4% increase in total area under permanent forests by 1990 	<ul style="list-style-type: none"> - GSL Forest Dept., Dept. Census & Statistics, Central Bank, and Dept. of Agriculture inspections, reports and statistics. - USAID site inspections - Aerial photography 	<ul style="list-style-type: none"> - Price of alternative energy sources remain reasonable (i.e. do not become exorbitant relative to firewood) - Land-use patterns remain consistent - Fuelwood forest used for designated purpose. 																					
<ul style="list-style-type: none"> - Increase the institutional capacity of the Forest Dept. to carry out GSL national forestry plan. - Reforestation of denuded watershed of the Upper Mahaweli Catchment Area. - Establish a reforestation program for fuelwood plantations. <p>Develop a national forestry baseline map.</p>	<ul style="list-style-type: none"> - Forest Department personnel training of 515 pm; 124 pm of TA; and 1 dormitory facility at the Forest College constructed by 1985 - 15,000 acres of the Upper Mahaweli Catchment Area reforested by 1985. - 35,000 acres of fuelwood plantations planted by 1985, 70,000 by 1990. - National Forestry baseline maps constructed by January 1981. 	<ul style="list-style-type: none"> - Joint GSL/USAID field inspections and evaluations 	<ul style="list-style-type: none"> - Capable project management - Efficient and effective use of project resources. - Labor availability - No epiphytotic or national disaster 																					
<ul style="list-style-type: none"> - Develop and implement a National Forest Extension Service - Establish village run fuelwood plots on a pilot basis - Establish a village charcoal production program 	<ul style="list-style-type: none"> - 7 mobile centers and 120 Forest Department employees will be trained and in place by 1985. - 50 villages participating in fuelwood pilot project by 1985 - 24 portable chemical kilns functional by 1983. 																							
<p><u>GSL</u></p> <ul style="list-style-type: none"> - Personnel - Commodities - Local Operational Costs <p><u>USAID</u></p> <ul style="list-style-type: none"> - Technical Assistance - Commodities/Construction - Training 	<table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Inputs</th> <th style="text-align: right; border-bottom: 1px solid black;">GSL</th> <th style="text-align: right; border-bottom: 1px solid black;">USAID</th> </tr> <tr> <th></th> <th style="text-align: right; border-bottom: 1px solid black;">\$ 000</th> <th style="text-align: right; border-bottom: 1px solid black;">\$ 000</th> </tr> </thead> <tbody> <tr> <td>Tech.Asst.</td> <td style="text-align: right;">0</td> <td style="text-align: right;">950</td> </tr> <tr> <td>Commd.Const.</td> <td style="text-align: right;">2,574</td> <td style="text-align: right;">1,910</td> </tr> <tr> <td>Personnel</td> <td style="text-align: right;">7,756</td> <td style="text-align: right;">0</td> </tr> <tr> <td>Training</td> <td style="text-align: right;">0</td> <td style="text-align: right;">1,490</td> </tr> <tr> <td></td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">10,330</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">4,350</td> </tr> </tbody> </table>	Inputs	GSL	USAID		\$ 000	\$ 000	Tech.Asst.	0	950	Commd.Const.	2,574	1,910	Personnel	7,756	0	Training	0	1,490		10,330	4,350	<ul style="list-style-type: none"> - GSL and USAID financial and activity reports and records. 	BOPS
Inputs	GSL	USAID																						
	\$ 000	\$ 000																						
Tech.Asst.	0	950																						
Commd.Const.	2,574	1,910																						
Personnel	7,756	0																						
Training	0	1,490																						
	10,330	4,350																						

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Economic Support Fund.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? **It can be demonstrated**
2. FAA Sec. 481. Has it been determined that the government of the recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? **No**
3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not dominated or controlled by the international Communist movement? **Yes**
4. FAA Sec. 620(c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government? **Not to the best of our knowledge.**
5. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? **No**
6. FAA Sec. 620(a), 620(f), 620D; FY 80 App. Act. Sec. [511, 512 and 513]. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos or Vietnam? Will assistance be provided to Afghanistan or Mozambique without a waiver? **No**
7. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? **No**
8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? **No**
9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? **N/A**
10. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters, **N/A**
 - a. has any deduction required by the Fishermen's Protective Act been made?
 - b. has complete denial of assistance been considered by AID Administrator?

11. FAA Sec. 620; FY 80 App. Act Sec. [518.] (a) Is the government of the recipient country in default for more than six months on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds? **No**
12. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo: "Yes, taken into account by the Administrator at time of approval of Agency OYB." This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.) **Yes, taken into account by the Administrator at time of approval of Agency OYB.**
13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? **No**
14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? **The GSL is current**
15. FAA Sec. 620A, FY 80 App. Act, Sec. [521.] Has the country granted sanctuary from proscription to any individual or group which has committed an act of international terrorism? Has the country granted sanctuary from prosecution to any individual or group which has committed a war crime? **No**
16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? **No**
17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon State" under the nonproliferation treaty? **No**

B. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1. Development Assistance Country Criteria.

a. FAA Sec. 102(b)(4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy. **Yes**

b. FAA Sec. 104(d)(1); IDC Act of 1979. If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, assistance to urban poor and through community-based development programs which give recognition to people motivated to limit the size of their families? **Yes**

2. Economic Support Fund: Country Criteria.

- a. FAA Sec. 502E. Has the country (a) engaged in a consistent pattern of gross violations of internationally recognized human rights or (b) made such significant improvements in its human rights record that furnishing such assistance is in the national interest? NO
- b. FAA Sec. 533(b). Will assistance under the Southern Africa program be provided to Angola, Mozambique, Tanzania, or Zambia? If so, has President waived prohibition against the assistance by determining that such assistance will further U.S. foreign policy interests? N/A
- c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? N/A
- d. FY 80 App. Act Sec. [510.] Will assistance be provided for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights? NO
- e. FAA Sec. 620B, P.L. 94-329 Sec. 406. Will 28F be furnished to Argentina or Chile? N/A

5C(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual funding sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Economic Support Fund.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE?
HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT

- 1. FY 80 App. Act Unnumbered; FAA Sec. 634A; Sec. 653(b): (a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure)?
- 2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?
- 3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?
- 4. FAA Sec. 611(b); FY 80 App. Act Sec. [501.] If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?
- 5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

The Agency's Congressional Presentation for FY 80 includes funding for and a description of the project. Congressional Notification will also be provided.

Yes, see the Project Paper for details.

Not required

N/A

Yes

6. FAA Sec. 204. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.
7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
9. FAA Sec. 612(b); Sec. 616(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?
11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?
12. FY 80 App. Act Sec. [521.] If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?

No

An element of the project will promote and establish both private and village organizations to construct and operate small charcoaling facilities.

U.S. consultants and equipment will be financed by the bulk of project funds.

Country contribution discussed in the Financial Plan.

No

Yes

N/A

FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 281b. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise, encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)

(1) [103] for agriculture, rural development or nutrition; if so (a) extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, full account shall be taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which

(a) This project is designed to generate 20,000 person years of day labor (LOP) most of which will be supplied by landless laborers. As this effort is initiating a long term GSL commitment these labor requirements should be long term.

(b) See Sec. A-7.

(c) The GSL is providing nearly 2/3 of the project costs.

(d) See detailed discussion in Social Soundness Analyses.

(e) N/A.

Assistance is being provided under Section 103 for agriculture and rural development, since it will promote the productivity and development of a natural renewable energy resource (forest).

assistance is used in coordination with programs carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people; and (c) extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

N/A

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, a. extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

N/A

(4) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; and b. extent to which assistance provides advanced education and training of people in developing countries in such disciplines as are required for planning and implementation of public and private development activities.

N/A

(5) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is: (i) (a) concerned with data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; and (b) facilitative of geological and geophysical survey work to locate potential oil, natural gas, and coal reserves and to encourage exploration for potential oil, natural gas, and coal reserves.

N/A

(ii) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

N/A

(iii) research into, and evaluation of, economic development processes and techniques;

N/A

(iv) reconstruction after natural or manmade disaster;

N/A

(v) for special development problems, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

N/A

(vi) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

N/A

c. [107] is appropriate effort placed on use of appropriate technology? (relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor.)

YES

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least developed" country)?

