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

CAPITAL ASSISTANCE PAPER

A.I.D.
Reference Center
Room 1858 NS

Proposal and Recommendations
For the Review of the
Development Loan Committee

JAMAICA - FORESTRY DEVELOPMENT

532-L-008

AID-DLC/P-2006

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532-22-170-038
532-L-008

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

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AID-DLC/P-2006/3

July 3, 1973

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Jamaica - Forestry Development (Addendum)

When subject paper AID-DLC/P-2006 was distributed to you under covering memo dated June 21, 1973, it specified that Annex III, Exhibit A-6 would be sent to you at a later date to complete the information submitted in the paper.

Annex III, Exhibit A-6, Page 1 of 1 is attached, and we request that you insert it in the proper place in the DLC Paper for Jamaica Forestry Development.

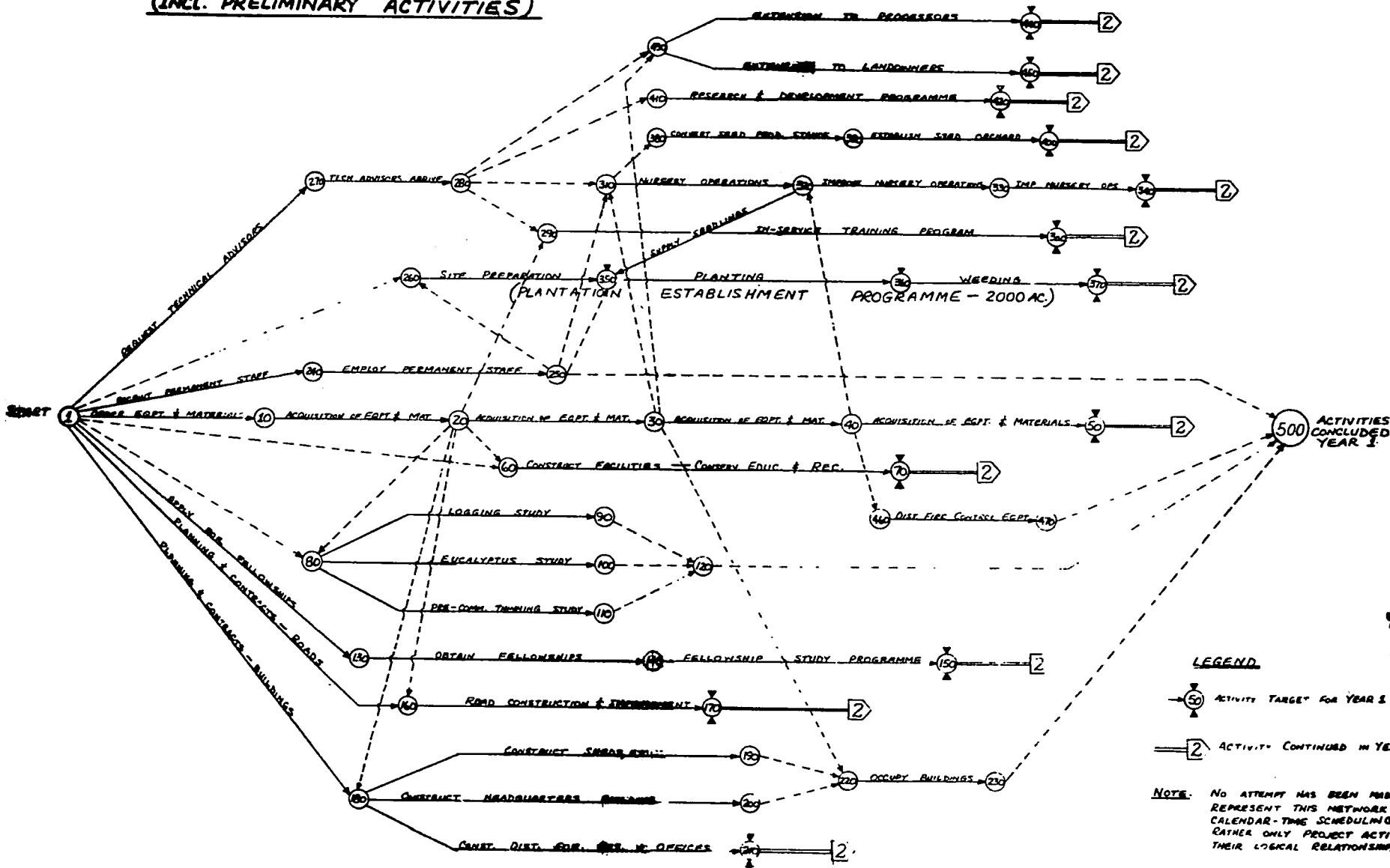
Development Loan Committee
Office of Development
Program Review

Attachments: (Addendum dated July 3, 1973)
Annex III, Exhibit A-6, Page 1 of 1

Previously Distributed: (June 21, 1973)
Memorandum for the DLC
Summary and Recommendations
Project Analysis
Annexes I - V

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GOJ/US AID FORESTRY DEVELOPMENT PROJECT. YEAR 1 IMPLEMENTATION PROGRAMME. (INCL. PRELIMINARY ACTIVITIES)



Addendum
July 2, 1973

ADD-DIC/1-1
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FORM 3
EXHIBIT A-6
Page 1 of 1

LEGEND

- (50) Activity Target for Year 1
- (2) Activity Continued in Year 2

NOTE. NO ATTEMPT HAS BEEN MADE TO REPRESENT THIS NETWORK IN A CALENDAR-TIME SCHEDULING FORMAT. GATHER ONLY PROJECT ACTIVITIES AND THEIR LOGICAL RELATIONSHIPS AND

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

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AID-DLC/P-2006

June 21, 1973

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Jamaica - Forestry Development

Attached for your review are the recommendations for authorization of a loan in an amount not to exceed \$4,400,000 to the Government of Jamaica to assist in financing the foreign exchange and local currency costs of goods, services and technical assistance necessary to support a program to improve the utilization and to expand Jamaican forest resources and infrastructure.

Please advise us as early as possible, but in no event later than close of business on Thursday, June 28, 1973, if you have a basic policy issue arising out of this proposal.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analysis
ANNEXES I - V

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ANNEXES

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- Exhibit B - State Cable 72871 dated 4/19/73
- ANNEX III - Exhibit A-1 - Proposed Forest Department Organization Chart
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- Exhibit B-1 - Cross Section of Forest Access Road
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- ANNEX III - Exhibit C-3 - Basic IRR Model
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- Exhibit C-4 - Schedule of Annual Sawlog Volumes from 7,000 Acres of Existing Pine Plantations
- Exhibit C-5 - Employment Opportunities by Year Generated by 7,000 Acres
- Exhibit C-5/A - Employment Opportunities by Year Generated by 8,000 Acres
- Exhibit C-6 - Standing Timber Volumes by Year on 7,000 Acres of Existing Pine Plantations
- Exhibit C-7 - Employment Opportunities by Year Generated from a Total Land Base of 70,000 Acres of Caribbean Pine
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- ANNEX IV - Environmental Impact of the Project
- ANNEX V - Checklist of Statutory Criteria

SUMMARY AND RECOMMENDATIONS

1. Borrower: The Borrower will be the Government of Jamaica (GOJ), acting through the Ministry of Finance. The Executing Agency will be the Forest Department (FD), a sub-entity of the Ministry of Agriculture.

2. Loan:

(a) Amount: U.S.\$4,400,000

(b) Terms: 30-year repayment period, including a 5-year grace period on principal, with interest at 2% during the grace period and 3% thereafter.

3. Purpose: The purpose of this loan is to provide financial assistance to the Government of Jamaica in support of its program to improve the institutional capability of the Forest Department (FD) to manage and efficiently administer existing and expanded forest resources. The Government plans an increasing role for this rural development sub-sector in attacking high priority national development goals, including: increasing employment, substantial reductions in imports, conservation of Jamaican natural resources and diversification of land use, channeling capital and entrepreneurial skills into socially useful activities, as well as efforts to decrease the rate of urban migration. The Government recognizes that success in achieving these objectives depends upon a sound and experienced organization capable of coordinating and managing its program.

4. Project Description: Since independence in 1962, every Jamaican Administration has included Forest Development as part of its national policy objectives, and has demonstrated support for such development by the yearly allocation of significant budget resources (see Table B-1 p. 5). With small, untrained staffs and difficult working conditions, the Forest Department and predecessor agencies have made good use of these resource commitments in that they have managed standing forests and existing nurseries and have undertaken additional plantings such that the total acreage under direct government control and supervision is now 274,000, including 19,231 acres of plantations, comprised of approximately 9,964 acres of Caribbean pine, 702 acres of other pine, 4,780 acres of various hardwoods and 3,785 acres of Mahoe, an attractive hardwood, unique to Jamaica. While these forest stands constitute a

substantial appreciating asset, they are insufficient to bring Jamaican forest development to its take-off stage. What must be done to take advantage of these initial investments is commencement of a program which expands Jamaican institutional capacity, and, at the same time, enlarges the raw material base over a reasonable period of time to the point where domestic commercial processors can be assured of standard quality supplies in sufficient, guaranteed, quantities to justify reasonable capital investment. The acreage expansion financed under the loan sets the stage for later planned increases in government forests and attracting timberland investment by private landholders, which, together, will provide the essential supply.

Unquestionably, the commercial benefits of forests plays the key role in generating private sector interest and therefore in formulating the level and kinds of activities of the Forest Department. The Project is designed to allow the FD to manage a substantially larger commercial acreage which will supply the initial raw material base, and this increase in managerial responsibility is one of the fundamental institution building tools. However, without participation of the private sector as one of its prime concerns, the function of the FD would be essentially to attend to modest forest growth which it is probably now equipped to do. Project elements relating to the private sector include demonstration projects in wood processing, timber sales and extension activities, as well as the creation of a Forest Industry Development Committee (FIDC) to plan a balanced investment network of domestic wood production and wood processing.

The Project is designed to permit the FD to develop its capacity in harmony with increasing responsibility over a three-year period. During the first Project year, technical assistance and training will strengthen the technical capability of the FD, while construction of the new central headquarters and regional offices will be started to provide the administrative complex needed to supervise GOJ forestry activities. Concurrently, seed production, nursery improvement, and plantation establishment will continue at an increasing rate, as well as initial efforts at private sector analysis and development, and public education. Throughout the remaining two Project years, plantation establishment and the other described activities will proceed at a measured pace, reflecting the growing absorptive capacity of the Jamaican FD staff and additions to the physical complex. Throughout the Project life, technical consultants, probably USDA Forest Service technicians, will provide expertise, as necessary, drawing upon U.S. short term advisors, to complement other donor technical assistance activities.

During the three year Project period, a total of 8,000 acres of Caribbean pine plantations (2,000 acres in year I, 2,5000 in year II, and 3,500 in year III) will be established. By the last year of the Project, the acreage to be planted should be sufficient to sustain the necessary yearly level of timber production needed for eventual self-sufficiency. The magnitude of this newly planted acreage, in addition to relating directly to the institution building process, affects other substantial benefits anticipated from the Project. For example, the amount of acres under cultivation determines the number of man days of work generated, and, therefore, the impact on regional unemployment and underemployment. As discussed in the body of the paper, the immediate effect on the rural and semi-rural employment situation on the eastern half of the Island (not including Kingston), due to the geographical concentration of the Project, is not insignificant. The additional direct employment effect over the three years of the Project will be an increase of 407,026 man days, or approximately 3,700 part-time jobs (due to the seasonal nature of forestry), in addition to the 498 man years of full-time forestry jobs created in the professional, technical and administrative fields.

The Project also offers a future potential solution to the broader problems of urban unemployment and migration by instituting pilot projects, whereby unskilled or semi-skilled workers are transported daily from adjacent urban communities, as well as Kingston, to rural work sites. Additionally, the future employment opportunities created by the 8,000 acres of the Project are likely to be considerable. A total of 1,571,400 man days, or approximately 14,267 part-time jobs, directly related to forestry, should be created over the next 22 years (the maturation period or "rotation cycle" for Caribbean pine plantations under the Project). It is difficult to estimate the exact number of secondary and tertiary jobs to be created during this time, but the future generation of permanent "spin off" employment in the wood processing industries should amount to a sizeable number of employment opportunities.

The foreign exchange benefits of the rise in domestic timber production are also likely to be significant, as the savings in foreign exchange will rise to approximately U.S.\$25 million by 1995, when the Caribbean pine planted under the Project comes to maturity. This is a considerable savings for an island economy, such as Jamaica's, in which most consumer items and a great deal of agricultural products are imported. Further, the existence of a guaranteed source of softwood timber supply, with its numerous economic implications (See P. 43), has extremely important ramifications.

5. CONSOLIDATED FINANCIAL PLAN
ESTIMATE AND SUMMARY
(U.S. \$000)

	<u>Calendar Year</u>				<u>Total</u>
	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	
<u>GOJ</u>					
LC <u>1/</u>	500	1,010	805	357	2,672
U.S. \$	-	-	-	-	-
<u>A. I. D.</u>					
I.C	605	1,071	1,054	514	3,244
U.S. \$ <u>2/</u>	396	442	270	-	1,098
Subtotal	<u>1,001</u>	<u>1,513</u>	<u>1,324</u>	<u>514</u>	<u>4,352</u>
TOTAL	<u>1,501</u>	<u>2,523</u>	<u>2,129</u>	<u>871</u>	<u>7,024</u>

1/ Local currency is expressed in U.S. dollars. The exchange rate is U.S.\$1.00 = J\$.90

2/ U.S. dollar expenditures consist of (1) Technical assistance, \$276,000; (2) Training, \$132,000; and (3) Equipment, \$690,000.

6. Other Sources of Funds: The Ex-Im Bank, IDB, and IBRD have indicated no interest in financing this Project, Other free world financing is not available on reasonable terms.

7. Statutory Criteria: All Statutory Criteria of the U.S. Foreign Assistance Act of 1961, as amended have been met (see Annex

8. Country Clearance: The Country Team has concluded that this proposed loan is an integral part of the country's high priority in developing its rural resources and directly contributes to the realization of basic development objectives in Jamaica.

9. Issues: All issues outlined in the IRR meeting (see cable, Annex II, Exhibit B) were examined in depth during the Intensive Review and are discussed in the content of the CAP.

10. Recommendations: It is recommended that a U.S.\$4.4 million loan to the GOJ be authorized, subject to the following terms and conditions:

a) Repayment of the loan by the GOJ within thirty (30) years of the date of disbursement, including a five (5) year grace period. Interest rate of two percent (2%) will be charged during the grace period and three percent (3%) thereafter. Interest and principal will be repaid in U.S. dollars in semi-annual installments.

b) Other Terms and Conditions

1) The loan will be disbursed to the borrower in both U.S. dollars and Jamaican dollars. U.S. dollars utilized under the Loan to finance local currency costs shall be made available pursuant to procedures satisfactory to A.I.D.

2) Procurement of equipment, training and technical assistance under the loan will have source and origin in countries included in A.I.D. Geographic Code 941.

An outline of the remaining conditions precedent and covenants of the loan agreement follows:

c) Conditions Precedent to Initial Disbursements

1) The GOJ shall provide evidence satisfactory to A.I.D. that the Forest Department has sufficient professional, technical and administrative staff,

has executed a contract with the Project technical consultant and has firm commitments by other international donors for technical assistance, all necessary to carry out activities planned for implementation during the first year of the Project.

2) Standard A.I.D. conditions precedent following signing of the Loan Agreement.

d) Conditions Precedent for Disbursements other than Technical Assistance and Related Procurement

Prior to disbursement of loan funds other than for technical assistance and related equipment, the GOJ shall provide to A.I.D.:

1) Evidence that all Project lands are government-owned and, whether acquired by eminent domain or otherwise, held with clear title.

2) A Master Implementation Plan covering the full three-year Project period and future GOJ commitments, as well as a detailed first-year Implementation Plan containing, inter alia, a PERT/CPM scheduling of the areas of activity proposed for execution, and GOJ commitment of physical, human and budgetary resources necessary to accomplish the first year Implementation Plan. Part of the first year Implementation Plan will be the plan for construction and maintenance of roads included in the Project, maintenance of all loan-procured equipment, as well as evidence that easements have been obtained for all roads to be constructed in the period. Prior to commitment of A.I.D. funds for each subsequent Project year, a similar plan will have been developed for the succeeding year and submitted to A.I.D. during the annual loan review, for approval.

3) Establishment of a Forest Industry Development Committee (FIDC) composed of representatives of the Forest Department, Jamaica Industrial Development Corporation, National Planning Agency, Jamaica Development Bank, and such other appropriate members as the GOJ may desire. The purpose of the Committee will be to coordinate activities in wood production and processing, and to formulate policies and guidelines directed at providing the necessary private sector incentives to assure proper use and development of forest resources.

The Borrower shall further covenant that recommendations regarding such private sector incentives will be reviewed with the FIDC and A.I.D. within one year of the execution of the Loan and that implementation of agreed upon incentive measures will be similarly reviewed within the succeeding year.

4) Evidence of the provision in the Jamaican FY 74 of no less than the U.S. equivalent of J\$2,152,571 for FD annual operating costs and contribution to the UNDP/FAO forestry project, and a direct Project contribution of no less than J\$309,000. The Borrower shall further covenant to support the Project through yearly budget allocations to the FD in amounts sufficient to accomplish the purposes of the program in conformance with the time-phased plan.

e) The GOJ shall covenant to sustain the future expansion of forest reserves at a rate no less than the targets mutually agreed upon in the Master Implementation Plan by A.I.D. and the GOJ, unless otherwise agreed. The GOJ shall also insure sufficient future allocation of budget resources to maintain the roads and acreage developed during the Project period.

f) Covenants

1) The GOJ covenants to make GOJ contributions for all project activities available on a timely basis.

2) The GOJ will endeavor to provide adequate incentives to attract private sources of capital and human resources into the forestry sector.

3) The GOJ will attempt, to the maximum extent feasible, to provide linkage between the GOJ/USAID Rural Feeder Roads Project and the Forestry Development Project.

CAPITAL ASSISTANCE COMMITTEE

Loan Officers: Thomas C. Ivers, LA/DR
Richard M. Seifman, LA/DR
Economist : Sher J. Rana, LA/DR/EAD
Engineer : Candeloro C. Donato, USAID/Kingston
Forest Management Advisor: Robert V. Potter, USDA/FS
Forest Financial Advisor: Gary Steber, USDA/FS

I. NATURE OF THE PROJECT

A. Project Background

Origin of the Project

As a result of Prime Minister Hugh Shearer's visit to President Nixon in August of 1970, the President authorized the creation of a U.S. Economic and Social Development Commission to Jamaica to examine Jamaica's social and economic development needs, and to determine in what ways the U.S. could be of assistance. The Commission, headed by former Ambassador Maurice Bernbaum, held extensive consultations in Washington and Jamaica during November and December of 1970. Prior to departure for Jamaica, the Commission met with various U.S. Government departments and agencies concerned with economic relations with Jamaica. The Commission was impressed that, despite Jamaica's continuing ability to increase its development efforts and services, the country was suffering from a dangerously high level of chronic unemployment, a serious shortage of skilled manpower, and a depressed agricultural sector, unduly dependent upon the production of a small number of traditional primary crops.

During discussions in Jamaica, the Prime Minister expressed to Commission members his special concern about the persistently high rate of unemployment, and he requested U.S. assistance in attacking this basic problem. Of a wide number of possible high priority, labor intensive projects, the Commission was requested to examine a list of projects that fell into four general categories: financial institutions, management studies, employment programs, and social development. In the area of employment programs, the Ministry of Finance requested loan assistance for various labor intensive public works projects which could be undertaken quickly and without extensive engineering or other technical study, including: (1) afforestation, (2) river control, (3) rural road maintenance and improvement, (4) minor water supplies and (5) improvement of national parks.

Of the above projects, the Commission specifically recommended two projects, rural roads and afforestation, for serious consideration by the U.S. or other donors, because of their importance to Jamaica's rural development. The Rural Feeder Road was subsequently authorized in June 1971.

An initial forestry development project proposal was made by the GOJ to USAID/Jamaica in August 1972. This proposal encompassed a time period considered by AID to be too long for disbursement purposes and too general in nature to serve as the basis for a request for assistance. It was agreed, after a meeting of the Minister of Agriculture with representatives from USAID, that a new plan, covering a lesser period of time, and providing a more specific workplan, would be submitted. On October 19, 1972, the outline of a new, six-year proposal was received by USAID, as well as a request for technical assistance in the preparation of a Forestry Development Project. As a result of this request, a team, consisting of a loan officer and two Forest Service technicians, (a silviculturist and a forest management advisor), spent three weeks in Jamaica (early this year) to determine the feasibility of a forestry loan project and to prepare an Intensive Review Request. Extensive technical work in Jamaica followed, and this loan paper is the result of such efforts, the series of studies done by the UNDP/FAO and the work of the GOJ Forest Department.

Since 1967, the Forest Department has been advised by the bilateral assistance program of C.I.D.A., as well as by the UNDP/FAO through its project for "Forestry Development and Watershed Management in the Upland Regions". The UNDP/FAO Project, during its initial five-year period, July 1967 - June 1972, in cooperation with the FD, has established a good foundation for forestry expansion by preparing some 38 publications, including the preparation of forest inventories, cost/benefit analyses, and studies of various forest operations, such as soil suitability, forest growth rates and other topics. The project also established a pilot forestry demonstration project, as well as a watershed demonstration center, prepared a land use for Jamaica and initiated guidelines and plans for establishing a forest road system. The UNDP/FAO project is currently in a one-year "bridging" operation, and in July will begin a two-year second phase which will feature a continued technical assistance component of two forest technicians, one to be engaged in demonstration logging techniques, the other concentrating on setting up a demonstration sawmill and wood utilization center located near Kingston. The mill will utilize the domestic Caribbean pine now being cut from mature stands, while the wood utilization center will serve to assist small sawmills in modernizing their technology, and, at the same time, to introduce the wood products industry to locally produced, treated, Caribbean pine lumber. The UNDP/FAO effort, in this fashion will closely complement the GOJ/AID Project. The former has been shaped to a large extent by the planning and discussions which preceded the formulation of this Project.

B. Program Justification

1. Place of the Project in the Country Program

The project is one of the two specific high priority recommendations of the 1971 Report of the U.S. Economic and Social Development Commission to Jamaica. As such, the USAID/Jamaica-Embassy assigns a high priority to the Forestry Development Project, as expressed in the FY 1973 Country Field Submission.

2. Jamaican Priority for the Project

The Jamaican Government, in its request to the UNDP for technical assistance, as stated in the "Country Program" of April 17, 1972, sets forth its two highest priorities for the period January 1, 1972 to June 30, 1975 as: (1) the development of manpower resources and (2) the revitalization of agriculture through the productive use of idle lands and greater cost efficiency. The emphasis placed on these two priorities is not based on short-term considerations alone, and, while amelioration of the immediate unemployment and productivity problems is considered indispensable to a stable political and economic climate, the GOJ realizes that a long-term strategy is necessary to full development of the agricultural sector.

Another expression of the high priority which Jamaica places on the development of forestry is shown in the "National Physical Plan for Jamaica - 1970-1990" (October 1971), prepared by the Ministry of Finance and Planning with the assistance of the UNDP. The Plan sets forth the need for forestry development for obvious reasons, such as import substitution, employment opportunities, rural industry development, the creation of recreation facilities and the stabilization of rural populations. In addition, the GOJ views forestry development as an indispensable element of rational land use and conservation, as well as a means for watershed protection. In conjunction with better land use, the GOJ has developed an agricultural zoning approach and now requires a development plan for land holdings of over 100 acres.

With specific reference to the Forestry Development Project, both the Prime Minister, as well as the Minister of Agriculture have expressed keen personal interest. The Ministry of Finance has carried out this mandate by making a high level of financial commitment to the project.

3. Consistency with CIAP Review

The proposed loan is in keeping with recommendations resulting from the 1973 CIAP Review of the Jamaican economic situation, which identified the following elements of the economy, among others, as priority areas requiring action:

a. Balance of Payments - "Government efforts at diversifying export markets and import sources are strongly encouraged."

b. Employment - "As an important element in the strategy to reduce the unemployment rate are efforts destined to directing increments in the domestic product. It is recommended... that the Government make additional efforts toward directing investment to these three (agriculture, textiles or food processing) sectors."

c. Agriculture - "As land is a scarce resource, emphasis must be put on increasing land productivity, partly by concentrating on more labor - intensive crops."

The CIAP Sub-Committee, referring to the use of new external financing by international agencies in the above priority areas, stated that: "The availability of such funds and their increasing trend toward such projects become extremely important factors in relation to the overall development strategy....these factors are also important to the sectoral strategies derived from this strategy. In this regard, the attainment of the targets of the public sector investment program is of paramount importance."

4. FAA Section 611 (e) Certification by the USAID Mission Director

The AID Affairs Officer in Jamaica certified on May 29, 1973 that the borrower had performed satisfactorily with respect to previous AID loans and to the capability of the GOJ to implement the proposed loan. The certification is attached as Annex II, Exhibit A.

5. The Executing Agency

The Jamaica Forest Department, created in 1942, and headed by a Conservator of Forests, is an agency of the Ministry of Agriculture.

As the sole GOJ organization responsible for the development and preservation of all GOJ Forest Reserves, the FD maintains jurisdiction over approximately 274,000 acres of forest land, in addition to operating seven tree nurseries, four recreation areas and a fence post treatment plant.

The FD is a decentralized organization, although overall administrative direction and technical and administrative services staff are located in the headquarters office in Kingston. The field staff are located in four geographic Regions (Northern, Southern, Central and Western). (See Annex III, Exhibit A-3 Map of Forest Reserves, Regions and Districts.) The Department has a total permanent staff of 222, 11 of which are professionals, 159 are technical personnel, and 52 provide clerical and administrative services. (See FD present organization chart, page 6 .)

The 11 professional officers constitute the principal "line" positions of the organization. They are currently filled by six Jamaicans and three expatriate professional foresters (on special contract) and by two Jamaican technicians on an "acting" or temporary basis. In addition, four other professionals and one technician are being trained through UNDP/FAO fellowships. Nine of the staff currently filling technical positions are graduates of one year forest ranger schools.

Large numbers of unskilled laborers have been employed annually to construct and maintain forest roads, operate tree nurseries, survey property boundaries, inventory forests, plant tree seedlings, remove undergrowth and weeds on planting sites, thin plantations, operate a fence post treatment plant, and maintain forest recreation sites.

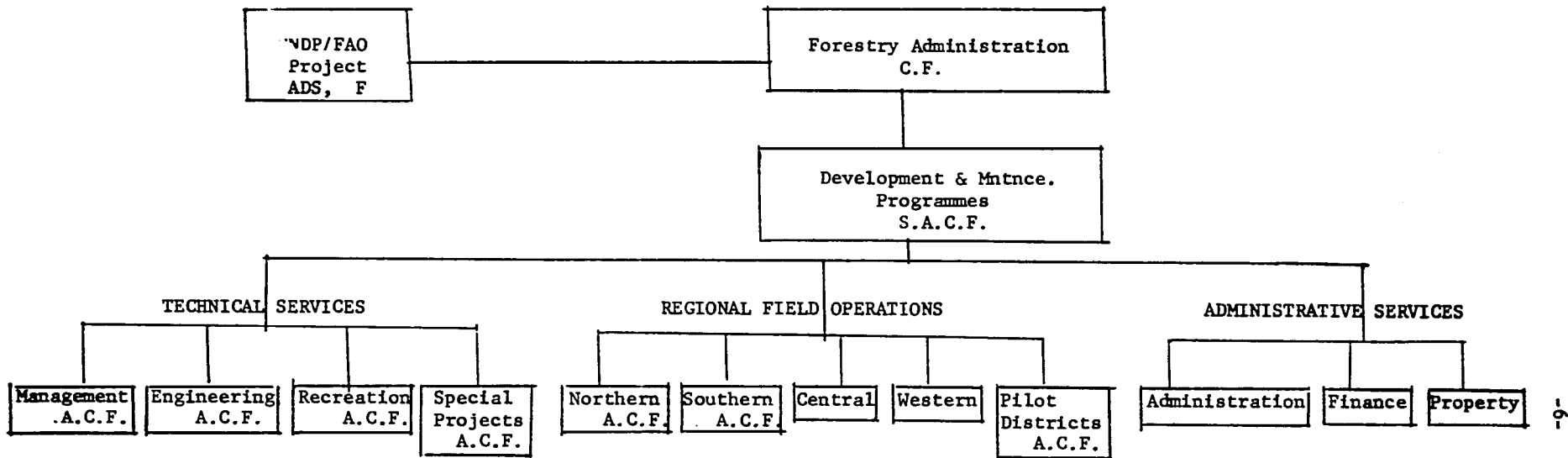
The operating budget of the Forest Department has continued to rise in recent years, indicating a serious desire on the part of the government to undertake additional public sector activities in this sector, as can be seen from the following:

TABLE B-1
FOREST DEPARTMENT BUDGET

<u>FY</u>	<u>Recurrent</u>	<u>Capital</u>	<u>Total</u>	<u>Percentage Change</u>
1968/69	438,568	606,000	1,044,568	--
1969/70	479,816	706,000	1,185,816	14
1970/71	675,229	718,500	1,393,729	18
1971/72	898,441	540,547	1,438,988	3
1972/73	1,014,407	770,000	1,784,407	24

Source: GOJ, Forest Department

ORGANIZATION CHART
FOREST DEPARTMENT
JAMAICA, MAY 1973



KEY

- C.F. -- Conservator of Forests
- S.A.C.F.-- Senior Asst. Conservator of Forests
- A.C.F. -- Assistant Conservator of Forests
- A.D.S. -- Assistant District Supervisor
- F. -- Forester

II. PROJECT ACTIVITIES

A. Technical Description and Analysis

1. The Physical Setting: Jamaica is the third largest of the Caribbean Islands, with about 4,400 square miles (2,816,000 acres). It is 146 miles long and has a maximum width of 51 miles and 550 miles of coastline.

Repeated submersions and volcanic uplifts of Jamaica throughout time have left it with a variety of landforms, a wide range of soils, and significant mineral deposits, notably bauxite. Interior mountain ranges form the spine of Jamaica and are highest and most rugged in the east where the Blue Mountains attain an elevation of over 7,000 feet. Soils in these highlands are derived from ancient igneous, volcanic, and metamorphic rocks. Both lithosols and clay types of soil are capable of supporting coniferous forests, and both are liable to rapid surface erosion upon removal of forest vegetation.

In the central part of Jamaica, from Stony Hill in the east of the Cockpit Country in the West, the terrain is characterized by limestone hills, plateaus, and mountains, rising up to an elevation of 3,000 feet. The highlands are composed chiefly of granite, shale, and conglomerate soils, capable of supporting coniferous forests. The surface soils of the upland plateaus have a high organic content on which agricultural use depends, and there is a wide variance in soil depth, which, in turn, determines suitability for coniferous forest growth on these sites.

The coastal plains and interior valleys are typified by alluvial soils (loam, sand, gravel, and clay), and in some places are well suited for large-scale commercial agriculture. In the western and south-western parts of Jamaica the coastal plains are covered by large swamps.

The excellent tropical climate of Jamaica is one of the country's greatest assets, both as a basis for economic development and in producing a good living environment. Temperatures are warm and equable (mean minimum 67° - maximum 83° F) throughout the year, and a relatively high average annual rainfall varies from about 50 inches on the coast to over 200 inches at the highest elevations.

The physical and demographic features of Jamaica strongly influence its pattern of land use. (See Table A-1, Land Use Distribution - 1970, below). Agriculture is the predominant activity, extending over 46% of the land area. The major export crops (sugar, bananas, citrus, etc.) occupy the coastal plains, valleys and foothills;

mixed farming on small individually-owned farms takes up the central upland; and the pasture and grasslands occupy the north-central and western parts of Jamaica. Urban areas account for 3.7% of the land area, and mining (mostly bauxite) occupies 7,000 acres, or 4% of the land. Forest and other woodlands cover almost 44% of the country, mostly areas of rugged terrain, such as the Blue Mountains and the Cockpit Country and the dry, hilly uplands of poor soils in the southern, western, and north-western parts of Jamaica. Outside of the Cockpit Country and the Blue Mountain Forest Reserve, most of the forests or other woodlands are comprised of "ruinate" or second growth trees. A considerable portion of the forest and woodlands has productive potential that is not now being used.

Table A-1
Land Use Distribution - 1970

<u>Land Use</u>	<u>Acres</u>	<u>Percent</u>
Forest	655,000	24.1
Other Woodland	538,000	19.8
Agriculture, including pasture	1,258,000	46.4
Natural range and grassland	103,000	3.8
Swamp	50,000	1.8
Mining	7,000	.4
Urban	100,000	3.7
Barren	4,000	.1
Total	<u>2,715,000</u>	<u>100.0</u>

Source: National Atlas of Jamaica.

2. Historical Background of Forestry in Jamaica: It is reported that Jamaica, at the time of its discovery by the Spaniards, was covered with dense forest and abounding with streams. This led the Spanish to name the country "Xamayca", derived from the indigenous Arawak Indian language and meaning "land of wood and water".

The Spanish and later the British brought about the cultivation of large scale sugar estates using slave labor. After slavery was abolished, the shifting pattern of land cultivation led to the exploitation of mountain slopes and a subsequent deforestation and erosion of mountain lands. These lands became progressively less productive, but until 1935 no effective steps were taken to protect the soils and forests of the country. In that year the Forest Branch of the Lands Department was created, and in 1937 a Forestry Law was passed, designed primarily to preserve the wooded areas of Crown Lands. In 1938 the Forest Branch was transferred to the Department of Agriculture and was involved mainly in the demarcation and reservation of protective forests. The Forest Department was established in 1942,

The principal interest at that time being to protect the forest reserves and to promote afforestation, mainly for soil protection purposes. During the first ten years of the agency, a modest planting program was developed (approximately 400 acres per year) utilizing a large number of native and exotic tree species under various site conditions. Of these species, Caribbean pine was found to be the most promising and was adopted as the principal plantation species.

With the attainment of political independence in 1962, an expanded planting program was launched, and in 1967 a Five year UNDP/FAO Forestry Development and Watershed Management Project was inaugurated. The UN project carried out a number of technical studies which contributed to a Forest Development Plan, prepared in late 1971.

3. Forest Conditions: Existing forests cover about 660,000 acres, or 24% of Jamaica's land area^{1/}. Of this, 190,000 acres (29%) consist of well stocked broadleaved natural forest, and 460,000 acres (70%) are classed as "ruinate" or unstocked non-commercial forest. The Government owns 274,000 acres (44% of total) for forest (i.e., Crown Lands), of which 19,231 acres are in plantations. Much of the existing natural forest is not readily available for exploitation because of its value for watershed protection, its proximity to established recreation areas, because of steep and inaccessible terrain or the paucity of usable trees.

In 1962 an annual FD planting target of 1,200 acres was established and was increased to 3,000 acres in 1968. Forest Department planting records (See Table A-2, Plantation Establishment by Forest Department, below) indicate that by the end of 1972, Caribbean pine had been planted on 9,964 acres, including 665 acres of Water Commission lands for which the Department has responsibility for forestry activities. In addition, other species of pine had been planted on 702 acres, and 8,565 acres of broadleaved hardwoods also were planted. Peak planting accomplished was 2,145 acres in 1970.

Table A-2
Plantation Establishment (Acres) by GOJ Forest Department^{1/}

<u>Years</u>	<u>Caribbean Pine</u>	<u>Other Pine</u>	<u>Mahoe</u>	<u>Honduras Mahogany</u>	<u>Other Hardwoods</u>	<u>Total</u>
Up thru 1961	1,783	628	2,994	11	1,266	6,682
1962	705	-	49	104	-	858
1963	201	-	30	109	42	382
1964	289	-	85	112	33	519
1965	533	-	68	108	37	746
1966	343	-	130	174	78	725
1967	601	27	92	88	6	814
1968	1,341	47	198	385	133	2,104

^{1/}UNDP/FAO Forest Inventory, 1968

Table A-2 (Cont'd)
Plantation Establishment (Acres) by GOJ Forest Department^{1/}

<u>Years</u>	<u>Caribbean Pine</u>	<u>Other Pine</u>	<u>Mahoe</u>	<u>Honduras Mahogany</u>	<u>Other Hardwoods</u>	<u>Total</u>
1969	720	-	126	278	67	1,191
1970	1,484	-	13	434	402	2,145
1971	1,019	-	-	656	60	1,735
1972	945	-	-	354	41	1,340
Total thru '72	9,964	702	3,785	2,813	1,967	19,231

^{1/}Based on Forest Department Planting Records (May 1973) and includes Caribbean pine plantations established on Water Commission lands by FD in 1966, 1970, and 1971.

The experience gained by the Forest Department during the last twenty years of plantation establishment, plus the various studies carried out by the UNDP/FAO Forestry Development and Watershed Management Project, have confirmed that forestry development in Jamaica is both feasible and profitable using Caribbean pine. This species has survived and grown well on sites less than 4,500 feet elevation, between 20° - 40° slopes, having annual rainfall of 50-160 inches, and having shale, lithosol, or deep "terra rossa" soils. Growth and yield studies conducted by the UNDP/FAO Project have confirmed that in 20 years, Caribbean pine will yield volumes of wood ranging from a low of 4,475 cubic feet/acre (Mean Annual Increment 224 cu.ft/annum to a high of 5,604 cu.ft/acre (M.A.I. 280 cu.ft/annum). This is based on a planting of 680 trees/acre, a reduction of 400 to 500 trees/acre at age five years, mainly due to mortality, and a thinning of one-fourth the stand volume at age 6 years.

Further investigation of land suitable for Caribbean pine plantation was carried out by the UNDP/FAO Project. (A survey was made in the Northern and Southern Regions, and estimates were made for the Central and Western Regions.) The criteria of suitability adopted were:

- (1) Environmental: Soils derived from shales, conglomerates and igneous rocks within the 50 in. to 160 in. rainfall zone.
- (2) Harvesting Limit: Slopes above 40° were assumed to be too steep for economic establishment and extraction of wood.
- (3) Agricultural Competition: It was assumed that slopes of less than 30° would be required for agricultural crops. Most of the land with slopes less than 30° and with suitable soil is at present used for agriculture.

