AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER

PHILIPPINES

REFORESTATION/RURAL ENERGY PROJECT
(RREP)
492–0352

JULY 1980

PHILIPPINES
REFORESTATION/RURAL ENERGY PROJECT
(RREP)
PROJECT PAPER

492-0352

TABLE OF CONTENTS

ANNEXES (cont'd.)

C. Budget Tables (Technical Assistance and Equipment/Materials)
D. Summary Scope of Work for Technical Assistance
E. NEA Organization Chart
F. Economic and Financial Feasibility
G. Forestry Details
H. Project Application
I. 611(e) Certification
J. Statutory Checklist
K. PID Approval Cable

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: _____ — DOCUMENT CODE: 3

2. COUNTRY/ENTITY: Philippines

3. PROJECT NUMBER: 492-0352

4. BUREAU/OFFICE: ASIA [4]

5. PROJECT TITLE (maximum 40 characters): Reforestation/Rural Energy

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 84

7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4): A. Initial FY 80 B. Quarter 4 C. Final FY 80

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 80			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	1500	500	2000	1500	500	2000
(Grant)	(1000)	(-)	(1000)	(1000)	(-)	(1000)
(Loan)	(500)	(500)	(1000)	(500)	(500)	(1000)
Other U.S. 1.						
Other U.S. 2.						
Host Country		250	250		1000	1000
Other Donor(s)						
TOTALS	1500	750	2250	1500	1500	3000

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	C. PRIMARY TECH. CODE 2. Loan	D. OBLIGATIONS TO DATE 1. Grant	D. OBLIGATIONS TO DATE 2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	E. AMOUNT APPROVED THIS ACTION 2. Loan	F. LIFE OF PROJECT 1. Grant	F. LIFE OF PROJECT 2. Loan
(1)	220	160	160	-	-	1000	1000	1000	1000
(2)									
(3)									
(4)									
TOTALS									

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 240 825 850 874

11. SECONDARY PURPOSE CODE:

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	BL	BS	ENV	LAB			
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

To develop a capability within the National Electrification Administration to plan and implement reforestation/rural energy activities on a nationwide basis.

14. SCHEDULED EVALUATIONS: Interim MM 09 YY 81 / MM 09 YY 82 — Final MM 06 YY 84

15. SOURCE/ORIGIN OF GOODS AND SERVICES: [X] 000 [X] 941 [X] Local [ ] Other (Specify) _____

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)

17. APPROVED BY — Signature: Anthony M. Schwarzwalder — Anthony M. Schwarzwalder — Title: USAID/Director — Date Signed MM DD YY

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION MM DD YY

AID 1330-4 (8-79)

PROJECT PAPER

PHILIPPINES - REFORESTATION/RURAL ENERGY

I. Summary and Recommendations

A. Borrower/Grantee:

The Government of the Philippines will be the Borrower/Grantee. The Executing Agency will be the National Electrification Administration (NEA), an autonomous government corporation created to meet the rural electrification needs of the Philippines.

B. Amount:

Loan - $1.0 million
Grant - $1.0 million

C. Loan Terms:

Repayment within 40 years; 10 year grace period on principal repayment; interest at 2% during grace period and 3% thereafter.

D. Purpose:

To develop a capability within NEA to plan and implement reforestation/rural energy activities on a nationwide basis.

E. Project Description:

NEA has embarked on a massive nationwide program to develop indigenous renewable energy sources primarily mini-hydro and dendro (woodfired) thermal power complexes. The proposed project will mainly finance technical assistance, materials and training to assist NEA with the development and implementation of the dendro thermal program component. Assistance will be concentrated on the forestry and farmer organization end of the activity. Suppliers of power plant hardware will provide assistance, as appropriate, for plant erection, operation and maintenance. NEA and AID have selected five pilot sites on which to focus the assistance and test and modify the dendro thermal model.