YES

e. FAA Sec. 112(a). Will grant capital assistance be sustained for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

N/A

f. FAA Sec. 291(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

The project was specifically designed jointly by USAID and the GSL taking into account the needs and desires of the people of the country. Active participation of researchers and adaptive testing of activities will encourage both educational and institutional development, and effective utilization of the country's resources.

g. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth? **Yes.**

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.

GSL has capacity to repay the loan and the prospects of repayment are good.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

N/A

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102?

N/A

b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?

N/A

5C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds.

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?

Yes, usual competitive procedures will be utilized and small businesses may participate.

2. FAA Sec. 604(a). Will all procurement be from the U.S. except as otherwise determined by the President or under delegation from him?

No, a portion of procurement will be local as well as code 941 countries.

3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will commodities be insured in the United States against marine risk with a company or companies authorized to do a marine insurance business in the U.S.

The Loan Agreement will so provide.

4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?

N/A

5. FAA Sec. 608(a). Compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.

The Agreement will so provide.

the maximum extent practicable will such assistance, goods and professional and other services from private enterprise, be furnished on a contract basis? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

Yes

8. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

Yes

9. FY 80 App. Act Sec. [505.] Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States?

The Contract will so provide.

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

Yes

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

Yes

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million?

N/A

Other Restrictions

1. FAA Sec. 122(b). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

Yes

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?

N/A

3. FAA Sec. 620(h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries?

Yes

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, sale, longterm lease, exchange or guaranty of motor vehicles manufactured outside the U.S.

Yes

5. Will arrangements preclude use of financing:

a. FAA Sec. 104(f). To pay for performance of abortions as a method of family planning or to, motivate or coerce persons to practice abortions; to pay for performance of involuntary sterilization as a method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization?

Yes

b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property?

Yes

c. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs?

Yes

d. FAA Sec. 662. For CIA activities?

Yes

e. FY 80 App. Act Sec. [504.] To pay pensions, -etc., for military personnel?

Yes

f. FY 80 App. Act Sec. [506.] To pay U.N. assessments?

Yes

g. FY 80 App. Act Sec. [507.] To carry out provisions of FAA section 209(d) (Transfer of FAA funds to multi-lateral organizations for lending.)

Yes

h. FY 80 App. Act Sec. (511.) To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields? **Yes**

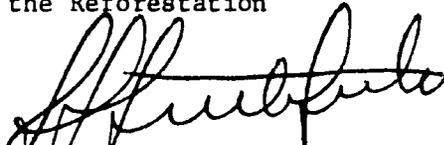
i. FY 80 App. Act Sec. (515.) To be used for publicity or propaganda purposes within U.S. not authorized by Congress? **Yes**

UNITED STATES OF AMERICA
INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
c/o American Embassy, Colombo, Sri Lanka.

March 28, 1980

Certification Pursuant to Section
611 (e) of the Foreign Assistance
Act of 1961, as amended

I, Sarah Jane Littlefield, the Director of the Agency for International Development Mission to Sri Lanka, having taken into account among other things the maintenance and utilization of projects in Sri Lanka previously financed or assisted by the United States do hereby certify that in my judgement Sri Lanka has the capability (both financial and human resources) to effectively maintain and utilize the Reforestation and Watershed Management Project.


S.J. Littlefield
Director

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

Name of Country: SRI LANKA

Name of Project: REFORESTATION
AND WATERSHED MANAGEMENT

Number of Project: 383-0055

Pursuant to Part 1, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Loan and a Grant (hereinafter collectively referred to as "Assistance") to the Democratic Socialist Republic of Sri Lanka the "Cooperating Country" of not to exceed two million five hundred thousand United States Dollars (\$2,500,000) the ("Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph. Of the Authorized Amount, two million United States Dollars ("Loan") will be loaned and five hundred thousand United States Dollars ("Grant") will be granted to the Cooperating Country to assist in financing certain foreign exchange and local currency costs of goods and services required for the Project.

The project consists of forestry research, upper watershed reforestation and stabilization and development of lowland fuelwood plantations, together with ancillary forestry related activities (hereinafter referred to as the "Project").

I approve the total level of A.I.D. appropriated funding for this project of not to exceed four million three hundred fifty thousand United States Dollars (\$4,350,000) Loan and Grant of which \$3,400,000 will be Loan funded and \$950,000 will be Grant funded including the funding authorized above, during the period FY 1980 through FY 1981. I approve further increments during that period of Loan funding up to \$1,400,000 and Grant funding up to \$450,000 subject to availability of funds in accordance with A.I.D. allotment procedures.

I hereby authorize the initiation of negotiation and execution of the Project Agreement in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in United States Dollars within forty (40) years from the date of the first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in United States Dollars interest from the date of first disbursement

of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Goods and services, except for Ocean Shipping, financed by A.I.D. under the Loan shall have their source and origin in the Cooperating Country or in countries included in A.I.D. Geographic Code 941 and goods and services financed by A.I.D. under the Grant shall have their source and origin in the Cooperating Country or in the United States (A.I.D. Geographic Code 000), except as A.I.D. may otherwise agree in writing. Ocean Shipping financed under the assistance shall be procured in the U.S. or the Cooperating Country, except as A.I.D. may otherwise agree in writing.

c. Conditions and Covenants

(A) Initial Conditions Precedent to Disbursement under the Loan and Grant:

Prior to the first disbursement under the Assistance, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made the Cooperating Country will, except as the AID may otherwise agree in writing, furnish A.I.D. in form and substance satisfactory to A.I.D.:

- (1) an opinion of counsel acceptable to A.I.D. that this Agreement has been duly authorized and/or ratified by, and executed on behalf of, the Cooperating Country, and that it constitutes a valid and legally binding obligation of the Cooperating Country in accordance with all of its terms;
- (2) a statement of the name of the person holding or acting in the Office of Director, External Resources Department, Ministry of Finance and Planning of the Cooperating Country and of any additional representatives, together with a specimen signature of each person specified in such statement;
- (3) evidence that adequate budgetary resources are being made available for 1980 and assurance that further budgets for 1981-85 will provide adequate funding for the Forest Department to implement the Project.

(B) Additional Conditions Precedent to Disbursement:

Prior to disbursements or to the issuance by A.I.D. of documentation pursuant to which disbursements will be made by the Cooperating Country, for the following activities, the Cooperating Country will, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(1) For Training:

A comprehensive training plan for the development of Cooperating Country personnel directly associated with carrying out the Project.

(2) For Charcoaling Activities:

A working agreement established between the Forest Department and the State Timber Corporation on operating procedures and guidelines to be followed in implementing the charcoaling activities.

(C) Covenants:

(1) The Cooperating Country covenants to establish an evaluation program as part of the Project.

(2) The Cooperating Country covenants that, except as AID may otherwise agree in writing, the August 30, 1979 Amendment to the Forest Ordinance concerning conservation, management and protection of the natural forests and reforested areas of Sri Lanka will be continued in effect without modifications and will be strictly enforced during the life of the Project.

(3) The Cooperating Country covenants that by the end of the fourth year of the Project it will establish and have in operation a satisfactory Project replanting and forest maintenance program financed by setting aside in a Special Fund an adequate portion of the proceeds of the sale of project generated fuelwood and/or timber products.