The results of this investigation are shown in Table A-3 below:

Table A-3
Areas of Land Suitable for Carib Pine Plantations

	<u>Forest Reserves</u>	<u>Private Property</u>	<u>Total</u>
Northern and Southern Regions	14,500	83,000	97,500
Central and Western Regions	<u>1,000</u>	<u>79,000</u>	<u>80,000</u>
Total	<u>15,500</u>	<u>162,000</u>	<u>177,500</u>

Of the 83,000 acres privately held in the Northern and Southern Regions, 26,600 acres are wooded in one form or another and are not presently used for agriculture, while the remaining 56,400 acres are used for small mixed farming. In the Central and Western regions the present use of the 79,000 private acres was not determined.

It is obvious that large-scale expansion of forest plantations in Jamaica will require lands that are now in private ownership, as well as those owned by the Government. Government acquisition of the private lands is obviously one alternative. The leasing of such lands is another. A more practical approach, in the long run, would be the encouragement of private landowners through the use of Government incentives (i.e., technical assistance, free seedlings, tax concessions, etc.) to plant trees on their land and participate voluntarily in the production of marketable forest products.

4. Utilization of Forest Resources

The production of softwood timber from Forest Department Plantations has been very limited and in 1968 - 1969 was valued at only US\$26,400. About one-quarter of the volume was estimated as coniferous timber and only about 20% as logs, with the major portion being utilized for sleepers, firewood, fence posts, rafters, and yam sticks. The production of coniferous timber outside Government plantations was negligible.

Although no reliable data is available for domestic production of hardwood timber from private lands, estimates derived from sawmill capacity and use indicate that it may range from 1.5 to 4.5 million cubic feet per annum. Tentative figures (UNDP/FAO) for local production of fuelwood, yam sticks and fence posts indicate an additional production of from 25 to 30 million cubic feet.

The forest industries now processing local woods consist of 84 primitive sawmills and several small furniture and joinery factories. The sawmills usually operate on a part-time basis, cutting hardwood sawlogs obtained from private property. Output from the mills is in short lengths and is poorly sawn, due to poor equipment and the absence of sawmilling skills. Extraction and transport of logs from the forest to the sawmill is labor intensive and devoid of modern equipment and techniques. Modern commercial logging is not yet in evidence.

5. Outdoor Recreation

Although the rural people of Jamaica have long had close contact with the natural forests, public awareness of forestry conservation is virtually lacking - the transient farmer cuts and burns forest vegetation to make room for yams and bananas, while the urban dweller seeks retreat to the mountain forest areas for relief from the heat and the crowds of the city. The four existing recreation areas, three in the Northern and Southern Regions, and one in the Central Region are receiving increasing use but are inaccessible to the majority of people, due to a lack of transportation facilities. There are no facilities or activities designed to engender public understanding or support for the systematic management of trees and forest areas to produce wood, water, recreation opportunities, and other amenities on a sustained basis. Such facilities and information need to be made available to a wider spectrum of the population. The establishment or improvement of conservation education and recreation facilities at seven sites throughout the island will be designed to meet these public needs by attracting public attention to forestry activities, encouraging public interest and support, and at the same time providing low-cost, popular, outdoor recreation.

6. The Project and Its Scope of Operations

The GOJ seeks to increase the production of goods and services that are obtainable from managed forests. This is a long-term undertaking that can and should be started now, with external assistance. It will develop in stages, the first and most fundamental requirement being the existence of a public (Government) forestry institution that has the technical and managerial capability to administer the expanded program of resource development and management. In this regard, the existing Forest Department of the Ministry of Agriculture is the best base on which to build. Reorganization to strengthen and clarify line and staff functions, increase in staff,

training of professional and technical staff, construction and improvement of buildings and facilities, establishment of radio communication, and increase in mobility of staff are objectives which will be achieved under the project, not only at the headquarters, but in the four regional offices as well.

The expansion and protection of a timber raw material base is the second main task. This will be initiated through the establishment of 8,000 acres of Caribbean pine plantation on Government lands in the Northern and Southern Regions, where sufficient blocks of Government land suitable for this species are already available. (See Annex III, Exhibit A-4, Map of Project Activities).

Because of the more gentle terrain and lower tree planting and extraction costs in the Central and Western Regions, efforts there will concentrate on motivating private land owners to establish Caribbean pine plantations on their lands. (There are 79,000 acres of private land suitable for such use in these regions.) This will be achieved through the extension of technical assistance and information to land owners and through the demonstration of profitable methods of pine plantation establishment.

Industrialization, extraction, processing, and utilization of domestic Caribbean pine is the third and final goal to be achieved under the GOJ/AID Forestry Development Project. Technical assistance and information will be directed to the operators of sawmills ("sawbenches") and to other wood processors. A study of timber extraction (logging) methods and equipment and a demonstration timber sale to illustrate commercial feasibility will be conducted in the Central Region. This will complement similar activities currently being conducted in the Northern and Southern Regions jointly by the Forest Department and the UNDP/FAO Forestry Project. These activities consist of a logging study in the more rugged, less accessible terrain of the two above regions, and of the establishment of a modern, band sawmill near Kingston for use in demonstration and training purposes.

7. Strengthening of the Institution

(a) Staff Development

In order to effect an expanded program of forestry development in Jamaica, the Forest Department will need to increase the strength of its professional, technical and administrative staff, as well as upgrade the quality of staff work performed through short inservice and long range training programs. During the Intensive

Review, an investigation was conducted into the existing capabilities of the Forest Department and agreement was reached regarding the number and kinds of additional personnel required to carry out the various phases of project implementation.

The expanded workload to be imposed by the Project and the level of supervision required to reach the productivity needed to insure the economic feasibility of the Project will require the expansion of the FD organization by 13 professional, 123 technical, and 30 administrative staff, to a minimum level of 24 professionals, 282 technical and 82 administrative positions, respectively. (See Annex III, Exhibit A-2, Forest Department Staffing). The increase of 13 professional positions, mainly at the Assistant Conservator of Forest level, will improve managerial and technical competence of the Department. Each of the "line" officers in charge of a Region will be a professional forester, as will be each of the key technical staff officers in charge of the training, research and development, forestry extension, and engineering units in the headquarters office (see Annex III, Exhibit A-1, Proposed Forest Department Organization Chart). In the technical area, this will provide sufficient depth in the positions that supervise field crews (i.e., Headman and Works Overseer) to insure that the work of the unskilled laborers will increase in quality and quantity from the marginal levels of performance that currently exist. (See Annex III, Exhibit A-9 for current productivity levels.) The increase of 30 Administrative Services positions will be spread throughout the Department (10 at headquarters, 20 at field offices) to handle the increased amount of personnel records, documentation of field activities, correspondence and property management generated by the Project.

In addition, 15 man/years of long term training will be provided to develop 6 foresters to the professional level, and 16 man/months of short term technical training will be provided for 7 people in the areas of forest seed production and nursery management, timber sales preparation and management, forestry extension, and forestry research and development.

(b) Training

Training for the FD can be divided into two parts: (1) the in-service training of primarily staff technicians in certain operational areas, such as forest access road construction, tree planting and thinning

techniques, and (2) medium to long term training for the purpose of building up, over time, Jamaican technical and professional expertise in forestry.

The first of these activities is intended to complement the existing and ongoing efforts of the FAO/UNDP and CIDA. Training will focus on identified areas of FD weakness related to project execution, and will utilize work manuals developed in other countries, audio-visual equipment and on-the-job training techniques. Particularly for the in-service program, close cooperation is expected with the Public Works Department of the Ministry of Works and with the Civil Service Commission, both of which are undertaking similar sorts of activities.

The medium to long term training package is designed primarily for personnel at the management/professional level to improve their capacity to handle expanded resources and growing responsibilities. The mix and timing of intensive courses (1 - 3 months) and long term training will reflect FD staffing needs during the project period as well as thereafter.

(c) Building and Facilities

The headquarters staff of the Forest Department are located in the FD headquarters building as well as in office facilities at the UNDP/FAO Forest Project Office (both offices are located in Kingston). The headquarters facilities provide office space of only 6,000 sq. ft. and are already overcrowded and obsolete. The FD lease on the building will expire this year and will not be renewed. The UNDP/FAO Project office is expected to continue through June, 1975, but these office facilities can be expected to accommodate no more than about 20 FD personnel during that time.

The growth of the FD staff during the three years of the Project, and the increase expected thereafter, will require more adequate and permanent office facilities. Therefore, a new FD headquarters office will be constructed during the first year of the Project on land already in GOJ ownership and in close proximity to the present office. The new building, which will be financed by the GOJ contribution, will contain 21,000 sq. ft. of office space, will cost approximately US\$416,000 and is expected to generate about 18,900 man days of labor.

Similarly, additional accommodations are needed for both the existing and expanded field staff. In year I, the GOJ contribution to the Project will support the construction of one District Forester's residence, two District Forester's residence/offices, and two detached

District Forester's offices. The total cost will be approximately US\$54,000, and the labor expected to be generated is 2,400 man days. In year II, four detached residences and three residences with attached offices will be built, costing a total of US\$75,000 with the amount of labor generated estimated at 3,400 man days. Furniture will be provided by the GOJ for the 7 offices at a total cost of US\$9,000.

(d) Mobility and Communication

The effectiveness of the expanded and decentralized FD staff will depend, to a very large degree, on its mobility and communications capability. The foresters and technicians must necessarily travel to the field to do their work. They need reliable transportation and fast reliable communications facilities to enable coordination of their activities with others, and both of these are essential for fast and effective control of forest fires.

In support of these activities, the Project will purchase 21 "Jeep"-like vehicles (e.g., International Harvester "Scouts") with 4 wheel-drive for field officers (see Annex III, Exhibit A-8, Equipment Purchase List). Five of the six Extension Foresters and the Training Officer will be provided with a small passenger vehicle. A 10-passenger bus (or possibly a panel truck or station wagon) will be purchased for use in transporting FD personnel to and from training activities at the training centers and in the field. These vehicles will cost a total of US\$116,000. As indicated in the Equipment Purchase List, other vehicles will be purchased for transportation of labor crews and tree seedlings to work sites. In addition, a radio communications system, consisting of 10 base station transmitter-receiver sets, 20 mobile transmitter-receiver sets, and 12 portable transmitter-receiver sets, will be purchased at a total cost of US\$53,000.

(e) Technical Assistance

The FD professional staff are well informed about forestry technology; however, they are more limited in their ability to apply modern technology and work methods, due mainly to a lack of managerial skill at the middle-management level of the organization. The technical assistance to be provided by the Project is designed to cope with this problem. The technical advisors should be experienced managers of programs that employ modern, but not highly sophisticated forestry techniques. Due to the institution building nature of the Project, it is suggested that technical assistance be obtained from the Forest Service and U.S. Department of Agriculture

under existing AID/USDA PASA arrangements. The technical advisors should be assigned to the Project as follows:

(1) Technical Advisor in Forestry Administration, 3 Man Years - (in residence for the duration of the Project) The Technical Advisor, who will closely monitor Project activities and progress, will be the only U.S. resident technician, as most of the technical assistance essential to the Project will be of a relatively short term nature. The Technical Advisor will advise and assist the Conservator of Forests and his Deputy Conservator in the overall management and coordination of the many and varied technical activities under the Project, and will assist in strengthening the managerial capacity and other institutional needs of the Forest Department. The role of the Advisor is a key one, as AID does not employ staff with the necessary technical background, and USAID's monitoring capacity would be considerably less effective without this arrangement.

(2) Forestry Training, 1/4 Man Year in Year I of Project - to assist the Assistant Conservator of Forests (ACF) in charge of training in developing and implementing a continuing program of short-term training activities that are designed initially to resolve operational problems of the Project.

(3) Applied Forestry Research and Development - 1/4 Man Year in Year I of Project - to assist the ACF for R & D in organizing a series of studies and field trials that will enable relatively fast and practical application of existing technology to solve Project and resource problems.

(4) Forestry Extension with Sawmillers and other Wood Processors - 1 Man Year in Year I - to advise and assist the 3 ACF Extension Foresters in developing a program of assistance to private sawmillers and wood processors that will generate more profitable, less wasteful utilization of Jamaican timber.

(5) Forestry Extension with Land Owners - 1/2 Man Year in Year I - to advise and assist the 2 ACF Extension Foresters in developing a cooperative program with private landowners that will generate widespread but voluntary establishment of Caribbean pine plantations on private lands.

(6) Management of Forest Nurseries and Production of Tree Seed - 1/3 Man Year in Year I - to advise and assist the FD in improvement of the operation of existing nurseries and in the establishment of Caribbean pine Seed Production Stands and Clonal Seed Orchards.

(f) Program Planning, Implementation and Control

This Project is but the first stage of a permanent and comprehensive forest resource management program. It has a sound biological basis in the ecological conditions that already exist, but the managerial base must be developed in both the public (GOJ/FD) and private sectors.

The limitations of existing middle management will, in this project, be offset by the technical assistance and training previously described, and by selected planning and management devices. A PERT/CPM network analysis of the Project on an overall and a regional year-by-year basis (see Annex III, Exhibit A-6, First Year Implementation Plan, and Annex A-7, Input/Output Analysis) is being developed by the FD in cooperation with the Project Review and Development staff of the office of the Prime Minister (See Annex III, Exhibit A-5, Planned Implementation Schedule). This plan will be adapted and used by the FD's Project Monitor for use in maintaining Project coordination and control. The Project Monitor will advise the SACF (Senior Assistant Conservator of Forests) in charge of Field Operations in relation to the scheduling of Project events, e.g., procurement of equipment and materials, construction of roads, etc. and about the status of progress in meeting Project targets. The SACF, in turn, will use this information as the basis for generating operational decisions, as well as action by appropriate units of the FD to keep the Project on schedule.

8. Caribbean Pine Resource Development

(a) Plantation establishment

Caribbean pine plantations will be established directly on 8,000 acres of Government land (North 2400 Ac. + South 5600 Ac.) over a 3-year period (2000 Ac. + 2500 Ac. + 3500 Ac.). (See Annex III, Exhibit A-4, Map of Project Activities). This will require site preparation to remove vegetation from the planting strips, tree planting by hand of 680 Caribbean pine seedlings per acre, at a spacing of 8 x 8 feet, and finally two weedings to remove or reduce vegetative competition. These three events will occur twice each year to accommodate the April - May and October - November planting (rainy) seasons.

It is estimated that these activities will provide employment opportunities of 68,000 man days (MD) of labor in Year 1; 117,600 MD in Year 2; 12,380 MD in Year 3 and 80 man-years of supervision during each of the three years.

Field trials are already underway by the FD to determine the possibility and methodology for

using chemical herbicides in reducing weedy competition to the newly planted pines. The use of a water solvent systemic herbicide (Atrazine) appears promising. (It has already been proven successful in Puerto Rico). If practical application proves to be feasible on the plantation sites in Jamaica, most of which are in valuable watershed areas, a reduction in plantation establishment costs by as much as 30 - 40% may be possible.

The trees grown in these new plantations are expected to yield about 59 million board feet of sawn wood and panels in year 20^{2/}, 73.7 million in year 21, and 103.3 million in year 22. This compares with the present 1971 imports of about 40 million board feet of soft sawnwood and panels valued at approximately US\$5.5 million. Jamaica's projected demand for softwood lumber in year 20 (1993) is about 80 million board feet. These newly established plantations, then, would provide most of the softwood sawntimber needed by the country in 1993 - 5.

(b) Seed Production and Nurseries

The Caribbean pine plantations, at a tree spacing of 8 x 8 feet, require about 700 pine seedlings per acre for plantation establishment. On this basis, 1.4 million seedlings will be needed in year I of the project. 1.75 million in Year II, and 2.45 million in Year III, in the Northern and Southern regions. The FD currently operates 4 nurseries in the Southern region, producing a total of between 500,000 to 1,500,000 Caribbean pine seedlings per annum, depending on needs. It is expected that these nurseries will supply all the seedlings required by the Project, with no expansion and only minimal improvement in current facilities and work methods. The additional irrigation systems at 3 nurseries, garden tractors and trailers, and improved seedling containers at all four, at a total cost of US\$12,000, are the material inputs required to increase production to the level needed. Technical assistance under the Project will aim at improving techniques of nursery operation and management.

The FD currently imports from British Honduras 300 to 400 lbs. of Caribbean pine seed annually at a cost of US\$38/lb. to supply the needs of its seven nurseries. The seed is "woods run" (i.e., collected from natural forests without regard to quality of source trees) and is increasingly in short supply in the Caribbean area. Establishment of Jamaican seed production areas and seed orchards will be accomplished under the Project to create reliable domestic supplies of higher quality Caribbean pine seed than are now available to Jamaica from external sources. In Year I a total of 131 acres

^{2/}Based on G. Steber (USDA/Forest Service) estimate of yield of 29,500 bd.ft./acre at 20 yrs. at avg. dbh of 13^{1/2}" after precommercial thinning at age 6.

of existing plantations will be converted to seed production areas by thinning the present stands to leave about 100 evenly distributed trees per acre. In Year II, the program will be expanded to bring the total area of Seed Production Areas to 200 acres. On these areas the residual seed trees (about 20,000) will be fertilized and kept free of competing (for soil nutrients and moisture) vegetation.

Beginning about 5 years after establishment, the seed trees are expected to produce about 1 to 2 oz. of clean, viable seed per tree/year or a total annual production of about 1250 to 2500 lbs. of seed, currently priced at US\$38/lb. This quantity will be sufficient to meet domestic needs (about 300 lbs.) and make available a limited quantity (1000 - 2000 lbs.) for export. The volume of timber to be removed in Years I and II by commercial timber sale, during the establishment of the Seed Production Areas, is estimated at 1,752,000 board feet, currently valued at US\$135,000 (\$77 per 1000 board feet.)

In Year I a Seed Orchard of 20 acres will be established on a low, hot, level site of 60 - 80 inches of rainfall, where the soil is well drained and acid in reaction. This site will be cleared of existing vegetation and in Year II planted with locally grown Caribbean pine seedlings at a stocking of 100 trees/acre, evenly spaced. In the meantime, about 2000 scions (a small branch with a terminal bud) will be removed from about 50 superior trees (having the best available tree form, crown development, and growth rate) scattered throughout the existing Jamaican plantations. In the latter part of Year II, after the seedlings in the Seed Orchard are well established, the scions will be grafted on the seedlings, and the seedlings will be fertilized and irrigated to stimulate rapid growth and vigorous crown development. A total annual yield of up to 400 lbs. of superior seed may be expected by year 12. This should be adequate for domestic needs and to enable the export of small quantities. Experience in the southern United States and the Fiji Islands indicated that the productivity of future plantations established with such seed may be expected to increase substantially in quantity, quality, and value.

A small forest seed store will be established to facilitate the drying of pine cones, and sorting, cleaning, and testing of seeds. Only a storage shed for pine cones and open space on which tarpaulins can be spread are needed during the 3 year Project. Cold storage facilities for the preservation of seed should continue to be rented. Later, in 5 - 10

years, as local seed supplies increase, larger and more efficient facilities will be needed. A total of 3580 man days of labor employment will be generated by these activities in Year I, 2486 (MD) in Year II, and 3049 (MD) in Year III.

(c) Applied Research and Development

The FD is already working on various development projects including possibilities in the symbiotic growing of coffee with Caribbean pine, selected seed production, and so forth. The Project would finance some short-term technical assistance in specialized areas of research as well as the equipment and materials necessary to carry out test programs. The FD will employ an applied research and development specialist to plan and coordinate with operational personnel the application in Jamaica of forestry technology which is appropriate for Jamaica but which has been developed elsewhere. This will require short term field trials and pilot studies to resolve operational problems. No long term basic research will be undertaken.

(d) Fire Protection

A modest investment of US\$3300 for fire fighting hand tools is provided for this activity in the Project. The training of forest laborers in the use of these tools and in the suppression of forest fires will be done under the proposed training program (see 7(b) for a full discussion of training). Although the risk of forest destruction and damage by fire is not high, it is expected to increase, due to the greater inflammability of the pine plantations as compared to the indigenous broad-leaved hardwood forests. The provision of hand tools and training will establish the basis for subsequent development of the FD fire control capability.

(e) Forest Extension to Private Landowners

Forest extension activities will consist of providing assistance to private landowners on technical matters, in demonstration of good planting, identification of domestic wood product values and markets, and implementation of promotional activities to inform the private sector about incentives available, in coordination with the Forest Industry Development Committee. The demonstration of good site preparation, tree planting and weeding measures on the cleared areas of the Demonstration Timber Sale will be a major undertaking for the extension foresters, working with landowners.

Private plantation forestry development will complement the expansion of plantations on Government lands. The greatest potential for private plantations, initially, is probably on the larger holdings, but Government incentives and technical support to encourage private forestry need to be more fully considered to lead to the formulation of realistic schemes. The goal of this extension effort will be to motivate Caribbean pine plantation establishment on 1000 acres of private land in Year II and 2000 acres in Year III.

The Extension Foresters will not engage in the broad spectrum of usual agricultural extension activities, such as small and medium sized farm planning, credit analysis and approval, which would require considerable staff and administrative support. However, during the Intensive Review, at least three GOJ institutions, the Agricultural Credit Board, The Jamaica Development Bank, and the Small Business Loan Board, indicated that they would be interested, in principle, in supplying credit to private forestry operations. Another institution, the Jamaica Industrial Development Corporation, offered to provide expertise to persons preparing requests for financial assistance from the above organizations.

As presently conceived, AID technical inputs in this area would be scheduled for the first two project years, but actual timing would depend on the establishment of the Forest Industry Development Committee and selection of FD personnel designated to carry out the program.

(f) Conservation Education and Recreation

Facilities such as an information kiosks, picnic shelters, nature trails, rest rooms and parking space will be installed at seven existing sites. Tent camp sites will also be installed at two of the seven locations. The installations will be in the location of existing recreational areas and will provide easiest access to the majority of people. The kiosks will house posters, photos, hand-out materials, as well as other visual aids that describe the local ecology and and forestry development work visible from the site. The other facilities will be designed primarily to accommodate low cost, day-use by local citizens and community groups. The materials used to build the facilities should, to the extent possible, come from local sources.

The activities should generate 2880 man days of labor employment in Year I, 4470 in Year II, and 2370 in Year III.

9. Caribbean Pine Processing and Utilization

(a) Extension to Industrial Wood Processors

The major share of the forestry extension effort will be aimed at developing, in the private industrial sector, the capability for extracting, transporting, sawing, finishing, and marketing Caribbean pine grown in Jamaica. A logging study will be conducted in Year I in the Central Region to demonstrate the extracting (logging) equipment and techniques most suitable for the landscape in both the Central and Western regions. In Year II, a demonstration timber sale, utilizing the logging methods and equipment used in the previous study, will be conducted by the FD to demonstrate timber cutting, logging, and hauling methods that are technically sound, economically efficient, and suitable for protecting the environment. The sale will occur over about 50 acres each of Caribbean pine and Eucalyptus plantations, and the timber will come from selective thinnings as well as from clear fallings. The various Eucalyptus species are included in the sale, as they present a special problem. About 1618 acres of Eucalyptus plantations exist and are ready for harvest, but adequate markets have not been developed. If cleared of the existing Eucalyptus, the sites can be planted to Caribbean pine, which promises a higher return.

Meanwhile, during Years I and II of the Project, the Forest Industry Extension Specialists will be working with the more progressive operators of sawbenches and sawmills to help them adapt their equipment and work methods to utilize some of the Caribbean pine and Eucalyptus logs coming from the demonstration timber sale.

By Year III, it is expected that private lumber and sawmilling businesses will be ready to purchase Government timber (stumpage), as well as extract and process it on a profitable basis. It also is expected that by then the FD will have completed the planning of the allowable cut (amount of timber to be harvested) and the preparation of timber sales, so that it can launch a permanent, systematic program of timber harvest on a sustained basis (i.e., commensurate with the volume of timber being grown). The assurance of reliable, future supplies of timber is a prerequisite for securing and maintaining the involvement of private industry in the domestic timber activity.

The combined FD work and the required labor estimated by the commercial loggers to complete the timber sales should total about 1040 man days in Year I, 2740 man days in Year II, and 3940 man days in Year III.

B. Engineering Analysis

1. General Description of Forest Roads

Forest roads in Jamaica are constructed simply to provide minimal access to designated forest lands, and are not intended to generate traffic, nor are they built for general vehicle use. (During the plantation establishment stage ADT is estimated at 10-15 light vehicles.) The Project includes 18.5 miles of new forest road construction, as well as 1.5 miles of road improvement. In the first year, 11.5 miles of new road and 1.5 miles of road improvement will be constructed, all for second year Project use. The new roads will be built along government rights-of-way to government-owned forests and will be either extensions of existing forest roads or connections to trunk roads of the National Highway Network. To the extent feasible, rural feeder road construction under AID Loan 532-L-006 will relate to forest roads.

At present, the Forest Department has approximately 105 miles of existing forest road in four regions, of which 43 miles are adjacent to the Project area. These roads are presently being maintained within the annual operational budget of the FD at somewhat less than desirable standards. While the funds have been relatively sufficient to provide for labor costs, there has not been enough for purchase of any capital equipment. Therefore, some of the maintenance equipment financed under the Loan will be used for work on some of the 43 miles of existing forest road in areas adjacent to new plantation establishments. This will not entail additional capital expenditure beyond what is contemplated, nor further unskilled labor wage outlays, but will require some new GOJ funding of operators, spare parts, lubricants and fuel costs for the equipment. Using the equipment for this purpose is recommended for several reasons: (a) it is likely that the equipment for the Project will all be purchased at one time and will be available to the Forest Department before the first Project year roads require extensive maintenance, and (b) the more experience FD has in road maintenance, using capital equipment, the greater likelihood of effective maintenance on Project roads once they are complete and part of the system.

2. Engineering Plan for Forest Access Roads

The Forest Engineering Unit will have prime responsibility for the selection, construction, improvement and maintenance of forest roads. Headed by the Chief

Forest Engineer, it is organized to carry out design, construction, and maintenance of roads, as well as other engineering activities related to actual logging operations. The Forest Engineering Unit will provide the necessary inputs to plan construction, insure cost control and maintain all forest roads. It will also provide personnel through the foreman and work overseer level for construction of the forest access roads.

Construction will generally be done by force account, under the supervision of the Forest Engineering Unit, though some work may be done by contract. For work by force account, engineering to the degree required for low standard roads, but sufficient to furnish a reasonably firm cost estimate, will precede actual construction. Work will be measured monthly, and field work records will show the cost breakdown of major construction items (labor, equipment, and materials) for comparison of actual against estimated costs. A minimum of one forest engineer and one foreman will be available during the construction period for each section of road to be built.

For work by contract, complete design, specifications and contract documents will be prepared under the supervision of the Forest Engineering Unit as a basis for solicitation of bids and contract award to the lowest responsive bidder. The Unit will supervise the work to insure compliance with specifications and certify payment requests. Work will be measured monthly and payments made against contractor invoices. A project committee will be formed of USAID and Forest Department representatives to plan and review the following:

- (a) The prequalification of contractors.
- (b) Design, specifications, bid documents prepared by or under the supervision of the Forest Engineering Unit.
- (c) Selection and procurement of equipment.
- (d) Joint inspection of the work to verify quantities for progress or acceptance payments.
- (e) Other appropriate necessary functions.

3. Design Standards

Design Standards have been established for the roads to be constructed. (See Annex III, Exhibit B-1, Cross Section of Forest Access Road.) The roads will have one lane of 12 ft. width with 2 ft. shoulders and a minimum thickness of limestone or other hard material

sufficient to furnish traction during wet periods. The use of asphalt will be confined to surface treatment of steep slopes as needed. It is expected that the major portion of the roads will be on sidehill cuts of slopes of 45° or more, and only light intermittent use is expected for the first three years. After this period, the roads will be set aside with minimum maintenance, until year 16, when upgrading will be required to standards which will support logging trucks. The road surface will be drained inward to side ditches, and slopes will be planted with vegetation to reduce erosion during the dormant period. No major stream crossings requiring bridges are anticipated. Where crossings are necessary, they will be of a fording type of culverts with at least a 12 foot clear width.

4. Cost Analysis and Estimates

Road construction costs are estimated at an average of J\$21,200 mile for new construction during the first three years, while improvement of existing forest roads is estimated at \$10,500/mile. (See Annex III, Exhibits B-2, B-3, and B-4, Construction Cost Analysis, Total Construction Schedule, and Construction Schedule by Location.)

While the Forest Department cost data on prior forest road construction was available for cost analysis, it was not itemized by type of construction material; thus, the cost per mile of road improvements and new construction was primarily derived from the GOJ Public Works Department average estimated unit prices of the Rural Roads Project, as well as other more recent sources of information. Observation by the USAID Project Engineer of present road construction methods and type of road built by the Forest Department indicate that the work can be done within the cost estimates. As each road section is completed and firm cost figures become available, the cost information obtained will be used to re-evaluate existing cost estimates to provide more accurate cost figures for subsequent construction.

Emphasis has been placed on labor intensivity, as far as practical, within a time constraint factor of 40 construction work days per mile. It is estimated that, by using this approach, approximately 50% of road construction costs will be attributed to unskilled and semi-skilled labor per mile of construction, 1,150 man days per mile of road improvements and 110 man days per mile of road maintenance.

re-organized maintenance schedule will be set up under the Forest Engineering Unit, and maintenance equipment will be dispatched to the districts upon request from the regional office. Unskilled labor will be recruited in the district to supplement permanent personnel and equipment, with a coordinated plan for carrying out the work. In addition, serious consideration is being given to the recruitment of laborers in high employment sections of Kingston and transporting them to the job daily. The largest proportion of the project activities will take place in the Southern Region, which is the nearest to Kingston, and several plantation sites in that region are within an hour's drive from the city. Therefore, transportation problems should not be insurmountable, and the costs comparatively reasonable, certainly by comparison to any labor camp undertaking. It is estimated that maintenance costs can be eventually reduced to approximately \$600 per mile, using the above described methods.

While no serious problems are foreseen in the availability of equipment operators, unskilled labor and materials, Jamaica has a persistent problem in obtaining experienced supervisory personnel. The Public Works Department is now planning a construction supervisor and equipment operator school and, has indicated a willingness to permit FD personnel to attend.

C. ECONOMIC ANALYSIS ^{1/}

I. Current State of the Economy

Jamaica's economic growth for the past several years has been quite satisfactory. The GNP continues to grow at nine percent or above, per annum excepting 1971, when it grew by only 5.4 percent. Data about the real **growth rate** is generally not prepared by the GOJ offices, but computations made by the IMF and other international organizations place the real growth during the past five years to be around 2.0%-2.5% per annum.

Population growth has slowed the increase in per capita income by 1-2 percentage points in relation to national income. However, the per capita income of US \$671 achieved in 1972 places Jamaica among the relatively more advanced of the developing nations.

In terms of relative importance, the mining, manufacturing and construction sectors precede agriculture, as indicated in Table A-1. The income originating from this sector remained around J\$78 million from 1967 to 1971, with sectoral growth being negative, in real terms. However, the agricultural sector has recently broken out of stagnation, and in 1972, agriculture's contribution grew by about 7.0 percent in current prices.

Table A-1
Origin of GDP by Sectors
(In Millions of Current Jamaican Dollars)*

	1961	1967	1968	1969	1970	1971	1972
GDP at Factor Cost	462	723	785	869	965	1,032	1,119
Agriculture	55	78	78	77	80	86	92
Mining	44	103	100	125	160	173	190
Manufacturing	65	103	115	121	129	136	145
Construction	52	73	95	105	114	118	122
Services	239	357	387	428	468	504	555
Utilities	5	9	10	13	14	15	15
	<u>As Percent of Total</u>						
Agriculture	11.9	10.8	9.9	8.9	8.3	8.3	8.2
Mining	9.5	14.2	12.7	14.4	16.6	16.8	17.0
Manufacturing	14.1	14.2	14.6	13.9	13.4	13.2	13.0
Construction	11.3	10.1	12.1	12.1	11.8	11.4	10.9
Services	51.7	49.4	49.3	49.3	48.5	48.8	49.6
Utilities	1.1	1.2	1.3	1.5	1.5	1.5	1.3

Source: GOJ Department of Statistics

*J\$ 1.00 equals US\$1.10

^{1/} For a more detailed macro-economic description of Jamaica, see Annex III, Exhibit C-1, Macro-economic Survey of Jamaica.

The principal agricultural products remain sugar cane and bananas, followed by citrus, pimentos and cocoa in descending order of importance (See Table A-2). Some of these crops are currently overproduced in relation to the international demand for them. This places the Jamaican agricultural economy on uncertain and often precarious foundations. The sale of Jamaican sugar in foreign markets, for instance, depends largely on quotas and other restrictions imposed by importing countries. Because of these limitations, Jamaican sugar production in the past was deliberately curtailed. The total area under sugar cane plantation was reduced from 153,000 acres in 1968 to 140,000 in 1969 but gradually increased again to 150,000 acres in 1972 (See Table A-3).

Table A-2
Output of Major Crops and Products in Jamaica
1967 - 1972

	1967	1968	1969	1970	1971	1972
Sugar (000 tons)	449	445	400	370	379	373
Bananas (000 tons)	192	153	151	134	126	127
Citrus (000 boxes)	1,232	1,404	1,258	1,067	1,366	1,102
Pimento (tons)	1,905	2,246	3,225	2,205	1,952	2,032
Cocoa (tons)	1,676	2,344	1,941	1,794	1,827	2,333
Coffee (000 boxes)	1,449	932	1,130	249	299	211
Ginger (000 lbs.)	1,600	1,020	690	671	718	766
Rum (000 gal.)	3,162	2,155	2,853	3,046	3,296	4,792
Molasses (000 tons)	157	156	160	168	150	143

Source: Economic Survey of Jamaica, 1969-72

Table A-3
Sugar Production in Jamaica
1968 - 1972

Calendar Year	1968	1969	1970	1971	1972
Total Acreage Reaped	153,213	140,000	144,000	146,000	150,900
Tons of Cane Per Acre	28.75	28.60	29.27	27.68	26.93
Sugar Produced (000 tons)	445	383	370	379	373
Sugar Exported (000 tons)	383	302	293	299	276
Sugar Exported-Value (J\$000)	34,004	28,586	30,022	30,734	33,765
Average Net (Export) Price per ton	88.80	94.79	102.36	102.91	122.39

Source: Economic Survey of Jamaica - 1972

The agricultural sector suffers from several additional weaknesses, viz., structural dichotomy characterized by a small number of large plantations and a disproportionately large number of small peasant farms; under-utilization of large amounts of arable land; over-intensive cultivation and misuse of steep slopes, etc. Largely because of these structural and international factors, the growth in the agricultural sector has tended towards stagnation. However, despite this poor performance, agriculture provides employment to around 250,000 workers, and nearly one million persons, or half of the island's total population, live on farms.

Forestry currently constitutes the smallest proportion of the agricultural sector but is very important as a source of rural employment. It contributes less than 1% (1.4%) of the Gross Domestic Product, but provides several thousand part-time jobs.

Economic Growth. So far the economy has continued to grow at a respectable rate, due mainly to large foreign investments in bauxite mining and alumina, tourism, and construction activity related to these sectors. Foreign investments and tourism are likely to remain at high levels but the exact magnitude of additional inflow cannot be predicted, especially because of the recent disturbances in the international financial markets. Anticipating these declines and offsetting the ones that have already taken place, the government has increased the public sector investment programs. However, the future growth of the economy cannot be predicted with any certainty.

Population Growth. Until 1971, population growth of the island remained at levels of less than 1.5% per annum. This was due partly to emigration of Jamaicans, especially females of child-bearing age, to the U.K. and the U.S. But in 1972 the population growth reached 2.2 percent per annum.

The Government is trying to control the population growth and **various family** planning centers have been established to **achieve** this objective. In spite of these programs, the latest projections place population growth at around 37 percent during the next 18 years.

Labor Force and Unemployment. In spite of the rapid economic growth, huge capital inflows and restrained population growth, Jamaica continues to suffer from an ever increasing under and unemployment. In October 1969 (the peak of investment and construction activity), the economy had 17.2% of its labor force looking for productive activities and, as of October 1972, the rate of unemployment had jumped to 22.5%.

It is ironic that Jamaica has such a large reservoir of labor, **yet** the majority of these unemployed persons cannot be hired for skilled and **semi-skilled** jobs, which virtually go begging. In the face of existing levels of unemployment, the additional increases in the labor force, especially among the teenage groups, are being viewed with a great degree of seriousness and alarm.

Balance of Payments. In addition to the problems of high rates of population growth, under and unemployment, the economy, after so many years of surpluses, also suffered from balance of payments difficulties. Ordinarily, one year's performance cannot be taken as an indication of a trend, but in the Jamaican context, it can be argued that deficits in overall account may continue in the future also. The reason is that the deficit occurred due to a 30 percent decline in the inflow of foreign capital, especially from the private sector, and there was a big deficit in the trade account also. Since all of the mining and most of the tourist-related foreign investment programs have already been completed, it is unlikely that large scale inflows of foreign private capital, especially at the levels achieved during 1968 - 1969, will resume in the near future.

2. Development Strategy

So far the new Jamaican Government has adopted a definite development strategy that it intends to pursue in the medium and long term. However, from policy actions taken to deal with short-run problems, especially slow economic growth, unemployment, the balance-of-payments crises and inflation, it is possible to assert that, in the short-run, the government intends to rely heavily on fiscal and monetary policies.

It is generally agreed that agriculture is the critical sector of the economy and that much attention needs to be paid to this area. The GOJ has undertaken new initiatives, including an expansion of agricultural credit, income tax incentives and a land tax based on the use made of private land holdings. Besides these actions, some twenty studies (with financial assistance from the IBRD) dealing with the potential and requirements of the agricultural sector, have been completed. After a careful review, appropriate short and medium-term development programs and strategies will be determined.

For the long term development of the economy, it is possible that the strategy developed in the Second Five Year Economic Development Plan, 1970-75, will be used with minor adjustments. In this plan, it was asserted that the Jamaican economy depended heavily on agricultural sector.