F. Project Costs:

($000)

	AID Loan	AID Grant	GOP	Total
Technical Assistance	440	920	588	1,948
Training	60	80	60	200
Equipment/Materials	500	-	-	500
Local Support	-	-	352	352
Total	$1,000	$1,000	$ 1,000	$ 3,000

G. Project Analysis:

There are many questions remaining to be answered on the implementation of the dendro thermal component of NEA's program. The proposed project will assist in addressing these questions. The technical assistance package proposed in this project is considered appropriate from a technical, economic, social and financial basis to achieve this objective and the project purpose.

H. Recommendation:

A loan of $1.0 million and a grant of $1.0 million be obligated in FY 80 for the proposed Reforestation/Rural Energy Project.

PHILIPPINES
REFORESTATION/RURAL ENERGY PROJECT
(RREP)
PROJECT PAPER

492-0352

I. Project Description:

A. Background:

"Kaingin" Farming Population Pressure and Deforestation [1]

An estimated 500,000 Filipino farmers practice "kaingin" agriculture.[2] In earlier times, when the land-man ratio was more stable, long fallow periods (10-15 years) between cut-burn cycles were incorporated in this primitive farming system. Long fallows were essential to facilitate regrowth of forests, with the resultant renewal of soil fertility, that made "kaingin" economically feasible, and acceptable from an environmental viewpoint. However, increased population pressure on the static land supply now forecloses the option of long fallows. Forests no longer have time to re-grow and fertility declines until only the hardiest vegetation can survive, e.g. Imperata grass which has little or no economic value.[3] "Kaingin" have thus become a major factor in degrading forest eco-systems into unproductive grassland - in short, deforestation. Given the large number of existing "kaingineros" [4] plus expected increases from natural population growth, and assuming a clearing rate of merely 0.5 ha./farmer/yr. there is the distinct probability that 6.7 million has. or 85% of all remaining Philippine forests will be denuded by "kaingineros" by the year 2000 A.D.[5] Clearly the Philippines cannot continue to tolerate "kaingin" farming and expect to preserve a healthy physical environment.

1/ "Kaingin" is the Philippine term for shifting slash-and-burn agriculture.

2/ CDSS, AID/W, 1980.

3/ Imperata cylindrica, a noxious grass that already covers 5 million has., or 1/6 of the total Philippine land area.

4/ "Kaingineros" - those who practice "kaingin", i.e. slash-and-burn farmers.

5/ See Annex G, page 7, "Projected Potential Forest Destruction by 'Kaingin' Farmers".

Energy Crisis:

Coupled with the problems of deforestation and the marginal use of uplands, the Philippines has been severely hit by oil price increases over the last decade. The Philippines is currently dependent on imported oil for about 83% of its oil needs and this reliance is expected to remain substantially at this level over the next ten years even with major investments in developing indigenous oil and coal resources. Compounding the impact of the fuel import problem is the fact that the Philippines is presently dependent on oil for 84% of its electric power generation. Apart from Mindanao there are few major hydro sites to be developed. The country must turn to non-conventional energy sources or continue to suffer the economic strains of foreign oil reliance.

Interventions:

To address these problems, the National Electrification Administration (NEA) has initiated a nationwide rural energy development program consisting of essentially two components:

- to convert "kaingins" and denuded grasslands into forest energy plantations that will fuel wood-fired thermal plants (dendro-thermal) generating electric power for rural electric cooperatives;

- a major effort to develop the country's mini-hydro potential.

NEA's program is aimed at making electric coops self-reliant. At stake for the Philippines is the viability of the electric coop movement and the benefits it provides to the people. Of equal, perhaps even greater developmental impact is the opportunity to help impoverished "kaingineros" abandon a primitive, outmoded method of farming that can no longer provide a decent living, and grow a biomass energy crop that will be profitable to them and will improve environmental conditions in the Philippines.

To accommodate financing the program, Presidential Decree No. 1645, dated October 8, 1979, increased the capital stock of NEA from $265 million to $800 million On the same date, President Marcos instructed the rural electric cooperatives to initiate dendro thermal and mini-hydro projects to achieve the goal of self-reliance. Funds that would otherwise be used to finance imported fossil fuels will be invested in developing energy plantations and mini-hydro plants. The plantations

will grow species of fast growing trees on denuded government lands currently occupied by small scale upland farmers.