S.J. Littlefield
Director, USAID/Sri Lanka

13 SEPT/1600/1978

SEPT 78
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TO AMEMBASSY COLOMBO 7515
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ACTION: AID
INFO
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E.O. 11652: N/A

TAGS:

SUBJECT: REFORESTATION AND WATERSHED MANAGEMENT PID -
PROJECT 0055

1. APAC REVIEW HELD IN LATE JUNE AND APPROVED PID AND PROJECT DEVELOPMENT FOR PLANNED 1980 START. FOLLOWING IS OFFICIAL REPORT OF APAC RESPONSE PREVIOUSLY TRANSMITTED BY TELEPHONE.
2. IN PREPARATION AND SUBMISSION OF PP, SEVERAL ISSUES SHOULD BE ADDRESSED:
 - A. PROJECT PURPOSE OF REFORESTING 40,000 ACRES INCLUDING FIREWOOD AND DENUDED FOREST LAND DOES NOT APPEAR TO LEAD DIRECTLY TO OVERALL AGRICULTURAL DEVELOPMENT GOAL AS STATED ON PID FACESHEET. ASSUMING VERIFICATION OF LINKAGES BETWEEN MOUNTAIN CATCHMENTS AND RURAL ENERGY CONSUMPTION, WHAT IS CONCEPTUAL SUB-GOAL WHICH LINKS THESE TO PROJECT GOAL?
 - B. RECENT AGRICULTURAL SECTOR ASSESSMENT ADDRESSED SOIL AND WATER MANAGEMENT AND INCLUDES RECOMMENDATIONS FOR STUDY DEVOTED TO INTEGRATED DEVELOPMENT OF FORESTRY ALONG WITH CROPS AND LIVESTOCK IN THE DRY ZONE. UPCOMING MAHAWELI GANGA ENVIRONMENTAL ASSESSMENT ALSO INCLUDES

FOREST SECTOR ANALYSIS. PID STATES THAT INTENSIVE STUDY REQUESTED FOR UPPER MOUNTAIN CATCHMENTS, INITIALLY FOCUSING ON MAHAWELI CATCHMENT. SHOULD THESE STUDIES BE SPECIFICALLY DIRECTED TOWARD PROBLEM AREAS RAISED IN PID IN ANTICIPATION OF FUTURE COMPREHENSIVE ENERGY/FORESTRY/ CONSERVATION PROGRAM OR DOES SUFFICIENT INFORMATION EXIST TO PROCEED WITH FULL-SCOPE PROJECT DEVELOPMENT AS PROPOSED.
 - C. MIX OF INPUTS IN BUDGET REFLECTS HIGH PROPORTION OF CAPITAL EQUIPMENT. PAST FORESTRY PROJECT EXPERIENCE SUGGEST THAT LESS CAPITAL-INTENSIVE, MORE LABOR-INTENSIVE APPROACHES MAY BE APPROPRIATE. THIS MAY ESPECIALLY BE TRUE GIVEN SRI LANKA'S HIGH UNEMPLOYMENT RATE (20 PERCENT) SUGGEST INPUT MIX STRATEGY BE CAREFULLY ASSESSED IN PP PREPARATION.

D. VILLAGER PARTICIPATION IN FORESTATION COMPONENTS (PLANTING AND INTER-CROPPING) AND FIREWOOD PLANTATION COMPONENTS (DECENTRALIZED REFORESTATION CENTERS) IS PROPOSED. APPARENT GSL NEAR-FUTURE RESOLUTION FOR SOIL/WATER MANAGEMENT AND FIREWOOD PROBLEMS APPEARS REMOTE. WOULD NOT INCREASED FOCUS ON LOCAL PARTICIPATION IN LOCAL PLANNING AND MANAGING COMPONENTS PROVIDE A LONGER-TERM SUSTAINED RESOLUTION TO SERVE ON THESE PROBLEMS?

E. PID RAISES ISSUE OF PROBABLE LOSSES TO RURAL POOR AND LANDLESS WHO DERIVE INCOME FOR FOREST PRODUCTS. ALTHOUGH AID/W BELIEVES MANAGEMENT OF REFORESTED AREAS AND FIREWOOD PLANTATION NOT YET FULLY ADDRESSED, CAN PROJECT DEVELOPMENT PROCEED IN SUCH A WAY TO PERMIT ALTERNATIVE OPPORTUNITIES FOR THESE PEOPLE OR SHOULD SPECIFIC ALTERNATIVE DEVELOPMENT AND INCOME-GENERATION ACTIVITIES BE INCLUDED IN PROJECT DESIGN?

3. IN SUMMARY, AID/W FINDS PROPOSED PROJECT TO BE INNOVATIVE AND IMPORTANT. WE ARE CONCERNED THAT PROJECT BE PRESENTED IN FULL CONGRUENCE WITH ENTIRE RURAL SECTOR STRATEGIES AND LONG-RANGE PROGRAM PLANNING BY BOTH GSL AND US AID. LINKAGES OF THE PROJECT TO GENERAL SECTOR AND OTHER ON-GOING/PLANNED PROJECTS SHOULD STRENGTHEN PROPOSED PROJECT'S OBJECTIVES. AID/W LOOKS FORWARD TO PP SUBMISSION AND STANDS READY TO ARRANGE ASSISTANCE AS NEEDED TO GSL AND USAID FOR PROJECT DEVELOPMENT. CHRISTOPHER
BT

#1650

A.I.D. Loan Number: 383-T-025

Project Number: 383-0055

PROJECT
LOAN AND GRANT AGREEMENT
BETWEEN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
AND THE
UNITED STATES OF AMERICA
FOR
REFORESTATION AND WATERSHED MANAGEMENT

Dated: July 8, 1980.

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PROJECT LOAN AND GRANT AGREEMENT

Dated: July 8, 1980

Between

Democratic Socialist Republic of Sri Lanka("Cooperating Country")

And

The United States of America, acting through the
Agency for International Development ("A.I.D.")

Article 1: The Agreement

The purpose of this Agreement is to set out the understandings of the parties named above("Parties") with respect to the undertaking by the Cooperating Country of the Project described below, and with respect to the financing of the Project by the Parties.

Article 2: The Project

SECTION 2.1 Definition of Project. The Project, which is further described in Annex 1, will consist of forestry research, upland watershed reforestation and stabilization and development of fuelwood plantations, together with ancilliary forestry related activities. Annex 1, attached, amplifies the above definition of the Project.

Within the limits of the above definition of the Project, elements of the amplified description stated in Annex 1 may be changed by written agreement of the authorized representatives of the Parties named in Section 9.2 without formal amendment of this Agreement.

SECTION 2.2. Incremental Nature of Project.

(a) A.I.D.'s contribution to the Project will be provided in increments, the initial one being made available in accordance with Section 3.1 and 3.2 of this Agreement. Subsequent increments will

be subject to availability of funds to A.I.D. for this purpose, and to the mutual agreement of the Parties, at the time of a subsequent increment, to proceed.

(b) Within the overall Project Assistance Completion Date stated in this Agreement, A.I.D., based upon consultation with the Cooperating Country, may specify in Project Implementation Letters appropriate time periods for the utilization of funds granted by A.I.D. under an individual increment of assistance.

Article 3: Financing

SECTION 3.1. The Loan. To assist the Cooperating Country to meet costs of carrying out the Project, A.I.D., pursuant to the Foreign Assistance Act of 1961, as amended, agrees to lend the Cooperating Country under the terms of this Agreement not to exceed two million United States ("U.S.") dollars (\$2,000,000) ("Loan"). The aggregate amount of disbursements under the Loan is referred to as "Principal".

SECTION 3.2. The Grant. To assist the Cooperating Country to meet the costs of carrying out the Project, A.I.D., pursuant to the Foreign Assistance Act of 1961, as amended, agrees to grant the Cooperating Country under the terms of this Agreement not to exceed five hundred thousand United States ("U.S.") dollars (\$500,000) ("Grant").

The Loan and Grant (hereinafter collectively referred to as the "Assistance") may be used to finance foreign exchange costs as defined in Section 7.1, and local currency costs, as defined in Section 7.2, of goods and services required for the Project.

SECTION 3.3. Cooperating Country Resources for the Project

(a) The Cooperating Country agrees to provide or cause to be provided for the project all funds, in addition to the Assistance, and all other resources required to carry out the Project effectively and in a timely manner.

(b) The resources provided by the Cooperating Country for the Project life will be approximately the equivalent of U.S.\$10,330,000 including costs borne on an "in-kind" basis.

SECTION 3.4. Project Assistance Completion Date

(a) The "Project Assistance Complete Date" (PACD), which is July 8, 1985, or such other date as the Parties may agree to in writing, is the date by which the Parties estimate that all services financed under the Assistance will have been performed, and all goods financed under the Loan will have been furnished for the Project as contemplated in this Agreement.

(b) Except as A.I.D. may otherwise agree in writing, A.I.D. will not issue or approve documentation which would authorize disbursement of the Assistance for services performed subsequent to the PACD or for goods furnished for the Project, as contemplated in this Agreement, subsequent to the PACD.

(c) Requests for disbursement, accompanied by necessary supporting documentation prescribed in Project Implementation Letters, are to be received by A.I.D. or any bank described in Section 3.1 no later than nine (9) months following the PACD, or such other period as A.I.D. agrees to in writing. After such period, A.I.D., giving notice in writing to the Cooperating Country, may at any time or times reduce the amount of the Assistance by all or any part thereof for which requests for disbursement, accompanied by necessary supporting documentation prescribed in Project Implementation Letters, were not received before the expiration of said period.