3. Regional Considerations

a). CARIFTA

Jamaica is a member of Caribbean Free Trade Association (CARIFTA) ^{2/} which was established on May 1, 1968. This economic bloc represents a free-trade area, although a number of items, including forestry products, are on a reserved list and will not be freed of tariff restraints until 1978. Plans are underway to study the formulation of a common external tariff and to harmonize fiscal incentives. The existing protocol prohibits member countries from importing listed commodities from outside sources until supplies available within the region have been exhausted.

Forestry products, especially softwoods, are not included in the protocol because they are not available in sufficient quantities to satisfy demand within the region. However, Trinidad and Tobago and Jamaica, and to some extent Guyana, have been developing their respective softwood forest resources for the past several years. New plans are underway in these countries to stimulate further growth within the next several years. The overall progress of these forest development programs will determine whether or not the member countries will be able to meet their future domestic demands.

^{3/}The annual per capita consumption of sawn lumber within CARIFTA-^{3/} remained around 31 board feet per person during the period 1960-69. This is well below the world average of 42 board feet per person and could improve if income and population continue to grow and technological developments do not produce reliable and economic substitutes.^{4/}

The lack of a complete series of data on the gross domestic products of the different CARIFTA countries makes it impossible to undertake a statistical analysis in order to estimate future demand of forest products. It has, therefore, been necessary to use simpler methods, and the results can only be considered rough estimates, to be used as general guidelines.

^{2/} Membership includes: Antigua, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts-Nevis-Anguilla, St. Lucia, St. Vincent and Trinidad and Tobago.

^{3/} The main consumption centers in order of importance are: Jamaica, Guyana, Trinidad and Tobago, which collectively represent 75% of the total CARIFTA market.

^{4/} The excessive price increases of the past several months lead some experts to believe that cement, aluminum and plastics may eventually compete for a substantial portion of softwood demand, providing that supplies are sufficient and prices remain competitive.

TABLE I
Projected Demand for Caribbean Pine
in the CARIFTA Markets
 (all figures in millions of board feet)

	Pine Saw Logs	Coniferous Sawwood (MMBF)
1985	156,000	96,000
1990	176,000	103,000
1995	190,000	111,600
2000	205,000	120,400

(NOTE: Pine Sawn Logs data is 1.7 times the amount of coniferous sawnwood).

SOURCE: FAO/CEPAL/UNIDO: "Forest Industries Development in the CARIFTA Region". Santiago, Chile 1972.

Belize (British Honduras) is a potential source of supply, having a total of 3.01 million acres of forest land, out of which 200,000 acres are in natural pine, although these have been heavily logged over. This is the only natural coniferous (softwood) forest in CARIFTA, and the potential of this forest base is currently being assessed by a team of experts from the ODA (Overseas Development Administration, U.K.).

After completion of this inventory, the government intends to develop plans to plant Caribbean pine on a larger scale basis. Although it has not exported any softwood to Jamaica in a number of years, and the future supply of softwood exports cannot be projected with accuracy, it is conceivable that, if the country decides to commit sufficient resources in the future, Belize could be considered as a future supplier of softwoods.

Guyana has large forest reserves (85% of total land), consisting almost entirely of hardwoods, which has resulted in the importing of all softwoods, mostly from Canada and the United States. However, the experimental planting of Caribbean pine plantations on sandy soils has encouraged the government to set aside resources to plant pine on an additional 5,000 acres within the next four years. Forestry Department officials are assessing the domestic and CARIFTA needs for softwoods and are considering planting Caribbean pine on additional lands under the Forest Department jurisdiction if they can determine that demand is sufficient.

Trinidad and Tobago and Jamaica began a Caribbean pine plantation establishment program in the mid-1950's and are currently planting softwoods at an approximately equal rate (approximately 1,000 acres per year) and have at present some 9-10,000 acres each in plantations which are 10-18 years old. Domestic needs are expected to account for all pine timber production in each country.

As a result of expanding construction, for which softwoods are needed, most of the CARIFTA member countries have so far been importing these commodities from Central and North America. Unless Belize decides to reforest its idle lands at a rapid rate, it is doubtful that CARIFTA countries will have any surplus softwoods to export within the next 20-25 years. It is difficult to state with certainty the demand for softwoods in the 1990's, when the trees planted under the loan Project will be ready for cutting. However, under current projections, it appears that the demand for pine softwood will remain at high levels.

b). Central America

At present Jamaica imports most of her softwoods, from Central America, principally from Honduras (63%), followed by Nicaragua and Guatemala.^{5/} Generally the imports are of lower quality (primarily for cost considerations), and since the Central American countries have satisfactory markets for their prime quality woods in Europe and, lately, the U.S. and Japan, Jamaica will probably continue to be considered a less than preferred customer, both in quantity as well as quality. In fact, Jamaica is already experiencing supply difficulties in this regard.

Honduras - Honduras has the most extensive pine and hardwood forests in Central America. About 45% of the country is covered with natural forests, and all stands of pine are suitable for lumbering and commercial use. Due to the fact the forests are left to regenerate naturally, the costs of maintenance and extration have been traditionally low. The main constraint in the extraction of timber to date has been the lack of access to the mature stands of pine. The recent increases in international prices, however, have encouraged government and private business to develop the necessary infrastructure and to extract timber from the heretofore inaccessible areas.

^{5/} Some authorities believe that Central America may not be able to meet higher export requirements after 1980, unless serious reforestation programs are undertaken by Honduras, Nicaragua and Guatemala. Even if plantations were undertaken in these countries today, there would be no effect on supply until the period 1995-2000.

The Honduran forestry sector has been growing rapidly as a result of the current excellent price for wood, and forest products are contributing an increasing percentage to foreign exchange earnings. The government is planning to devote more attention to this sector, and new plans call for control of forest fires, development of modern lumbering methods and reduction of transportation bottlenecks. (A high level team recently visited Germany, and Honduras plans to seek technical and capital development cooperation from that country.) However, although the price of wood is currently at a high level on the world wood market, in the future, Honduran logging and transport costs will rise considerably as the sources of timber are increasingly further removed from the processing locations. Both of the latter factors will increase the cost of imported Honduras pine in Jamaica.

If Honduras takes the initiative in protecting and developing its forest resources, it will continue to remain a major supplier of timber in the Caribbean area. On the other hand, if it does not follow through with current plans, it is unlikely that it will be able to meet the demands of even its traditional customers, including Jamaica, by the time the Jamaican Caribbean pine comes to maturity.

Guatemala - Exactly one half of the total land area (5.4 million hectares) of Guatemala is under natural forests. The government owns 54 percent of the forest lands, while the balance is in private ownership. Forests stocked with Caribbean pine exceed one million hectares and are estimated to contain 30 million cubic meters of wood.

In the past, the forestry resources of Guatemala have been exploited carelessly, and no serious attention was given to this sector. The government has started looking into the potential of forestry and is likely to devote more attention and resources to this sector in the future. The Organization of American States and the Federal Republic of Germany are understood to have agreed to provide both technical and capital assistance to Guatemala for the preservation, development, and expansion of forest lands. FAO recently completed a study of forestry resources of a small section of the country, (4000km²) and a new project, dealing with compilation of an inventory of all existing forests, will be undertaken in two months. Similarly, a study of land suitability for Caribbean pine plantations will be initiated in August 1973. GOG Forest Department officials believe that some 435,000 hectares of existing forest reserve have a potential for planting Caribbean pine and therefore, are considering proceeding in this direction in the near future.

In addition to the federal government, municipal governments are also developing programs to grow Caribbean pine trees on their own lands. If these plans are adopted, they will make Guatemala a viable

source of future supply of softwoods for the region. However, it is not known at this time whether the Government is committed to forest development.

Nicaragua - Roughly one half (47%) of the total land area of Nicaragua is under different kinds of national forests. In terms of acreage, these forests (6.4 million hectares) are the largest among the national forests in the Central American Republics. Approximately 280,000 hectares of forest lands are stocked with Caribbean pine of different age groups, but a major portion is currently not accessible, due to a lack of roads.

The recent earthquake, and the consequent destruction, has partially disturbed Government plans to develop and expand national forests. Within the next two years, the government is considering the initial stages of the development of 600,000 hectares in the northeast region. For the present, there are no plans to bring additional acreage under pine plantations, but it is possible that the increasing prices of softwoods in the international markets may encourage private land owners to develop softwood plantations.

Private firms, which are granted concessions on public lands, are now being required to reforest the land that they exploit. In spite of these restrictions, many concessionaires recently have started bidding on previously inaccessible forests and have agreed to build roads from their own sources. This development should generate additional revenues for the government and the economy in general. Consequently, the government will probably devote more attention (it is understood that the burning of trees has already been banned under severe penalties of law) to developing and protecting these natural resources.

In recent years the export volume and value of pine has increased appreciably (See Table 2 below). This performance could indicate that Nicaragua may be an important source of pine softwood for both the Caribbean and North American markets in the future, if supplies are adequate and costs do not rise too rapidly.

TABLE 2
NICARAGUA

	<u>Total Pine</u> <u>Volume</u> (Board Feet)	<u>Exports</u> <u>Value</u> (US\$)
1971	34,692,190	2,925,752
1970	24,845,890	1,943,462
1969	15,200,203	1,670,881
1968	5,473,368	445,550
1967	8,736,789	783,089

SOURCE: Different Annual Reports titled "Nicaragua -
Comerico Exterior" issued by the Ministerio
De Economia, Industria y Comercio.

c) Conclusions

In the preceding sections, attention has been drawn to the potential of forest resources in different countries in Central America and the Caribbean. Almost all these countries have large forestry resources which can be further developed and exploited. However, the present comparative advantage held by Central American pine producers may also be somewhat reduced by rising costs of cutting less accessible stands of timber. If this situation continues to hold true, Jamaica's ability to economically compete with imports will rise. Additionally, if Jamaica does not take steps to ensure self-sufficiency in pine production, it is very possible that the lack of large scale purchasing power will leave the country without a sufficient and continuous supply of this product. It is unlikely that there will ever be such a surplus of softwoods that the respective nations will be unable to market their output. The world demand for this commodity is increasing at such a rapid rate that no one, at the present moment, would predict a glut in the market when Jamaican plantations are ready for harvesting.

4. The Supply, Demand and Use of Wood In Jamaica

To date, the production of pine softwood in Jamaica has been almost negligible, ^{6/} and most of the domestic demand is met through imports. However, nearly 7,000 acres of Caribbean pine trees planted by the Government over the last 18 years will soon be ready for harvesting in the next few years, and therefore a small portion of Jamaica's total softwood demand should be met by domestic production. (See Table 1 below and Annex III, Exhibit C-6). The projected supply from the existing and planned Caribbean pine plantations in Jamaica has been estimated as follows:

TABLE 1
DOMESTIC PRODUCTION
OF CARIBBEAN PINE SAWNWOOD
(In Millions of Board Feet)

	<u>Existing</u>	<u>Planned (Project)</u>	<u>Total</u>
1972	0	0	0
1976	4	0	4
1982	8	0	8
1986	12	0	12
1991	16	0	16
1995	20	60	80

SOURCE: A.I.D. Forest Appraisal Mission (G. Steber)

Presently, all softwood imports come from the Central Americas, Canada and the U. S., and this trend is likely to continue for the foreseeable future, or at least until the early 1990's when Jamaica becomes self-sufficient. Honduras is the main supplier, providing 63% of the Jamaican softwood market in 1969, followed by Nicaragua and Guatemala.

Over the past ten years, the volume of imported softwood lumber has risen from 31 million board feet in 1960 to 40 million board feet in 1971, while the corresponding value has increased from U.S. \$3.3 million to \$5.5 million in the same period.

^{6/} Some rough and rather unreliable estimates place the total output to date to be around 400,000 cubic feet per annum.

The demand for softwood lumber, which is used mainly for construction (although it has various other uses), is a function of population and national income growth. In addition, the increase in the price influences the demand for softwood. Unfortunately, reliable projections of income and population growth in Jamaica are difficult to obtain. However, some tentative demand projections, based on UNDP/FAO data, as well as current information, have been developed.

The consumption of sawn wood for the period 1960 to 1971 grew at a rate of slightly less than 4%, but during 1967-69, construction activity grew at an abnormally high rate. Taking the latter factor into account, it is possible that the real growth, associated with population and income increases, was around 3% per annum. Assuming this trend to prevail in the future, the projected softwood demand and value of future imports can be estimated as:

<u>Year</u>	<u>Volume</u>	(millions of US\$) <u>7/</u> <u>Value of Imports</u>
1972	46 million board ft.	5.5
1985	60 million board ft.	11.4
1990	69 million board ft.	21.8
1995	80 million board ft.	-0- <u>8/</u>

During the Intensive Review, a number of interviews were conducted with key figures involved in the wood industry. Most of the persons interviewed foresaw a continued high demand for pine lumber. There is a very high preference for wood in housing, and consumers prefer it to all substitutes as it is a natural product. Past consumer resistance to pine, due to its susceptibility to termite damage, has been overcome in recent years by the pressurized treatment of this wood. A high demand is foreseen for Caribbean pine in Jamaica for construction and housing purposes and other current uses. In addition, if sufficient domestic supplies become available, at a reasonable price, a ready market exists not only for sawnwood but for utility poles, fence posts, pre-fabricated housing, and plywood as well.

In regard to plywood, the importation of this product is strictly licensed by the GOJ in order to stimulate the consumption of locally produced bagasse (pressed sugar cane waste) board.

7/ Prices are assumed to increase by 20% by 1985 and 10% for each additional period of 5 years each.

8/ Jamaica is expected to reach self-sufficiency by 1995.

Unfortunately, bagasse board used for concrete framework and exterior wallboard, is almost unanimously rejected by the building industry due to its inability to resist moisture. Bagasse (although as expensive as imported plywood) is considered adequate for interior partitions as well as for cabinets and countertops, is heavier than plywood and the quality control is extremely poor.

If world prices for wood remain high, some Jamaicans foresee a gradual substitution with metal, aluminum and even plastic in certain areas; however, as all substitutes are imported, they also rise in price and will all be expensive landed in Jamaica. The strong preference for natural wood should prevail to a high degree, and, if the domestic price for wood remains competitive, wood may become itself a substitute for other materials.

While a 20-year demand forecast is already subject to varying assumptions with differing interpretations, it can be stated with a fair degree of certainty that a high demand for wood will continue to prevail for the foreseeable future. It is also true that the supplies of softwood currently available to Jamaica from Central America have diminished and would appear to be even less reliable sources in the future. Further, a sustained supply of equal quality, domestically produced, Caribbean pine would be fully utilized in Jamaica, at present and in the future. Private enterprise, (especially timber importers) which has shown a deep interest in developing the capacity for harvesting and processing Caribbean pine, is expected to carry out its expressed intentions in order to be assured of an adequate supply on a sustained basis.

The Need for Domestic Protection

Jamaica will continue to import large quantities of softwood timber until its own plantations have developed to maturity on a large scale basis, sometime in the late 1980's. Until then, there is no need for any tariff measures to be enacted. At the point in the future when the domestic plantations mature, Jamaica will have to assess the demand and supply situation and make a judgment as to whether any domestic protection measures will be needed, although world demand by that time could cause such measures to be obsolete. The Forest Industry Development Committee, as a result of its experience, will be able to advise the Government in this regard at that time.

5. Overall Economic and Social Justification of the Project

At present, softwood imports alone cost Jamaica US\$4.0 million. With rising world prices and the forecasted growing demand in Jamaica for wood imports, this figure is likely to increase to US\$ 25 million (at current prices) by 1995, the point in time when production from Project plantings will begin to come on stream.

Most authorities who have studied Jamaica's unemployment problem believe that the future level of unemployment will depend heavily on developments in the agricultural sector. The GDP per agricultural worker, however, is currently estimated to be less than one-third the average for all workers. Given this disparity and the generally low standard of rural living, it is not difficult to understand the increasing migration rate from subsistence level farms to the urban centers, primarily Kingston. Nor is it hard to appreciate the Government's view that it must undertake, as soon as possible, a multi-faceted program which will reduce the urban-rural life, if Jamaica is to have any hope of controlling the rural influx to city. Each unskilled worker who migrates to the city brings services already in overabundant supply and serves to further burden limited public resources. By enlarging the ranks of frustrated Jamaicans living in extremely poor conditions, without job opportunity or future, he exacerbates the potential for social unrest and civil disorder.

The Project is almost entirely directed at enhancing the rural setting in the eastern portion of the Island, with foreseeable ramifications throughout all rural areas of the country. The unquantifiable, intangible benefits of the Project, when lumped together as a social welfare investment, constitute an equal if not greater potential worth to Jamaica than the commercial returns emanating from Caribbean pine production taken by itself.

As stated before, while forestry and logging now constitute the smallest proportion of the agricultural sector, they can become an important source of rural employment and are destined to play a larger future role in the economy. The Project is designed to expand the role of forestry in the employment of unskilled workers and training of semi-skilled workers by optimizing labor input without unduly sacrificing technological efficiency. The Project is expected by itself to directly provide 498 full-time and 3,700 part-time^{9/} new jobs. In addition, as Jamaica is an importer of forest products for the building and construction industries, furniture manufacturers and the like, there will be the inevitable link between the domestic wood production, and the further development of such industries, translating into some factor of increase in secondary industrial employment

^{9/} Additional employment generation is estimated to be 407,026 MD.
Dividing this figure by 110 MD per year yields 3,700 part-time jobs.

opportunities. Data is not available to quantify estimates as to job spin-offs in secondary and tertiary wood processing industries, but clearly, additional jobs would be created.

Perhaps the most forceful argument for the establishment of a domestic forest resource base is that of Fries¹⁰ when he cautions one not to consider the internal rate of return as the only basis for justification. Using the example of Sweden and its forestry resource base which yields only a four percent IRR, he states "... plantation forestry in Sweden would be a very poor business compared to forestry in Jamaica. In spite of this, forestry in Sweden is continued on a large scale. This suggests that a rather low rate of return can be accepted in forest plantations because of the total benefits of forestry to the investor. These benefits in the case of a private owner could be, for example, certain advantages with respect to income and property taxation and the advantages of supplying an integrated forest industry with wood from his own forests instead of having to purchase it. The advantages to a government of investments in forest establishment can be reduced imports, employment in rural areas, increased volume of forest industries and, last but not least, environmental benefits such as: protection against erosion, control of water runoff and improved possibilities for recreation. A government might thus be justified in accepting a much lower internal rate of return from the establishment of forests than it would accept in a short term industrial investment. However, the internal rate of return is still a good measure of profitability especially when it comes to choices within forestry between species, spacings, thinning regimes and logging methods.

The conclusion is that the Jamaican Government may very well be justified in regarding investments in forestry plantations as profitable even if the internal rate of return is found to be lower than in some other investment alternatives. One main condition is, however, that the forestry is made operational in the sense that the wood can be harvested with existing methods at reasonable costs and that the wood can be utilized in a proper way."

Judging from the above, the GOJ-AID Forestry Development Project would be justified if only from the viewpoint of sustained supply alone. However, as it will be shown in the following section the Project yields an IRR of 10.8% and a Cost/Benefit ratio of 1.1, therefore, the Project may well be considered to stand on its own economic merit.

¹⁰Fries, The Profitability of Forest Plantations in Jamaica UNDP/FAO, 1972.

6. Financial Analysis

This section deals primarily with two areas: 1) the financial analysis, expressed in terms of the internal rate of return (IRR), of the proposed 8,000 acres of Caribbean pine to be established; and 2) the effort needed over the next 20 years to make Jamaica self-sufficient in softwood lumber consumption. The impact of the 8,000 acres will be evaluated, but it must be put into the total framework of what Jamaica has already accomplished in the forestry sector, as well as what it has to do over the next 20 years to meet its forestry and lumber needs.

THE BASIC IRR MODEL

General Methodology

There are almost an infinite number of methods to grow and manage trees over a period of time, the case of Caribbean pine being no exception. From the studies of several UNDP/FAO researchers (Gray and Fries, in particular) it has been determined that Caribbean pine can produce wood of the quality and size necessary for conversion into lumber, fence posts, utility poles, pulping chips, and veneer for plywood. Taking the data already available, three management alternatives were considered, which appeared best suited to meet the volume, size and product characteristics required in Jamaica. (See Annex III Exhibit C-2).

Alternative 2 was chosen as the best on the strength of its internal rate of return. The basic components are:

1. Plant 680 trees per acre, with two weedings the same year;
2. Two additional weedings one year later;
3. Non-commercial thinning at age 6, leaving 250 trees per acre;
4. Harvest 29,600 board feet per acre and 900 fence posts at age 20;
5. Maintain roads each year of the 20-year rotation.

The IRR model is constructed to reflect an infinite series of Caribbean pine plantings on the same acreage. Since all acreage is to be replanted in pine after each harvest, it is appropriate to spread out the initial cost of forest access roads over a period of time as these roads represent forest infrastructure costs. The terrain is very steep

^{11/} J. Fries, The Profitability of Forest Plantations in Jamaica, UNDP/FAO, 1972

in most areas of Jamaica, which results in very high costs per mile for primary access, which is of utmost importance for the establishment as well as economic development of the 8,000 acres of the project. Maintenance must be provided every year to re-establish those parts of the newly constructed access road which has sloughed off or which has otherwise lost grade. About one year before harvest (the 19th year), logging spur roads must be constructed which tie into the main access road. During the second 20-year rotations, the only chargeable road costs will be for bi-annual maintenance and spur road re-construction. Thus, the present net worth and IRR represent values adjusted for an infinite series. Establishment costs (which include seedling production, planting, and weeding), thinning and roads are highly labor-intensive, and as such, result in costs higher than what would normally be expected in more capital intensive conditions.

The revenues associated with the 8,000 Project acres are generated by clear-cutting when the stands reach 20 years of age. It is assumed that the harvesting operation will be performed by a relatively efficient logging contractor who employs fairly high capital-intensive methods (due to the large size and weight of the logs, it would be mandatory). It is also assumed that privately owned sawmills would purchase the timber "on the stump" from the GOJ at a negotiated minimum price, with the additional logging and hauling costs to be borne by the purchaser, either by contract with a logger or with company logging crews.

Basic IRR Model Assumptions:

1) All dollars are in U. S. \$thousands.

2) Establishment, weeding and road costs were determined as precisely as possible, and reflect a 15% increase in labor costs, as well as a simultaneous 15% increase in efficiency for the first 3 years (years 0-2). Starting in the 4th year (year 3), these costs are assumed to increase at the rate of 7% (simple interest) per year from those unit costs at year 2.

3) Thinning costs will increase 7% from the base of U.S. \$27.50 at year 0.

4) Overhead (administrative costs) will increase at the rate of 7% per year (simple interest) from a base of U.S. \$4.50 at year 0.

5) Stumpage revenues will increase at a simple interest rate of 3% per year, from a base of \$77 at year 0.

6) The schedule of road construction and acres to be planted and weeded follows:

Year 0 - 2,000 acres planted and 4,000 acres weeded. Primary access road construction is 11.5 miles and 1.5 miles of road improvement.

Year 1 - 2,500 acres planted and 9,000 acres weeded. Primary access road construction is 7.0 miles and 13.0 miles of road maintenance.

Year 2 - 3,500 acres planted and 8,500 acres weeded. Road maintenance is 20.0 miles ad infinitum.

Year 6 - 2,000 acres to be thinned.

Year 7 - 2,500 acres to be thinned.

Year 8 - 3,500 acres to be thinned.

Year 19- 12.5 miles of spur roads to be constructed from a base of \$7,700 per mile at year 0.

Year 20- 15.5 miles of spur roads.

Year 21- 22.0 miles of spur roads.

The basic IRR model is found in Annex III Exhibit C-3. Given the assumptions listed above, the IRR is 10.8%, which represents the first 20-year rotation and an infinite series thereafter. As the cost of capital is generally considered to be 10% in Jamaica, the project is considered a viable one.

As a test of the sensitivity of the basic model to selected changes in costs and revenues, a sensitivity analysis was made, with the following results being obtained:

<u>Changes</u>	<u>IRR</u>
A. Add institutional building costs of \$450,000 during the first three years.	10.3%
B. Decrease in establishment costs (seedlings, site preparation, planting and weeding) by 50%, for a total reduction of \$1,216,000.	12.7%
C. Decrease in revenues by 20% for a total reduction of \$6,431,000.	9.7%
D. Increase in revenues by 20% for a total increase of \$6,431,000	11.9%

MEETING THE NEEDS OF THE FUTURE

A. Demand for Lumber

The present consumption of Caribbean pine lumber in Jamaica is approximately 40 million board feet^{12/} per year. Based on present trends in Jamaica and the CARIFTA region^{13/}, lumber consumption is expected to rise at the rate of 2.3% per year, giving Jamaica an expected demand of 75-80 million board feet in 1995.

B. Present Plantation Supply in Relation to Demand

At present there are about 9,000 acres of pine plantations in Jamaica, the bulk of which are in Caribbean pine, although the distribution of ages and acreage is erratic. Also, yields per acre in most of the older stands are low in addition to some of the acreage being scattered in small, mostly inaccessible stands. It can be assumed, therefore, that a net of 7,000 existing acres can be used for supply planning purposes during the next 20 years. However, if properly utilized, this acreage can contribute a sizeable portion of the supply of softwood lumber during this time. The timing and magnitude of the harvest and the size of the production facilities are shown in Annex III Exhibit C-4). New jobs, at an increasing rate can be generated from such a schedule in the areas of cutting, hauling, skidding and sawmill production (See Annex III Exhibit C-5). One interesting aspect of this schedule is the intitation of a pine plywood plant at about year 1990. From all indications at present, demand for plywood is quite high in Jamaica and in the CARIFTA region in general. Such a plywood plant would utilize 20 million board feet of logs (International 1/4" scale), and would yield 40 million square feet of plywood on a 3/8" basis. The feasibility of manufacturing and marketing Caribbean pine for plywood for construction (concrete forms) and sheathing is well established.^{14/}

C. AID-GOJ 8,000 acres

The 8,000 acres of Caribbean pine to be established during the three years of the project will not contribute to the lumber supply over the next 20 years, due to the time needed for this species to reach maturity. However, by the year 1993, the 2,000 acres planted in 1973-74 will contribute 59 million board feet of lumber, the 2,500 acres planted in 1974-75 will contribute 74 million board feet in 1994, and the 3,500 acres planted in 1975-76 will contribute 103 million board feet in 1995. It can be seen from Annex III Exhibit C-4, therefore, that the projected demand can be met by 1995 or 1996. In the meantime, the 7,000 acres of plantations now in existence will provide an interim build-up to this point of self sufficiency. (See Annex III Exhibit C-6).

^{12/} The Supply of Wood for Jamaica, UNDP/FAO, B. F. Gibson, 1973.

^{13/} FAO/ECLA/UNIDO Forest Industries Advisory Group for Latin America, Forest Industries Development in the CARIFTA Region, September 1972

^{14/} USDA-Forest Service, Forest Products Laboratory.

D. Meeting and Maintaining Demand

As discussed above, during the next two decades, the 7,000 existing acres of pine will have been completely harvested just at the time the 8,000 acres planted during the project reach maturity. These 8,000 acres can satisfy forecasted demand for a short period from (1995-1997) twenty years hence, but demand levels thereafter can be satisfied only by regular, further planting throughout the interim period, i.e. provision for a constant supply of maturing trees after 1997. What is needed, therefore, beyond the simple replanting of existing acreage, is GOJ planning and funding for additional acreage, suitable for Caribbean pine, over and above the nearly 20,000 acres already in Forest Reserve lands. Thus, over the next twenty years, 50,000 acres must be acquired, (an average of 2,500 new acres each year) so that the minimum of 70,000 acres is met by 1995.

While 2,500 acres of land must be brought into Caribbean pine production each year, a total of 3,500 acres must be planted each year throughout the next 20 years. In addition, all plantations reaching age 6 must be thinned, which at the sustained level, equals 3,500 acres per year. Failure to meet these two conditions will not allow the GOJ to meet and maintain its softwood needs by 1995.

Annex III Exhibit C-7 shows the extent of employment created by an on-going forestry organization and Annex III Exhibit C-8 portrays expected cash flows for the next 20-year building period. It may be noted that a total of 5,989,000 man days of productive labor will be generated during this 20-year period.

7. Benefit/Cost Analysis

The Benefit/Cost Analysis is set forth in Annex III, Exhibit C-3a, with the financial assumptions built into the methodology having been generally treated in the previous section, II, C-6, Financial Analysis. The cost side of the B/C ratio is derived from those cost items directly relating to plantation establishment and maintenance, and road construction, improvement and maintenance. It does not include the entire costs of expenditures such as headquarters and office construction, conservation, education, and other elements which are predominantly institution building aspects of the loan. These latter items have been attributed to different institution building aspects of the Project, and a relevant portion of their costs has been excluded from the Benefit/Cost Analysis. This approach is in keeping with the present formula used in evaluating and approving sub-projects, under the Jamaica AID Rural Road Loan. (With rural road sub-projects, only direct costs are included without any distribution of related institutional costs, such as loan financed US technical assistance.) In considering the costs of this Project, we did not apply, the shadow price adjustment factor employed in rural road technical appraisals. "The economic cost of unskilled labor - reflecting estimated opportunity earnings - is placed at 50% of the wage bill," as it appeared the Project was viable without this adjustment.^{15/}

On the benefit side, the prime elements in the calculation are the foreign exchange savings through import substitution, and the direct employment created by the Project. Employment generated beyond the three-year project life, related to the upkeep and management of the established plantations, was not included, nor was the increase in secondary and tertiary employment and expansion of wood industry.

In the context of the above, the financial internal rate of return was determined to be 10.8% over twenty years. (See Financial Analysis, II C-6). Over the life of the project, the discounted direct benefits are estimated at US\$4,428,300. The creation of 407,000 man days of productive labor, primarily at the low income level, will generate an

^{15/} Rural Feeder Roads Loan, "May Pen IIA Feasibility Study," Page 3, May 31, 1973.

incremental income of about US\$866,000 per year over the three years of the project. Utilization of Project funds for such labor costs, as compared to capital intensive activities, will result in a broader income distribution at the basic consumer level. The multiplier effect of this additional employment is likely to be significant, considering the generally low incomes of the workers employed, the high marginal propensity to consume at this income level, and the increasing domestic production orientation of the national economy.

In addition to the directly quantifiable benefits listed above, it is important to note a number of equally important benefits which cannot be directly quantified or which are intrinsic in nature. Yet it is essential that these areas be discussed:

Other Direct but Non-Quantifiable Benefits

1. As mentioned before in Section III, above, a constant supply of domestic lumber has separate value to Jamaica even if the specific IRR is not very high, as the development of an integrated domestic forest industry, with a commensurate reduction in imports, creation of rural employment opportunities and the reduction of migration to the cities, in addition to environmental benefits, makes the value of the domestic forest sector even greater than the IRR may show.

2. The increase in secondary and tertiary wood industry, as a result of expanded forest resources, will result in the creation of more job opportunities, again with an effect upon consumption and investment.

3. Through an aggressive technical assistance and extension program, the GOJ expects to bring private enterprise into the forestry sector. The attraction of the private sector into the production and processing of softwood in Jamaica will have a positive effect upon the economy. On the production side, it will enable the GOJ to reduce its share of the entire 70,000 acre venture and thus maintain its desired role as a catalyst, depending on the private sector to bear a good amount of plantation establishment and associated costs. The private sector will probably have somewhat lower establishment and maintenance costs due to the fact that they will have almost no overhead expenses with which to contend. In the areas of processing, the GOJ will rely heavily on the private sector for thinning harvesting and sawmilling.

4. The increased administrative and technical efficiency, brought about through inservice and long term training, loan funded technical assistance, and organizational improvements, should result in more productivity and output for the Forest Department, with subsequent lower costs. The practical research and development envisaged under the program should add to this capacity.

5. The provision of maintained forest plantation roads and fire control training should give the GOJ the ability to combat forest fires more easily and thus reduce its losses of timber, with an economic savings not only of timber but of soil losses as well.

6. By increasing the rural worker's income through the creation of forest related jobs, it is quite possible that he will be less dissatisfied with his situation and will have less of a tendency to migrate to urban areas, where chances of finding employment are considerably less. The reduction of migration to urban areas should have a significant effect upon the social costs related to unemployment and social disruption. It is possible that, through the innovative method of assisting the urban worker to commute to forests in the eastern part of the Island, not far from Kingston, a partial reversal of the urban migration trends might occur. It is a worthwhile effort and one which has not yet been attempted to any degree.

7. The Caribbean pine has excellent soil stabilization characteristics and will serve as an improvement to the environment by reducing soil losses to both wind and rain, when planted in areas susceptible to erosion. In addition, the very presence of the mature trees discourage any land misuse by squatters who might otherwise take over the steep-sloped lands and plant agricultural cash crops, to the permanent detriment of the soil. Planting pine will have a positive effect upon watershed values as well.

8. By establishing forest education and recreation centers in various locations on the island, the public will become more informed of what the Forest Department is attempting to accomplish through its varied activities. The public should become more aware of the value of forest resources through this association, and it might have an effect by reducing damage to forests, perpetuated by a public unaware of their worth.

a. SUMMARY COST-ESTIMATE AND FINANCIAL PLAN BY YEAR*

(J\$ 000)

ITEM	YEAR I		YEAR II		YEAR III		ENTIRE PROJECT		TOTAL
	GOJ	AID	GOJ	AID	GOJ	AID	GOJ	AID	
A. Buildings	426	-	71	-	-	-	497	-	497
B. Staff Expansion	308	-	342	-	362	-	1012	-	1012
C. Fellowships	-	75	-	45	-	-	-	120	120
D. Technical Advisors	-	136	-	55	-	60	-	251	251
E. Equipment & Materials	-	507	-	116	-	11	-	634	634
F. Equipment Rental Operation & Maintenance Costs	-	135	-	99	-	29	-	263	263
G. Seedlings	-	86	-	112	-	151	-	349	349
**H. Plantation Establishment	101	304	177	531	223	670	501	1505	2006
I. Road Construction & Maintenance	34	105	30	92	3	10	67	207	274
J. Seed Production	3	11	3	10	5	15	11	36	47
K. Plantation Management	2	5	7	21	2	6	11	32	43
L. Conservation, Education, Recreation	4	12	6	18	3	11	13	41	54
Sub Totals	878	1394	636	1099	598	963	2112	3456	5568
15% Contingency	131	209	96	165	90	145	317	519	836
Jamaican Dollar Total	1009	1585	732	1264	688	1108	2429	3957	6386
U.S. Dollar Total	1110	1744	805	1390	757	1219	2672	4353	7025

* All Figures Rounded in Thousands.

** Items H, I, J, K, L Approximate a 25% - 75% split

3. Ability of the GOJ to Support the Project

The absorptive capacity of the Forest Department, considering financial as well as human resource needs, was raised as an issue in the IRR. During the Intensive Review, an agreement was reached to scale down the size of the Project to reflect these considerations. A mutually agreed upon project scope was established, which was based upon the need for GOJ self sufficiency in softwood production by 1995, as well as on the corresponding number of human resource personnel needed to build up the Forest Department during the three project years to reach the "take-off" stage for sustained production.

The GOJ financial contribution was considered on the same basis and, although the level of expenditures projected for the three years of the Project represents a considerable increase over past years, it represents an awareness on the part of the GOJ of the need to make moderately heavy future investments in the forestry sector, in order to attain relative self-sufficiency in softwoods. However, the amount of incremental expenditures projected in the next three years is considered reasonable and within the capacity of the GOJ to provide.

In relation to administrative and technical capacity, it should be noted that the build-up of the Forest Department, although proportionately somewhat higher in the first year, will be phased over three years, in concert with the amount of physical activity involved in the Project. The Department has a good level of basic capability, and, with increased training programs and technical assistance, will be able to carry out an expanded program, both in technical and administrative areas as well as in physical size.

Beyond the three-year period of the Project, if the GOJ intends to develop the needed acreage under Government auspices, the GOJ will need sustained investments of approximately U.S. \$1.5 to 2.0 million per year (in constant dollars) to adequately manage a plantation program of 3,500 acres of Caribbean pine. By 1976 the budget of the Forest Department should include most of the needed resources, so that any incremental costs will not be inordinately high.

A crucial consideration to the project is the assumption that the GOJ intends to carry on this program beyond the life of the Project, for, without this commitment, the Project would not stand by itself. To this

end, the GOJ has committed itself in providing the necessary level of resources to sustain the expansion of forest reserves to meet the mutually agreed upon targets as indicated in the Master Implementation Plan. However, it is quite possible that this amount can be reduced substantially over the years, if an aggressive extension program is mounted to attract private enterprise by providing incentives and technical assistance to private landowners.

c. Terms of the A.I.D. Loan

Due to the long-term nature of the project, and the lag between the time the project investments are made in the form of physical plantings and the time the financial benefits accrue to the Project, it is the view of the Project Committee that this situation requires favorable terms, including a 30-year repayment period. During this time period the Project should have a definite and substantial impact on foreign exchange savings, and this savings can provide at least a partial basis for repayment of the loan. In addition, the higher incomes generated by the labor intensive methods of forest production will lead to higher levels of investment and consumption which will provide the basis for a larger tax base and, subsequently, for the GOJ to service the A.I.D. loan.

d. Prospects for Loan Repayment

The prospects for repayment of the loan appear to be good. The Island's export earnings suffered a minor setback in 1971 due to international financial developments and economic slow-downs in the United States, Canada and Great Britain, the major trading partners of Jamaica. The situation improved significantly in 1972, as exports increased by 5.9% and rose to an all time high of J\$293 million (U.S.\$322 million). Although in 1972 the overall balance of payments accounts and total foreign assets of the Island suffered a decline of U.S.\$45 million, as of December 31, Jamaica still had foreign exchange reserves of J\$101.2 million (U.S.\$111.3 million) which, at the current rate of imports, would be sufficient to finance imports for three months.