The French and British governments are financing 22 dendro units at a cost of about $59.0 million. The ADB is also considering assistance to the program.

B. Dendro Model:

A major component in the GOP's drive for energy self-sufficiency, the development of forest energy farms, is unique among energy programs, in that institutional and social issues pose a host of new challenges beyond purely technical considerations. Recognizing this, NEA has created a division whose function is to focus on developing the program so that it is socially and economically attractive to "kaingin" farmers. Approximately 12% of NEA's entire staffing for the dendro-thermal/mini-hydro program is composed of sociologists, agricultural extension workers, community development officers and similary oriented personnel. Additionally, all coop managers and senior officers are being required to undergo training which stresses the importance of winning cooperation and voluntary involvement of the "kaingin" farmers whose tree planting activities are central to success in this new initiative.

The energy farm model is proposed to occupy at least 1,500 hectares, which is estimated to be the minimum land area required to plant, grow and harvest wood on a sustained yield, with rotational cutting cycles, in sufficient quantity to power a 3-megawatt (MW) plant. Plant capacity will be consistent with coop power demand projections and where possible connected to the power grid to serve as base load. Wherever suitable land is available, or more area is needed to produce wood requirements, larger areas will be used. This additional land in excess of 1,500 has. can be used to expand the program and meet increases in power demand as well as providing land for lumber and food production as discussed later in this section. NEA's goal is to supply fuel for over 200 wood-fired steam turbines which would produce an estimated 50% of projected rural coop electricity demand by the late 1980's. 1/ While this target is very optimistic, program impact will be significant, socially and economically, if only a portion of these plants are operating within this short time span. 2/

1/ Projected demand is 1324 MW. Goals are - Dendro-thermal power 676.2 MW (51%), small scale hydro power 479.7 MW (35%). The balance (13%) would be purchased from the National Power Corporation.

2/ See sections II-A and B, Economic and Financial Feasibility; Social Soundness Analysis.

To power the projected 200 plus plants, a minimum of 300,000 has. will be required. Development of 300,000 hectares will ultimately enable some 30,000 farm families, as members of tree farmer associations, to plant, harvest and sell the most appropriate and profitable crop for the upland areas they occupy - namely wood. In initial years only government owned lands will be used for the energy farms. Since GOP estimates a total of 5 million hectares of denuded government lands needing reforestation, land availability is not seen to be a major problem at this stage.[1/] Expeditious inter-agency coordination to secure control of land will, however, be important.

The dendro model involves three distinct rural institutions:

- Tree Farmer Associations, responsible for growing, harvesting and supplying to satellite collection points adequate quantities of wood on a timely basis;

- Power Plant Corporations, responsible for transporting the wood to the power plant, and operating and maintaining the power plant;

- Rural Electric Cooperatives, which purchase the power from the dendro power plant corporations and distribute electricity to consumers/members.

Rural electric cooperatives are constituted as independent, consumer-owned legal entities that can apply for and obtain legal rights to use government lands for refoestation under Presidential Decree 705. Land will be secured through long-term leases (25 years, renewable for an additional 25 years, with token rental payments of ₱.50/ha./yr.). Electric coops will subdivide plantation areas and sub-lease parcels to tree farmer associations. Each association will have exclusive use of a minimum of 100 has. (approx. 8-10 has./farm family) for a similar 25 year period, renewable for another 25 years. Title to the land will remain with the government as part of the public domain. However, the trees and capital assets will be owned by the farmer associations.

Tree farmer associations will be composed of landless farmers who voluntarily join and commit themselves to plant trees (see Section II. B.). In the selection of farmer association members, the electric cooperatives will give preference to slash-and-burn farmers.

1/ BFD Reports, 1979.