Article 4: Loan Terms.

SECTION 4.1. Interest. The Cooperating Country will pay to A.I.D. interest which will accrue at the rate of two percent (2%) per annum for ten (10) years following the date of the first disbursement hereunder and at the rate of three percent (3%) per annum thereafter on the outstanding balance of Principal and on any due and unpaid interest. Interest on the outstanding balance will accrue from the date (as defined in Section 3.1) of each respective disbursement, and will be payable semi-annually. The first payment of interest will be due and payable no later than six (6) months after the first disbursement hereunder, on a date to be specified by A.I.D.

SECTION 4.2 Repayment. The Cooperating Country will repay to A.I.D. the Principal within forty (40) years from the date of the first disbursement of the loan in sixty-one (61) approximately equal semi-

annual installments of Principal and interest. The first installment of Principal will be payable nine and one-half (9½) years after the date on which the first interest payment is due in accordance with Section 4.1. A.I.D. will provide the Cooperating Country with an amortization schedule in accordance with this Section after the final disbursement under the Loan.

SECTION 4.3. Application, Currency, and Place of Payment.

All payments of interest and Principal hereunder will be made in U.S. Dollars and will be applied first to the payment of interest due and then to the repayment of Principal. Except as A.I.D. may otherwise specify in writing payments will be made to the Controller, Office of Financial Management, Agency for International Development, Washington, D.C. 20523, U.S.A., and will be deemed made when received by the Office of Financial Management.

SECTION 4.4. Prepayment. Upon payment of all interest and

any refunds then due, the Cooperating Country may repay, without penalty, all or any part of the Principal. Unless A.I.D. otherwise agrees in writing, any such prepayment will be applied to the installments of Principal in the inverse order of their maturity.

SECTION 4.5. Renegotiation of Terms.

(a) The Cooperating Country and A.I.D. agree to negotiate, at such time or times as either may request, an acceleration of the repayment of the Loan in the event that there is any significant and continuing improvement in the internal and external economic and financial position and prospects of Sri Lanka which enables the Cooperating Country to repay the loan on a shorter schedule.

(b) Any request by either Party to the other to so negotiate will be made pursuant to Section 9.1, and will give the name and address of the person or persons who will represent the requesting Party in such negotiations.

(c) Within thirty (30) days after delivery of a request to negotiate, the requested Party will communicate to the other, pursuant to Section 9.1, the name and address of the person or persons who will represent the requested Party in such negotiations.

(d) The representatives of the Parties will meet to carry on negotiations no later than thirty (30) days after delivery of the requested Party's communication under subsection (c). The negotiations will take place at a location mutually agreed upon by the representatives of the Parties, provided that, in the absence of mutual agreement, the negotiations will take place at the office of the Cooperating Country's Ministry of Finance and Planning in Sri Lanka.

SECTION 4.6. Termination on Full Payment. Upon payment in full of the Principal and any accrued interest, this Agreement and all obligations of the Cooperating Country and A.I.D. under it will cease.

Article 5: Conditions Precedent to Disbursement

SECTION 5.1. First Disbursement under Assistance. Prior to the first disbursement under the Assistance, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Cooperating Country will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) an opinion of counsel acceptable to A.I.D. that this Agreement has been duly authorized and/or ratified by, and executed on behalf of, the Cooperating Country, and that it constitutes a valid and legally binding obligation of the Cooperating Country in accordance with all of its terms;

(b) a statement of the name of the person holding or acting in the office of the Cooperating Country specified in Section 9.2, and of any additional representatives together with a specimen signature of each person specified in such statements;

(c) evidence that adequate budgetary resources are being made available for 1980 and assurance that further budgets for 1981-1984 will provide adequate funding for the Forest Department adequately to implement the Project.

SECTION 5.2. First Disbursement for Training. Prior to the first disbursement or issuance by A.I.D. of documentation pursuant to which disbursement will be made to finance training, the Cooperating Country will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D. a detailed training plan for officers of the Forest Department and State Timber Corporation.

SECTION 5.3. First Disbursement for Charcoaling Activities. Prior to the first disbursement or issuance by A.I.D. of documentation pursuant to which disbursement will be made to finance charcoaling activities the Cooperating Country will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D. a contract between the Cooperating Country and the State Timber Corporation for carrying out Project charcoaling operations.

SECTION 5.4. Notification. When AIE has determined that the conditions precedent specified in Sections 5.1, 5.2, and 5.3 have been met, it will promptly notify the Cooperating Country.

SECTION 5.5. Terminal Dates for Conditions Precedent.

If all of the conditions specified in Section 5.1 have not been met within ninety (90) days from the date of this Agreement, or such later date as A.I.D. may agree to in writing, A.I.D. at its option, may terminate this Agreement by written notice to Borrower.

Article 6: Special Covenants

SECTION 6.1. Project Evaluation. The Parties agree to establish an evaluation program as part of the Project. Except as the Parties otherwise agree in writing, the program will include during the implementation of the Project and at one or more points thereafter: (a) evaluation of progress toward attainment of the objectives of the Project; (b) identification and evaluation of problem areas or constraints which may inhibit such attainment; (c) assessment of how such information may be used to help overcome such problem; and (d) evaluation, to the degree feasible, of the overall development impact of the Project.

SECTION 6.2. Forestry Policies. Except as the Parties otherwise agree in writing, the Amendment of August 30, 1979 to the Forestry Ordinance concerning conservation will be continued in effect without significant modifications and will be strictly enforced during the life of the Project.

SECTION 6.3. Replanting and Forest Maintenance Program. The Cooperating Country covenants that by the end of the fourth year of the Project it will establish a satisfactory procedure for the replanting and forest maintenance program of the Project, financed either by setting aside in a Special Fund an adequate portion of the proceeds of the sale of Project generated fuelwood and/or timber products, or by a continuing budgetary provision by the Cooperating Country.

SECTION 6.4. Tax Exemption. Notwithstanding the flexibility allowed under the Project Standard Provisions Annex, Section B.4(b), the Cooperating Country agrees and hereby covenants that any contractor, any and all of its personnel, any property or transaction relating to the contract with such contractor, and any commodity procurement transaction financed by the Agreement will be exempt from identifiable taxes, tariffs, duties or other levies imposed under the laws of Sri Lanka provided that any personal articles imported by contractor personnel will be either re-exported or duty will be paid prior to disposal in Sri Lanka, in accordance with the laws, rules and regulations of the Cooperating Country.

Article 7: Procurement Source

SECTION 7.1. Foreign Exchange Costs. Disbursements pursuant to Section 8.1 will be used exclusively to finance the cost of goods and services required for the Project having their source and origin:

(a) In countries included in Code 941 of the A.I.D. Geographic Code Book as in effect at the time orders are placed or contracts entered into for such goods and services to be financed from the Loan;

and

(b) in the United States (Code 000 of the A.I.D. Geographic Code Book as in effect at the time orders are placed or contracts entered into for such goods and services) to be financed from the Grant;

(hereinafter collectively called Foreign Exchange Costs), except as A.I.D. may otherwise agree in writing, and except as provided in the Project Standard Provisions Annex, Section C1 (b) with respect to marine insurance.

Ocean transportation costs will be financed under the Assistance only on vessels under flag registry of the United States or Sri Lanka, except as A.I.D. may otherwise agree in writing. If A.I.D. determines either that there are no vessels under flag registry of Sri Lanka generally available for ocean transportation, or that Sri Lanka has no access to U.S. flag service, A.I.D. in

a Project Implementation Letter may agree to finance under the assistance ocean transportation costs on vessels under flag registry of any country included in A.I.D. Geographic Code Book 941.

SECTION 7.2. Local Currency Costs. Disbursement pursuant to Section 8.2 will be used exclusively to finance the costs of goods and services required for the Project having their source and, except as A.I.D. may otherwise agree in writing, their origin in Sri Lanka ("Local Currency Cost"). To the extent provided for under this Agreement "Local Currency Costs" may also include the provisions of local currency resources required for the Project.

Article 8: Disbursements

SECTION 8.1. Disbursement for Foreign Exchange Costs.