The improvement in the international financial markets, and the fact that Jamaica has a stable, democratic government, are likely to improve the inflow of private capital in the near future. In addition, the recent austerity program of the government to restrict the

import of luxury items, compulsory remittances required of Jamaican workers overseas and improved revenues from tourism are all likely to improve the balance of payments position of the Island in the near and distant future. The 1972 debt service ratio as a percentage of exports was approximately 6.4%, a level which does not raise serious issues in relation to debt service capacity.

e. Impact on U.S. Balance of Payments

The impact of this loan on U.S. balance of payments will be favorable. Nearly all equipment and goods financed under the loan are expected to be of U.S. source and origin, with the exception of certified quality seeds, which will be procured from Honduras. The loan may be expected to induce follow-up orders for equipment and spare parts needed to support an expanding forestry program and private investment in the wood processing industry, and will strengthen the U.S. commercial position in the Jamaican market for construction equipment. While it is expected that most procurement will be from the U.S., because of the nature of the items to be financed, other Code 941 countries will be eligible.

III. LOAN ADMINISTRATION

A. Target Dates

1. Execution of the loan agreement.

It is anticipated that draft loan agreement can be prepared by the end of July and that negotiations can be completed and the agreement signed by the first part of September.

2. Conditions Precedent

The conditions precedent to disbursement should be satisfied by November, at which time a contract with the technical consultant can be executed. (See Section IV C, below, for a list of proposed conditions precedent and covenants.) Further, the Loan Agreement will provide that the date of loan authorization will be the eligibility date for loan reimbursement of items relating to the first planting year. All conditions precedent, including the development of a Master Implementation Plan, should be completed by January 1, 1974.

B. Implementation Plan

The execution period of the loan will entail a period of 48 months, starting from the date of authorization of the loan and lasting until the final payment date. Within this time framework, the physical execution period for the loan will be three planting years, or roughly from January 1, 1974 to December 31, 1976. The Loan Implementation Plan, below, provides complete details of the execution of the Project.

GOJ - AID FORESTRY DEVELOPMENT PROJECT

LOAN IMPLEMENTATION PLAN

<u>Action</u>	<u>Approximate Date</u>
1. Loan Authorization	Starting Date (SD) June 30, 1973
2. Loan Agreement Execution	SD + 2 months September 1, 1973
3. Satisfaction of Conditions Precedent for Technical Assistance	SD + 4 months November 1, 1973
4. Satisfaction of all Other Initial Conditions Precedent, including Submission of Master Implementation Plan and Detailed Annual Implementation Plan for First Project Year	SD + 6 months January 1, 1974

<u>Action</u>	<u>Approximate Date</u>
5. Annual Review and Submission of Annual Implementation Plan as well as Other Recurrent Conditions Precedent	SD + 18 months January 1, 1975
6. Annual Review and Submission of Annual Implementation Plan as well as Other Recurrent Conditions Precedent	SD + 30 months January 1, 1976
7. Total Commitment Date	SD + 42 months December 31, 1976
8. Total Disbursement	SD + 48 months June 30, 1977

C. Loan Disbursement Procedures

1. Technical Assistance and Training

It is anticipated that, because of the institutional building nature of the project, technical assistance will be provided in large part by the Forest Service of the USDA. The technical assistance component will be treated in the usual PASA-AID contracting fashion, with any related equipment costs such as training aids, vehicles and the like procured under Letter of Commitment. The GOJ has promised to provide the necessary office space and furnishings. USAID will supply the administrative assistance necessary to prepare the documentation for overseas participants, and they will be treated as if they were grant-funded AID participant trainees. The AID loan-financed portion of the technical assistance and training element is projected at about U.S.\$408,000.

2. Procurement of Other Goods and Services

Project financing has been consolidated in a single Breakdown of Project Costs (see II C 8a). As therein detailed, certain specific items such as the construction of the central headquarters, district forest offices and residences will not be AID-funded. Rather, they will be considered part of the GOJ contribution to the project, AID accepting the total of the face value of paid vouchers for these items as evidence of this portion of the GOJ contribution, once they are presented to AID after certification by the Conservator of Forests. The equivalent of U.S.\$547,000 will be considered the maximum allowable for these purposes.

Other items requiring primarily foreign exchange, such as construction, logging, and fire control equipment, certified seed and seedlings, will be financed entirely out of the proceeds of the AID loan and will be procured through normal Letter of Commitment techniques. The amount estimated for this category of goods to be procured equals U.S.\$1,129,000.

The remainder of Project costs, i.e., road construction and plantation establishment, seed and nursery improvement and development, as well as conservation/education and recreation, will be shared by AID and the GOJ on approximately a 25% - 75% basis. The usual mechanism for AID disbursement in similar circumstances would be to create a Project fund and provide for AID's drawdown on a pro rata basis. What is proposed in this case, in light of the number of sub-project activities and the relatively high labor component, (requiring a disproportionate amount of record keeping and creating an unnecessary management burden), is to establish such a fund but utilize a modified 'turnkey' technique, whereby AID makes an initial advance, then accepts sections of sub-activities for release of further advance disbursements. The first advance would be: a) equivalent to three months costs during the planting season (U.S.\$110,000), b) a road construction advance (U.S.\$35,000), and c) an amount for small essential sub-items (U.S.\$5,000), all totalling U.S.\$150,000. After inspection of certified road mileage completed, amounts of acreage planted with Caribbean pine and other such items, AID would simply accept such work at agreed upon prices, regardless of the actual cost to the GOJ. This then provides the basis for an additional AID drawdown. The cost associated with each turnkey item would be initially set forth in the Master Implementation Plan, would include a yearly percentage increase factor for inflation, and would be reviewed for reasonableness at each annual review.

With regard to road construction by contract, AID's contribution of 75% of the total eligible costs would remain in force and disbursements would be made from the Project fund. In this case, a contract would be awarded to the lowest responsive bidder and AID would disburse on the basis of vouchers or invoices certified by the GOJ and approved by AID. Prior to final acceptance of any road section a joint inspection will be made by the GOJ and AID.

To further streamline AID monitoring of the project, AID's proportionate share of major items could be at a considerably higher percentage allowing the GOJ to pick up relatively minor cost project activities, even though they might nominally fall in the commingled funding category. This overall monitoring approach should result in equally high quality performance, yet significantly ease Mission supervisory workload, reduce possible tensions between AID and the GOJ over eligible costs for AID financing, and potentially have positive impact on project costs. For example, should the FD complete project tasks at a substantially lower price than estimated as a result of greater efficiency, the effect on the internal rate of return would be highly beneficial and should be considered a project windfall. If lower costs are incurred because of overstated cost estimates (highly unlikely in light of Jamaican inflationary trends, and AID experience in Jamaica with similar projects), it must be remembered that GOJ involvement in forestry will be a long term one, requiring sustained incremental contributions well beyond the three year Project life, and well in excess of any conceivable savings. This future commitment is incorporated in the Condition Precedent within the Master Implementation Plan.

D. USAID Monitoring Responsibilities

It is the opinion of the Project Committee that, in view of its complexity, the Project should have nearly full-time services of a resident USAID/Jamaica staff officer for at least the first year of the project, to ensure that the Project is initiated on a sound basis and to fulfill AID monitoring requirements. The appointed officer, probably the General Engineering Advisor, will maintain close contact with the Project Technical Advisor.

Additional loan monitoring services will be provided by AID/W, and LA/DR staff personnel will visit Jamaica periodically. AID/W will also provide controller services, and controller personnel will visit Jamaica on occasion, as is the present case for active loans, to review local currency disbursement, back-up documentation and financial control procedures.

E. Annual Review

An Annual Review shall be held at the end of Project years I and II, at which time AID and the GOJ shall discuss Project progress, problems, difficulties or delays encountered in implementing the Project and shall propose corrective action for overcoming such problems in the subsequent period.

F. Reports

The technical consultant will prepare, in conjunction with the Conservator of Forests, a monthly report on progress under the Project, measured against the detailed Yearly Implementation Plan. As set forth in Section II, 7f, this Annual Implementation Plan contains the detailed description and scheduling of activities planned for the following 12-month period and will utilize PERT/CPM

planning techniques. Each year, in conjunction with the Annual Review (see p. 57) the FD will submit a new Annual Plan to AID in fulfillment of a recurrent condition precedent to disbursement, with the new plan evaluated against objectives expressed in the Master Implementation Plan and actual implementation experience in the preceding period.

Conditions and Covenants

The following conditions and covenants are proposed for inclusion in the Loan Agreement:

1. Conditions Precedent to Initial Disbursements

a) The GOJ shall provide evidence satisfactory to AID that the Forest Department has sufficient professional, technical and administrative staff, has executed a contract with the Project technical consultant and has firm commitment by other international donors for the technical assistance, all necessary to carry out activities planned for implementation during the first year of the project.

b) Standard AID conditions precedent following signing of the Loan Agreement.

2. Conditions Precedent for Disbursements other than Technical Assistance and Related Procurement

Prior to disbursement of loan funds other than for technical assistance and related equipment, the GOJ shall provide to AID:

a) Evidence that all Project lands are government-owned and, whether acquired by eminent domain or otherwise, held with clear title.

b) A Master Implementation Plan covering the full three-year project period and future GOJ commitments, as well as a detailed first-year Implementation Plan containing, inter alia, a PERT/CPM scheduling of the areas of activity proposed for execution, and GOJ commitment of physical, human and budgetary resources necessary to accomplish the first year Implementation Plan. Part of the first year Implementation Plan will be the plan for construction and maintenance of roads included in the Project, maintenance of all loan-procured equipment, as well as evidence that easements have been obtained for all roads to be constructed in the period. Prior to commitment of AID funds for each subsequent project year, a similar plan will have been developed for the succeeding year and submitted to AID during the annual loan review, for approval.

c) Establishment of a Forest Industry Development Committee (FIDC), composed of representatives of the Forest Department, Jamaica Industrial Development Corporation, National Planning Agency, Jamaica Development Bank, and such other appropriate members as the GOJ may desire. The purpose of the Committee will be to coordinate activities in wood production and wood processing, and to formulate policies and guidelines directed at providing the necessary private sector incentives to assure proper use and development of forest resources. The Borrower shall further covenant that recommendations regarding such private sector incentives will be reviewed with the FIDC and A.I.D. within one year of the execution of the Loan and that implementation of agreed upon incentive measures will be similarly reviewed within the succeeding year.

d) Evidence of the provision in the Jamaican FY 74 of no less than the U.S. equivalent of J\$2,152,571 for FD annual operating costs and contribution to the UNDP/FAO forestry project, and a direct Project contribution of no less than J\$309,000. The Borrower shall further covenant to support the Project through yearly budget allocations to the FD in amounts sufficient to accomplish the purposes of the program in conformance with the time-phased plan.

e) The GOJ shall agree to sustain the expansion of forest reserves at a rate no less than the targets mutually agreed upon in the Master Implementation Plan by AID and the GOJ, unless otherwise agreed. The GOJ shall also insure sufficient allocation of budget resources to maintain the roads and acreage developed during the project period.

3. Covenants

a) The GOJ covenants to make GOJ contributions for all project activities available on a timely basis.

b) The GOJ will endeavor to provide adequate incentives to attract private sources of capital and human resources into the forestry sector.

c) The GOJ will attempt, to the maximum extent feasible, to provide linkage between the GOJ/USAID Rural Feeder Roads Project and the Forestry Development Project.



UNITED STATES COORDINATOR
ALLIANCE FOR PROGRESS

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

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AID-DIG/1-1006/A
ANNEX 1
Page 1 of 4

LOAN AUTHORIZATION

Provided from: Alliance for Progress Funds
JAMAICA : Forestry Development

Pursuant to the authority vested in the Deputy U. S. Coordinator, Alliance for Progress, by the Foreign Assistance Act of 1961, as amended, and the delegations of authority issued thereunder, I hereby authorize the establishment of a loan ("Loan"), pursuant to Part I, Chapter 2, Title VI, Alliance for Progress, to the Government of Jamaica ("Borrower") of not to exceed Four Million Four Hundred Thousand United States Dollars (\$4,400,000) to assist in financing the foreign exchange and local currency costs of goods, services and technical assistance necessary to support a program to improve the utilization and to expand Jamaican forest resources and infrastructure ("Project"). The loan shall be subject to the following terms and conditions:

I. Interest and Terms of Repayment

Borrower shall repay the loan to A. I. D. in United States dollars within thirty (30) years from the date of the first disbursement under the loan, including a grace period not to exceed five (5) years. Borrower shall pay to A. I. D., in United States dollars, on the disbursed balance of the loan, interest of two percent (2%) per annum during the grace period and three percent (3%) per annum thereafter.

II. Other Terms and Conditions

(a) Except for marine insurance and ocean shipping, goods and services financed under the Loan shall have their source and origin in Jamaica or any countries included in Code 941 of the A. I. D. Geographic Code Book. Marine insurance financed under the Loan

shall be placed in Jamaica or any countries included in Code 941 of the A. I. D. Geographic Code as in effect at the time of placement; provided, however, that such insurance may be financed under the Loan only if it is obtained on a competitive basis and any claims thereunder are payable in convertible currencies. Ocean shipping financed under the Loan shall be procured in any country included in A. I. D. Geographic Code 941.

(b) United States dollars utilized under the Loan to finance local currency costs shall be made available pursuant to procedures satisfactory to A. I. D.

(c) Prior to the first disbursement or the issuance of any commitment document under the Loan, Borrower shall provide evidence in form and substance satisfactory to A. I. D. that the Forest Department has sufficient professional, technical and administrative staff, has executed a contract satisfactory to A. I. D. with a technical consultant satisfactory to A. I. D. and has firm commitments by other international donors for technical assistance, all necessary to carry out activities planned for implementation during the first year of the Project.

Except as A. I. D. may otherwise agree:

(d) Prior to any disbursement or issuance of any commitment document under the Loan, other than for technical assistance and related equipment, the GOJ shall provide to A. I. D., in form and substance satisfactory to A. I. D.:

(1) Evidence that all Project lands are government-owned and, whether acquired by eminent domain or otherwise, held with clear title.

(2) A Master Implementation Plan covering the full three-year project period and future GOJ commitments, as well as a detailed first-year Implementation Plan containing, inter alia, a PERT/CPM scheduling of the areas of activity proposed for execution, and GOJ commitment of physical, human and budgetary

resources necessary to accomplish the first year Implementation Plan. Part of the first year Implementation Plan will be the plan for construction and maintenance of roads included in the Project, maintenance of all loan-procured equipment, as well as evidence that easements have been obtained for all roads to be constructed in the period. Prior to commitment of A. I. D. funds for each subsequent project year, a similar plan will have been developed for the succeeding year and submitted to A. I. D. during the annual loan review, for approval.

(3) Establishment of a Forest Industry Development Committee (FIDC), composed of a representative of the Forest Department, Jamaica Industrial Development Corporation, National Planning Agency, Jamaica Development Bank, and such other appropriate members of the IOJ may desire. The purpose of the Committee will be to coordinate activities in wood production and wood processing, and formulate policies and guidelines directed at providing the necessary private sector incentives to assure proper use and development of forest resources. The Borrower shall further covenant that, except as A. I. D. may otherwise agree, recommendations regarding such private sector incentives will be reviewed with the FIDC and A. I. D. within one year of the execution of the Loan and that implementation of agreed upon incentive measures will be similarly reviewed within the succeeding year.

(4) Evidence of the provision in the Jamaican FY '74 budget of no less than the U. S. equivalent of J\$2, 152, 571 for Forest Department annual operating costs and contribution to the UNDP/FAO forestry project, and a direct Project contribution of no less than \$309, 000. The Borrower shall further covenant to support the Project through yearly budget allocations to the Forest Department in amounts sufficient to accomplish the purposes of the program in conformance with the time-phased plan.

(e) Borrower shall covenant to sustain the future expansion of forest resources at a rate of no less than the targets mutually agreed upon in the Master Implementation Plan, except as A. I. D. and Borrower may otherwise mutually agree. The GOJ shall also insure sufficient future allocation of budget resources to maintain the roads and acreage developed during the Project period.

(f) The Loan shall be subject to such other terms and conditions as A. I. D. may deem advisable.

CERTIFICATION PURSUANT TO SECTION 611(e) OF THE FOREIGN
ASSISTANCE ACT OF 1961, AS AMENDED

I, George B. Roberts, Jr., the AID Affairs Officer of the Agency for International Development in Jamaica, having taken into account, among other things, the maintenance and utilization of projects in Jamaica previously financed or assisted by the United States, do hereby certify that in my judgment Jamaica has both the financial capacity and the human resource capability to effectively maintain and utilize the capital assistance project, Forestry Development Loan.

This judgment is based on the facts and implementation system developed in the Capital Assistance Paper for the proposed loan. The Paper discusses in detail the capabilities of the executing agencies and finds that, by following the agreed procedures set forth in this Paper, they will possess adequate financial and managerial resources, supported by technical assistance where appropriate, to effectively maintain and utilize the project. In addition, the Capital Assistance Paper certifies that the statutory criteria as applied to Jamaica have been met.

George B. Roberts, Jr.
AID Affairs Officer


(Date) May 29, 1973



Department of State

TELEGRAM

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UNCLASSIFIED

4/18/73

Classification

11:00AM

FM STATE 72871 APR 19, 1973

TO KINGSTON

AIDAC

E.O. 11652: N/A

SUBJ: IRR-FORESTRY DEVELOPMENT LOAN

1. DAEC MET ON MARCH 16, 1973, TO CONSIDER SUBJECT IRR.
2. PRINCIPAL ISSUE FOCUSED ON ECONOMIC JUSTIFICATION OF PROJECT CONSIDERING PRESENT AND FUTURE ALTERNATIVE SOURCES OF WOOD PRODUCTS-ESPECIALLY PINE-BOTH WITHIN CARIFTA AREA AND OUTSIDE. OUR PRELIMINARY REVIEW INDICATES THAT ALTERNATIVE SOURCES OF SUPPLY ARE UNCERTAIN WHILE WORLDWIDE DEMAND FOR WOOD PRODUCTS INCREASING AT RAPID PACE. THUS, WHILE THIS AND RELATED QUESTIONS DESERVE ADDITIONAL STUDY, INTENSIVE REVIEW OF A LOAN UP TO \$6.5 MILLION CAN PROCEED.
3. DURING INTENSIVE REVIEW, TDY LOAN TEMA AND USAID SHOULD FOCUS ON FOLLOWING POINTS AND PRESENT APPROPRIATE ANALYSES AND CONCLUSIONS IN THE LOAN PAPER:
 - A. ENTIRE ECONOMIC QUESTION DISCUSSED ABOVE SHOULD BE FULLY CONSIDERED. IN THIS REGARD TEAM SHOULD ANALYZE PRESENT COMPOSITION AND LEVEL OF WOOD IMPORTS, EXPECTED FUTURE DEMAND, PRESENT AND EXPECTED FUTURE SOURCES OF SUPPLY, NEED (IF ANY) FOR PROTECTIVE TARIFFS AND PROBABLE COMPARATIVE COST FACTORS, INCLUDING TRANSPORT, BETWEEN JAMAICA AND FOREIGN SUPPLIERS.
 - B. CONSIDERATION SHOULD BE GIVEN TO PRESENT MARKETING ARRANGEMENTS OF WOOD PRODUCTS WITHIN COUNTRY AND WOOD PROCESSING ACTIVITIES TO DETERMINE DEGREE OF COMPETITION AND RELATIVE EFFICIENCY OF SYSTEM. WOULD SOURCE OF DOMESTIC SUPPLY BECOME PART OF PRESENT SYSTEM OR COULD IT SERVE TO INCREASED COMPETITION BY OFFERING INCENTIVES TO NEW PROCESSING AND MARKETING AGENTS, SUCH AS COOPERATIVES?
 - C. AFTER CAREFUL CONSIDERATION OF QUANTIFIABLE ECONOMIC FACTORS, BENEFITS AND COSTS SHOULD BE QUANTIFIED AND THE NATIONAL ECONOMIC RATE OF RETURN CALCULATED. OTHER FACTORS, SUCH AS EROSION CONTROL, AND ITS EFFECTS UPON THE PROJECTED WATER SUPPLY, DIRECT AND INDIRECT EMPLOYMENT GENERATION, RECREATIONAL POSSIBILITIES, ETC., SHOULD BE EVALUATED IN THE PROJECTS ECONOMIC JUSTIFICATION. THE USE OF SHADOW PRICING SHOULD ALSO BE CONSIDERED.
 - D. AN IMPORTANT FACTOR IN DETERMINING THE AID LOAN LEVEL IS THE ABSORPTIVE CAPACITY OF THE FOREST DEPARTMENT. IT WAS NOTED THAT IMPLEMENTATION OF PROPOSED PROGRAM WOULD REQUIRE SIGNIFICANT

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Department of State

TELEGRAM

PAGE 2 STATE 72871

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INCREASES IN TRAINED STAFF AND IN BUDGETARY SUPPORT AT TIME WHEN GOJ FACING FISCAL CONSTRAINTS. IF CONCLUSION MADE THAT ABSORPTIVE CAPACITY CANNOT BE EXPANDED QUICKLY ENOUGH TO MEET PROJECT OUTLINED IN IRR, SERIOUS CONSIDERATION SHOULD BE GIVEN TO POSSIBLE SCALING DOWN OF PROJECT (AND THE AID LOAN).

F. RELATED TO ABOVE, GOJ INCREMENTAL BUDGETARY COMMITMENTS SHOULD BE CAREFULLY QUANTIFIED ON AN ANNUAL BASIS AND PROPER ASSURANCES OBTAINED FROM GOJ THAT FORESTRY BUDGET WILL BE INCREASED BY NECESSARY AMOUNTS. LETTER OF APPLICATION FOR LOAN SHOULD INDICATE GOVERNMENT INTENTIONS TO PROVIDE A SPECIFIED BUDGETARY LEVEL DURING NEXT THREE YEARS.

F. WHILE PROVISION CAN BE MADE IN AID LOAN FOR CONTINGENCIES, SUCH AS INCREASED EQUIPMENT AND LABOR COSTS, CONTINGENCY ITEM SHOULD ALSO BE INCLUDED IN GOJ FINANCE PORTION. IN ADDITION, CONSTRUCTION OF BUILDINGS SHOULD BE ENTIRELY FOR THE ACCOUNT OF THE GOJ.

G. APPARENT THAT LONG RANGE PROGRAM WILL REQUIRE CONTINUED FOREIGN ASSISTANCE--BOTH FOR INVESTMENT AND TECHNICAL ASSISTANCE NEEDS--AFTER AID LOAN DISBURSED. WHAT PLANS ARE BEING MADE TO OBTAIN THESE CONTINUING NEEDS?

H. IN VIEW OF THE PRESENT DIMENSIONS OF TECHNICAL ASSISTANCE--LOAN FUNDED, UNDP, CIDA, ILO, ETC.--LOAN PAPER SHOULD SHOW THAT THESE WILL INTERMESH RATHER THAN OVERLAP OR CONFLICT WITH EACH OTHER. TO THE EXTENT THAT OTHER THAN LOAN FUNDED TECHNICAL ASSISTANCE IS NEEDED FOR PROJECT SUCCESS, ASSURANCE MUST BE PROVIDED THAT IT WILL BE AVAILABLE.

I. IN VIEW OF VARIETY OF PROJECT COMPONENTS, IMPORTANT THAT A PRELIMINARY PERT PLAN BE DEVELOPED DURING INTENSIVE REVIEW AS PART OF IMPLEMENTATION PLAN AND THAT PERT, OR OTHER EFFECTIVE SYSTEM, BE MADE PART OF FORESTRY DEPARTMENT ADMINISTRATIVE CONTROL PLAN FOR PROJECT.

J. DUE CONSIDERATION SHOULD BE GIVEN TO ROLE OF PRIVATE SECTOR, INCLUDING INDUCEMENT INCENTIVES, IN OVERALL PROGRAM. FINANCIAL ANALYSIS, OUTLINING RATIONALE FOR PRIVATE SECTOR PARTICIPATION, SHOULD BE INCLUDED IN PROJECT DESCRIPTION.

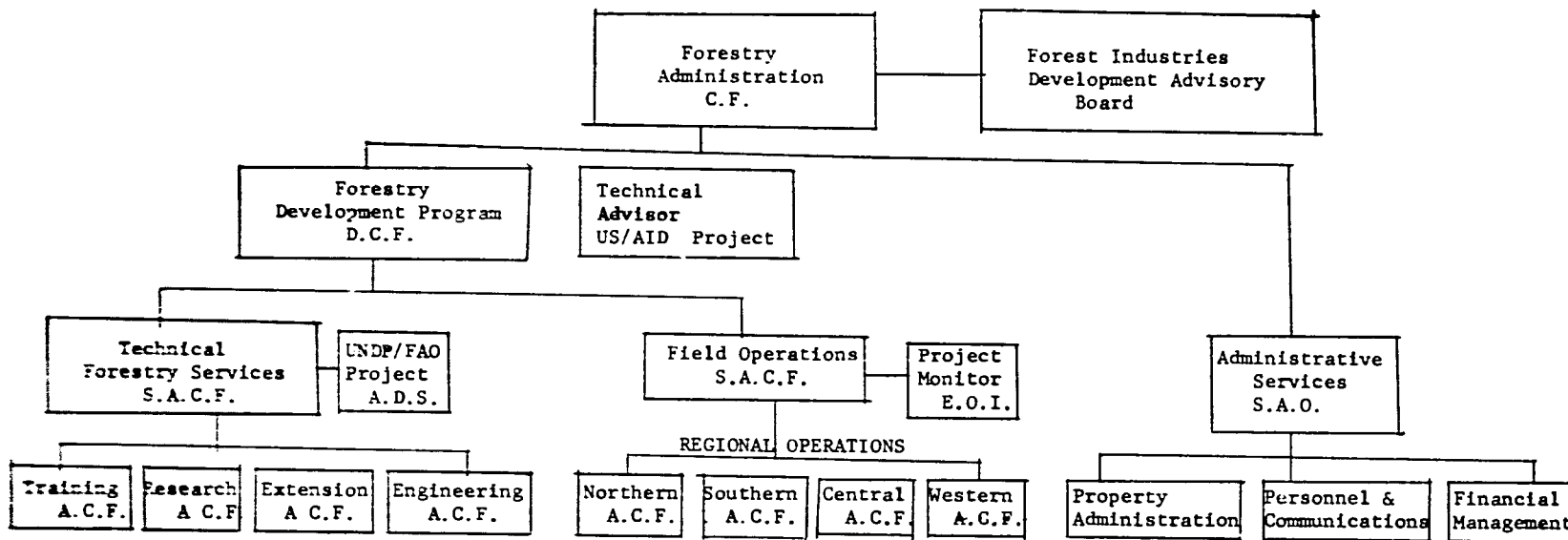
4. IDY LOAN TEAM WILL HANDCARRY ECONOMIC DATA GATHERED IN WASHINGTON FOR REVIEW OF GOJ.

5. AVAILABILITY OF DONATO TO ASSIST LOAN TEAM WILL BE MOST IMPORTANT FOR PROMPT COMPLETION OF INTENSIVE REVIEW. ROGERS

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PROPOSED ORGANIZATION CHART
FOREST DEPARTMENT
JAMAICA, MAY 1973



KEY

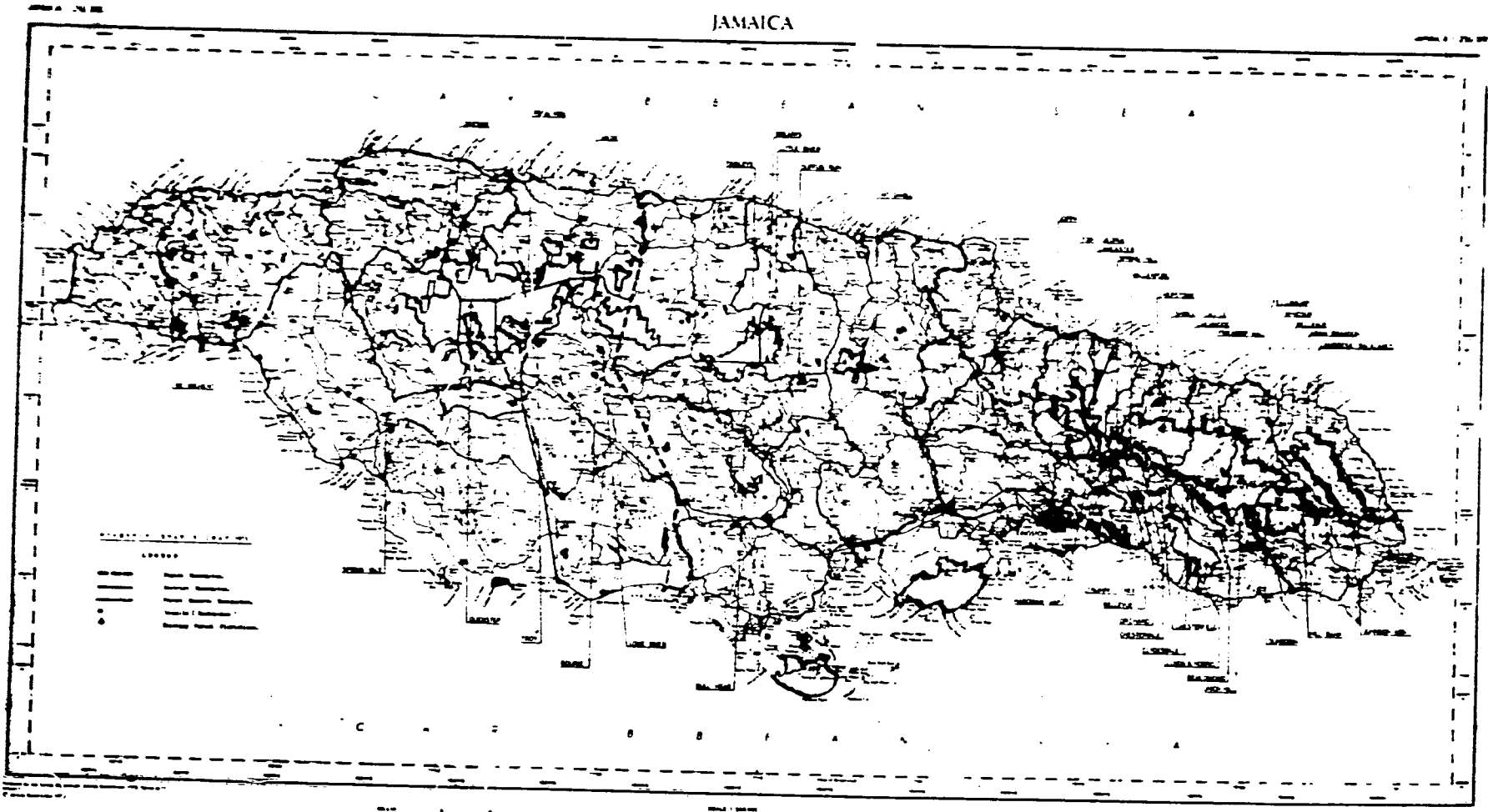
- C.F. -- Conservator of Forests
- D.C.F. -- Deputy Conservator of Forests
- S.A.C.F. -- Senior Assistant Conservator of Forests
- A.C.F. -- Assistant Conservator of Forests

FOREST DEPARTMENT STAFFING

POSITIONS (Perm. f/t)

<u>POSITION</u>	<u>EXISTING MAY 1973</u>	<u>PROPOSED FOR GOJ/AID PROJ.</u>	<u>TO BE ADDED</u>
<u>Professional</u>			
Conservator of Forests	1	1	-
Deputy Conservator of Forests	-	1	1
Senior Asst. Conservator of Forests	1	2	1
Assistant Conservator of Forests	9*	20	11
Subtotal	11	24	13
Includes 3 on spec. contract			
<u>Technical</u>			
District Supervisor	6	6	-
Asst. District Supervisor	4	7	3
Senior Foresters	6	12	6
Foresters	45	45	-
Works Overseer I	3	6	3
Senior Works Overseer	-	2	2
Draftsman	1	6	5
Senior Draftsman	-	1	1
Research Assistant	1	1	-
Headman	16	96	80
Forest Warden	28	28	-
Temporary Forest Warden	22	22	-
Nurseryman	19	19	-
Workshop Assistant	-	4	4
Operato. Mechanical Unit	2	21	19
Sidemen	6	6	-
Subtotal	159	282	123
<u>Administrative Services</u>			
Senior Administrative Officer	-	1	1
Executive Officer I	1	2	1
Executive Officer II	-	2	2
Accounting Officer	2	2	-
Accounting Officer II	-	4	4
Departmental Assistant I	4	6	2
Departmental Assistant II	12	12	-
Secretary/Stenographer	1	2	1
Stenographer/Typist	1	3	2
Typist	4	7	3
Clerical Officer I	1	4	3
Clerical Officer II	5	13	8
Telephone Operator	1	2	1
Driver	11	13	2
Cleaner	2	2	-
Yardman	1	1	-
Watchman	2	2	-
Messenger	4	4	-
Subtotal	52	82	30
TOTAL	222	388	166

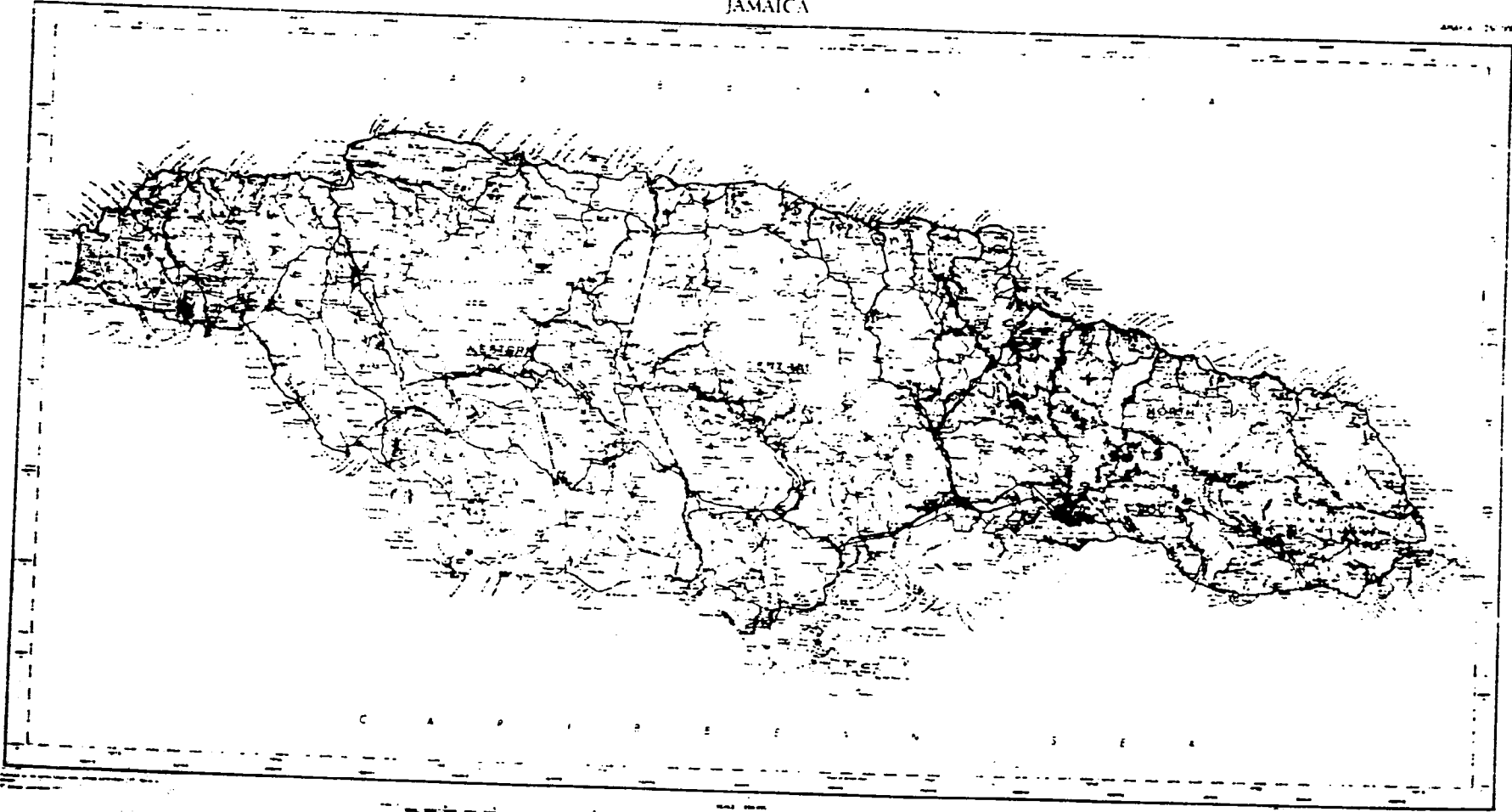
JAMAICA



AM 47-25-247

JAMAICA

AM 47-25-102



Scale: 1:50,000
Projection: UTM
Datum: WGS 84
Elevation: Contours at 100m intervals
Roads: Solid lines for main roads, dashed for secondary roads
Water: Blue lines for rivers, light blue for lakes and swamps
Settlements: Black dots for small settlements, larger black areas for towns and cities
Other: Dotted lines for boundaries, hatched areas for specific terrain types

SECRET

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ANNEX III
Exhibit A-4
Page 1 of 2

LOCATION OF GOVT/AID FORESTRY PROJECT ACTIVITIES

LEGEND

DIVISION BOUNDARIES

Plantation to be Established

No. 4, Bull Head
No. 6, Cape Clear
No. 7, Greys Inn
No. 8, Fort George
No. 9, Joppa
No. 11, Langley
No. 12, Belmore
No. 13, Oatley
No. 14, Rose Hill
No. 16, Halberstadt
No. 17, Clifton Mountain
No. 18, Strawberry Hill
No. 19, Charlottenburg
No. 20, Clydesdale
No. 23, Serge Island
No. 24, Wind Hill

Plantation Mgt.