The electric coops, through a power plant corporation, will guarantee a market for the wood produced. This guarantee will take the form of long-term purchase contracts for specified quantities and qualities of wood delivered to pick-up points within the plantations. The power plant corporation will be responsible for transport to the dendro-thermal plant.

Dendro-thermal plants (the power plant corporation) will be owned jointly by the rural electric coops (50%), the farmers associations (30%) and NEA (20%). All owners will have access to a vote in management policies. A simple system of accounting for the power plant corporations which the farmers can understand will be developed and instituted.

NEA will furnish financing to the rural coops for establishing dendro-thermal plants and forest energy farms. The coops will re-lend NEA supplied funds to the tree farmers' associations for the development of their farms and equity investments in the dendro-thermal plants as well as for subsistence during the first years of the program.

Land use planning will follow multiple use concepts to the extent this is possible, considering site conditions and the need to guarantee deliveries of wood volumes required by the dendro-thermal plant. Wherever terrain and soil conditions permit, agriculture and forage production will be encouraged to meet farm family food consumption requirements. The use of backyard gardens and food crop plantation inter-planting will be encouraged. Improved land use methods on the plantation sites, such as vegetative terracing, contour farming, bench terracing and water impounding to produce fish, will be implemented. However, there will be a need to control the ratio between land devoted to food production and forests to assure an environmentally sound ratio of tree cover to all other land uses. Long-term optimum economic benefits to participating farmers is one of the program's objectives; however, the primary short-run goal is fuel wood production for dendro thermal.

In view of present and projected costs of oil-based energy, preliminary economic studies indicate that trees will be the most profitable crop on most upland areas. Therefore, no serious conflicts are expected between the farmers need for income and food production, and the dendro plant fuel requirements. This complex set of variables will be one of the items to be examined and analyzed during the life of this project.

NEA's reforestation policies include the interplanting of slower-growing trees, between firewood species, beginning the second year of forest energy farm development. These trees will include both orchard and timber species. As these more valuable trees grow to maturity, firewood production will cut back as lumber and fruit production become increasingly important farm activities. As this objective is obtained, dendro-thermal plant fuel sources will be more heavily reliant on sawdust, edgings, and processing waste from the conversion of timber trees into finished lumber to meet the building materials requirements of an expanding population. Fuel wood production, however, will not be reduced until these resources are fully developed. Sawmilling, and other wood processing facilities, will be established at appropriate dendro-thermal plant sites, where power and process steam are available. It is thought that this transition may take as much as 20 years. Once realized, however, the small farmer will become a participant in the lumber business - a lucrative field that has, heretofore, been reserved for the well-to-do in the Philippine economy. For this to occur, the plantations will have to expand or supplemental sources of wood found.

If NEA were to establish 200 dendro units of 3-MW each, the total cost in today's prices would exceed $850 million for capital costs. The AID proposed technical assistance project by comparison is quite small. We , however, believe the impact of the AID assistance package will be significant and contribute greatly to the nationwide dendro program.

C. AID Participation:

The purpose of the $2.0 million AID assisted project will be to assist NEA in developing a capability to plan and implement reforestation/ rural energy activities on a nationwide basis.[1/] This will include applied research to develop and modify dendro energy models which are appropriate to site specific variables, whether physical or cultural in nature. The AID assistance will focus on activities "outside the fence" of the power plant. Financing of assistance for the construction, equipping and operation of the power plants will not be financed under the AID portion of this program.

The Reforestation/Rural Energy Project will be targeted at five specific pilot sites as follows:[1/]

- Solsona, Ilocos Norte
- Bolinao, Pangasinan
- Bamban (Sacobia), Tarlac
- Kanlaon, Negros Occidental
- Nabas, Aklan

1/ See map, Annex A.

NEA and AID believe these to be typical sites, and therefore, anticipate most of the issues/constraints/problems, that must be addressed as the project expands, will be encountered in these locations. Additional sites may be added if project variables at other sites indicate that valuable information can be learned from including them. A summary description of these proposed sites is in Annex A.