(a) After satisfaction of conditions precedent, the Cooperating Country may obtain disbursements of funds under the Assistance for the Foreign Exchange Costs of goods or services required for the Project in accordance with the terms of this Agreement by such of the following methods as may be mutually agreed upon:

(1) by submitting to A.I.D., with necessary supporting documentation as prescribed in Project Implementation Letters, (A) requests for reimbursement for such goods or services, or (B) requests for A.I.D. to procure commodities or services in the Cooperating Country's behalf for the Project; or

(2) by requesting A.I.D. to issue Letters of Commitment for specified amounts (A) to one or more U.S. banks, satisfactory to A.I.D., committing A.I.D. to reimburse such bank or banks for payments made by them to contractors or suppliers, under Letter of Credit or otherwise, for such goods, or (B) directly to one or more contractors or suppliers, committing A.I.D. to pay such contractors or suppliers for such goods or services.

(b) Banking charges incurred by the Cooperating Country in connection with Letters of Commitment and Letters of Credit will be financed under the Assistance unless the Cooperating Country instructs A.I.D. to the contrary. Such other charges as the Parties may agree to may also be financed under the Assistance.

SECTION 3.2. Disbursement for Local Currency Costs.

(a) After satisfaction of conditions precedent, the Cooperating Country may obtain disbursements of funds under the Assistance for Local Currency Costs required for the Project in accordance with the terms of this Agreement by submitting to A.I.D., with necessary supporting documentation as prescribed in Project Implementation Letters, requests to finance such costs.

(b) The local currency needed for such disbursement hereunder may be obtained:

(1) by acquisition by A.I.D. with U.S. dollars by purchase;
or

(2) by A.I.D. requesting the Cooperating Country to make available the local currency for such costs and thereafter reimbursing an amount of U.S. dollars equal to the amount of local currency made available by the Cooperating Country.

SECTION 3.3. Other Forms of Disbursement. Disbursements of the Assistance may also be made through other means as the Parties may agree to in writing.

SECTION 3.4. Rate of Exchange. If funds provided under the Assistance are introduced into Sri Lanka by A.I.D. or any public or private agency for purposes of carrying out obligations of A.I.D. hereunder, the Cooperating Country will make such arrangements as may be necessary so that such funds may be converted into currency of Sri Lanka at the highest rate of exchange which, at the time of conversion is made, is not unlawful in Sri Lanka.

SECTION 8.5. Date of Disbursement. Disbursement of the Loan by A.I.D. will be deemed to occur (a) on the date on which A.I.D. makes a disbursement to the Cooperating Country or its designee, or to a bank, contractor or supplier pursuant to a Letter of Commitment, contract or purchase order; or (b) on the date on which A.I.D. disburse to the Cooperating Country or its designee local currency acquired in accordance with Section 8.2 (b)(1) or U.S. dollars for reimbursement of the Cooperating Country in accordance with Section 8.2 (b) (2).

Article 9: Miscellaneous

SECTION 9.1. Communications. Any notice, request, document, or other communication submitted by either Party to the other under this Agreement will be in writing or by telegram or cable, and will be deemed duly given or sent when delivered to such party at the following address:

To the Cooperating Country:

Mail Address: Director, External Resources Department
Ministry of Finance and Planning
Colombo 1, Sri Lanka

Alternate address for telegrams: FORAID
Colombo, Sri Lanka

To A.I.D.:

Mail Address: Director of USAID
c/o American Embassy
Colombo, Sri Lanka

Alternate address for telegrams: USAID Amembassy
Colombo, Sri Lanka

All such communications will be in English, unless the Parties otherwise agree in writing. Other addresses may be substituted for the above upon the giving of notice.

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SECTION 9.2. Representatives. For all purposes relevant to this Agreement, the Cooperating Country will be represented by the individual holding or acting in the office of Director, External Resources Department, Ministry of Finance and Planning and A.I.D. will be represented by the individual holding or acting in the office of Director, A.I.D. mission to Sri Lanka, each of whom, by written notice, may designate additional representatives for all purposes other than exercising the power under Section 2.1 to revise elements of the amplified description in Annex 1. The names of the representatives of the Cooperating Country, with specimen signatures, will be provided to A.I.D., which may accept as duly authorized any instrument signed by such representatives in implementation of this Agreement, until receipt of written notice of revocation of their authority.

SECTION 9.3. Standard Provisions Annex. A "Project Standard Provisions Annex (Annex 2) is attached to and forms parts of this Agreement.

IN WITNESS WHEREOF, the Cooperating Country and the United States of America, each acting through its duly authorized representatives, have caused this Agreement to be signed in their names and delivered as of the day and year first above written.

THE DEMOCRATIC SOCIALIST
REPUBLIC OF SRI LANKA

UNITED STATES OF AMERICA

By: C. P. Chanmugha

By: Donald R. Toussaint

Name: C. P. Chanmugha
Title: Acting Secretary
Ministry of Finance
& Planning.

Name: Donald R. Toussaint
Title: American Ambassador

REFORESTATION AND WATERSHED MANAGEMENT

AMPLIFIED PROJECT DESCRIPTION

A. THE PROJECT

1. Purpose

The purpose of this project is twofold: (a) to conserve and stabilize watershed areas in the highland regions of Sri Lanka, and (b) to enhance the natural renewable energy and commercial natural resource base of Sri Lanka.

Since both purposes are of a continuing nature rather than ones that can be achieved in a limited time frame, this project is to increase the institutional capacity of the Forest Department to plan and carry out continuing operations and to implement the first phase of a long term program of tree planting, maintenance and harvesting.

2. Expected Outputs

To achieve the project purpose, outputs in two broad categories should be in place at the end of the five year project period: (a) institutional development of the Forest Department completed and (b) five forest-related activities completed.

(a) Institutional Development

(i) Forestry training capability has been expanded at the Forest Department's College at China Bay by increasing the capacity and strengthening the syllabus so it can offer short term courses on forestry management, and longer term courses for specialized trainee programs.

(ii) Forestry research and development elements within the Forestry Department has been strengthened to carry out a greatly expanded, intensive program of adaptive research on plant selection, propagation, and improved establishment and harvesting techniques; and

(iii) A forestry extension service has been established within the Forest Department so that seed, production materials, information and appreciation of the many benefits of the forests may be distributed down to the village level.

(b) Forest - Related Activities

(i) Fuelwood plantations will have been expanded by re-establishing forest cover on 35,000 acres of degraded chena land by 1985 in four specific sites: Puttalam, Pankulam, Mahaweli System "C"

(Rotalawela Reservoir) and Batticaloa (Pullumalai). The species to be used are 25% Eucalyptus spp; 25% Casuarina equisetifolia; 25% Leucaena leucocephala; and 25% Sesbania grandifolia. Trema orientalis and Calliandria spp will be evaluated for their potential. Six nurseries near the plantation areas will have been established to provide about ten(10) million needed seedlings per year.

(ii) The Upper Mahaweli Catchment Area will have forest cover re-established on 15,000 acres of degraded lands in the Rambukpitiya, Dolosbage and other catchment areas. The species to be used are 65% Pinus spp; 25% Albizia falcataria, and 10% Eucalyptus spp. The nurseries will have been established to produce seedlings for planting 1000 acres per year per nursery.

(iii) A national forestry base-line map will have been prepared, using satellite imagery. This will be supplemented by aerial photographs generated from the Agricultural Base Mapping Project to generate "base-line" forest cover data.

(iv) Village fuelwood plots (less than 50 acres each) will have been established for about 50 villages in land areas designated by the Mahaweli Development Board.

(v) Twenty-four portable kilns will have been constructed and in operation to produce charcoal. The State Timber Corporation will have established a charcoal collection network to collect the charcoal from the village operated kilns.

3. Expected Inputs

In order to achieve the expected outputs, the following inputs will be provided for in the project:

(a) Technical Assistance

Expatriate advisors to assist in the implementation of this project include: chief-of-party for about the life of the project (estimated 55 months), advisors for one year each in such subjects as charcoal technology, soil science, training on forest education, and silviculture. Some 21 months of short term assistance may be provided in such subjects as extension service activities, conservation, utilization and logging techniques. The exact mix of expertise and months of assistance is to be decided during contract negotiations.