No. 4, Bull Head - Demonstration -
Timber Sale & Reforestation

Seed Production

No. 4, Bull Head
No. 9, Joppa
No. 20, Clydesdale

Nursery Improvement

No. 10, Mount Airy
No. 20, Clydesdale
No. 21, Chesterfield

Road Construction

No. 6, Cape Clear
No. 8, Fort George
No. 9, Joppa
No. 12, Belmore
No. 13, Oatley
No. 14, Rose Hill
No. 19, Charlettenburg
No. 23, Serge Island
No. 24, Wind Hill

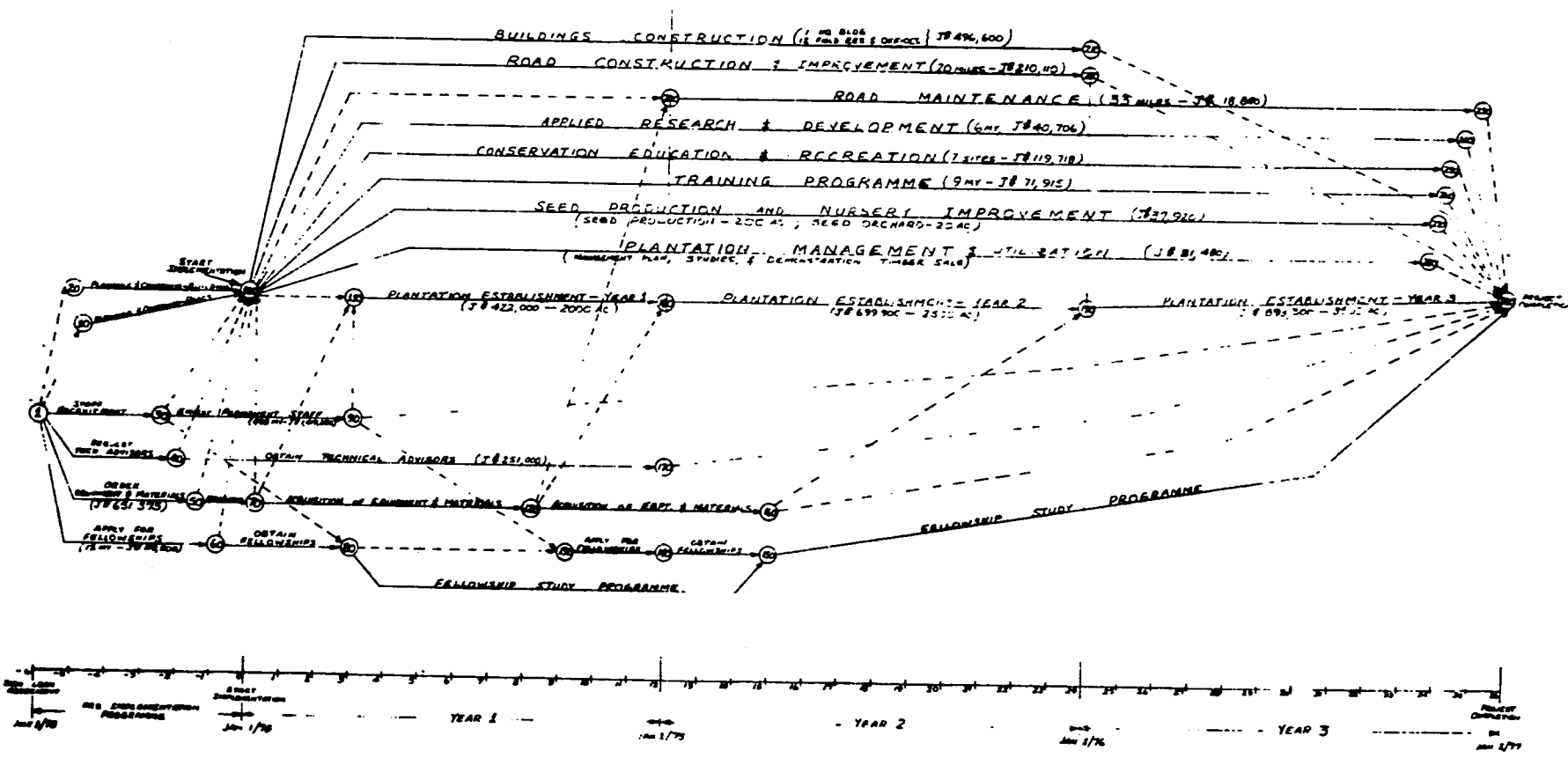
Conservation, Education
and Recreation

No. 1, Gourie
No. 2, Williams Field
No. 4, Bull Head
No. 5, Monegue
No. 22, Blue Mtn Peak
No. 25, Hardwar Gap

Buildings

No. 3, Seville
No. 6, Cape Clear
No. 7, Grays Inn
No. 9, Joppa
No. 12, Belmore
No. 15, Constant Spring
No. 16, Halberstadt
No. 20, Clydesdale
No. 23, Serge Island

GOJ/USAID FORESTRY DEVELOPMENT PROJECT PLANNED IMPLEMENTATION SCHEDULE



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ANNEX III
Exhibit A-6

AID-DLC/P-2006

Exhibit A-6 Will be distributed at a later date

INPUT/OUTPUT ANALYSIS OF GOJ/USAID FORESTRY LOAN PROJECT

Goal - Increase the contribution of Jamaica's Forestry Sector to National Development

Program - (I) Strengthen forestry institutions, (II) expand and improve Caribbean pine forest resources in Jamaica, and (III) improve utilization of such resources.

Duration - 3 years

Cost - J\$6.42 million (U.S.\$7.05 million)

I. Strengthen Forestry Institutions

Activity - 1. Expansion of GOJ Forest Department staff.

Purpose - To increase permanent, full time staff commensurate with the increase in workload.

Inputs - Add 13 professional forester positions (1 in field, 12 Hq.), 123 technical positions (82 field, 41 Hq.), and 30 administration services positions (16 field, 14 Hq.), Total = 498 man years, (MY) \$J1,419,280.

Outputs - Improved managerial and technical competence at all levels; improved productivity of labor crews through more intensive and higher quality supervision; and improved administrative services "backup". Workload distribution more compatible with staff capability. Better distinction between "line" and "staff" functions.

Activity - 2. Training and fellowships

Purpose - To increase technical and managerial performance and capability of FD staff; to increase forestry professionalism; and to introduce new activities such as forestry extension.

Inputs - Three MYs. Professional Training Offices, 3 MYs. Assistant Training Officer, 3 MYs Staff Assistant - plus training equipments and materials = total \$J58,315.

1/4 MY USAID Technical Advisor = \$J11,500. Fellowships (15 MYs Professional plus 1½ MY Technical) = \$J119,500.

Outputs - A permanent, in-service FD training program of short courses related to operational problems (i.e. - crew supervision, record keeping, problem analysis, safety, fire control, etc.); Annual assessment of FD training needs; 6 new, professional foresters; improved technical competence in forestry extension work, timber sales mgt., forest seed production, and applied research and development.

Activity - 3. Buildings and facilities.

Purpose - To provide adequate and permanent office facilities for headquarters and field staff; and provide residences for field staff and families where private housing is not available or adequate.

Inputs - A new FD headquarters office of at least 21,000 sq. ft. on Government land in Kingston = J\$378,600. Five residences (2,400 sq. ft. each) @ J\$8,000, plus five combined residences and offices (3,600 sq. ft. each) @ J\$12,000, plus two offices (2,400 sq. ft. each) @ J\$8,000 = Total J\$116,000. Office furniture for hq. and field offices = J\$18,000. Office equipment J\$16,950.

One utility shed on Government land at Twickenham Park for seed processing and equipment storage J\$2,600

Outputs - Improved and permanent FD facilities in Kingston, Fort George, Joppa, Serge Island, Belmore, Cape Clear, Clydesdale, Halverstadt, and Seville; and more adequate storage shed facilities at Twickenham Park will accommodate expanded workload and staff of FD. All construction by Ministry Public Works expected generate 24,730 man days of labor over 2 years.

Activity - 4. Mobility and communications

Purpose - To provide minimum basic radio facilities and vehicles needed for implementation and coordination of all resource management, extension, training, and related field activities.

Inputs - Radio system of 10 base station transmitters - receiver sets, 20 mobile sets, and 12 portable sets = J\$48,000.

New vehicles consisting of 21 four-wheel drive jeep-types for field officers, 5 small passenger cars for Forestry Extension staff, 1 small passenger vehicle and one 10-passenger bus for training activities = J\$105,700.

Other vehicles for transport of plantation establishment crews and road maintenance are listed separately under those activities.

Outputs - Improved mobility of FDs' technical and supervisory staff will enable better direction of field work crews, will facilitate a dynamic forestry extension program, and will enable fast response of the FD to forest fires and other emergencies. Similarly, the radio system will permit continuous coordination of staff activities, will help reduce lost time due to equipment breakdown, and will facilitate reporting of work status and staff needs.

Activity - 5. Program planning, implementation, and control.

Purpose - To advise and assist the Conservator of Forests and his top staff in the implementation, coordination, and control of the forestry loan project and in planning for follow-up programs.

Input - One Executive Officer for 3 MYs to serve as Project Monitor and thereby assist the SACF for Field Operations = J\$15,000 (included in #1 - Staff expansion). One USAID Forestry Management and Administration Advisor for 3 man years to advise and assist the Conservator of Forests and Deputy in project coordination and management = J\$165,000.

Output - Implementation and completion of Project activities on schedule; elimination of wasteful duplication of effort, and effective planning for follow-up stages.

II. Expansion and Protection of Caribbean Pine Resources

Activity - 1. Caribbean pine Plantation Establishment.

Purpose - To establish an economically viable and commercial timber resource to meet future demand for wood in Jamaica.

Inputs - 309,400 man days of labor costing J\$1,666,800; about 6½ million seedlings of Caribbean pine costing J\$348,400; and equipment including 14 crew trucks, costing J\$167,000, all to do site preparation, the planting, and four weedings on 8,000 acres of forest land in the Northern and Southern Regions of Jamaica's FD.

Outputs - 2,000 acres of Caribbean pine plantations in year 1 expected to yield about 59 million board feet (bd. ft.) of sawwood and panels in year 20, 2,500 acres in year 2 expected to yield 73.7 million bd. ft. in year 21, and 3,500 acres planted in year 3 should yield about 103.3 million bd. ft. in year 22. This volume of timber would satisfy about 3/4 of the projected demand for sawn softwood in year 20 (1993) of 80 million bd. ft. and by year 22 (1995) this domestic supply should exceed the demand.

Activity - 2 Road construction and maintenance

Purpose - To provide temporary access on a permanent location, to the Caribbean pine plantations established in years 2 and 3.

Inputs - 42,851 man days of labor costing J\$210,110 and J\$262,224 of rental equipment and contract services for construction of 18½ miles and improvement of 1½ miles of forest access roads. In addition, 3,490 man days of labor costing J\$18,840 plus J\$155,000, for equipment purchase for maintenance of 33 miles of forest access roads.

Outputs - These roads will insure quick access to 8,000 acres of Caribbean pine plantation during the 3 year project for all work related to plantation establishment, management and protection. Roads will be "put to bed" (i.e., planted w/grass to stabilize soils) at end of 3 year project - and reopened for access at a later date, for precommercial thinning and harvest operation. Thus, access will be temporary but on a permanent location.

Activity - 3. Seed production and nursery improvement.

Purpose - To produce high quality Caribbean pine seeds and seedlings needed for plantation establishment in Jamaica and for export as profitable.

Inputs - 9,115 man days of labor costing J\$37,920, plus J\$10,800 for nursery equipment and materials, and one USAID Technical Advisor for 1/3 man year costing J\$13,000, to convert 200 acres of existing Caribbean pine plantations to seed production stands, to establish a 20 acre clonal seed orchard, and to improve nursery management techniques at 4 nurseries in the Southern Region.

Outputs - Increased production of Caribbean pine seedlings at 4 nurseries in Southern Region to a level of 1.4 million seedlings in year 1, 1.75 million in year 2 and 2.45 million in year 3, will satisfy plantation establishment needs of Jamaica during the Project. Domestically produced seed will substitute for costly and mediocre quality (U.S.\$4,500-6,000) imports by year 3 and will, by year 5 produce sufficient quantities for exports valued at U.S.\$15,000 to 30,000. In addition, the quality of the seeds and resulting trees produced will improve considerably due to selection and development of superior phenotypes.

Activity - 4. Applied Research and Development

Purpose - To insure the success and efficiency of the Project by adapting forestry research and technology developed elsewhere to the Jamaican situation.

Inputs - 6 man years for a R & D director and staff assistant (included #1 Staff expansion) costing J\$27,206, plus J\$5,000 for equipment and materials, and 1/4 man years for USAID Technical Advisor costing \$8,500.

Outputs - Reduction in costs of plantation establishment by developing efficient use of chemical herbicides and mechanical methods for use in site preparation and weeding; by improving seedling containers so as to reduce costs of transporting seedlings to planting site; etc. will generate significant increases in the internal rate of return for the overall investment. Study of plantation rotation, growth response to thinning, optimum spacing, etc. will enable more profitable management of Caribbean pine plantations.

Activity - 5. Fire Protection.

Purpose - To provide the minimum number of basic hand tools needed for effective forest fire suppression.

Inputs - J\$3,000 for 10 forest fire tool kits to equip 10 fire crews of 6 men each. Training of forest laborers in the use of tools and in fire control techniques is provided for under the Training and Fellowships activity.

Outputs - Minimum level of fire control needed for protection of a rapidly expanding pine resource.

Activity - 6. Forestry Extension to Private Landowners.

Purpose - To increase production of forest products on privately owned lands and to increase extraction, processing, and utilization of Jamaican woods by local processors and consumers.

Inputs - 6 man years of professional extension foresters (included in #1 Staff Expansion) costing J\$31,000, to convey technical assistance to private landowners in tree planting, site preparation, weeding, thinning, harvesting, etc, plus J\$6,000 for vehicles, and ½ man year of USAID Technical Advisor in Forestry Extension to private landowners costing J\$19,000.

Outputs - Demonstration of profitable forestry activities such as the planting site preparation, and weeding and the development of effective incentives are expected to encourage establishment of Caribbean pine plantations on industry lands and of at least 3,000 acres of plantations on other private lands. Involvement of the private sector in forestry will reduce GOJ investments needed to increase self sufficiency in the domestic production of softwood sawnwoods.

Activity - 7. Conservation Education and Recreation

Purpose - To encourage public support for forestry development by informing people about the reasons for and methods of such development and by providing them with outdoor recreation facilities that are accessible and compatible with the local environment.

Inputs - 9,720 man days of labor costing J\$48,500 and local lumber and materials for installation of information Kiosks, picnic shelters, nature trails, toilets, and parking spaces at 7 sites - Gourie Forest, Williamsfield Nursery, Moneague Nursery, Bull Head Forest, Clydesdale, Hardwar, Gap, and Blue Mountain Peak. Tent camp facilities will also be installed at Clydesdale and Hardwar Gap. Kiosks to be maintained with posters, photos, handout materials, and other visual aids describing local ecology and any forestry work visible from the site.

Outputs - 7 popular sites, well distributed throughout Jamaica and accessible to local citizens, community groups, and others for outdoor recreation and for learning about the forest environment. Understanding and enjoyment provided by such facilities should generate public support for forestry development.

III. Improving Utilization of Forest Resources in Jamaica

Activity - 1. Forestry Extension to Commercial Timber Extractors and Wood Processors

Purpose - To develop in the private industrial sector the capability for profitable extraction, transport, sawing, finishing, and marketing of Caribbean pine timber and products grown in Jamaica.

Inputs - 9 man years of Professional Extension Foresters (included in #1 Staff Expansion), costing J\$46,500, plus J\$9,000 for vehicles, and 1 man year of USAID Technical Adviser - to encourage and assist in development of commercial logging and transport of Caribbean pine timber; to assist in improvement of sawmilling and processing of Caribbean pine timber; and to improve processing and utilization of other marketable timber in Jamaica.

Outputs - Demonstration timber sale to illustrate both feasibility and profitability of the extraction, processing, and utilization of timber from Caribbean pine plantations. The sale of timber stumpage on Government and private forest lands to commercial loggers.

Increase in productivity and improvements in quality of lumber sawn on small sawmills and sawbenches.

Substitution of at least 10% (4 million bd. ft.) of soft sawnwood imported with locally produced Caribbean pine lumber.

Reduction of 20% (400,000 cubic ft.) in waste of hardwood lumber sawn on local sawmills and sawbenches.

GOJ/USAID FORESTRY LOAN PROJECT

Equipment Purchase List (All Prices Estimated)
- May 1973

SUMMARY BY ACTIVITY

Plantation Establishment	J\$167,000
Road Construction and Maintenance	155,000
Plantation Management	60,000
Extension	15,000
Nursery Improvement	8,400
Fire Control	3,000
Training	26,000
Staff Development and Communications	193,975
Research and Development	5,000

TOTAL

J\$633,375

(U.S.\$676,732)

GOJ/USAID FORESTRY LOAN PROJECT

SUMMARY BY TYPE:

<u>Operation</u>	<u>Type</u>	<u>No.</u>	<u>Cost (\$J)</u>
1. <u>VEHICLES</u>			
Plantation Establishment	2-3 ton stake side	14	\$112,000
Road Maintenance	Mixed	3	16,600
Logging study	Crew Vehicle & Log Truck	3	24,300
Extension	Passenger cars	5	15,000
Training	Car, bus	2	13,000
Staff development	I H Scout	21	77,700
Sub Total		<u>48</u>	<u>\$258,600</u>

2. <u>HEAVY EQUIPMENT</u>			
Road Maintenance	Grader, loader, vibrator	3	76,000
Logging Study	Skidder	1	18,000
Nurseries	Garden tractor	4	3,200
		<u>8</u>	<u>\$ 97,200</u>

3. <u>MAINTENANCE EQUIPMENT</u>			
Plantation Establishment	Saw kits & Saw chain	8	1,400
Road Maintenance	-	-	18,500
Logging Study	-	-	580
			<u>\$ 20,480</u>

4. <u>FORESTRY FIELD EQUIPMENT</u>			
Plantation Establishment	Tools, etc.		6,300
Logging Study	-		450
Fire Control	Hand tools		2,610
Staff development	-		1,980
Research & Development	Weather instruments & misc.		1,980
			<u>\$ 13,320</u>

Operation	Type	No.	Cost (J\$)
5. <u>POWER TOOLS</u>			
Plantation Establishment	Saws, brushcutter	33	5,900
Logging Study	Saws	8	1,400
Nurseries	Pumps		1,000
Research & Development	Mist Blower	1	320
			<hr/>
			\$ 8,620
6. <u>AUDIO-VISUAL AIDS & OFFICE EQUIPMENT</u>			
Training	Misc. equipment		7,000
Staff Development & Communications	Misc. equipment		16,950
Research & Development	Calculator	1	1,500
			<hr/>
			\$ 25,450
7. <u>COMMUNICATIONS EQUIPMENT</u>			
Staff Development & Communications	Radios	40	\$ 48,600
			<hr/>
8. <u>MATERIALS</u>			
Nurseries	Pipe & Seedling containers		\$ 2,800
			<hr/>
9. <u>SAFETY</u>			
Plantation Establishment	Hats, First Aid		4,400
Logging Study	" "		270
Fire Control	" "		390
			<hr/>
			\$ 5,060
10. <u>SHIPPING, INSURANCE & CONTINGENCIES</u>			
			<hr/>
			\$153,245
GRAND TOTAL			<hr/>
			\$651,375

PLANTATION ESTABLISHMENT EQUIPMENT

<u>Item</u>		<u>No.</u>	<u>Cat. No.</u>	<u>Cost (J\$)</u>
Chainsaw	2/Work sites	27	-	\$5,400
" Tools & spares	1 per 2 sites	8	-	400
Saw Chain	10 rolls@\$100/roll	10	-	1,000
Back Pack Sprayers	200 acres/yr. each	50	20-425JP	2,000
Axes (Double-Bit)	10/Work site	160	16-W3-3½	800
Planting Mattock	10/Work site	160	16-203	
			16-20H	1,100
Wood seedling tray	50/site	800		400
Hazel Hoe (weeding	15/site	240	16-21	
			16-20H	2,000
Safety hat	40/site	600	13-AIA	3,000
First Aid Kit (16 man)	4/site	64	13-X116	800
Zinc Roofing Sheet	20/site @J200	300	-	600
Motorized Brush Cutter	Trial	2	21-H052	500
2 Ton Trucks	@ \$8,000	14		112,000
Sub-total				130,000
Shipping & Contingencies 30%				37,000
<u>TOTAL</u>		=		\$167,000

ROAD MAINTENANCE EQUIPMENT

	<u>Quant.</u>	<u>Cost (J\$)</u>
Grader (W/push blade)	2	44,000
Front end loader (1½ yd. ³ , W/backhoe)	1	26,000
Dump trucks (4 ton)	2	12,600
Equip.Maint. Vehicle (elec. weld & acetelyene, tools, towing (vehicle \$4,000)	1	13,500
Equip. Maint. Facilities for Regional workshops	4	9,000
Vibrator Roller		6,000
Sub-total		111,100
Shipping & Contingencies 40%		43,900
<u>TOTAL</u>	=	\$155,000

LOGGING STUDY EQUIPMENT

	<u>Quant.</u>	<u>Cost (J\$)</u>
Rubber Tire Skidder	1	\$18,000
Wire Rope ACC (Chokers Winch Drum Rope, Fittings)	L.S.	400
Chain Saws	8	1,400
Log Truck w/Hydraulic Loader	1	18,000
Crew Vehicles	2	6,300
Misc. Felling Equipment (Wedges, Tapes, Chain Saw Tools, Spare parts, Fuel containers, Machetes, Hand Axes)	L.S.	270
Surveying Tools for Spur Road Location Cabneys, Chains, Compasses, Flagging)	L.S.	180
Hand Tools and Tool Box for light maintenance work on Skidder by truck	L.S.	180
First Aid Kits (2 small - 1 large)	L.S.	90
Misc. Crew Equipment (Helmets, Gloves, Raingear)	L.S.	180
Sub-total		45,000
Shipping and Contingencies 30%		15,000
<u>TOTAL</u>	=	\$60,000

FORESTRY EXTENSION EQUIPMENT

5 Vehicles @ \$3,000		15,000
<u>TOTAL</u>	=	\$15,000

NURSERY IMPROVEMENT FOR 4 NURSERIES

<u>Item</u>	<u>Basis</u>	<u>No.</u>	<u>Cost (J\$)</u>
Garden tractor	@ \$800	4	3,200
1" Pipe	3,000/nursery	20,000 } 360 }	2,000
Pipe fittings	Carib pipe Co.\$25/100		
Spray nozzles	@ 6.00 ea.		
Styrofoam seedling containers	200/nursery		800
Pumps @ \$335 - see green guide		3	1,000
Sub-total			7,000
Shipping, Ins. & Contingencies 20%			1,400
<u>TOTAL</u>			8,400

FIRE CONTROL

10 Fire Control tool Caches (6 Man)

<u>Item (each Cache)</u>	<u>No.</u>	<u>Cat.No.*</u>	<u>Cost(J\$)</u>
1 Pulaski tool w/sheath	1	16-PA9	10.00
Fire rake	3	17-LW12	15.00
Shovel	1	17-BFG	8.00
Swatter	3	Local made	20.00
Back fire torches (case)	1	17-410	18.00
Indian backpack pump			60.00
Hard hats (red)	6	13 AIA	30.00
Head lamp	6	Western fire equip.	12.00
Canteen	6	24-2CBC	30.00
First aid kit	1	13-x 110	9.00
Tool Box	1	Local box	70.00
Food packs	6	Local supply	18.00
			300.00 x ✓ 10 crews
<u>TOTAL</u>			\$3,000

* Ben Meadows Forestry & Engine Supplies Catalogue.

TRAINING PROGRAM

<u>Item</u>	<u>No.</u>	<u>Cost (J\$)</u>
Automobile (6 or 5 pass. sedan)	1	3,000
Bus (10 passenger)	1	10,000
Slide projector	4	600
Movie projector 16 mm.	1	600
Classroom Easel	4	300
Movie Screen	4	300
Tape Recorder	2	400
Films	5	500
Text books	200	2,000
Misc. Training Equipment	-	1,000
Drafting Table	1	100
Tracing Table		400
Duplicating Machine		400
Movie Projector 8 mm.	1	400
Sub-total		<u>20,000</u>
Shipping, Ins. & Contingencies - 30%		6,000
<u>TOTAL</u>		<u>\$26,000</u>

Prices checked w/ (1) Stanley Motta Ltd., (2) Ben Meadows Cat. No. 8.

STAFF DEVELOPMENT & COMMUNICATIONS

<u>Item</u>	<u>Basis</u>	<u>No.</u>	<u>Cost (J\$)</u>
Base Station Radios	@\$1,500 (see attached)	10	\$15,000
Mobile sets	@\$1,200	20	24,000
Portable Radios	@ \$800	12	9,600
Calculators @ \$500	{ 3 for H.O. { 1 ea. Region (4)	7	3,500
Adding Machines @ \$150	{ 3 for H.O. { 1 ea. Region (4)	7	1,050
Typewriters @ \$400	1 ea. Region & Division	5	2,000
Xerox Machine No.720	@ \$220/month rental + paper	1	8,000
3 Drawer safes (filing cabinets) @ \$80	{ 1 ea. work site office { 2 ea. division, 5 H.).	30	2,400
Stereo photo equip.	-		300
Survey Equipment	{ Transit, Compass, Clinometer { Tapes Flagging, Notebook		1,140
Jeeps \$3,700 U H Scout	{ 1 ea. work site { 1 ea. Region	21	77,700
Clipboards - Aluminum	See Ben Meadows - 8th Ed.	20	100
Nel Spot paint gun & paint		10	440
Misc.Office Furniture	{ \$10,000 H.O. + \$8,000 field { offices		18,000
			<hr/> 163,230
Shipping & Contingencies	- 30%		48,745
			<hr/> 211,975
<u>TOTAL</u>	=		

Prices checked with the following sources:

1. Richard Boor Office Equipment Co.
2. Jamaica Supply Department
3. BUD DOANATO
4. Ben Meadows Catalogue No. 8
5. UNDP Actual XEROX cost by rental of machine + paper

RESEARCH AND DEVELOPMENT

<u>Item</u>	<u>Basis</u>	<u>No.</u>	<u>Costs(J\$)</u>
Measuring - Tapes, Scales, Prism, Diameter Tape, Relascope, Compass Clinometer, Clip boards etc., Scale sticks, Tally Counters	1 R & D Professional) + 1 Assistant	} 2 sets @ \$250	\$500
Back pack Sprayer		2	80
Mist Blower		1	320
2 sets of Equipment for Fire Weather Stations to calculate fire danger @ \$700 each set containing: Max Min Thermometer Psychrometer Rain Gauge Anemometer Wind Meter Portable Weather Kit Station			1,400
Statistical Calculator			1,500
Sub-total			<hr/> 3,800
Shipping & Contingencies - 30%			1,200
<u>TOTAL</u>			<hr/> \$5,000 <hr/>

CURRENT PRODUCTIVITY LEVELS FOR JAMAICAN FORESTRY ACTIVITIES

Telegraphic Address

"FORESTS"

ANY REPLY OR SUBSE-
QUENT REFERENCE TO
THIS COMMUNICATION
SHOULD BE ADDRESSED
TO THE CONSERVATOR OF
FORESTS AND NOT TO

ANY OFFICER BY NAME

AND THE FOLLOWING RE-
FERENCE QUOTED:-

No. A5/11

FOREST DEPARTMENT
144 Constant Spring Road
KINGSTON, 8
JAMAICA,

May, 19 73

Mr. Tom Ivers
US AID Forestry Loan Team
Embassy of the
United States of America
Kingston.

Dear Sir,

re: Productivity in Forestry Activities in Jamaica

This summary of current and projected productivity of manpower and forestry machinery in Jamaica will serve as a basis for your cost/benefit analysis of the proposed GOJ/AID Forestry Development Loan.

The estimates of physical input/output of manpower and machinery are based on experience and determination of the Forest Department during the period 1970-73.

Manpower wages are expressed in \$ (J) at current levels with average annual percent increases based on experience during the past two years and expectations for the period 1973-76.

Prices/costs of equipment purchase/rental and services available in Jamaica are expressed in \$ (J) at current levels at percent increases expected during 1973-76 due to inflation, rise in cost, etc.

I General Wage Scale

Average daily wages 1973

Prof. Forester	\$20/day
Tech. "	15/day
Headman	7/day
& Warden	7/day
Experienced labourer	\$4-5
Inexperienced labourer	\$3-4

Average annual increase of 10% is expected during 1973-76.

II Plantation Establishment

- (1) Site Preparation - severance, suppression or removal of only that amount of non-commercial vegetation essential for survival of trees to be planted.

	<u>Ruinete</u> (heavy brush & natural non-commercial forests)	<u>Light Ruinate</u> (light brush and grass)
a. Unskilled labour with machetes @ \$4.00 M.D.	20 Man days per ac. @ \$80.00/acre	12 Man days per acre @ \$48/acre.
b. Semi-skilled labour with machetes and mechanized tools @ \$5 M.D. in year 2	17 M.D. per acre \$85/acre	10 M.D. per acre @ \$50
c. Semi-skilled labour with mechanized sawa & machetes @ \$6 M.D. in year 3.	15 M.D. per acre \$90/acre	8 M.D. per acre \$48/acre

- (2) Tree Planting - insertion of 1 tree seedling per hole so as to ensure survival.

a. Unskilled labour with planting tool (hoe or bar) @ \$4 M.D.	8 M.D. per acre (at rate of 680 trees per acre). @ \$32 per acre.
b. Semi-skilled (employed 1 yr. or more) labour with planting tool (hoe or bar) @ \$5 M.D. in year 2.	6 M.D. per acre (at 680 trees per acre) @ \$30 per acre.
c. Semi-skilled (employed 1 yr. or more) labour with planting tool (hoe or bar) @ \$6 M.D. in year 3.	5 M.D. per acre (at 680 trees per acre) @ \$30 per acre.

- (3) Weeding - severance, suppression, or removal of only that amount of vegetation essential for survival of trees already planted.

a. Unskilled labour with machete @ \$4 M.D.	10 M.D. per acre @ \$40 per acre.
b. Semi-skilled labour with mechanized brush saw and machetes @ \$5 M.D. in year 2.	8 M.D. per acre @ \$40 per acre.
c. Semi-skilled labour with mechanized brush saw and machetes @ \$6 M.D. in year 3.	6 M.D. per acre @ \$36 per acre.

* Use of chemical herbicides, ex. Atrazine, in site preparation and in weeding will be tested and may reduce costs of these operations as much as 20 - 25%.

III Plantation Management and Utilization

(1) **Felling and crosscutting - severance of tree at stump and cutting stem into merchantable lengths. Standard crew consists of:-**

1 "Feller"	@ \$5.00/day	(current)
1 Helper	@ 4.00/day	
1 Power saw	@ 3.00/day	
1 Crew	@\$12.00/day	

Crew productivity: (based on Gibson and Fries and a workday of 300 minutes effective work time.)

Mean dbh (ins.)	Trees cut ac.	Worktime(min.) per tree	Trees cut per day	Crew days per acre	Cost acre \$ (J)
6	200	3.62	83	2.4	29.
8	200	5.47	55	3.6	43.
10	200	7.32	41	4.9	59.
12	200	9.17	33	6.1	73.
6	250	3.62	83	3.0	36.
8	250	5.47	55	4.5	54.
10	250	7.32	41	6.2	74.
12	250	9.17	33	7.6	91.

(2) **Skidding: Moving of merchantable logs from stump to roadside.**

A: With rubber tyre skidder and crew (adapted to Central and Western Regions) of:

1 Operator @ \$5.00/day (current)	- \$5.00
2 Choker Setters @ \$5.00/day	- 10.00
1 Chaser @ \$5.00/day	- 5.00
Operating cost of Skidder @ \$30/day (incl. dep.mtc.ins. & fuel)	- 30.00
1 Crew @ \$50/day	- \$ 50.00

Crew productivity: (based on J. Sessions' estimate)

	Vol./Ac (cu.ft.)	Ac./Crew Day	Vol.Removed per Day	Crew Days/Acre	Cost/Acre \$ (J)
Thinning + 500 (8 yrs.)	1.0	500 cu.ft.	1.0	50	
Clear + 5000 Felling -(20 yrs.)	.25	1300 cu.ft.	4.0	200	

B: With Unimog Urus Yarder and crew (adapted to Northern and Southern Regions) consisting of:

1 Operator	
1 Chaser	
1 Rigging Slinger (Asst. Foreman)	
1 Hook tender (Foreman)	
2 Choker Setters	
6 @ \$5.00/day - 30.00
1/2 day professional Forester @ \$15.00	... - 7.50
Operating cost of Unimog @ \$34.00/day	... - 34.00
1 Crew @ \$70/day - \$ 71.50

4.

Crew Productivity (based on J. Sessions' estimate):

	Vol./AC. (cu.ft.)	AC./Crew Day	Vol.Removed per Day	Crew Days/Ac.	Cost/Acre \$ (J)
Thinning	500 (8 yrs.)	.6	300	1.4	100
"	1000 (10 yrs.)	.5	500	2	173
Clear Felling	5000 (20 yrs.)	.2	1000	5	358

- (3) Loading and Transport: Loading logs on truck and transporting to mill with 15 ton truck and self loader.

1 Briver @ \$5.00/day	-	\$5.00
Operating cost (truck & loader) (incl. Dep., Mtc., Ins., & Fuel)	...		-	<u>43.00</u>
1 Truck/Loader Day (200 miles/day)				\$48.00

Truck productivity on basis 250 cu.ft. per load,
2 loads (2 x 100 miles round trip) per day
= 500 cu.ft. (3000 bd.ft.) per day.

IV Road Construction and Maintenance

The construction, improvement and maintenance of forest access roads.

- (1) Construction - 24 miles road

Avg/cost/mile	22,600	
Tot.cost/24 mile	\$542,000	
Labour M.D.	53424 @ cost	255,872
Equip.		217,200
Materials		69,000

- (2) Improvements - 3½ miles @ 10500/m

Total cost =	32,750
3896 M.D. labour	16,120
Equip.	15,400
Materials	<u>5,250</u>

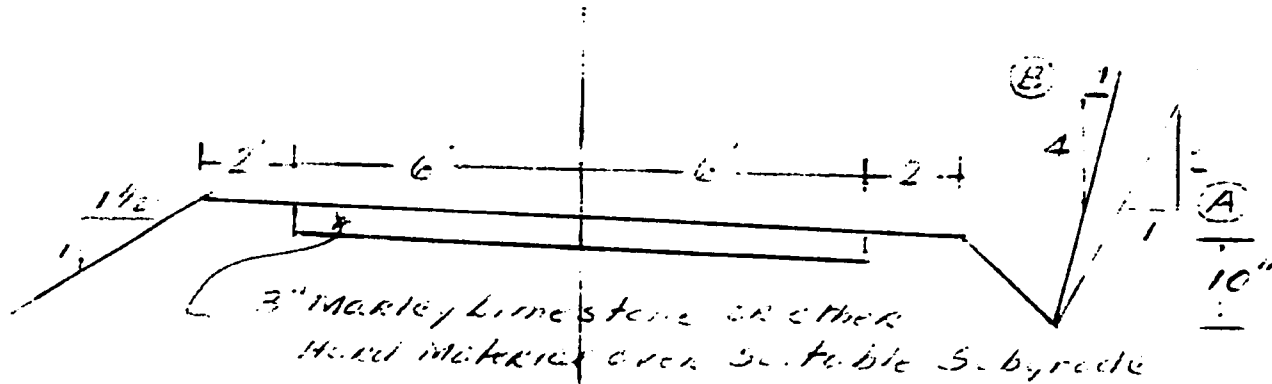
- (3) Maintenance - 45 miles/3 years.