AID's participation is consistent with Mission objectives as set forth in the CDSS. The upland slash-and-burn farmers, who will be enlisted as tree farm association members, are among those identified as being extremely poor and needing assistance. NEA's program will provide gainful employment for these people, through initiatives that concurrently address the issue of environmental degradation and energy - objectives AID also shares. Two of the five target sites, Kanlaon and Nabas, are within the present regional focus identified in the CDSS (Region VI). Solsona and Bolinao are in Region I which is also under consideration as a regional target. Sacobia was selected because it relates directly to the proposed Clark Area Development ESF program.

AID support is proposed to provide primarily technical assistance with funding for some training and commodity assistance including activities focusing on evaluation, modification and updating of NEA's overall program concept and policies.

The proposed project will finance NEA contracts with competent Filipino and American professionals needed to identify, document, analyze and address technical, social, institutional, environmental and economic issues. The project will also provide funds to improve NEA's implementation capabilities, support training programs and undertake relevant applied research, e.g., field trials on fast growing species.

Limited commodities will be financed. These include vehicles, tools, training aids and other non-power plant related equipment and materials (see Annex C for an illustrative list of items, quantities and cost estimates). Project inputs will be designed to help NEA test and modify program concepts and policies through modifications that improve on the original implementation model and lay the groundwork for expansion throughout the country.

1/ See map, Annex A.

A discussion of problem areas where AID project inputs will be directed is presented below.

1. Forestry/Silviculture/Agricultural Extension:

Conversion of denuded lands into productive forests and farms will require application of land use methods which many upland farmers have not previously employed. Technical assistance will be needed in the design and implementation of various multiple use land concepts appropriate to proposed program activities.

Rural Electric coops are already actively propagating seedlings for reforestation work during the current planting season. The major emphasis has been on ipil-ipil (leucaena leucocephala), a fast growing tree legume with proven potentials.1/ Energy production is NEA's primary focus and ipil-ipil is generally acknowledged, by most Philippine foresters, as a very promising fast growing species that will supply large quantities of fuel wood in a timely manner. However, until wood harvesting begins, food production will undoubtedly continue to be the major concern of most tree farmer association members, since this has previously been their primary means of livelihood. Most upland farmers in the Philippines live at the subsistence level, with minimal direct participation in the cash economy. The farming method prevailing on most Philippine uplands is slash-and-burn agriculture, which is not compatible with reforestation, as well as being counter-productive in the long-run for the farmers. Program designs must be tested and modified to refine strategies that educate farmers on improved land use practices for food production, while introducing them to the concept and practice of tree farming as a commercial venture. NEA is preparing a package of incentives and technical assistance (under this project) to help farmers grow their own food without causing environmental damage, and at the same time emphasizing reforestation for energy production. Technical assistance will be needed in all phases of this initiative.

Silviculture in the Philippines has not progressed much beyond the static stage of small scale test plots and academic discussion or study.

1/ Leucaena leucocephala wood has high BTU properties and can also be converted into lumber and pulp. Leaves are an excellent source of high protein animal feed and organic fertilizer. See "Tropical Legumes: Resources for the future", National Academy of Sciences, Wash. D.C., 1979; "Leucaena". Promising forage and Tree Crop for the Tropics", National Academy of Sciences, Wash. D.C., 1977; "Bayani", AID/M, 1976.

To continue meeting the requirements of expanding reforestation activities, NEA will need to develop a dynamic silviculture program. The electric coop's energy self-sufficiency objectives makes it necessary for NEA to assure that expert silviculture technology is available and at the disposal of the coops for transfer to the farmers. It will be important for both NEA and the farmers to achieve improved growth rates, apply proven methodologies and profitable management systems. This suggests a broad range of activities, including:

- identifying, multiplying and propagating selected high yielding clones in nurseries convenient to the farmer;
- site adaptability trials with various species;
- improved planting systems; e.g. proper spacing, mixed species tree farms.