(b) Training

Five Forestry Department personnel are to receive training in U.S. universities to the Master of Science degree level. About 76 people are to receive short term training (up to six months each) in U.S. and third country training/educational institutions or attend seminars and make orientation trips. The State Timber Corporation will receive training for 1 long-term and 4 short-term officer in logging techniques and charcoal production. A detailed training plan is to be prepared before the first training begins.

(c) Commodities

Commodities to be imported include about 15 utility vehicles (jeep-type), 17 trucks of 3-ton and 5-ton sizes, 14 tractors and trailers, vans, buses, maintenance, equipment for maintenance of laboratory office,

tools, fertilizer and seeds. Some commodities will be bought locally; i.e. small tools, office equipment, field station equipment etc.

(d) Other Inputs

This includes construction of a building at the Forestry College, establishment of the tree nurseries, planting and maintenance of the tree plantations and the continuing research and operational costs of the program.

B. PROJECT IMPLEMENTATION

1. Technical Assistance

The Forest Department will contract with a U.S. firm or university to provide the technical assistance, including arrangements for training and assistance with commodity procurement. A.I.D.'s competitive procurement procedures will be followed.

2. Training

It is expected that the consultant will handle all arrangements for training out of Sri Lanka.

3. Commodities

The Forest Department will follow A.I.D.'s competitive bidding procedures in buying the planned commodities. The selection of the appropriate procedures to be followed probably will be made during the negotiations for the contract for technical assistance. Some commodities may be bought within Sri Lanka.

4. Construction

The Cooperative Country rules concerning bidding and contracting will be used for the one building to be constructed with A.I.D. funds.

C. PROJECT MANAGEMENT

The project is to be implemented by the Forest Department. The day-by-day responsibility will be with the Deputy Conservator of Forests (Special Projects). Under the Deputy Conservator will be two assistant conservators, one for each of the two major areas of activity: upper watershed and dryland fuelwood. The State Timber Corporation will be responsible for the charcoaling effort under the cooperative guidance of the Deputy Conservator. All other project activities will be administered and/or monitored by the Deputy Conservator.

D. FINANCIAL PLAN

By this Project Agreement, A.I.D. is providing a grant of \$500,000 and a loan of \$2,000,000. Subject to the availability of funds and mutual agreement of the parties, A.I.D. intends to provide an additional \$450,000 of grant funds and \$1,400,000 of loan funds in future years. The total A.I.D. life of project contributions to this project thus should be \$950,000 in grants and \$3,400,000 in loans. The additional funds will be provided in subsequent years by amendments to this Project Agreement.

By this Project Agreement, the Cooperating Country agree to provide contributions, including in-kind contributions, of not less than the equivalent of \$10,330,000. The investment costs include the many local costs to prepare, construct and equip the facilities needed to implement the project. The operating costs are the usual costs of operating these facilities (personnel, supplies, maintenance, etc). In addition to the contributions listed below for the first five years, the estimated Cooperating Country's contributions to continue the program for the sixth through fifteenth years are \$675,000 equivalent for additional investments and \$4,268,000 for additional operating costs. The approximate amounts of contributions needed for the first five years are:

<u>Calendar Year</u>	<u>Investment Costs</u>	<u>Operating Costs</u>
	(\$000 equivalent)	
1980	1,237	1,087
1981	332	1,648
1982	340	1,659
1983	330	1,660
1984	336	1,702
	<u>2,574</u>	<u>7,756</u>
	=====	=====

Table 1, attached, gives the "Summary Cost Estimate and Financial Plan" of the project over the next five years. Changes of up to 40% in the allocation of A.I.D. funds to individual line items may be made without formal amendment of this Project Description. Adjustment in the allocation of funds for an individual line item between foreign exchange and local currency costs may be made by written agreement of the Parties without amendment of this Project Description.

SUMMARY COST ESTIMATE AND FINANCIAL PLAN
PROJECT FINANCIAL PLAN
(US\$ 000)

A. I. D.

<u>PROJECT INPUTS</u>	<u>LOAN</u>		<u>GRANT</u>		<u>TOTAL</u> <u>AID</u>	<u>Cooperating</u> <u>Government</u>	<u>TOTAL</u>
	<u>Foreign</u> <u>Exchange</u>	<u>Local</u> <u>Costs</u>	<u>Foreign</u> <u>Exchange</u>	<u>Local</u> <u>Costs</u>			
Technical Assistance	-	-	950	-	950	-	950
Training	1,490	-	-	-	1,490	-	1,490
Commodities	1,425	485	-	-	1,910	-	1,910
Investment (Capital) Items	-	-	-	-	-	2,575	2,575
Operational Costs	-	-	-	-	-	7,755	7,755
TOTAL	2,915	485	950	-	4,350	10,330	14,680

Standard Project Agreement
Provisions Annex

Definitions: As used in this Annex, the "Agreement" refers to the Project Agreement to which this Annex is attached and of which this Annex forms a part. Terms used in this Annex have the same meaning or reference as in the Agreement. "Cooperating country" is the Government of the Democratic Socialist Republic of Sri Lanka ("Borrower" and/or "Grantee" as appropriate).

Article A: PROJECT IMPLEMENTATION LETTERS. To assist the Cooperating Country in the implementation of the Project, A.I.D., from time to time, will issue Project Implementation Letters that will furnish additional information about matters stated in this Agreement. The Parties may also use jointly agreed-upon Project Implementation Letters to confirm and record their mutual understanding on aspects of the implementation of this Agreement. Project Implementation Letters will not be used to amend the text of the Agreement, but can be used to record revisions or exceptions which are permitted by the Agreement, including the revision of elements of the amplified description of the Project in Annex 1.

Article B: GENERAL COVENANTS

SECTION B.1. Consultation. The Parties will cooperate to assure that the purpose of this Agreement will be accomplished. To this end, the Parties, at the request of either, will exchange views on the progress of the Project, the performance obligations under this Agreement, the performance of any consultants, contractors or suppliers engaged on the Project, and other matters relating to the Project.

SECTION B.2. Execution of Project. The Cooperating Country will:

(a) carry out the Project or cause it to be carried out with due diligence and efficiency, in conformity with sound technical, financial, and management practices, and in conformity with those documents, plans, specifications, contracts, schedules or other arrangement, and with any modifications therein, approved by A.I.D. pursuant to this Agreement;
and

(b) provide qualified and experienced management for, and train such staff as many be appropriate for the maintenance and operation of the Project, and, as applicable for continuing activities, cause the Project to be operated and maintained in such manner as to assure the continuing and successful achievement of the purposes of the Project.

SECTION B.3. Utilization of Goods and Services. (a) Any resources financed under the Assistance will, unless otherwise agreed in writing by A.I.D., be devoted to the Project until the completion of the Project, and thereafter will be used so as to further the objectives sought in carrying out the Project.

(b) Goods or services financed under the Assistance, except as A.I.D. may otherwise agree in writing, will not be used to promote or assist a foreign aid project or activity associated with or financed by a country not included in Code 935 of the A.I.D. Geographic Code Book as in effect at the time of such use.

SECTION B.4. Taxation. (a) This agreement, and the Assistance will be free from, and the Principal and interest will be paid free from, any taxation or fees imposed under laws in effect in the territory of the Cooperating Country.

(b) To the extent that (1) any contractor, including any consulting firm, any personnel of such contractor financed under the Assistance, and any property or transaction relating to such contracts and (2) any commodity procurement transaction financed under the Assistance, are not exempt from identifiable taxes, tariffs, duties or other levies imposed under laws in the territory of the Cooperating Country, the Cooperating Country will, as and to the extent provided in and pursuant to Project Implementation Letters, pay or reimburse the same with funds other than those provided under the Assistance.

SECTION B.5. Reports, Records, Inspections, Audit. The Cooperating Country will:

(a) furnish A.I.D. such information and reports relating to the Project and to this Agreement as A.I.D. may reasonably request;

(b) maintain or cause to be maintained, in accordance with generally accepted accounting principles and practices consistently applied, books and records relating to the Project and to this Agreement, adequate to show, without limitation, the receipt and use of goods and services acquired under the Assistance. Such books and records will be audited regularly, in accordance with generally accepted auditing standards, and maintained for three years after the date of last disbursement by A.I.D., such books and records will also be adequate to show the nature and extent of solicitations of prospective suppliers of goods and services acquired, the basis of award of contracts and orders, and the overall progress of the Project toward completion; and

(c) afford authorized representatives of a Party the opportunity at all reasonable times to inspect the Project, the utilization of goods and services financed by such Party, and books, records and other documents relating to the Project and Assistance.