Avg. cost/mile/year	\$673	
4950 M.D. - @		26,658
Equip.		6,750
		<u>23,408</u>

K. C. Hall

(K. C. Hall)
Conservator of Forests

CROSS SECTION OF FOREST ACCESS ROAD



CLASS ROAD	DESIGN SPEED	NO LANES	WIDTH LANE	SHOULDER	GRADE MAX		DEGREE CURVE MAX	SLOPES		
					ADV	ADV		CUT A	CUT B	FILL
Forest Access	10 MPH	1	12'	2'	15%	8%	144°	1/2 i	1/8 i	1/2 i

CUT A EARTH

CUT B ROCK OR SHALE ETC

GOJ/AID FORESTRY DEVELOPMENT PROJECT

ROAD CONSTRUCTION COST ANALYSIS

(ALL COSTS IN J\$)

<u>Item</u>	<u>Unit</u>	<u>Quant.</u>	<u>Unit Cost</u>	<u>Tot. Cost</u>	<u>Man Days</u>		<u>Tot. MD</u>	<u>Labor</u>	<u>Cost Equip.</u>	<u>Materials</u>	<u>Total</u>
					<u>Un-skilled</u>	<u>Semi skilled</u>					
Route Location	mile	1	LS675	675	150	15	185	675	--	--	
Clearing	acre	485	LS675	675	150	15	185	675	--	--	
Excavation (common)	Yd ³	8000	060	4800	400	80	480	2000	2800	--	
Excavation (rock)	Yd ³	2700	200	5400	400	80	480	2000	3400	--	
Embankment	Yd ³	1000	050	500	80	--	80	320	180	--	
Surface Wearing Course	Yd ³	1000	380	3800	400	40	440	1800	--	2000	
Ditching	LF	6000	015	900	180	36	216	900	--	--	
Culverts	LF	125	600	<u>1590</u>	160	40	<u>200</u>	<u>840</u>	<u>--</u>	<u>750</u>	
				J\$18,340			2306	9210	6380	2750	= J\$18,340
				<u>917</u>							
				19257							
				<u>1926</u>							
				J\$21,283/Mile							

UNCLASSIFIED
ANNEX III
Exhibit B-2, P. 10F1

GOJ/AID FORESTRY DEVELOPMENT PROJECT
TOTAL CONSTRUCTION SCHEDULE
 (All Costs in J\$)

Assumptions: 1st Year Labor Costs Unskilled J\$4.00/day; Semi-Skilled J\$5.00
 2nd Year Labor Costs Unskilled J\$4.60/day; Semi-Skilled J\$5.75
 3rd Year Labor Costs Unskilled J\$5.29/day; Semi-Skilled J\$6.61

REGION	Miles	Cost/ Mile	Total Cost	Mandays		Total Mandays	Labor	Costs Equip	Materials
				Unskilled	Semi-Skilled				
Year 1 Northern									
Construct	3	\$21,000	\$ 63,000	5,760	918	6,687	\$27,100	\$26,900	\$ 9,000
Improve	-	-	-	-	-	-	-	-	-
Maintain	-	-	-	-	-	-	-	-	-
Total	3	21,000	63,000	5,760	918	6,687	27,100	26,900	9,000
Year 2 Northern									
Construct	1.5	22,600	33,900	2,880	459	3,339	16,200	13,200	4,500
Improve	-	-	-	-	-	-	-	-	-
Maintain	3	690	2,070	300	30	330	1,552	518	-
Total	4.5	23,290	35,970	3,180	489	3,669	17,752	13,718	4,500
Year 3 Northern									
Construct	-	-	-	-	-	-	-	-	-
Improve	-	-	-	-	-	-	-	-	-
Maintain	4.5	790	3,550	450	45	495	2,677	873	-
Total	4.5	790	3,550	450	45	495	2,677	873	-
Year 1 Southern									
Construct	8.5	21,000	178,500	16,320	2,601	18,921	78,200	77,600	22,500
Improve	1.5	10,500	15,750	1,440	230	1,620	6,910	3,600	2,240
Maintain	-	-	-	-	-	-	-	-	-
Total	10.0	31,500	194,250	17,760	2,831	20,541	85,110	84,400	24,740

2017-2018 FUTURE INVESTMENT DEVELOPMENTS PRODUCTION STORAGE CONSTRUCTION BONDPROCEEDS (Cont'd)

REVENUE	WATER	Cost/ WATER	Sewer Cost	Materials		Materials	Labor	Costs	
				Estimated	Sum of Estimated			Equip	Materials
Year 1 Southern									
Construct	5.5	122,400	1074,000	10,560	1,680	12,240	158,250	248,647	116,500
Improve	-	-	-	-	-	-	-	-	-
Maintain	10.0	590	6,900	1,000	100	1,100	5,375	1,725	-
Total	15.5	23,290	121,200	11,560	1,780	13,340	63,425	51,272	16,500
Year 2 Southern									
Construct	-	-	-	-	-	-	-	-	-
Improve	-	-	-	-	-	-	-	-	-
Maintain	15.5	790	12,245	1,550	155	1,725	9,224	3,021	-
Total	15.5	790	12,245	1,550	155	1,725	9,224	3,021	-

GOJ/AID FORESTRY DEVELOPMENT PROJECT
CONSTRUCTION & MAINTENANCE EQUIPMENT LIST

(ALL COSTS IN JS)

<u>Item</u>	<u>Quantity</u>	<u>Estimated Unit Cost</u>	<u>Total Cost</u>
Grader	2	J\$ 22,000	J\$ 44,000
Front End Loader	1	26,000	26,000
Dump Truck	2	6,300	12,600
Maintenance Vehicle	1	13,500	13,500
Workshop Equipment	4	2,250	9,000
Vibratory Roller	1	6,000	<u>6,000</u>
			J\$ 111,100
		Shipping	22,220
		Contingency	<u>21,680</u>
			J\$ 155,000

MACROECONOMIC SURVEY OF JAMAICA

A. RECENT ECONOMIC DEVELOPMENTS - The National Economy

Since her independence in 1962, Jamaica's output grew rapidly and the country made considerable progress in several social areas, but significant socio-economic problems remain, many of which appear difficult to overcome. During this period, the rate of growth of the Gross Domestic Product per capita, expressed in constant 1960 Jamaican dollars averaged around 5.0 percent per year.^{1/} The economic performance of Jamaica in terms of output expansion for the past decade has been satisfactory and it has allowed the island to reach a GDP of U.S.J.\$1,234 (US\$1,357) million in 1972. With a population of 1.95 million and a per capita income of J\$609 (U.S.\$670 in 1972 figures), Jamaica is ranked among the relatively more advanced of the developing nations, although it is generally considered that distribution is skewed.

The main stimulus to economic growth came from the mining sector. Large investments in processing facilities for alumina, beginning in 1967, induced a strong expansion in construction activities also. Thus, during 1968-1970, both the mining and construction sectors expanded at an abnormally high rate. Construction for housing and tourist facilities also expanded rapidly, whereas growth of manufacturing and agriculture lagged behind the annual increase in GDP.

TABLE I
Changes in GDP by Sector
(Percentage Annual Change)
(Current Prices)

	Average					
	1962-67	1968	1969	1970	1971	1972
GDP	8.0	8.9	11.6	10.3	5.9	8.4
Agriculture	6.0	-	-1.3	3.9	7.5	7.0
Mining	15.2	-2.9	25.0	28.0	8.1	9.8
Manufacturing	8.0	11.7	5.2	6.6	5.4	6.6
Construction	5.8	30.1	10.5	8.6	3.5	3.4
Other	7.0	8.5	11.1	9.3	7.7	9.8

Source: IMF - Table VI

^{1/}From an average of approximately 4.5% in real terms during 1968-70, the growth rate of the Jamaican economy declined to only 2% in 1971. This was due mainly to the weakening in world demand for aluminum. Preliminary information available for 1972 indicates a slight improvement, owing to a minor increase in ore production over the preceding year.

GDP at current market prices rose by only 5.9 percent in 1971, compared with an average rate of growth of 10.5 percent in the preceding three years. This slowdown was mainly due to a decline in the growth rate of the mining sector, which dropped from an average annual growth of 15.2 percent during 1962-67 and annual growth rates of 25.0 percent and 28.0 percent during the preceding two years, to 9.8 percent in 1972. Also with the completion of alumina expansion program, growth in the construction sector dropped from 30.1 percent in 1968 to 3.5 percent in 1971. In addition, the slowdown in the pace of economic growth in the U.S., Britain and Canada, Jamaica's main trading partners, contributed to a decline in the exports of bauxite and alumina. Manufacturing continued to lag behind the average growth achieved during 1962-67 and in 1971 experienced a slight decline in real terms. Agricultural output, however, rose more rapidly than GDP as a whole, for the first time in a number of years.

Significant fluctuations in the aggregate demand for the mining sector production, which are determined by international factors, the rising levels of under land unemployment and the growing unrest for social and economic improvement, have caused the Jamaican Government to realize the need for its increasing participation in managing the national economy. In the face of the decline in the private component of aggregate demand, the government has been increasing its expenditures at a very rapid rate.

TABLE 2
JAMAICA - ECONOMIC INDICATORS

	1968	1969	1970	1971	1972
	(in millions of current Jamaican dollars)				
	(percent annual change - current prices)				
GDP	868 (8.9%)	969 (11.6%)	1,069 (10.3%)	1,132 (5.9%)	1,234 (9.0%)
GNP	822 (10.3%)	916 (11.4%)	1,011 (10.4%)	1,066 (5.4%)	1,167 (9.5%)
National Income	680 (9.9%)	749 (10.1%)	830 (10.8%)	885 (6.6%)	967 (9.3%)
Per Capita Income (Actual)	451 (8.6%)	497 (8.9%)	542 (9.2%)	564 (5.5%)	609(p) (8.2%)

Source: IMF "Jamaica - Recent Economic Developments" --
January, 1973, and GOJ Department of Statistics, May 1973.

B. THE PUBLIC SECTOR^{2/}

Over recent years both revenues and expenditures of the Central Government have risen very rapidly, exceeding in almost every year the rate of growth in the economy as a whole (see Table 3 below). Until FY 1969-70, the growth in current revenues was greater than in current expenditures, but since FY 1970-71 the trend has been reversed. Similarly, capital expenditures continue to increase, and the combined effect of these rising levels is reflected in the overall budgetary deficits. In FY 1972-73 the current account surplus was narrowed substantially, with the result that the overall budgetary deficit reached an all time high of 88 million dollars. This was primarily due to the fact that revenue sources decreased from 84.4 percent to 77.8 percent of the total government operations.

To meet the increasing demands of public services and development expenditures, the government continues to adopt new tax measures and improved tax administration measures, in order to raise additional revenues. As a result, revenues rose from 20 percent of GNP in 1967-68 to 24 percent in 1972-73.

Current expenditures have been rising by 20% or more, due mainly to wage and salary increases granted to government employees, additional employment in the public sector, inflation and higher interest payments on the public debt. As a result of all these factors, current expenditures rose by 26 percent during the preceding fiscal year.

After slowing down considerably in 1971/72, the growth in capital expenditures accelerated to 22 percent in 1972/73. Outlays on the sub group "agriculture" increased by 70 percent. Increased capital expenditure chiefly for the acquisition of land as well as grants and loans to various agricultural organizations were mainly responsible for this increase. Similar increases, although not as significant, were made in allocations for employment-generation and investment programs during FY 1972/73.

^{2/} The Central Government is the dominant component of the public sector, and the public sector developments in this section are, therefore, analyzed in terms of its operation.

TABLE 3

Summary of Central Government Operations

FY	1967/68	68/69	69/70	70/71	71/72	72/73
(In millions of Jamaican Dollars)						
Current Revenues	131.3	148.9	180.4	213.1	244.8	280.7
Current Expenditures	117.0	130.6	144.2	178.4	213.7	269.1
Current Surplus	14.3	18.3	36.2	34.7	31.1	11.6
Capital Revenues	4.0	4.1	4.5	4.8	4.6	5.0
Capital Expenditures	39.8	50.6	55.0	73.2	85.6	104.4
Overall budget deficit	-21.6	-28.2	-14.3	-33.7	-49.9	-81.7
Balance on extra budgetary operations	-3.8	3.8	3.9	-1.6	11.6	6.1
Overall financing	25.4	24.4	10.4	35.3	38.3	75.1
(Percentage annual change)						
Current revenues	---	13.4	21.2	18.1	14.9	14.7
Expenditures	---	15.6	9.9	26.3	18.9	24.8
Current	---	(11.6)	(10.4)	(23.7)	(19.8)	(25.9)
Capital	---	(27.1)	(8.7)	(33.1)	(16.9)	(22.0)
(As per cent of GNP)						
Current Surplus	1.9	2.2	4.0	3.4	2.8	1.0
Overall Financing	-3.4	-3.0	-1.1	-3.5	-3.5	-6.3

C. NATIONAL DEBT

At the end of 1972 calendar year, the National debt stood at \$391.5 million or 24 percent higher than the corresponding figure of \$316 million for CY 1971. With the continuation of Government's policy to undertake large-scale socio-welfare and economic development programs, and the sluggishness of the tax revenues to increase at the same rate, the Government has been forced to depend heavily on deficit finance. Until 1972 the public debt increased at a moderate rate of 14%, but in 1972 it increased by 24 percent.

TABLE 4
NATIONAL DEBT OUTSTANDING
(\$ Million)

Category	Dec. 1969	Dec. 1970	Dec. 1971	Dec. 1972
Internal	141.1	175.1	206.9	258.5
(a) Treasury Bills	(25.6)	(35.0)	(41.4)	(43.8)
(b) Other	(115.5)	(141.1)	(165.5)	(214.7)
External	100.5	104.4	109.5	133.0
Total	241.6	275.9	316.4	391.5
Increase in total		14.2%	14.7	23.7

Until 1971 the Government relied heavily on raising the domestic debt from domestic internal sources, but in 1972 the portion financed through external sources rose 21% from the preceding year.

D. AGRICULTURE

Because of the increased economic diversification of the recent past, Jamaican agriculture, forestry and fisheries currently contribute relatively less to the Gross Domestic Product than in the past. This contribution was 8.2% in 1972 compared to 11.9% in 1961, but the value of agricultural production has risen to almost twice its 1961 level.

Nearly one million persons, or half of the population, live on farms, and about one-third of the gainfully occupied population is engaged in agriculture. Also, about one fifth of total exports consists of processed and unprocessed agricultural products.

The main agricultural products remain sugar cane and bananas, followed by citrus and pimentos in descending order of importance. Additional items of importance, especially for foreign markets, include cocoa, coffee, ginger and their products. A variety of other crops are grown for local consumption, including vegetables, a small amount of rice, potatoes, yams, pineapples and a wide range of other fruits which are exported fresh or processed to specialized markets in the U.S. and Europe.

The agricultural economy suffers from a basic weakness - a structural dichotomy characterized by a small number of large plantations spread over the fertile alluvial plains and a disproportionately large number of small peasant farms, the main features of which are their uneconomic size in relation to the enterprises pursued, low soil nutrient and production potentials, fragmentation and under-capitalization. Largely because of this basic structural mal-foundation, growth in the agricultural sector has tended to lag behind the overall growth of the economy.

The orientation of Jamaican agriculture to the production of tropical export crops -- which are currently over produced in relation to the demand for them on the international market, places the agricultural economy on uncertain and often precarious foundations. The effect of the world surplus of these crops is that the production and sale of a number of such commodities have to be maintained on the basis of continued international commodity negotiations and agreements on quotas and prices. However, with the admission of the United Kingdom into the European Economic Community, some of the advantages enjoyed by Jamaica regarding **sugar have disappeared.**

In addition to the above problems, the costs of agricultural production in Jamaica have risen abruptly, due to poor weather conditions and unknown factors, thus making some of the agricultural commodities less competitive in the international markets. For instance, the cost of citrus production in Jamaica is almost twice the level currently prevailing in British Honduras.

Other major problems of the agricultural sector can be summarized as follows:

1. The under-utilization of a large amount of arable land. Much land (conservatively estimated to be at least 225,000 acres) is devoted to unimproved pastures and could be made substantially more productive in providing both better pasture and land for cultivation and tree crops.

2. Over-intensive cultivation and misuse of steep slopes. The development of small farms in hilly terrain, combined with inappropriate cultivation techniques and crops, has led to serious erosion of land.

3. High man-land ratio on the micro-farms of the uplands; a characteristic pattern of unsystematic production; lack of nonagricultural employment; the general contempt held for manual work, especially agricultural labor, etc., are some of the other problems which have to be solved before significant increases from the agricultural sector can be obtained.

Special efforts are being made through government-organized agricultural development programs such as the Agricultural Development Corporation, and the Agricultural Marketing Corporation, to aid the farmers overcome some of the above mentioned constraints. Technical, financial and marketing assistance is being afforded by these organizations to small farmers to meet the increasing demands of foreign and local markets. Based on these efforts, suitable natural resources, and skills already partially developed, agriculture and related activities have considerable growth potential with respect to increasing production. Latest studies of the agricultural sector indicate that much of the country's future domestic food and timber needs can be met through local production, thus reducing the rapidly rising cost of imports. At this time, some twenty studies financed by the IBRD have been prepared and will be thoroughly reviewed, beginning in FY 1974. At the conclusion of this review, recommendations will be made for the formulation of government policies for the development and growth of this sector. While any comment on the probable outcome of the review is obviously premature (nor are all studies even in final form), it is generally conceded that this Forestry Development project will not contradict or conflict with the conclusions of these studies or probable decisions stemming therefrom.

E. FORESTRY

Forestry and logging constitute the smallest proportion of the overall agricultural sector. The present domestic production

of wood and lumber is low (slightly more than J\$3.0 million in 1972 compared to J\$2.6 million in 1965). Recently UNDP/FAO undertook a detailed investigation of the large-scale establishments of pine plantations in Jamaica and concluded that out of roughly 381,000 acres of forest lands under private ownership, 206,000 acres were suitable for softwood. Thus, should the government decide to develop large scale Caribbean pine plantations in conjunction with private enterprise, additional private land is available, either through purchase, rental or other forms of use.

At present, Jamaica imports about 90% of the forest products it consumes. Government owned natural forests, the principal source of timber, continue to produce a declining level of sawn timber and roundwood.

Against this rather low output of forest products, there is an increasing demand. It is estimated that there is a current national softwood demand of 40 million board feet annually, which is rising at a rate of 3.0% due to population growth and affluence of a certain section of the population. In addition to lumber for building construction, this wood is also used for citrus packaging boxes, utility transmission poles and matches and pulp, all of which are imported at present.

The value of all wood and paper imports has risen steadily from approximately J\$9.0 million in 1960 to J\$22.0 million (est.) in 1972, with the quantities of the major wood categories and imported products increasing correspondingly. A linear projection^{3/} of the annual demand for coniferous timber indicates an increase from 45,447 tons in 1955 to 85,427 tons in 1970 and above 100,000 tons in 1975.

Imports of forestry products continue to increase due mainly to the increase in housing demand. It is interesting to note that imports of softwood have declined slightly from the peak reached in 1969. This is due mainly to a decline in construction activity related to the mining sector.

F. FOREIGN TRADE AND BALANCE OF PAYMENTS

The balance of trade in Jamaica continues to deteriorate because of various external (exchange rates, currency devaluations,

^{3/} "A Projected Acreage Requirement for Coniferous Timber", Agricultural Planning Unit, May 22, 1970.

TABLE 5

Imports of Forestry Products in Jamaica
(In 1,000 Jamaican dollars)

<u>Year</u>	<u>Utility Poles</u>	<u>Sawn wood (soft)</u>	<u>Sawn wood (hard)</u>	<u>Wood-based Panels</u>	<u>Paper & Paperboard</u>	<u>Total</u>
1960	307	2,480	630	359	2,320	6,096
1961	204	2,260	660	440	2,680	6,244
1962	181	1,770	430	319	2,910	5,610
1963	84	2,470	520	317	3,900	7,291
1964	198	2,980	670	585	4,700	9,133
1965	226	3,560	780	718	4,970	10,254
1966	389	3,120	780	802	5,920	11,011
1967	1,076	3,420	1,080	870	6,500	12,946
1968	450	4,280	900	1,249	7,700	14,579
1969	159	4,530	1,370	1,039	9,090	16,188
1970	473	4,180	1,970	1,208	9,810	17,641
1971	418	3,410	2,740	1,445	10,340	18,353
1972	N.A.	N.A.	N.A.	N.A.	N.A.	

Source: External Trade Bulletins of Jamaica.

TABLE 6
FOREIGN TRADE FOR SELECTED YEARS

	Exports ^{1/} of Merchandise (f.o.b.)	Imports Percentage (c.i.f.) (In million J\$)	Deficits
	%		
1955	64.8	91.4	26.6
1960	111.6	155.0	43.4
1965	149.8	206.4	56.6
1966	193.6	233.8	40.2
1967	194.2	252.6	58.4
1968	203.5	320.4	116.9
1969	238.0	363.3	125.3
1970	277.7	437.8	160.1
1971	276.4	459.7	183.3
1972 p.	292.6	493.2	200.6

Source: GOJ: "Economic Survey - 1972"

1/ Excluding re-exports.

etc.) and internal factors (increased demands for consumer goods to meet the needs of expanding population). Preliminary estimates for 1972 indicate not only a continuing increase in exports and imports, but also an all time deficit record of \$200.6 million.

As in the past several years, in 1972 imports increased at a faster rate (7.3 percent) than the export of merchandise (5.8 percent). Capital goods imports declined again for the second successive year, but imports of consumer goods and raw materials continued to rise.

Exports

Exports of primary products remained at their existing levels, excepting bauxite, which continued to drop, due mainly to a decline in the economic prosperity in the U.S., Canada and England, the major markets for Jamaican bauxite, and partly because of the increasing conversion of bauxite into alumina in Jamaica. However, due to the latter factor, the total earnings from the mineral sector expanded, even though bauxite exports declined by 11.0% during 1972.

Manufactured goods, especially re-exports, continued to make aggressive penetration in foreign markets during 1972. Export earnings from sugar cane products increased by 10.5 percent, even though the volume of sugar exported fell by 22,993 tons. Rum, like sugar, showed a decrease in the volume exported from 2.3 million proof gallons in 1971 to 1.6 million in 1972, but recorded a marginal increase in the value of exports.

Imports

The value of merchandise imports in Jamaica continued to rise in 1972, the increase being above 7.0%. The biggest increases continue to take place in consumer goods, while imports of capital goods continue to move downward from the peak they had reached in 1970. In the former category, food, particularly meat, fish and cereals, accounts for most of the increase. The past performance of this sector indicates that the rise in local

TABLE 7

1/
Exports by Type of Product

	1968	1969	1970	1971	1972
	(Value in \$ million)				
Primary Products	78.8	99.8	98.5	95.5	89.1
Semi-Processed Products	96.0	109.4	145.3	137.1	156.2
Manufactured Goods	25.2	38.5	36.1	42.2	47.3
<u>TOTAL</u>	<u>200.0</u>	<u>243.7</u>	<u>280.7</u>	<u>274.8</u>	<u>292.6</u>
<u>Bauxite & Alumina</u>	88.9	147.1	187.6	179.0	188.3
Bauxite	N.A.	76.0	76.5	74.7	68.4
Alumina	N.A.	71.1	111.1	104.3	119.9

1/ Includes re-exports.

Source: GOJ: "Economic Survey - 1972"

output of these commodities has not been adequate to satisfy the growing demand. The final winding up of most of the mining sector projects is responsible for the decline in the imports of capital goods.

TABLE 8

Imports by Economic Function or End Use

	1968	1969	1970	1971	1972p	1968	1969	1970	1971	1972
	Value(\$million)					Percentage of Total				
Consumer Goods	114.4	118.1	131.2	147.8	175.6	35.7	32.5	30.0	32.2	35.6
Raw Material	89.2	119.1	139.8	165.0	178.6	28.1	32.8	31.9	35.8	36.2
Capital Goods	116.2	125.4	163.5	146.5	138.3	36.3	34.5	37.3	31.9	28.0
<u>Total</u>	<u>320.4</u>	<u>363.3</u>	<u>437.8</u>	<u>459.7</u>	<u>493.2</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
Forestry Products	14.6	16.2	17.6	18.4	23.3					

NOTE: Totals may not add up due to rounding.
Source: GOJ: "Economic Survey - Jamaica - 1972".

Balance of Payments

Due to increasing deficits in the balance of trade and decline in foreign capital inflows, the Jamaican balance of payments position suffered a serious setback during 1972. A significant increase in official capital flows and additional allocation of SDRs (IMF Special Drawing Rights) would have increased the total official reserves, had the private capital movements not declined by almost 50 percent. Thus, there was an overall deficit of \$43.6 million in the Jamaican balance of payments position during 1972, but the increases of the preceding several years still leave the country with a substantial foreign reserve position of \$101.2 million.

TABLE 9

Balance of Payments
(Million J. \$s)

	1970 Net	1971 Net	1972 Net
<u>Current Account</u>	<u>-127.2</u>	<u>-142.3</u>	<u>-160.7</u>
Merchandise (f.o.b.)	- 89.2	-108.2	-121.0
Services	- 56.2	- 51.4	- 59.2
Transfer Payments	18.2	17.3	19.5
<u>Capital Account</u>	<u>134.1</u>	<u>160.2</u>	<u>112.4</u>
Official	- 1.2	4.0	17.6
Private	135.3	156.2	94.8
<u>Allocation of SDRs</u>	<u>5.3</u>	<u>4.7</u>	<u>4.7</u>
Net Errors and Omissions	<u>5.4</u>	<u>13.7</u>	<u>-</u>
<hr/>			
BALANCE OF PAYMENTS	17.6	36.3	- 43.6
<hr/>			
TOTAL FOREIGN ASSETS	<u>103.4</u>	<u>143.0</u>	<u>101.2</u>

Outstanding External Public Debt

The latest information indicates that total external public indebtedness amounted to the equivalent of U.S. \$180 million. Figures for the external public debt are represented below:

TABLE 10
OUTSTANDING EXTERNAL PUBLIC^{1/}
DEBT

	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972^{2/}</u>
Total Public Debt	100.6	132.6	149.5	144.7	149.8	188.2
As Percent- age of GNP	13.5	61.1	16.3	14.2	13.5	15.7
As % of Export Earnings	5.2	6.2	6.3	5.2	5.4	6.4

^{1/} Includes government guaranteed debt.

^{2/} AID Team estimates for 1972.

Source: IMF "Jamaica - Recent Economic Developments"
Jan. 12, 1973

An Examination of the above figures leads to the conclusion that servicing of the external debt will probably not present great difficulties in the foreseeable future.

G. POPULATION AND EMPLOYMENT

The latest estimates (1972) place the total population of Jamaica at 1,953,472, of which about 60% are 15 years and older. The total population figure represents an increase of 42,072 persons or 2.2 percent over the 1971 estimates. During 1971 the population had grown by only 1.1 percent, or almost as slowly as it grew during 1967-69. The increase in the rate of population growth last year may partially be attributed to a substantial drop in emigration from Jamaica.

TABLE 11

Population Statistics For Jamaica, 1968-72

Year	Population	Births	Deaths	Net Migration
1968	1,939,649	65,402	14,557	5,273
1969	1,863,749 (adjusted)	64,668	14,094	29,000
1970	1,890,703	64,375	14,352	23,069
1971	1,911,420	66,277	14,078	31,482
1972	1,953,472	66,219	13,970	10,197

Source: Registrar General and "Economic Survey - 1972".

In the early 1960s, the birth rate was fairly stable at around 4 percent, after which it declined to 3½ percent from 1969 to 1971. A factor behind this reduction appears to have been the increase, around 1967, in the emigration of women, many of whom (an estimated 70 percent in 1969, for example) were of childbearing age. Another factor explaining the reduction in the birth rate was the intensification, under government auspices, of a family planning program, as a result of which, by 1972, there were 147 clinics operating under the National Family Planning Board, with full-time clinics established in all parish (state) capitals. Government expenditures (including U.S. AID Contributions) have risen from \$330,000 in FY 1968/69 to J\$1,294,000 in FY 1972/73 and are expected to increase further in the near future. Despite all these increasing family planning programs and efforts, the Central Planning Unit of the GOJ estimates the island population to exceed 2 million persons within the next two years and reach around 2.7 million by 1990.

Rural/Urban Mix

An examination of increase in the urban population of Jamaica^{4/} indicates that the proportion of population living in urban areas has risen from 30% in 1960 to 37% in 1970^{5/}. According to one expert, the total urban population of Jamaica should rise to over 50% by 1990^{6/}. This would mean that the total urban dwellers will be 1,329,000 by 1990,

^{4/} Based only on Kingston Metropolitan area and 13 other selected towns.

^{5/} It should be noted, however, that the boundaries of several urban areas were extended for the 1970 census.

^{6/} R. J. Harewood: "A Demographic Study of Jamaica" UNDP Physical Planning Project. December 1969.

which would represent an increase of at least 640,000 persons over the total number of urban dwellers in 1970. However, Central Planning Unit projections, based on the current urbanization trends, predict that the population in these areas will grow by 760,000 persons.

Labor Force

The labor force of Jamaica is presently increasing at a much faster rate than the growth in population. This is due primarily to the fact that Jamaica has a large number of teenagers who will join the labor force during the next several years. The GOJ National Planning Agency projects the population and labor force growth in the following manner:

TABLE 12

POPULATION AND LABOR FORCE PROJECTIONS
1970 - 1990

Year	Population	Population 15 years and over	Proportion of Total Population	Labor Force
1970	1,890,703	1,039,886	55%	782,500
1972	1,953,472	1,113,479	57%	808,290
1975	2,045,900	1,240,500	61%	892,600 ^{1/}
1990	2,671,800	1,749,300	65%	1,100,000

Source: Central Planning Unit

Employment & Unemployment

The most recent survey of labor force, employment and unemployment, conducted in October 1972, indicates that the labor force at that time numbered 808,291, of which 626,513 were employed and 181,777 were unemployed. Compared to a prior survey, conducted in October 1969, the unemployment in 1972 increased appreciably, rising from 17.2% to 22.5% during the three-year time span.

^{1/} Participation rates of 85.4% for males and 55% for females applied to 14-65 age group of population. Source: Central Planning Unit.

The increase in unemployment is attributable to several factors, the most important of which are: (a) an acceleration in the birth rate in 1954-56 and a sudden bulge in 1957 which was translated later into a more rapid accretion of young persons to the labor force; (b) a decline in employment in certain major sectors (in sugar, for example, the number of workers employed during the crop season has dropped from 61,000 in 1969 to 52,000 in 1972, and in the construction sector workers have been laid off as major expansion programs for alumina and tourism have been completed); (c) a sharp decline in 1971 in the number of farm workers sent to the United States; and (d) continued migration to urban centers, resulting in the conversion of rural underemployment into overt urban unemployment.

Rising economic activity has, over recent years, had no appreciable impact on employment, partly because much of the economic growth has been in capital-intensive sectors of the economy (bauxite, alumina industry) and partly due to shortage of skilled labor in labor-intensive industries, such as construction and tourism, where increased activity has often encountered shortages of qualified labor. Thus, side by side with a large pool of unemployed persons who lack the skills to qualify them for employment, there has existed a shortage of qualified people. It is worth noting that, although net emigration from Jamaica has helped to relieve population pressures, it has tended to aggravate the shortage of persons with those skills for which demand in the labor market has been considerable.

Carib Pine,
 Jamaica

Forest Management Alternative 1 -
Commercial thin at 10 yrs., harvest 20 yrs.

Per Acre

<u>Year</u>	<u>Establishment</u>	<u>Roads</u>	<u>Overhead</u>	<u>Returns</u>	<u>Net Total</u>
-2		-44	-4		-48
-1		-1.25	-4		-5.25
0	-230	-1.25	-4		-235.25
1	-80	-1.25	-4		-85.25
2-9		-1.25	-4		-5.25
10		-1.25	-4	+25	+19.75
11-18		-1.25	-4		-5.25
19		-45	-4		-49
20		-1.25	-4	+1868	+1862.75
<hr/>					
Second and following rotations					
0	-230	-1.25	-4		-5.25
1	-80	-1.25	-4		-5.25
2-9		-1.25	-4	+25	+19.75
10		-1.25	-4		-5.25
11-18		-1.25	-4		-5.25
19		-25	-4		-29
20		-1.25	-4	+1968	+1962.75

If yr. 10 thinning yields: Present net worth \$J (infinite series)

	<u>7%</u>	<u>8%</u>	<u>9%</u>	<u>10%</u>
\$+19.75 (net)	+74	-9	-87	-147
\$+94.75 (net)		+26	-53	-122

22,829 BF (Int. ¼") at harvest @ J\$70; 900 posts @ J\$30;
 thin from 500 to 250 trees/A

(U.S. \$1.00 = J\$.90)

Carib Pine,
 Jamaica

Forest Management Alternative 2 -
Non-commercial thinning at 6 yrs.,
harvest 20 years

Per Acre

<u>Year</u>	<u>Establishment</u>	<u>Roads</u>	<u>Overhead</u>	<u>Returns</u>	<u>Net Total</u>
-2		-44	-4		-48
-1		-1.25	-4		-5.25
0	-230	-1.25	-4		-235.25
1	-80	-1.25	-4		-85.25
2-5		-1.25	-4		-5.25
6	-25 (Thin)	-1.25	-4		-30.25
7-18		-1.25	-4		-5.25
19		-45	-4		-49
20		-1.25	-4	+2345	+2339.75
<hr/>					
Second and following rotations					
0	-230	-1.25	-4		-235.25
1	-80	-1.25	-4		-85.25
2-5		-1.25	-4		-5.25
6	-25 (thin)	-1.25	-4		-30.25
7-18		-1.25	-4		-5.25
19		-25	-4		-29
20		-1.25	-4	+2345	+2339.75

Present net worth \$J (inifinite series)

<u>8%</u>	<u>9%</u>	<u>10%</u>
+89	+52	-91

29,652 BF (Int. ¼") at harvest @ J\$70; 900 posts @ J\$30;
 thin from 500 to 250 trees/A.

(U.S. \$1.00 = J\$.90)

Carib Pine,
 Jamaica

Forest Management Alternative 3 -
Non-Commercial thin at 6 yrs., harvest 25 yrs.

Per Acre

<u>Year</u>	<u>Establishment</u>	<u>Roads</u>	<u>Overhead</u>	<u>Returns</u>	<u>Net Total</u>
-2		-44	-4		-48
-1		-1.25	-4		-5.25
0	-230	-1.25	-4		-235.25
1	-80	-1.25	-4		-85.25
2-5		-1.25	-4		-5.25
6	-25 (thin)	-1.25	-4		-30.25
7-23		-1.25	-4		-5.25
24		-45	-4		-49
25		-1.25	-4	+3113	+3107.75
<hr/>					
Second and following rotations					
0	-230	-1.25	-4		-235.25
1	-80	-1.25	-4		-85.25
2-5		-1.25	-4		-5.25
6	-25 (thin)	-1.25	-4		-30.25
7-23		-1.25	-4		-5.25
24		-25	-4		-29
25		-1.25	-4	+3113	+3107.75

Present net worth \$J (inifinite series)

<u>8%</u>	<u>9%</u>	<u>10%</u>
+18	-83	-158

40,620 BF (Int. ¼") at harvest @ J\$70; 900 posts @ J\$30;
 thin from 500 to 250 trees/A.

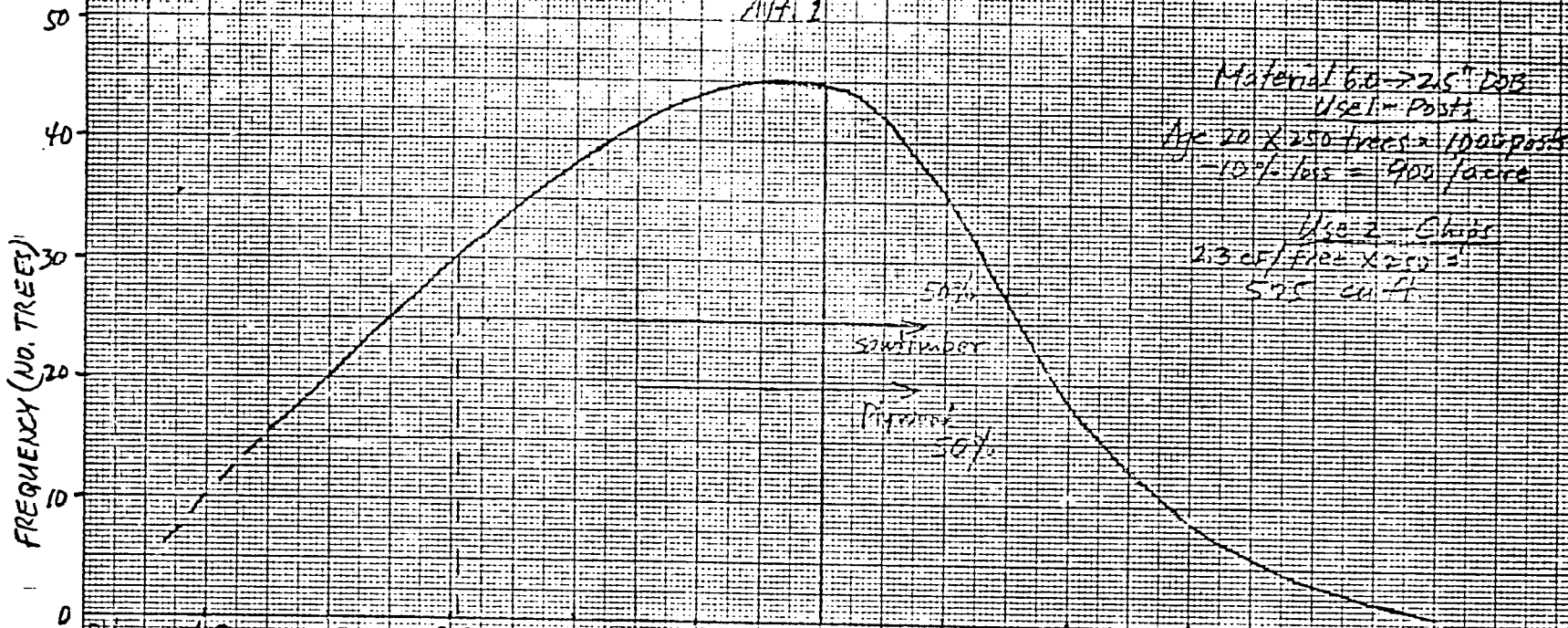
(U.S. \$1.00 = J\$.90)

Table

Expected frequency distribution
 Carib. Pine - Jamaica
 Harvest age 20, Commercial thin age 10

GD Steber 4/73

Att. 1



Material 6.0 → 2.5" DOB

Use 1 - Posts

Age 20 x 250 trees = 1000 posts

- 10% loss = 900 posts

Use 2 - Chips

2.3 cu ft / tree x 250 trees

575 cu ft

DOB →	6.5	7.5	8.5	9.5	10.5	11.5 (Mean)	12.5	13.5	14.5	15.5	16.5	Total
Ht to top	25	32	39	46	53	60	67	73	79	84	90	
Cu ft / tree	2.5	4	7	10	14	19.6	25	30	42	48	59	4230
Ht to 6.0'	-	-	24	31	38	45	52	59	64	70	76	
Bu ft / tree	-	-	35	43	78	110	147	182	225	272	333	22827
No. trees	6	20	30	39	44	45	34	18	9	4	1	250

Ht. tested on taper rate of 1.37" / ft.