Pilot forest energy farms are currently being developed at the three target areas on Luzon island, and two locations in the Visayas. The sites are on government lands that are largely denuded with "cogon" (Imperata cylindrica)and "talahib" (Saccharun spontaneum) as the dominant vegetative cover. However, there is some natural regeneration taking place and patches of residual virgin growth exist in steem gullies. Invasion (second-growth) species are becoming established. 1/ NEA's program will profit through application of forest management skills that incorporate inclusion of existing invasion species in plantation management, maintenance to accelerate natural succession, and interplanting of ipil-ipil or other firewood species.

Extension skills will be required to incorporate agricultural practices with forestry and applied silviculture. Coordinating reforestation and agricultural production with the disciplines of land use planning and silviculture, while adapting technical recommendations to a degree of simplification that is feasible for farmer participants, will require well-planned, systematic approaches. Personnel trained in economics, the natural sciences and applied social science will all have active roles to fill.

1/ The following are generally prevalent - "Binunga" (Macaranga tanarius) "akleng parang" (Albizia procera), "anagdung" (Trema cannabina); "Bogus" (Acalypha stipulacea) and "Inyam" (Antidesma impressinerve)

2. Institutional development:

While NEA has built up extensive experience during the past 10 years, the new activities envisioned in the establishment of forest energy farms pose many new challenges. These new activities will take place in remote upland locations. Community organizers experienced in assisting upland farmers and prepared to live in these mountainous areas, are very rare in the Philippines. NEA will need to recruit, train and develop a corps of institutional officers prepared to deal with a whole new set of problems.

Implementation constraints must be identified, documented, analyzed and solved in a phased, coordinated manner. This will need to be done in close association with the beneficiaries themselves. Policy guidelines will be required to help farmer associations and coops decide on a multitude of issues, the solutions of which may vary from site to site. These may include:

- succession to equity rights of farmers who leave the association, die or are expelled for violation of rules;

- inclusion of slash-and-burn farmers living outside the plantation site, but occupying government lands adjoining program areas;

- methodology for determining when (and when not to) construct new settlements for farmer association members;

- design of accounting and payment systems for the work done by each association member;

- pro-rating the amortization of farm development costs among members;

- monitoring of credit and advances for farm development and family subsistence;

- assignment and acceptance of group responsibilities (e.g., fire fi hting);

- provision for recreational activities.

Workable solutions to issues such as these can only be implemented if beneficiaries are integrally involved in the decision making process. Actual field implementation, coupled with the inputs of qualified institutional personnel are required simultaneously.

3. Land Use Planning and Farm Extension:

The varying conditions of upland sites will require careful planning on a micro-level to determine optimum land use of each hectare. Technical expertise is needed to accomplish this, and to integrate this expertise with farmer preferences and capabilities. Additionally, assistance will be needed to help farmers plan and implement rational land use decisions and/or improve on indigenous land use methodology. Where and how to raise food, forage, animal protein and cottage industry raw materials along with fuel wood will be important decisions that affect the farmers well-being and success of the program. Long-term consultancies will be provided in this most critical area.

4. Wood Transport Systems:

Many plantations will be located on steep lands that are not presently used for agricultural production. Preliminary site checks indicate that cable transport systems, possibly combined with rough cutroads, will be the most feasible method for moving wood from plantation to power plant. While there is considerable expertise available locally in highlead yarding, skyline transport, and other cable systems, this experience is with heavy loads (large logs) and slow cycle times. For the NEA project, harvesting trees for fuel will mean moving large numbers of smaller logs rapidly from field to plant. Systems similar to ski-lift cableways seem most appropriate. A combination of local expertise and U. S. consultants, familiar with fast cycle systems, will be provided to help investigate design and install transport systems that meet program requirements.

Labor intensive tree harvesting will be combined with modern transport and roads where appropriate. Primary extraction from stump to landing will most likely be accomplished by skidding with animals, after manual felling and topping in the woods. Technical assistance will be supplied to synchronize these systems and assist local A&E firms in engineering design activities.