SECTION B.6. Completeness of Information. The Cooperating Country confirms:

(a) that the facts and circumstances of which it has informed A.I.D. or caused A.I.D. to be informed, in the course of reaching agreement with A.I.D. on the Assistance, are accurate and complete, and include all facts and circumstances that might materially affect the Project and the discharge

(b) that it will inform A.I.D. in timely fashion of any subsequent facts and circumstances that might materially affect, or that it is reasonable to believe might so affect, the Project or the discharge of responsibilities under this Agreement.

SECTION B.7. Other Payments. The Cooperating Country affirms that no payments have been or will be received by any official of the Cooperating Country in connection with the procurement of goods or services financed under the Assistance except fees, taxes, or similar payments legally established in the territory of the Cooperating Country.

SECTION B.8. Information and Marking. The Cooperating Country will give appropriate publicity to the Assistance of the Project as a program to which the United States has contributed, identify the Project site, and mark goods financed by A.I.D., as described in Project Implementation Letters.

Article C: PROCUREMENT PROVISIONS

SECTION C.1. Special Rules

(a) The source and origin of ocean and air shipping will be deemed to be the ocean vessel's or aircraft's country of registry at the time of shipment.

(b) Premiums for marine insurance placed in the territory of the Cooperating Country will be deemed an eligible Foreign Exchange Cost, if otherwise eligible under Section C.7.(a).

(c) Any motor vehicles financed under the Assistance will be of United States manufacture, except as A.I.D. may otherwise agree in writing.

SECTION C.2. Eligibility Date. No goods or services may be financed under the Assistance which are procured pursuant to orders or contracts firmly placed or entered into prior to the date of this Agreement, except as the Parties may otherwise agree in writing.

SECTION C.3. Plans, Specifications, and Contracts. In order for there to be mutual agreement on the following matters, and except as the Parties may otherwise agree in writing:

(a) The Cooperating Country will furnish to A.I.D. upon preparation,

(1) any plans, specifications, procurement or construction schedules, contracts, or other documentation relating to goods or services to be financed under the Assistance, including documentation relating to the prequalification and selection of contractors and to the solicitation of bids and proposals. Material modifications in such documentation will likewise be furnished A.I.D. on preparation;

(2) such documentation will also be furnished to A.I.D., upon preparation, relating to any goods or services which, though not financed under the Assistance, are deemed by A.I.D. to be of major importance to the Project. Aspects of the Project involving matters under this sub-section

(a) (2) will be identified in Project Implementation Letters.

(b) Documents related to the prequalification of contractors, and to the solicitation of proposals for goods and services financed under the Assistance will be approved by A.I.D. in writing prior to their issuance, and their terms will include United States standards and measurements;

(c) Contracts and contractors financed under the Assistance for engineering and other professional services, for construction services, and for such other services, equipment or materials as may be specified in Project Implementation Letters, will be approved by A.I.D. in writing prior to execution of the contract. Material modifications in such contracts will also be approved in writing by A.I.D. prior to execution; and

(d) Consulting firms used by the Cooperating Country for the Project but not financed under the Assistance, the scope of their services and such of their personnel assignment to the Project as A.I.D. may specify, and construction contractors used by the Cooperating Country for the Project but not financed under the Assistance shall be acceptable to A.I.D.

SECTION C.4. Reasonable Price. No more than reasonable prices will be paid for any goods or services financed, in whole or in part, under the Assistance. Such items will be procured on a fair and, to the maximum extent practicable, on a competitive basis.

SECTION C.5. Notification to Potential Suppliers. To permit all United States firms to have the opportunity to participate in furnishing goods and services to be financed under the Assistance, the Cooperating Country will furnish A.I.D. such information with regard thereto, and at such times, as A.I.D. may request in Project Implementation Letters.

SECTION C.6. Shipping.

(a) Goods which are to be transported to the territory of the Cooperating Country may not be financed under the Assistance if transported either: (1) on an ocean vessel or aircraft under the flag of a country which is not included in A.I.D. Geographic Code 935 as in effect at the time of shipment; or (2) on an ocean vessel which A.I.D., by written notice to the Cooperating Country, has designated as ineligible; or (3) under an ocean or air charter which has not received prior A.I.D. approval.

(b) Costs of ocean or air transportation (of goods or persons) and related delivery services may not be financed under the Assistance, if such goods or persons are carried: (1) on an ocean vessel under the flag of a country not, at the time of shipment, identified under the paragraph of the Agreement entitled "Procurement Source: Foreign Exchange Costs" without prior written A.I.D. approval; or (2) on an ocean vessel which A.I.D., by written notice to the Cooperating Country, has designated as ineligible; or (3) under an ocean vessel or air charter which has not received prior A.I.D. approval.

(c) Unless A.I.D. determines that privately-owned United States - flag commercial ocean vessels are not available at fair and reasonable rates for such vessels, (1) at least fifty percent (50%) of the gross tonnage of all goods (computed separately for dry bulk carriers, dry cargo liners and tankers) financed by A.I.D. which may be transported on ocean vessels will be transported on privately-owned United States flag commercial vessels, and (2) at least fifty percent (50% of the gross freight revenue generated by all shipments financed by A.I.D. and transported to the territory of the Cooperating Country on dry cargo liners shall be paid to or for the benefit of privately-owned United States-flag commercial vessels. Compliance with the requirements of (1) and (2) of this subsection must be achieved with respect to both any cargo transported from U.S. ports and any cargo transported from non-U.S. ports, computed separately.

SECTION C.7. Insurance.

(a) Marine insurance on goods financed by A.I.D. which are to be transported to the territory of the Cooperating Country may be financed under the Assistance, as a Foreign Exchange Cost under this Agreement provided (1) such insurance is placed at the lowest available competitive rate, and (2) claims thereunder are payable in the currency in which such goods were financed or in any freely convertible currency. If the government of the Cooperating Country, by statute, decree, rule, regulation or practice discriminates with respect to A.I.D.-financed procurement against any marine insurance company authorized to do business in any State of the United States, than all goods shipped to the territory of the Cooperating Country financed by A.I.D. hereunder will be insured against marine risks and such insurance will be placed in the United States with a company or companies authorized to do a marine insurance business in a State of the United States.

(b) Except as A.I.D. may otherwise agree in writing, the Cooperating Country will insure, or cause to be insured, goods financed under the Assistance imported for the Project against risks incident to their transit to the point of their use in the Project; such insurance will be issued on terms and conditions consistent with sound commercial practice and will insure the full value of the goods. Any Indemnification received by the Cooperating Country such insurance will be used to replace or repair any material damage or any loss of the goods insured or will be used to reimburse the Cooperating Country for the replacement or repair of such goods. Any such replacement will be of source and origin of countries listed in A.I.D. Geographic Code 935 as in effect at the time of replacement, and, except as the Parties may agree in writing, will be otherwise subject to the provisions of the Agreement.

SECTION C.8. U.S. Government-Owned Excess Property. The Cooperating Country agrees that wherever practicable United States Government-owned excess personal property, in lieu of new items financed under the Assistance should be utilized. Funds under the Assistance may be used to finance the costs of obtaining such property for the Project.

Article D: REFUNDS; NONWAIVER OF REMEDIES

SECTION D.1. Refunds.

(a) In the case of any disbursement which is not supported by valid documentation in accordance with this Agreement, or which is not made or used in accordance with this Agreement, or which was for goods or services not used in accordance with this Agreement, A.I.D., notwithstanding the availability or exercise of any other remedies provided for under this Agreement, may require the Cooperating Country to refund the amount of such disbursement in U.S. Dollars to A.I.D. within sixty days after receipt of a request therefor.

(b) If the failure of the Cooperating Country to comply with any of its obligations under this Agreement has the result that goods or services financed under the Assistance are not used effectively in accordance with this Agreement, A.I.D. may require the Cooperating Country to refund all or any part of the amount of the disbursements under this Agreement for such goods or services in U.S. dollars to A.I.D. within sixty days after receipt of a request therefor.

(c) The right under subsection (a) or (b) to require such a refund of a disbursement will continue, notwithstanding any other provision of this Agreement, for three years from the date of the last disbursement under this Agreement.