Bu ft / cu ft ratio 4.0" DOB = 5.8

Expected frequency distribution

Table

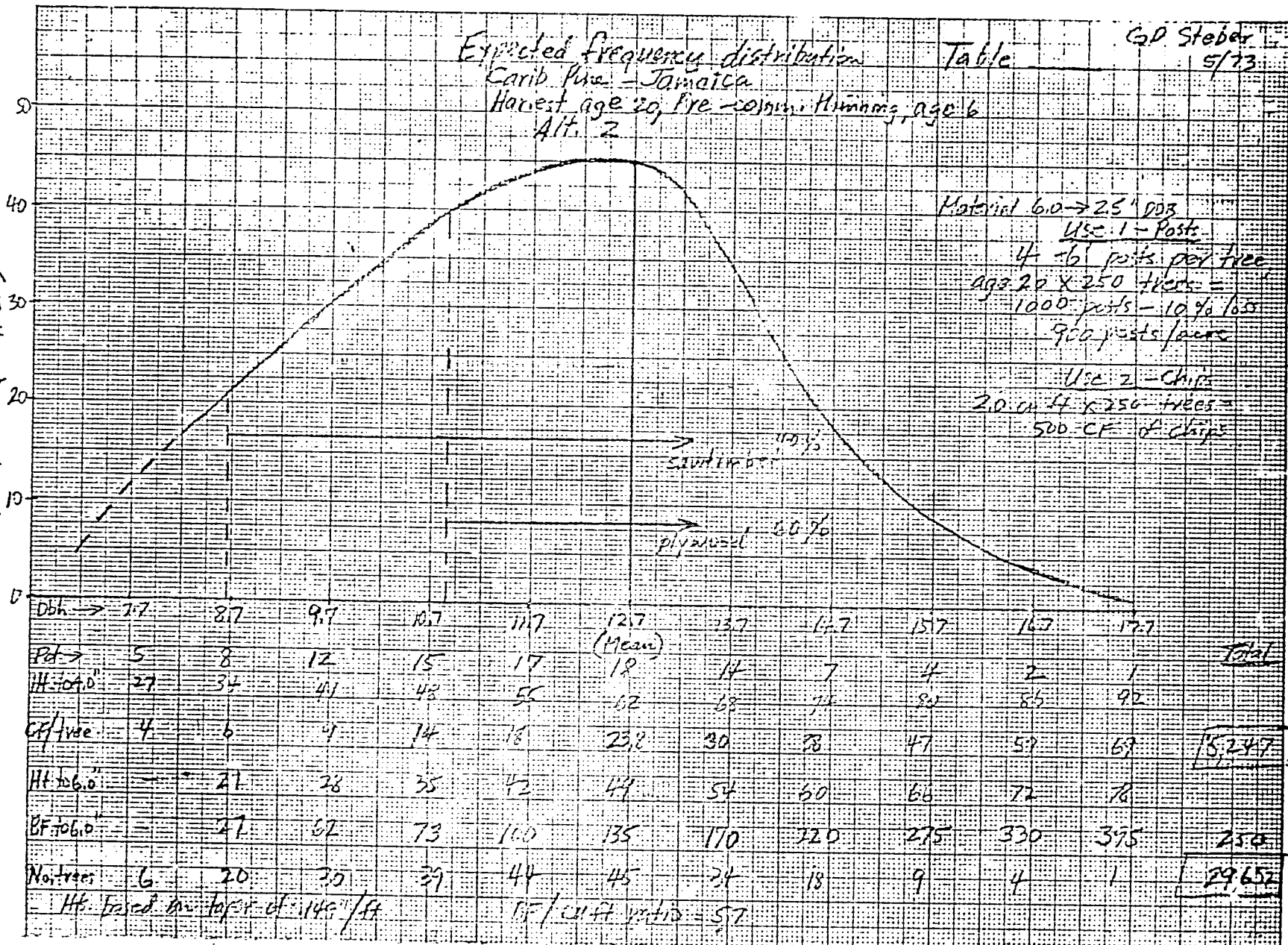
G.D. Stebbins
5/73

Carib Pine - Jamaica

Harvest age 20, fire-cosm. thinning, age 6

Alt. 2

FREQUENCY (No. TREES)



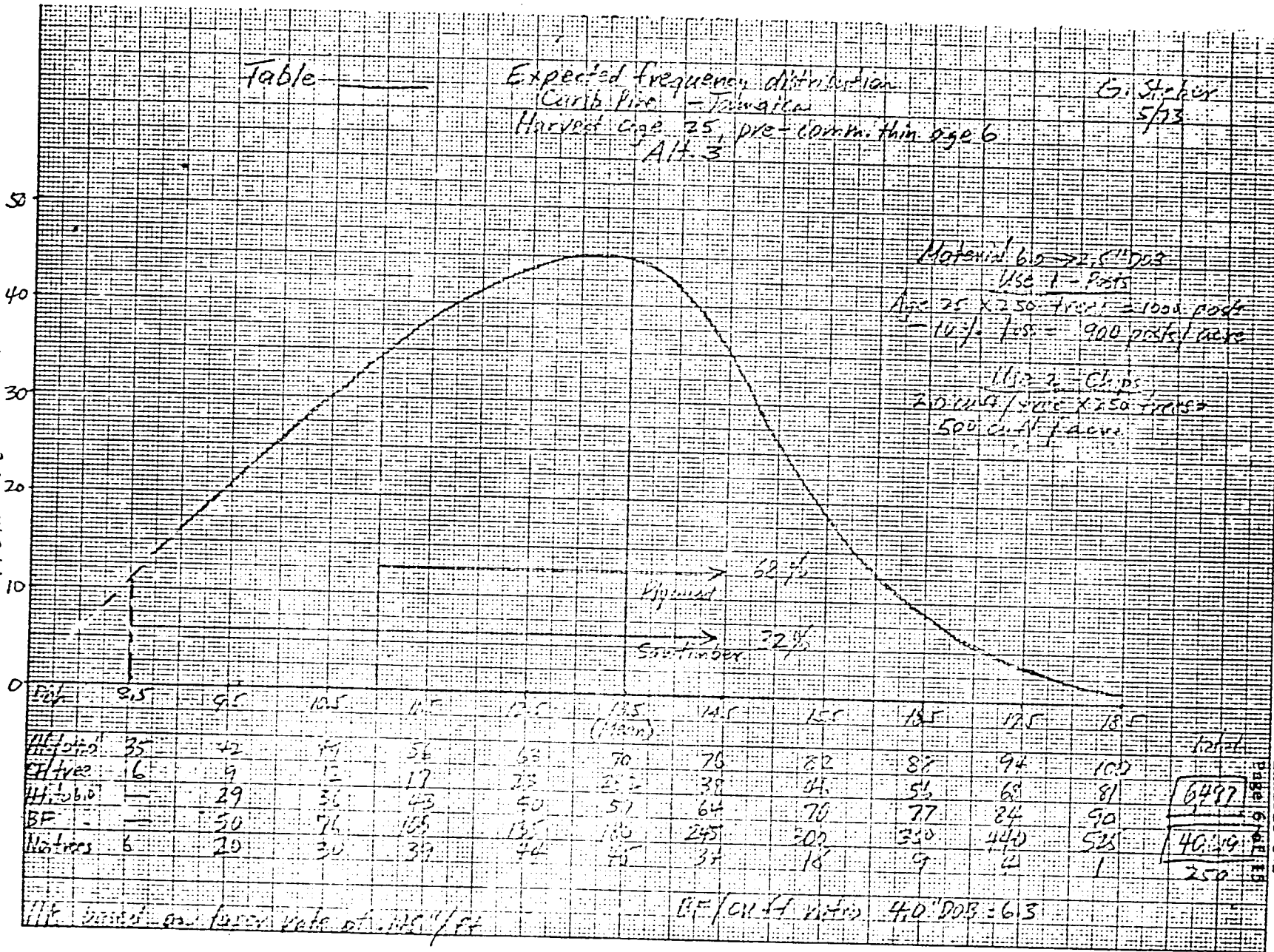
Material 6.0 -> 25' DBH
 Use 1 - Posts
 4 - 61 posts per tree
 age 20 x 250 trees =
 1000 posts - 10% loss
 900 posts/acre
 Use 2 - Chips
 20 cu ft x 250 trees =
 500 CF of chips

Table

Expected frequency distribution
 Carib Pine - ~~Tournaire~~
 Harvest age 25, pre-comm. thin age 6
 Alt. 3

G. Steiner
 5/73

FREQUENCY (NO. TREES)

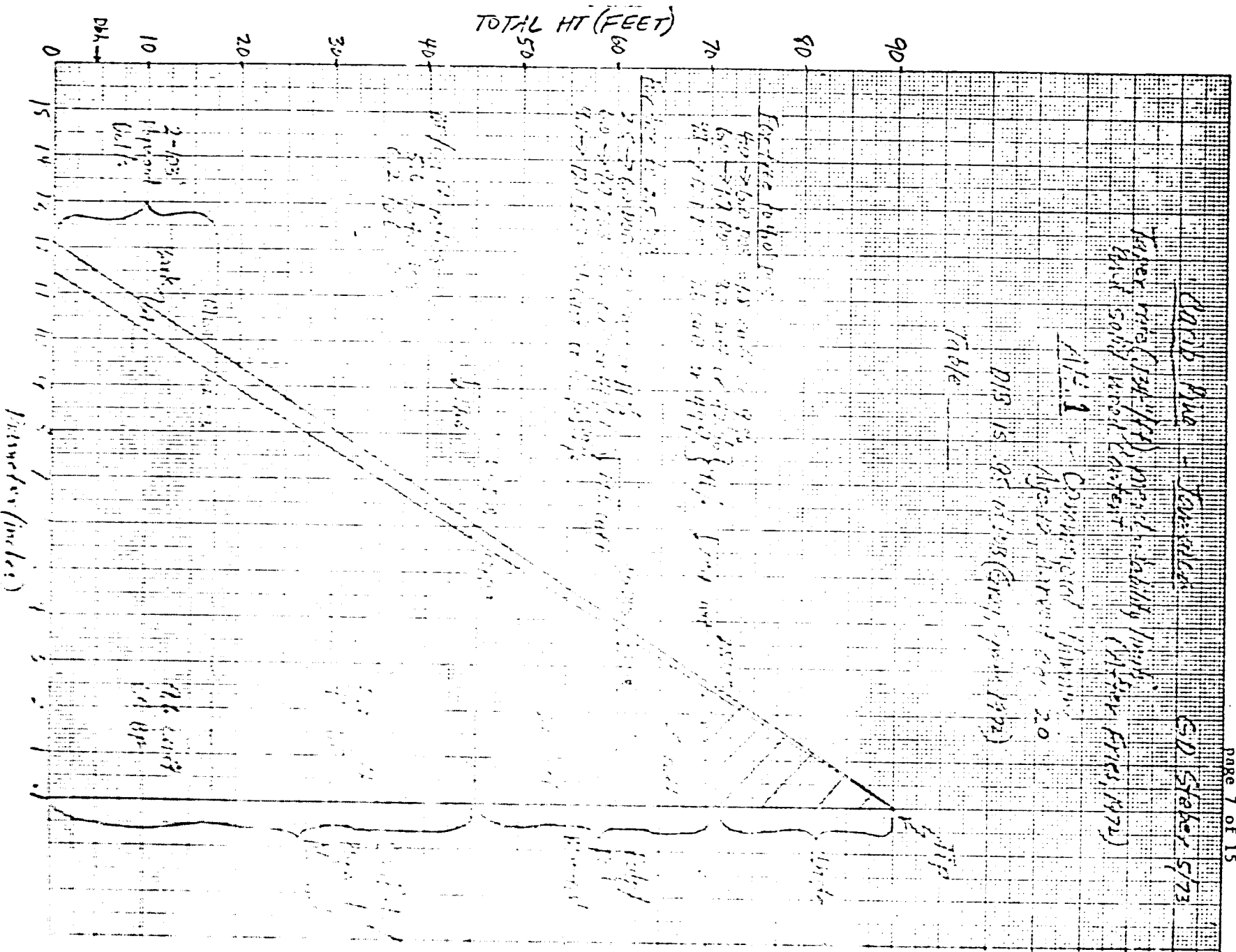


Material: 60 → 2.5" DOB
 Use: 1 - Posts
 Age 25 x 250 trees = 1000 posts
 - 10% loss = 900 posts/acre
 Use: 2 - Clips
 20 cuts/acre x 250 trees =
 500 cuts/acre

	8.5	9.5	10.5	11.5	12.5	13.5 (Mean)	14.5	15.5	16.5	17.5	18.5	Total
All trees	35	42	49	56	63	70	76	82	87	94	100	649
Soft timber	—	29	36	43	50	57	64	70	77	84	90	409
Kipwood	6	20	30	39	46	55	63	70	77	84	90	250

Use based on forest data of 1.25" / ft BF / cut of trees 4.0" DOB = 6.3

Page 6 of 15
 Exhibit C-2
 Annex III

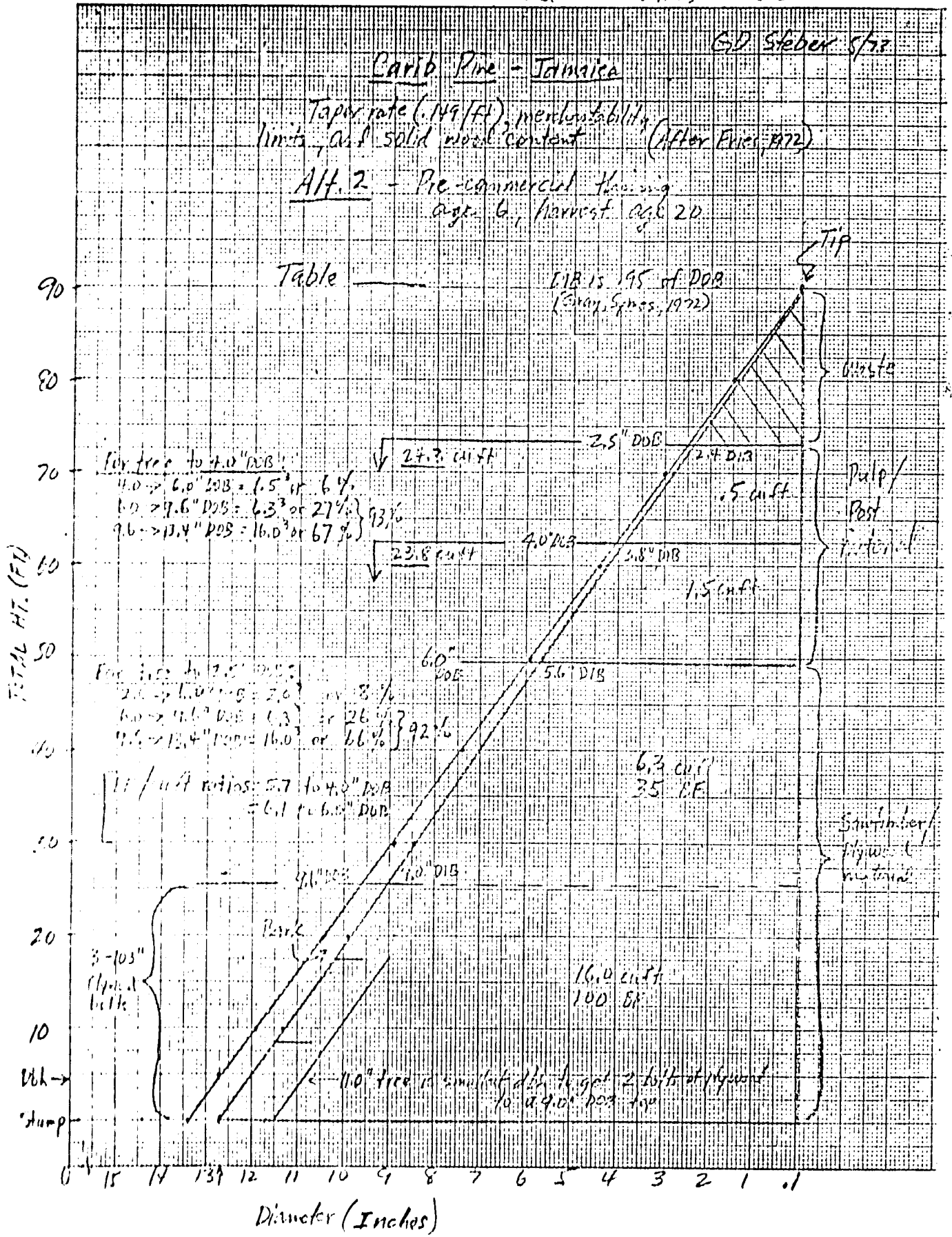


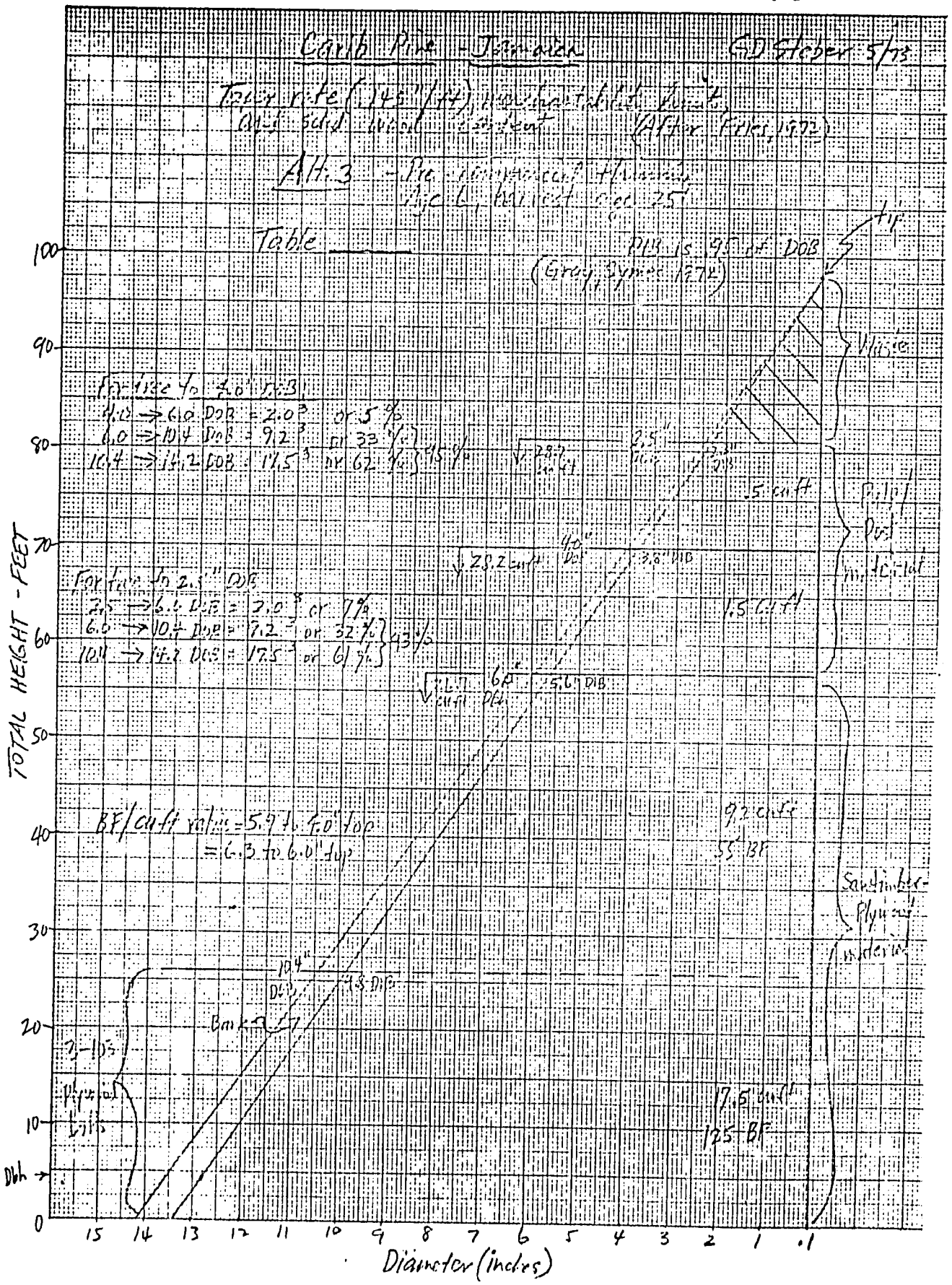
Carib Pine - Jamaica

GD Steber 5/72

Taper rate (.149/ft), merchantability limits, and solid wood content (After Eries, 1972)

Att. 2 - Pre-commercial thinning
 age 6, harvest age 20





Carib Pine - Jamaica

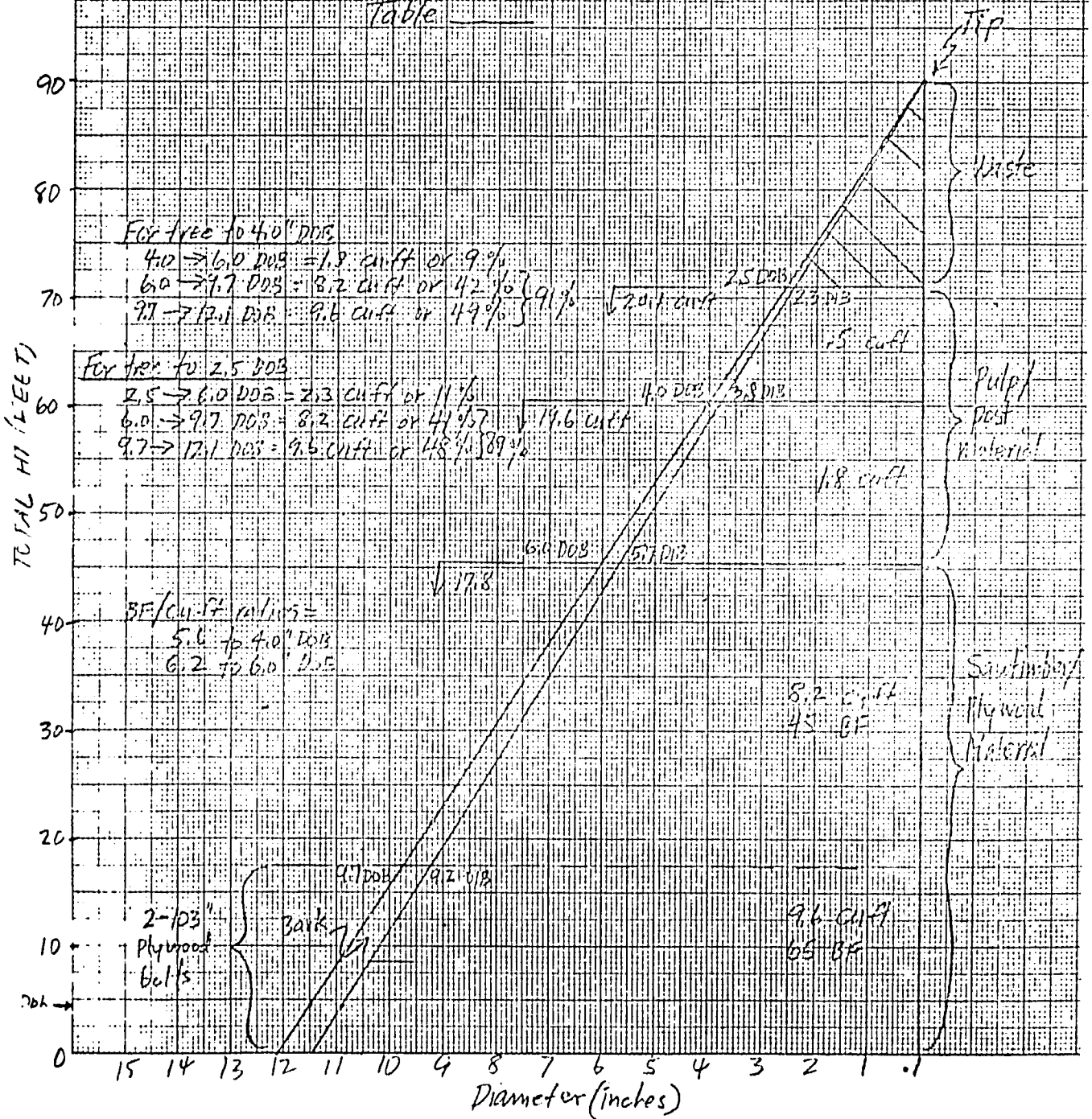
G.D. Steber 5/73

Taper rate (13.1"/ft), maximum stability limit
 and solid wood content (After Fries, 1972)

AF-1 - Commercial Timbers
 Age 10, Harvest age 20

DIS is .95 of DOB (Gray, Symon 1972)

Table



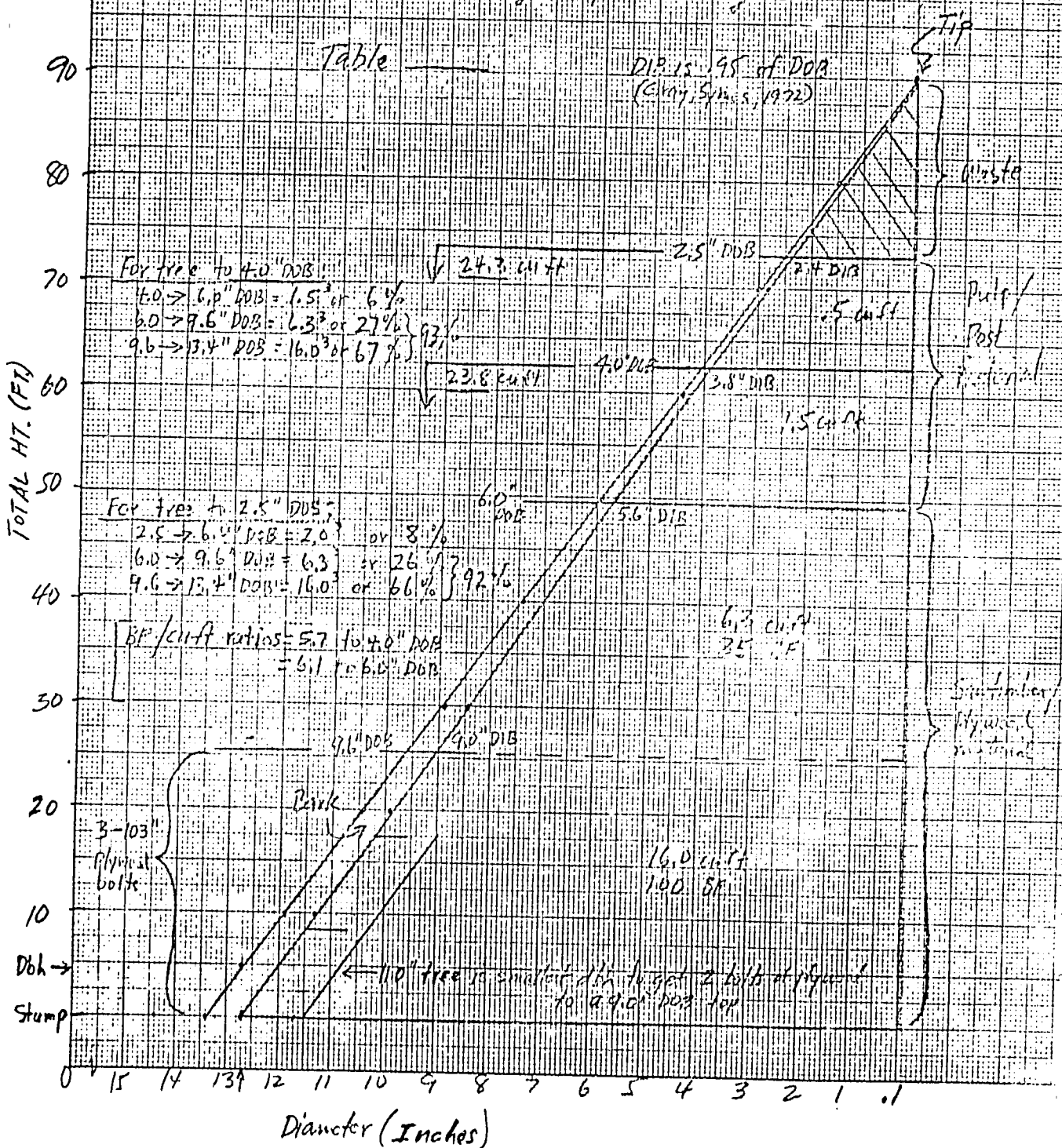
Carib Pine - Jamaica

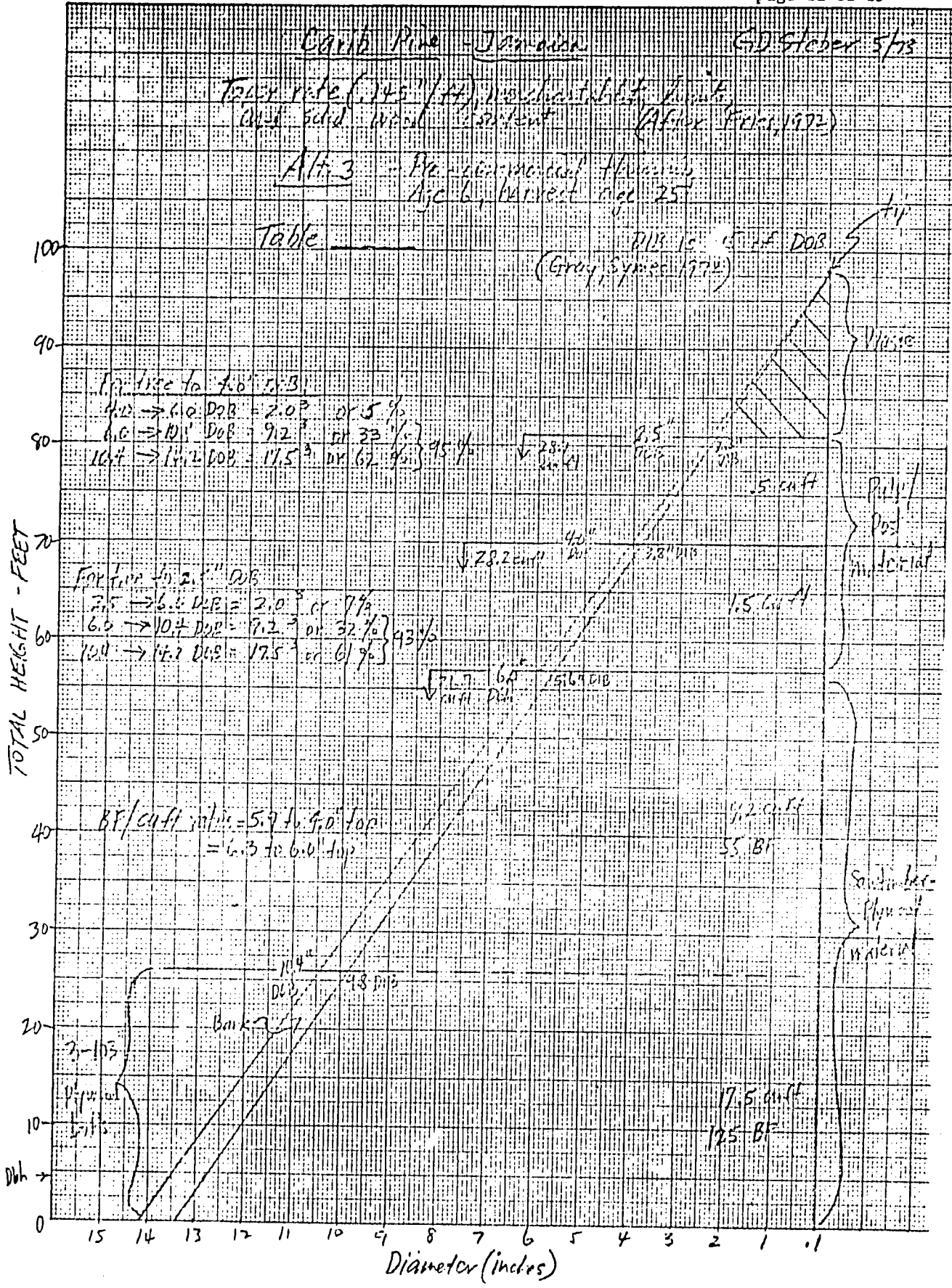
ED Steber 5/77

Taper rate (.149/ft), merchantability limits, and solid wood content (After Fries, 1972)

Att. 2 - Pre-commercial thinning age 6, harvest age 20

Table



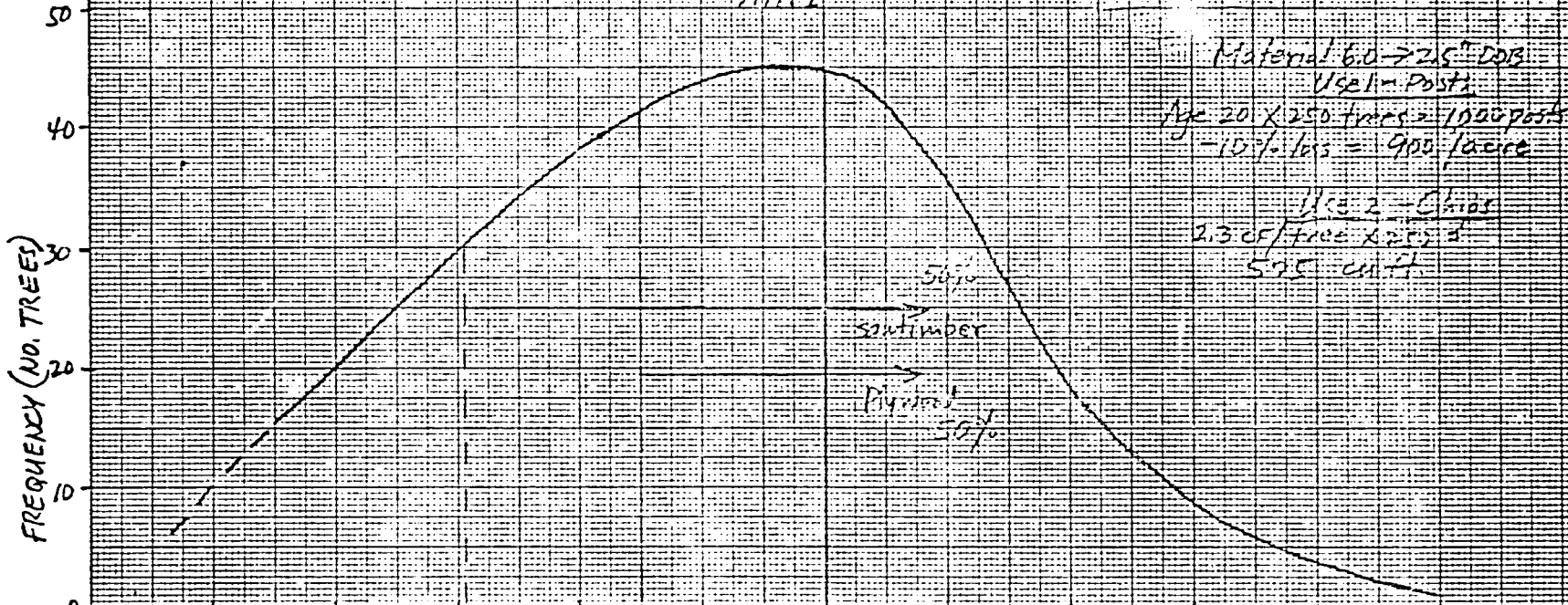


Table

Expected frequency distribution
 Carib Pine - Jamaica
 Harvest age 20, commercial thin age 10

GD Steber 5/73

AH.1



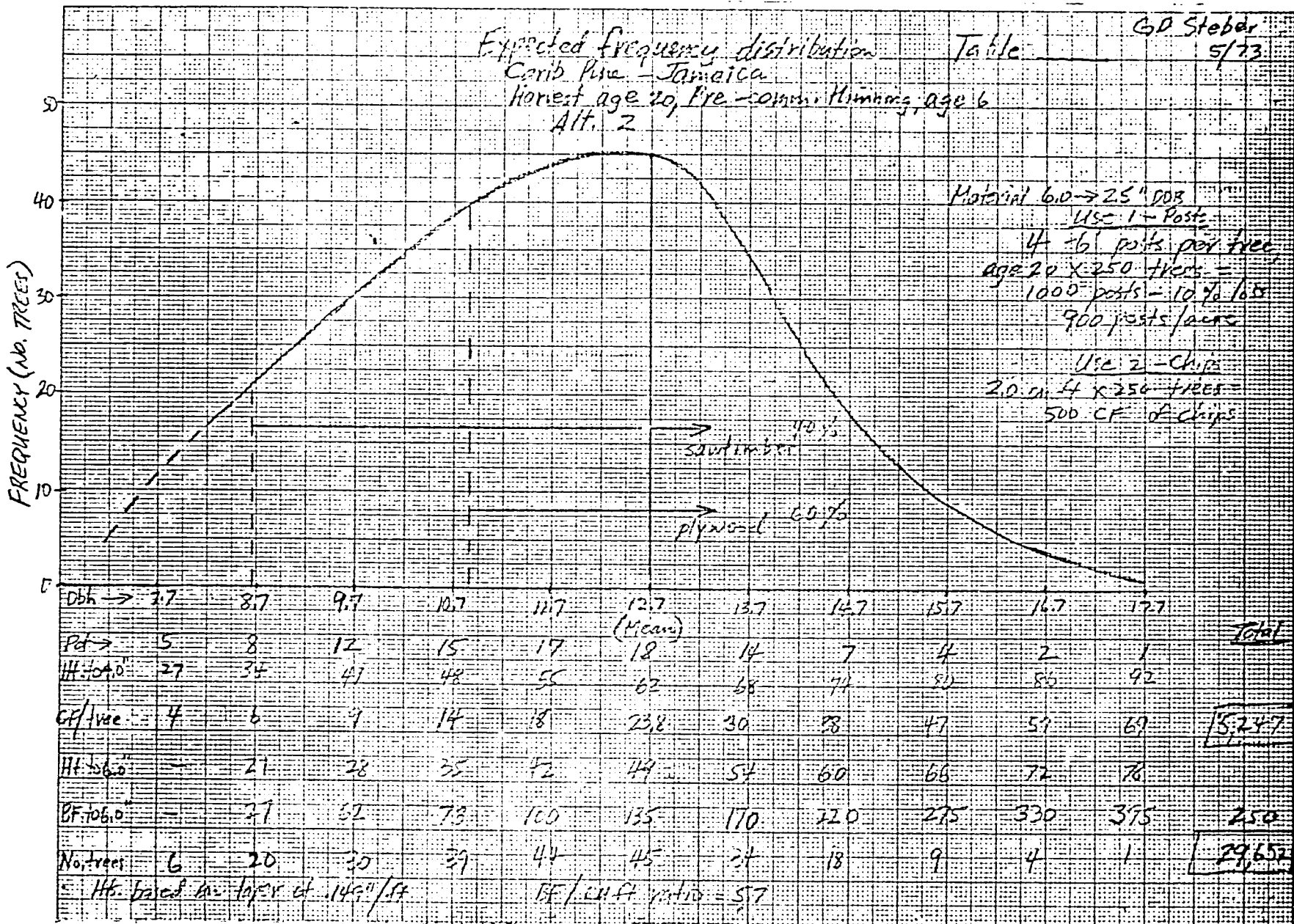
Dbh	6.5	7.5	8.5	9.5	10.5	11.5 (mean)	12.5	13.5	14.5	15.5	16.5	Total
Ht to 40'	25	32	39	45	53	60	67	73	79	84	90	
Cuff/tree	2.5	4	7	10	14	19.6	25	32	40	48	59	4230
Ht to 60'	-	-	24	31	38	45	52	59	64	70	76	
BA/tree	-	-	35	43	78	110	147	182	225	272	333	22,827
Workers	6	20	30	39	44	45	34	18	9	4	1	250

Ht. based on taper rate of 1.34"/ft.

BA/cu ft rate 40' dia = 5.4

Expected frequency distribution Table
 Carib Pine - Jamaica
 Harvest age 20, Pre-commercial thinning, age 6
 Alt. 2

G.P. Steber
 5/73

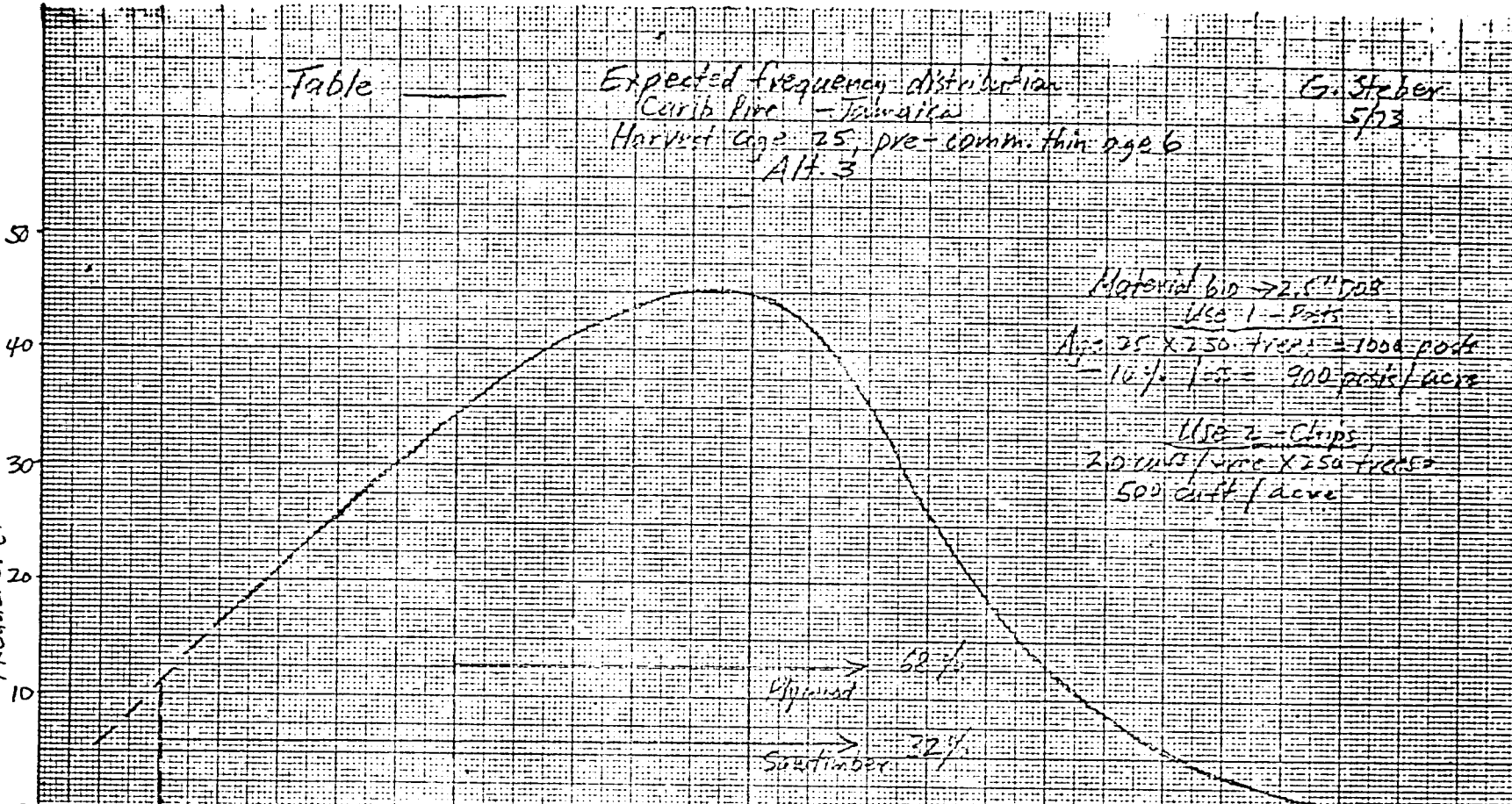


Table

Expected frequency distribution
 Carib Pine - Jamaica
 Harvest Age 25, pre-comm. thin age 6
 Alt. 3

G. Steber
 5/73

FREQUENCY (NO. TREES)



Material bio → 2.5" DOB
 Use 1 - Posts
 Age 25 x 250 trees = 1000 posts
 - 10% / 25 = 900 posts/acre
 Use 2 - Clips
 20 clips/wire x 250 trees =
 5000 clips/acre

DOB	8.5	9.5	10.5	11.5	12.5	13.5 (Mean)	14.5	15.5	16.5	17.5	18.5	Total
Hit to 0	35	42	49	56	63	70	76	80	88	94	100	6497
Hit tree	6	7	12	19	23	28.2	38	46	56	63	81	4049
Hit bio	-	29	36	43	50	57	64	70	77	84	90	440
BF	-	50	76	105	135	180	245	300	330	440	525	250
No trees	6	20	30	35	44	45	37	18	9	4	1	

Hit based on taper rate of .145"/ft BF/cut ratio 4.0" DOB = 6.3

Annex III
 Exhibit G-2

Basic IRR Model - 8,000 Acres

1/

<u>Year</u>	<u>Cost</u>	<u>Revenues</u>	<u>Total</u>
	----- Thousand dollars (US) -----		
0	830		830
1	1,045		-1,045
2	1,112		-1,112
3	441		- 441
4	69		- 69
5	72		- 72
6	154		- 154
7	182		- 182
8	234		- 234
9	87		- 87
10	91		- 91
11	95		- 95
12	99		- 99
13	102		- 102
14	106		- 106
15	110		- 110
16	114		- 114
17	117		- 117
18	121		- 121
19	349		- 349
20	415	8,266	+7,851
21	551	10,527	+9,976
22	136	14,466	+14,330

Second rotation (infinite series)

0	583		- 583
1	890		- 890
2	1,113		- 1,113
3	434		- 434
4	69		- 69
5	49		- 49
6	146		- 146
7	156		- 156
8	225		- 225
9	59		- 59
10	91		- 91
11	64		- 64
12	99		- 99
13	69		- 69
14	106		- 106
15	74		- 74
16	114		- 114
17	79		- 79
18	121		- 121
19	310		- 310
20	405	8,266	+ 7,861
21	512	10,526	+10,014
22	122	14,466	+14,344

1/ Expected cash flows (undiscounted)

BENEFIT/COST ANALYSIS
(Present Value of Total Costs and
Discounted Benefit-Cost Ratios)
%

Period	Road Maintenance & Overhead	Total Costs	Present Worth Worth at 10%	Benefits	
				Actual	Discounted at 10%
		US \$(000)			
0		829.8	829.8		
1		1,044.7	949.7		
2		1,112.2	913.3		
3	441.3	441.3	331.6		
4	68.6	68.6	46.9		
5	72.4	72.4	45.0		
6	155.0	154.2	87.0		
7	182.3	182.3	93.5		
8	233.8	233.8	109.1		
9	87.4	87.4	37.1		
10	91.1	91.1	35.1		
11	94.9	94.9	33.3		
12	98.6	98.6	31.4		
13	102.4	102.4	29.7		
14	106.1	106.1	27.9		
15	109.9	109.9	26.3		
16	113.6	113.6	24.7		
17	117.4	117.4	23.2		
18	121.1	121.1	21.8		
19	349.2	349.2	57.1		
20	415.1	415.1	61.7	8,266.2	1,228.7
21	550.8	550.8	74.4	10,526.5	1,422.5
22	136.1	136.1	16.8	14,465.9	1,777.1

Present Worth of Costs \$3,906.4
Present Worth of Benefits 4,428.3

Discounted Benefit-Cost Ratio at 10% 1.13

SCHEDULE OF ANNUAL SAWLOG HARVEST VOLUMES^{1/}
FROM 7,000 ACRES OF EXISTING PINE PLANTATIONS AND
8,000 ACRES OF AID-GOJ PINE PLANTATIONS

<u>Year</u>	<u>ALTERNATIVE A</u>		<u>ALTERNATIVE B</u>	
	<u>Sawmill(s)</u>	<u>Plywood</u>	<u>Sawmill(s)</u>	<u>Plywood</u>
	-----million board feet-----			
1974	1		1	
1975	1		1	
1976	3		3	
1977	4		4	
1978	4		4	
1979	4		4	
1980	4		4	
1981	4		4	
1982	8		8	
1983	8		8	
1984	8		8	
1985	8		8	
1986	12		12	
1987	12		12	
1988	12		12	
1989	12		12	
1990	12	5	12	
1991	16	10	12	
1992	16	20 ^{2/}	12	
1993	16	20	12	
1994	16	20	65	
1995	24	20	80	20 ^{2/}
1996	69	20	83	20
1997	83	20	83	20

^{1/} International 1/4" scale, where 1 BF of tree scale = 1 BF of lumber.

^{2/} 1 BF input = 2 square feet output on 3/8" basis of plywood.

Employment Opportunities by year generated from
7,000 acres of existing pine plantations for next
20 years^{1/}

<u>Activity</u>	<u>1974</u>	<u>75</u>	<u>76</u>	<u>77</u>	<u>78</u>	<u>79</u>	<u>80</u>	<u>81</u>	<u>82</u>	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>	<u>87</u>	<u>88</u>	<u>89</u>	<u>90</u>	<u>91</u>	<u>92</u>	<u>93</u>
	----- Thousand man days -----																			
Felling, bucking	.6	.6	1.5	2.1	2.1	2.1	2.1	2.1	4.2	4.2	4.2	4.2	6.2	6.2	6.2	6.2	8.8	13.4	18.5	18.5
Skidding	.6	.6	1.8	2.5	2.5	2.5	2.5	2.5	5.0	5.0	5.0	5.0	7.3	7.3	7.3	7.3	10.4	15.9	22.0	22.0
Hauling	.4	.4	1.0	1.4	1.4	1.4	1.4	1.4	2.7	2.7	2.7	2.7	4.1	4.1	4.1	4.1	5.8	8.8	12.3	12.3
Fence posts	1.7	1.7	5.1	6.8	6.8	6.8	6.8	6.8	13.6	13.6	13.6	13.6	20.4	20.4	20.4	20.4	28.9	44.2	61.2	61.2
Thinning	3.0	1.6	3.0	3.2	2.6	4.9	12.0	15.0	-	-	-	-	-	-	-	-	-	-	-	-
Sawmill(s)	2.0	2.0	5.0	6.0	6.0	6.0	6.0	6.0	12.0	12.0	12.0	12.0	18.0	18.0	18.0	18.0	18.0	24.0	24.0	24.0
Plywood plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	10.0	20.0	20.0
Totals	8.3	6.9	17.4	22.0	21.4	23.7	30.8	33.8	37.5	37.5	37.5	37.5	56.0	56.0	56.0	56.0	76.9	116.3	158.0	158.0

Grand Total = 1,047.5 thousand man days.

^{1/} Based on present-day labor-intensive practices, excluding supervisory personnel.

EMPLOYMENT OPPORTUNITIES BY YEAR FROM 8,000 ACRES
of AID/GOJ CARIBBEAN PINE PLANTATIONS OVER NEXT 22 YEARS^{1/}

<u>Activity</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	
	----- thousand man days-----																							
Plantation establish- ment	68.0	117.6	123.8	25.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thinning	-	-	-	-	-	12.0	15.0	21.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Road Construction	27.3	15.6	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Road Maintenance	-	1.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Felling, Budking	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30.4	38.0	53.3	-
Skidding	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hauling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.1	25.2	28.3	-
Fence posts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.3	125.8	141.4
Sawmill(s)	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	88.7	111.0	125.0
Total	95.3	134.7	128.9	28.0	3.0	3.0	15.0	18.0	24.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	15.5	295.0	370.0	414.0	

GRAND TOTAL -- 1,571.4 thousand man days

^{1/} Based on present day labor-intensive practice, excluding supervisory personnel.

**STANDING TIMBER VOLUMES (MMBF) BY YEAR
ON 7,000 ACRES OF EXISTING PLANTATIONS**

Stand Age in 1974	Adjust- Acres	Species	1974	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	2000
20-	337	M-PP	5.0	5	1.7	5	6	2	5.7	2.3	21.0	12.7	2.0	4.2	9.9	10.9	14.9	7.7	14.6	15.9	12.5	24.0	59.0	73.8	103.2	103.2	103.2	103.2	
19	45	PP	5	2.0	5	1.6	1.2	5.1	2.2	19.4	11.2	1.8	3.9	8.9	10.0	13.9	7.3	13.7	14.9	11.8	22.5	55.4	69.3	97.0					
15	157	PP	1.5	5	1.6	1.1	4.7	1.9	17.8	10.4	1.7	3.5	8.1	9.0															
17	25	CP	1.5	1.5	1.1	4.3	1.8	16.4	9.6	1.5	3.1	7.5	8.3								20.6	50.6	63.3						
16	31	CP	1.5	1.1	4.8	1.6	14.8	8.9	1.4	2.9	6.8	7.6																	
15	10	CP	1.1	4.4	1.8	13.1	8.0	1.2	2.6	6.2	6.9																		
14	315	CP	4.0	1.7	14.6	7.0	1.1	2.3	5.5	6.2																			
13	134	CP	1.5	12.8	6.5	1.1	2.1	4.9	5.5																				
12	1627	CP	10.5	5.6	1.0	1.9	4.3	4.7																					
11	566	CP	4.8	1.0	2.2	3.2	4.0																						
10	161	CP	1.0	2.0	3.7	4.1																							
9	232	CP																											
8	426	CP																											
7	476	CP																											
6	503	CP																											
5	262	CP																											
4	675	CP																											
3	519	CP																											
2	625	CP																											
1	812	CP																											

Must be thinned
Age 6
1974 = 2,000 Acres
1975 = 2,500 Acres
1976 and after = 3,500 Acres per year (Minimum).
Must be thinned Age 6.

Total 7000

EMPLOYMENT OPPORTUNITIES BY YEAR GENERATED FROM A TOTAL LAND BASE OF 70,000 ACRES
OF CARIBBEAN PINE (INCLUDING ADDITION OF 50,000 ACRES) FOR NEXT 22 YEARS^{1/}

Activity	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
	----- thousand man days -----																						
Felling, bucking	.6	.6	1.5	2.1	2.1	2.1	2.1	2.1	4.2	4.2	4.2	4.2	6.2	6.2	6.2	6.2	8.8	13.4	18.5	18.5	30.4	38.0	53.2
Skidding	.6	.6	1.8	2.5	2.5	2.5	2.5	2.5	5.0	5.0	5.0	5.0	7.3	7.3	7.3	7.3	10.4	15.9	22.0	22.0	36.0	45.0	63.0
Hauling	.4	.4	1.0	1.4	1.4	1.4	1.4	1.4	2.7	2.7	2.7	2.7	4.1	4.1	4.1	4.1	5.8	8.8	12.2	12.2	20.1	25.1	35.1
Fence Posts	1.7	1.7	5.1	6.8	6.8	6.8	6.8	6.8	13.6	13.6	13.6	13.6	20.4	20.4	20.4	20.4	28.9	44.2	61.2	61.2	100.3	125.5	175.4
Thinning	3.0	1.6	3.0	24.2	23.6	25.9	33.0	36.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Sawmill(s)	2.0	2.0	5.0	6.0	6.0	6.0	6.0	6.0	12.0	12.0	12.0	12.0	18.0	18.0	18.0	18.0	18.0	24.0	24.0	24.0	24.0	36.0	104.0
Plywood plant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.0	10.0	20.0	20.0	20.0	20.0	20.0
Plantation establish- ment	68.0	117.6	123.8	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Road Construction	27.3	15.6	2.1	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Road Maintenance	-	1.5	3.0	6.0	9.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0	32.0	34.0	36.0	38.0	40.0	42.0	44.0	46.0
Spur Roads	.2	.2	.6	.8	.8	.8	.8	.8	1.6	1.6	1.6	1.6	2.5	2.5	2.5	2.5	3.6	5.5	7.3	7.6	7.6	9.2	21.7
	103.8	141.8	146.9	214.8	217.2	222.5	231.6	236.6	243.1	245.1	247.1	249.0	270.5	272.5	274.5	276.5	300.5	343.8	377.3	379.3	466.4	528.8	704.4
	GRAND TOTAL -- 5,989.6 thousand man days through 1995 704.4 per year after 1995																						

^{1/}Based on present-day labor-intensive practices. Does not include seed and seedling production and non-pine lands managed by the FD.

SCHEDULE OF REVENUES AND COSTS^{1/} BY YEAR, TOTAL PINE PLANTATIONS OF 70,000 ACRES

<u>Activity</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	
	(in thousands of US dollars)																								
<u>Revenues</u>																									
Sawtimber	77	79	245	336	345	354	363	373	764	782	801	819	1257	1284	1312	1340	1368	3023	4269	4352	8008	1004	1319	13429	
Posts	11	11	35	48	49	51	52	53	109	112	114	117	180	183	187	191	195	440	622	634	663	1167	1726	1757	
	<u>88</u>	<u>90</u>	<u>280</u>	<u>384</u>	<u>394</u>	<u>405</u>	<u>415</u>	<u>426</u>	<u>873</u>	<u>894</u>	<u>915</u>	<u>936</u>	<u>1437</u>	<u>1467</u>	<u>1499</u>	<u>1531</u>	<u>1563</u>	<u>3463</u>	<u>4891</u>	<u>4986</u>	<u>8671</u>	<u>11208</u>	<u>14917</u>	<u>15186</u>	
<u>Costs</u>																									
Planting	506	677	1009	1071	1133	1195	1257	1319	1381	1443	1505	1567	1629	1690	1753	1815	1877	1939	2001	2063	2125	2187	2249	2311	
Weeding	-	188	251	373	394	416	437	459	480	502	524	545	567	588	610	631	653	675	696	718	739	761	783	803	
Road Construction	111	149	222	236	249	262	276	290	303	317	331	345	358	372	386	399	413	426	440	454	467	481	-	-	
Road Improvement	5	8	11	12	13	13	14	15	15	16	17	18	18	19	20	20	21	22	22	23	24	24	-	-	
Road Maintenance	13	18	23	31	39	49	58	69	81	93	105	119	134	147	163	180	196	214	236	243	251	258	265	273	
Thinning	22	13	18	16	10	13	78	102	149	156	163	169	178	185	192	198	205	212	219	226	232	239	246	253	
Overhead	9	21	40	43	45	47	50	52	55	57	60	62	65	67	70	72	75	77	79	82	84	87	89	92	
Spur roads	2	2	6	8	8	9	9	10	22	23	24	25	38	40	41	43	63	99	141	146	150	187	391	468	
	<u>668</u>	<u>1076</u>	<u>1580</u>	<u>1790</u>	<u>1891</u>	<u>2010</u>	<u>2179</u>	<u>2316</u>	<u>2486</u>	<u>2607</u>	<u>2729</u>	<u>2850</u>	<u>2987</u>	<u>3108</u>	<u>3235</u>	<u>3358</u>	<u>3503</u>	<u>3664</u>	<u>3834</u>	<u>3955</u>	<u>4072</u>	<u>4224</u>	<u>4023</u>	<u>4200</u>	
Deficit	580	986	1300	1406	1497	1605	1764	1890	1613	1713	1814	1914	1550	1641	1739	1827	1940	201	-	-	-	-	-	-	
Surplus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1057	1031	4599	6984	10894	10986	

^{1/} US\$; Costs increase 7% simple interest/year; revenues increase 3% simple interest/year. Base price sawtimber = \$77 US/MBF (Int.1/4*); posts \$.33 each, 900/acre at harvest. Costs apply only to plantation development and harvest, not to private sector, training, etc. nor overhead for other non-pine lands managed by the FD.

ENVIRONMENTAL IMPACT OF THE PROJECT

The project is highly desirable for the environment, as many of the lands to be planted in Caribbean pine trees are in a "ruinate" or run-down state. The planting of pine trees will maintain the soil properties intact, and, at the same time, will produce an economically viable crop. Soil erosion will be minimized and should help in reducing water loss to the planted areas. The continuous protection and maintenance associated with plantation management will ensure the preservation of watershed value as well.

In addition to the above advantages, the planting of pine trees will serve various other purposes, including the establishment of camping and picnic areas for recreational purposes, windbreak protection, thus minimizing soil erosion, and, at the same time, creating aesthetic beauty. The influence of the proposed education, recreation and conservation activities should have a beneficial effect upon natural resources in general, and especially for the forest areas. With a population aware of the need for the care and preservation of wood and soil resources, the overall environmental benefits to Jamaica should be considerable.

Approximately 20 miles of forest road are to be built, improved and maintained during the three years of the project. These roads will provide access to the plantation areas for site preparation, planting and weeding, initially, and later for thinning and harvesting of the pines. Aside from these purposes, the forest access roads will serve as firebreaks and will also enable firefighters to rapidly penetrate the plantations in case of the outbreak of forest fires. If not constructed and maintained correctly, the access roads could cause some soil erosion, especially in the higher elevations, where rainfall is heavy. However, this problem has been considered, and the Forest Department intends to make a thorough road site survey of each road to be constructed, in order to minimize soil losses. Further, the roads to be built will be sloped inward into drainage ditches to keep water runoff from eroding the outer edges of the road. Where streams are found, concrete fords will be constructed to minimize streambank breakdown.

After the second year of plantation treatment, when the seedlings have reached the point where additional weeding is not needed, the roads will be "put to bed" by seeding the roadbed with grass seed to stabilize the soil and prevent erosion. The roads will be maintained on a yearly basis to remove slides and brush growth until they are used in the thinning and harvesting processes, in the sixth and twentieth years, respectively.

When the trees are harvested in the twentieth year of growth, measures will be taken to avoid soil damage by using cable logging techniques, and the harvested areas will be replanted with pine seedlings afterwards. By then, the accumulated humus and slash created over the twenty years of growth will protect the soil from erosion. Native vegetation will be preserved along streams and rivers, in order to minimize sedimentation.

An additional, important environmental aspect that must be considered is that the Forest Department may eventually utilize certain selected herbicides to control weed growth and to reduce weeding costs. Chemical fertilizers may also be used in some areas in growth experiments and to stimulate seed production. The Forest Department is fully aware of the delicacy of the use of such chemicals in areas that have high watershed values. Pilot field tests of herbicide and fertilizer application will first be conducted to insure that any subsequent use on a larger, practical scale will have no adverse effect on such areas.

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CHECKLIST OF STATUTORY CRITERIA

(Alliance for Progress)

In the right-hand margin, for each item, write answer or, as appropriate, a summary of required discussion. As necessary, reference the section(s) of the Capital Assistance Paper, or other clearly identified and available document, in which the matter is further discussed. This form may be made a part of the Capital Assistance Paper.

The following abbreviations are used:

FAA - Foreign Assistance Act of 1961, as amended.

App. - Foreign Assistance and Related Agencies Appropriations Act, 1972.

MMA - Merchant Marine Act of 1936, as amended.

COUNTRY PERFORMANCE

Progress Towards Country Goals

1. FAA Sec. 208; Sec. 251(b)

A. Describe extent to which country is:

() Making appropriate efforts to increase food production and improve means for food storage and distribution.

(1) The Agricultural Marketing Corporation provides improved collection, wholesale and retail facilities; and it promotes development of crop and livestock production through the Agricultural Development Corporation. A land tax has been instituted. The AID-supported rural feeder roads construction program, by making remote agricultural areas more accessible to markets, stimulates increased food production. A joint GOJ-IBRD

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in-depth study of the agricultural sector is directed toward stimulating productivity of the sector as a whole.

(2) Creating a favorable climate for foreign and domestic private enterprise and investment.

(2) The Government has encouraged foreign investment with tax concessions and free repatriation of earnings and capital of approved enterprises. Domestic private capital is at present concentrating on building construction, while the government is increasing the role of the public sector in investment in general.

(3) Increasing the public's role in the developmental process.

(3) The public has a definite role through the political process. While the government continues to encourage direct participation of small investors in productive enterprise by operating "Unit Trusts" (mutual funds) for public sale, as well as through a fledgling stock exchange, it has recently been increasing the role of the public sector.

(4) (a) Allocating available budgetary resources to development.

(4) (a) The 1973-74 budget allocates 29% of the total budget for capital expenditures for development.

(b) Diverting such resources for unnecessary military expenditure (See also Item No. 16 and intervention in affairs of other free and independent nations.) See also Item No. 14.

(b) Defense expenditures are minimal in Jamaica; annual appropriations for the small, lightly armed Jamaica Defense Force total only 2% of the island's budget. Jamaica is not intervening in the affairs of other nations.

(5) Willing to contribute funds to the project or program.

(5) Jamaica will make a substantial contribution to the project. See page 52 of the Loan Paper.

(6) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

(7) Adhering to the principles of the Act of Bogota and Charter of Punta del Este.

(8) Attempting to repatriate capital invested in other countries by its own citizens.

(9) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

(6) Jamaica is continuing to make excellent progress in improving income tax administration with the objective of collecting more revenue and distributing the tax burden more equitably. The land reform program is making good progress and a land tax was recently introduced. As for the other points, Jamaica is basically an open democratic society with a freely elected government, a rigorous two-party system, and a basically private enterprise economy.

(7) Jamaica adheres to the principles of the Act of Bogota and Charter of Punta del Este.

(8) Jamaica controls export of capital by Jamaicans through the operations of its system of exchange controls. There is virtually no Jamaican investment abroad.

(9) The Jamaican government supports programs such as education and family planning. A joint AID/IBRD team which recently prepared an assessment of the needs of Jamaica's education sector received government support at the highest level. The Prime Minister has announced free education for all. Jamaica is clearly determined to take effective self-help measures.

B. Are above factors taken into account in the furnishing of the subject assistance?

B. The above factors have been taken into account in recommending approval of this loan.

Treatment of U.S. Citizens

- | | |
|--|--|
| 2. <u>FAA Sec 620(c)</u> . If assistance is to 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) debt is not denied or contested by such government? | 2. Jamaica is not known to be so indebted. |
| 3. <u>FAA Sec. 620(e)(1)</u> . 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? | 3. No such action has been taken by the Jamaican government. |
| 4. <u>FAA Sec. 620(o): Fishermen's Protective Act. Sec. 5</u> . If country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters, | 4. No such action has been taken by Jamaica. |
| a. has any deduction required by Fishermen's Protective Act been made? | a. Not applicable. |
| b. has complete denial of assistance been considered by A.I.D. Administrator? | b. Not applicable. |

Relations with U.S. Government and
Other Nations

5. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the United States with United States enterprise, is there an agreement by the recipient country to prevent export to the United States of more than 20% of the enterprise's annual production during the life of the loan?
5. Although this project is directed towards the eventual establishment of a productive enterprise, it is geared to domestic needs and thus will not compete with any U.S. enterprise in the same field.
6. 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?
6. No such damage or destruction has occurred.
7. 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 A.I.D. administration within the past year considered denying assistance to such government for this reason?
7. The investment guaranty program is in operation in Jamaica.
8. FAA Sec. 620(q). Is the government of the recipient country in default of interest or principal of any A.I.D. loan to the country?
8. No such default exists.
9. 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?
9. Jamaica has not severed relations with the United States.

10. 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 A.I.D. Administrator in determining the current A.I.D. Operational Year Budget?
 11. FAA Sec. 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?
 12. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?
 13. FAA Sec. 620(f). Is recipient country a Communist country?
 14. 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?
 15. FAA Sec. 620(n). Does recipient country furnish goods to North Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from North Viet-Nam?
10. Jamaica is meeting its U.N. obligations.
 11. Jamaica does not at present furnish assistance to Cuba nor do ships or aircraft under its flag carry cargoes to or from Cuba.
 12. The Secretary of State has so determined.
 13. Jamaica is not a Communist country.
 14. Jamaica is not involved in nor is it known to be planning such subversion or aggression.
 15. Jamaica does not trade with nor furnish supplies to North Vietnam.

16. FAA Sec. 481. Has the government of recipient country failed to take adequate steps to prevent narcotic 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?
16. The Government has recently established a Narcotics Control Unit within the Jamaica Constabulary Force. The Unit has already proven effective in decreasing the production and processing of narcotic drugs in the country, their transport through the country, as well as their illegal sale within its jurisdiction to U.S. Government personnel and their dependents. Forceful steps are being undertaken to stop narcotic drugs from entering the U.S. unlawfully.
17. FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).)
17. 2% of budgetary expenditures are programmed for the military in Fiscal Year 1973-74. Foreign Exchange spent on military equipment amounts to less than \$100,000 annually. No funds are spent on sophisticated weapons systems.

CONDITIONS OF THE LOAN

General Soundness

18. FAA Sec. 201(d). Information and conclusion on reasonableness and legality (under laws of country and the United States) of lending and relending terms of the loan.
18. The terms are reasonable for Jamaica and legal under the laws of Jamaica and the U.S.

19. FAA Sec. 251(b)(2); Sec. 251(e). Information and conclusion on activity's economic and technical soundness. If loan is not made pursuant to a multi-lateral plan, and the amount of the loan exceeds \$100,000, has country submitted to A.I.D. an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?
19. The project is considered economically and technically sound. (See p. 10-18 & 42-52 of the Loan Paper.
20. FAA Sec. 251(b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.
20. Jamaica is considered able to repay the proposed loan. External debt as of 3/31/73 totalled U.S. \$239 million.
21. FAA Sec. 611(a)(1). Prior to signing of loan 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 United States of the assistance?
21. Plans and firm estimates in sufficient detail are available; this section will be met.
22. 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 purposes of loan?
22. None is needed.
23. FAA Sec. 611(e). If loan is for Capital Assistance, and all U.S. assistance to project now exceeds \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?
23. He has so certified. See Annex II of the Loan Paper.

24. FAA Sec. 251(b). Information and conclusion on availability of financing from other free-world sources, including private sources within the United States.

24. No such financing is available for this project. See p. iii. of the Loan Paper.

Loan's Relationship to Achievement of Country and Regional Goals

25. FAA Sec. 207; Sec. 251(a). Extent to which assistance reflects appropriate emphasis on: (a) encouraging development of democratic, economic, political, and social institutions; (b) self-help in meeting the country's food needs; (c) improving availability of trained manpower in the country; (d) programs designed to meet the country's health needs, or (e) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws.

25.
(a) Not applicable.
(b) The project should help in meeting the country's food needs through better land utilization.
(c) Some manpower training will result from this loan.
(d) Not applicable.
(e) The project is expected to create the basis for a locally based wood products industry.

26. FAA Sec. 209. Is project susceptible of execution as part of regional project? If so why is project not so executed?

26. No.

27. FAA Sec. 251(b)(3). Information and conclusion on activity's relationship to, and consistency with, other development activities, and its contribution to realizable long-range objectives.
27. This activity is consistent with Jamaica's other development activities, particularly in the agricultural sector. It contributes to the country's long-range objectives by helping to set up an indigenous wood products industry.
28. FAA Sec. 251(b)(7). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth.
28. This activity will assist the government in its endeavors to stimulate the agricultural sector by establishing the base for a wood products industry.
29. FAA Sec. 281(a). Describe extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private, and local governmental institutions.
29. This loan is initially expected to help stimulate employment in rural areas and increase income in rural areas. It should also assist in stabilizing the rural population and counteract the population drive from the country to the city.
30. FAA Sec. 281(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 civic education and training in skills required for effective participation in governmental and political processes essential to self-government.
30. In addition to stimulating employment and bringing about specialized training in wood processing, the activity will contribute to soil conservation and over the long run, substitute for imports. It will contribute to an improved standard of living.

31. FAA Sec. 601(a). Information and conclusions whether loan 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.
31. (a) It is conceivable that the loan will increase international trade in wood products;
(b) private enterprise will be fostered through its involvement in the establishment of tree farms, harvesting and an expanded sawmill industry;
(e) the loan will assist in making the forestry sector of the economy more professional;
(c) (d) and (f) - the loan will have little effect on these areas.
32. FAA Sec. 619. If assistance is for newly independent country; is it furnished through multilateral organizations or plans to the maximum extent appropriate?
32. Jamaica has been independent for eleven years. Assistance is furnished through multilateral plans to the maximum extent appropriate.
33. FAA Sec. 251(h). Information and conclusion on whether the activity is consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress in its annual review of national development activities.
33. This activity is consistent with CIAP recommendations. See p. 4 of the Loan Paper.
34. FAA Sec. 251(g). Information and conclusion on use of loan to assist in promoting the cooperative movement in Latin America.
34. This loan will not affect the cooperative movement.

35. FAA Sec. 209; Sec 251(b) (8). Information and conclusion whether assistance will encourage regional development programs, and contribute to the economic and political integration of Latin America.
35. It appears likely that the loan will encourage increased consideration of comparative advantage in wood resource production within CARIFTA.

Loan's Effect on U.S. and A.I.D. Program

36. FAA Sec. 251(b) (4); Sec. 102. Information and conclusion on possible effects of loan on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving the U.S. balance of payments position.
36. This loan will have virtually no effect on the U.S. economy, and none on areas of labor surplus. The assistance will be provided in a manner consistent with improving the U.S. balance of payments.
37. FAA Sec. 601(b). Information and conclusion on how the loan will encourage U.S. private trade and investment abroad and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
37. This loan will have little effect on U.S. private investment.
38. FAA Sec 601(d). If a capital project, are engineering and professional services of U.S. firms and their affiliates used to the maximum extent consistent with the national interest?
38. U.S. engineering and professional services will be utilized to the maximum extent feasible.

39. FAA Sec. 602. Information and conclusion whether U.S. small business will participate equitably in the furnishing of goods and services financed by the loan.
39. U.S. small business will be assured the opportunity to participate in the supply of goods and services under the loan.
40. FAA Sec. 620(h). Will the loan promote or assist the foreign aid projects or activities of the Communist-Bloc countries?
40. No.
41. FAA Sec. 621. If Technical Assistance is financed by the loan, information and conclusion whether such assistance will be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis. If the facilities of other Federal agencies will be utilized, information and conclusion on whether they are particularly suitable, are not competitive with private enterprise, and can be made available without undue interference with domestic programs.
41. It is anticipated that some technical assistance will be provided from the USDA Forest Service, as Forest Service skills are particularly suitable in this case because of the primarily institution building nature of the loan. It is possible that contracts with private enterprise will be executed also.
42. FAA Sec. 252(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources.
42. Loan funds will finance imports from private sources. It is possible that technical assistance will be obtained under contracts with private enterprise. See p. 16. of the Loan Paper.

Loan's Compliance with Specific Requirements

43. FAA Sec. 201(d). Is interest rate of loan at least 2% per annum during grace period and at least 3% per annum thereafter? 43. Yes.
44. FAA Sec. 608(a). Information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items. 44. Provision will be made for use of U.S. Government excess personal property to the extent consistent with sound implementation of the project.
45. FAA Sec. 604(a). Will all commodity procurement financed under the loan be from the United States except as otherwise determined by the President? 45. Procurement will be from Jamaica, U.S. and those countries included in AID Geographic Code 941.
46. FAA Sec. 604(b). What provision is made to prevent financing commodity procurement in bulk at prices higher than adjusted U.S. market price? 46. There will be no bulk commodity procurement.
47. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will loan agreement require that marine insurance be placed in the United States on commodities financed by the loan? 47. The loan agreement will so require.
48. 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? 48. No such procurement is contemplated.

49. FAA Sec. 611(b); App. Sec. 101
If loan finances water or water-related land resource construction project or program, is there a benefit-cost computation made, insofar as practicable, in accordance with the procedures set forth in the Memorandum of the President dated May 15, 1962?
49. The effect of the project upon watershed protection cannot be directly quantified. However, it is expected that the activities of the project will enhance the productivity of water-related agricultural activities.
50. FAA Sec. 611(c). If contracts for construction are to be financed, what provision will be made that they be let on a competitive basis to maximum extent practicable?
50. The Loan Agreement will provide for letting construction contracts on a competitive basis.
51. FAA Sec. 620(g).
What provision is there against use of subject assistance to compensate owners for expropriated or nationalized property?
51. The loan agreement will preclude such use of loan funds.
52. FAA Sec. 612(b); Sec. 636(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 United States are utilized to meet the cost of contractual and other services.
52. Jamaica is making a substantial contribution to the project. The U.S. does not own any foreign currencies in Jamaica.
53. App. Sec. 104. Will any loan funds be used to pay pensions, etc., for military personnel?
53. No. The loan agreement will preclude such use of loan funds.

54. App. Sec. 106. If loan is for capital project, is there provision for A.I.D. approval of all contractors and contract terms? 54. Yes.
55. App. Sec. 108. Will any loan funds be used to pay U.N. assessments? 55. No.
56. App. Sec. 109. Compliance with regulations on employment of U.S. and local personnel for funds obligated after April 30, 1964, (A.I.D. Regulation 7). 56. A.I.D. Regulation 7 will be complied with.
57. FAA Sec. 636(i). Will any loan funds be used to finance purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or any guaranty of such a transaction? 57. No.
58. App. Sec. 501. Will any loan funds be used for publicity or propaganda purposes within the United States not authorized by the Congress? 58. No.
59. FAA Sec. 620(k). If construction of productive enterprise, will aggregate value of assistance to be furnished by the United States exceed \$100 million? 59. No.
60. FAA Sec. 612(d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release? 60. The U.S. owns no excess Jamaican currency.

61. MMA Sec. 910.b. Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed with funds made available under this loan shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.

61. This requirement will be complied with.