(d) (1) Any refund under subsection (a) or (b), or (2) any refund to A.I.D. from a contractor, supplier, bank or other third party with respect to goods or services financed under the Assistance, which refund relates to an unreasonable price for or erroneous invoicing of goods or services, or to goods that did not conform to specifications, or to services that were inadequate, will (A) be made available first for the cost of goods and services required for the Project, to the extent justified, and (B) the remainder, if any, will be applied (i) if in connection with a Grant, to reduce the amount of the Grant, or (ii) if in connection with a loan, to the installments of Principal in the inverse order of their maturity and the amount of the Loan reduced by the amount of such remainder.

SECTION D.2. Nonwaiver of Remedies. No delay in exercising any right or remedy accruing to a Party in connection with its financing under this Agreement will be construed as a waiver of such right or remedy.

Article E: ADDITIONAL PROVISIONS (Grant Assistance Only)

SECTION E.1. Termination. Either Party may terminate this Agreement by giving the other Party 30 days written notice. Termination of this Agreement will terminate any obligations of the Parties to provide financial or other resources to the Project pursuant to this Agreement, except for payment which they are committed to make pursuant to non-cancellable commitments entered into with third parties prior to the termination of this Agreement. In addition, upon such termination A.I.D. may, at A.I.D.'s expense, direct that title to goods financed under the Grant be transferred to A.I.D. if the goods are from a source outside Cooperating Country, are in a deliverable state and have not been off-loaded in ports of entry of Cooperating Country.

SECTION E.2. Interest on Funds

Any interest or other earnings on Grant funds disbursed by A.I.D. to the Cooperating Country under this Agreement prior to the authorized use of such funds for the Project will be returned to A.I.D. in U.S. Dollars by the Grantee.

SECTION E.3. Air Transportation

Transportation by air, financed under the Grant, of property or persons, will be on carriers holding United States certification, to the extent service by such carriers is available. Details on this requirement will be described in a Project Implementation Letter.

SECTION E.4. Assignment

The Cooperating Country agrees, upon request, to execute an assignment to A.I.D. of any cause of action which may accrue to the Cooperating Country in connection with or arising out of the contractual performance or breach of performance by a party to a direct U.S. Dollar contract with A.I.D. financed in whole or in part out of funds granted by A.I.D. under this Agreement.

Article F: TERMINATION; Remedies (Loans only)

SECTION F.1. Cancellation by Cooperating Country. The Cooperating Country may, by giving A.I.D. 30 days written notice, cancel any part of the Loan which has not been disbursed or committed for disbursement to third parties.

SECTION F.2. Events of Default: Acceleration. It will be an "Event of Default" if the Cooperating Country shall have failed: (a) to pay when due any interest or installment of principal required under this Agreement, or (b) to comply with any other provisions of this Agreement, or (c) to pay when due any interest or installment of principal or other payment required under any other loan, guaranty or other agreement between the Cooperating Country or any of its agencies and A.I.D. or any of its predecessor agencies. If an Event of Default shall have occurred, then A.I.D. may give the Cooperating Country notice that all or any part of the unrepaid Principal will be due and payable sixty (60) days thereafter, and, unless such Event of Default is cured within that time:

- (1) such unrepaid Principal and accrued interest hereunder will be due and payable immediately, and
- (2) the amount of any further disbursements made pursuant to then outstanding commitments to third parties or otherwise will become due and payable as soon as made.

SECTION F.3. Suspension. If at any time:

- (a) An Event of Default has occurred; or
- (b) An event occurs that A.I.D. determines to be an extraordinary situation that makes it improbable either than the purpose of the Assistance will be attained or that the Cooperating Country will be able to perform its obligations under this Agreement; or
- (c) Any disbursement by A.I.D. would be in violation of the legislation governing A.I.D.; or
- (d) The Cooperating Country shall have failed to pay when due any interest, installment of principal or other payment required under any other loan, guaranty, or other agreement between the Cooperating Country or any of its agencies and the Government of the United States or any of its agencies;

Then A.I.D. may:

- (1) suspend or cancel outstanding commitment documents to the extent they have not been utilized through irrevocable commitments to third parties or otherwise, giving prompt notice thereof to the Cooperating Country;

- (2) decline to issue additional commitment documents or to make disbursement other than under existing ones; and
- (3) at A.I.D.'s expense, direct that title to goods financed under the Assistance be transferred to A.I.D. if the goods are from a source outside Sri Lanka, are in a deliverable state and have not been offloaded in ports of entry of Sri Lanka. Any disbursement made under the Loan with respect to such transferred goods will be deducted from Principal.

SECTION F.4. Cancellation by A.I.D. If, within sixty (60) days from the date of any suspension of disbursements pursuant to Section F.3., the cause or causes thereof have not been corrected, A.I.D. may cancel any part of the Assistance that is not then disbursed or irrevocably committed to third parties.

SECTION F.5. Continued Effectiveness of Agreement. Notwithstanding any cancellation, suspension of disbursement, or acceleration of repayment, the provisions of this Agreement will continue in effect until the payment in full of all Principal and accrued interest hereunder.

A.I.D. Loan Number: 383-T-025A

Project Number : 383-0055

AMENDMENT NUMBER ONE
TO
PROJECT LOAN AND GRANT AGREEMENT
BETWEEN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
AND
THE UNITED STATES OF AMERICA
FOR
REFORESTATION AND WILDLIFE MANAGEMENT

Dated: August 29, 1980

A.I.D. Loan No. 383-T-025A

A.I.D. Project No. 383-0055

AMENDMENT NUMBER ONE

TO

PROJECT LOAN AND GRANT AGREEMENT

Dated August 29, 1980

BETWEEN

The Democratic Socialist Republic of Sri Lanka ("Cooperating Country")

AND

The United States of America, acting through the
Agency for International Development ("A.I.D.")

WHEREAS, the Cooperating Country and A.I.D. entered into a Project
Loan and Grant Agreement for Reforestation and Watershed Management on
July 8, 1980, and

WHEREAS, A.I.D. now desires to make available to the Cooperating
Country additional funds for the said Project,

NOW THEREFORE, the Cooperating Country and A.I.D. hereby amend the
said Agreement as follows:

1. Article 3 : Financing

SECTION 3.1. The Loan. Delete the words "not to exceed two million
United States ("U.S.") dollars (\$2,000,000) ("Loan")" and substitute in
lieu thereof the words "not to exceed three million four hundred thousand
United States ("U.S.") dollars (\$3,400,000) ("Loan")".

SECTION 3.2. The Grant. Delete the words "not to exceed five hundred
thousand United States ("U.S.") dollars (\$500,000) ("Grant")", and sub-

stitute in lieu thereof the words "not to exceed nine hundred fifty thousand United States ("U.S.") dollars (\$950,000) ("Grant")".

2. Article 5 : Conditions Precedent to Disbursement

Add the following new Section 5.6.:

"SECTION 5.6. First Disbursement under Amendment Number One.

"(a) Prior to the first disbursement under Amendment Number One to this Agreement, or to the issuance by A.I.D. of documentation pursuant to which disbursement thereunder will be made, the Cooperating Country will, except as the Parties may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D., an opinion of counsel acceptable to A.I.D. that the said Amendment Number One has been duly authorized and/or ratified by, and executed on behalf of, the Cooperating Country, and that it and the Agreement as thereby amended constitute valid and legally binding obligations of the Cooperating Country in accordance with all of their terms.

"(b) If the condition specified in this Section has not been met within ninety (90) days from the date of Amendment Number One, or such later date as A.I.D. may agree to in writing, A.I.D., at its option, may terminate this Agreement, as amended, by written notice to the Cooperating Country. A.I.D. will promptly notify the Cooperating Country when it has determined that the condition precedent specified in this Section has been met."

3. All other terms and conditions of the Agreement dated July 8, 1980, shall remain in full force and effect.

IN WITNESS WHEREOF, the Cooperating Country and the United States of America, each acting through its duly authorized representative, have caused this Amendment Number One to be signed in their names and delivered as of the day and year first above written.

THE DEMOCRATIC SOCIALIST
REPUBLIC OF SRI LANKA

UNITED STATES OF AMERICA

By: W.M. Tilakaratna

Name: W.M. Tilakaratna
Title: Secretary
Ministry of Finance
and Planning

By: Donald R. Toussaint

Name: Donald R. Toussaint
Title: American Ambassador