5. Alternative Wood Uses:

In conjunction with NEA's plans to develop forest energy farms into multiple use plantations, alternate uses for wood will be considered

in the project. Flow designs for the positioning of equipment to mill, dry and otherwise process timber, will be part of the overall site planning at dendro-thermal plant locations.

Concurrently, there appear to be good prospects at several sites for the sale of charcoal which can be produced from plantation grown timber. Waste heat (steam and stack) can be harnessed to dry crops and process agricultural produce. Consultants will help NEA examine the prospect of small industry activities. This will include advising on processing techniques, examining markets, and targetting for various product mixes.

6. Local Manufacturing:

The production of components for dendro-thermal and mini-hydro plants is a promising prospect for Philippine industry, considering the high level of technical skills and manufacturing capabilities that are available. However, local industries and the government will need help in planning, preparatory to tooling up for manufacturing. NEA plans eventually to export plant components within the ASEAN region. Project assistance will make available the technical expertise required to help NEA develop a production program. Local manufacturers serving NEA, will likewise need some help in plant layouts, metallurgy, quality control and testing procedures.

7. Environmental:

Development of forest plantations is a standard forest management procedure practiced worldwide, including the Philippines. However, much remains to be studied on the environmental impacts of wood harvesting on comparatively short-term rotations under tropical conditions. Additionally, studies will be needed to determine the effects on the environment resulting from smoke emissions at dendro-thermal sites. The project will finance preparation of an environmental handbook that sets the parameters for long range study and observation of environmental impact, and assesses various measures that could be taken to improve plantation procedures and plant operations - as regards their effect on soil, air, water and human habitation.

8. Management Procedures:

NEA has targeted the establishment of over 200 bio-mass fueled power plants over the next seven years. Even if this target proved to be overly optimistic, there is a need to design and implement

training programs that will prepare the required technicians, engineers and plantation personnel, for the large scale activities that are envisioned. Operations manuals will need to be prepared for plantation activities, harvesting procedures, plant operations, plant maintenance, and related tasks.

Simple accounting systems that are easily understood by tree farm association members need to be developed. At the same time, these simplified systems need to contain information required for analysis of other considerations such as wood burning efficiency, acceptable levels of capital investment, and equitable distribution of benefits to tree farmers, the coop and power consumers plus a host of other relevant matters.

Project assistance will make it possible for NEA to engage the services of management and accounting consultants that can help them in this undertaking.

9. Coordination with other GOP agencies and other countries:

Documentation and evaluation of NEA's activities will be of interest to government planners involved in natural resource management, the economy, energy policy and related concerns both in the Philippines and in other countries. NEA will need assistance to augment existing in-house capabilities along these lines. The NEA program could serve as a model to help arrest the alarming rate of environmental decline that has caused concern at all levels of government.1/ Reporting, monitoring and evaluation systems need to be designed accordingly. Careful documentation could eventually help NEA tap additional donor support for program expansion.

10. Training:

As the prices of fossil-based fuel rise, research activities to increase the use of bio-energy have accelerated. New developments that are applicable to local conditions, may be employed if sufficient investments are made in training local personnel to use updated technology resulting from research. Regional and U.S. based training programs can help achieve this. For the near term, seminars, site visits to existing or future bi)-mass energy based power installations, workshops

1/ See NEPC Report on the Environment, 1979 and Environmental Center of the Philippines memorandum to the President, May 1980.

and special courses will be an important element in NEA training programs. Project assistance will support these activities.

II. Program Analysis:

The issues and questions remaining to be answered on the nationwide dendro thermal program are numerous. While many are addressed in the following section of this project paper, by no means are all of these answered. It is a major objective of this proposed technical assistance package to provide the skills and framework in which to study, analyze and begin to resolve these questions.

A. Economic and Financial Feasibility:

The economics of biomass production from forest energy farms is sensitive to a complex set of variables that impact on the feasibility of any agricultural enterprise (e.g. rainfall, soil fertility, terrain, productivity per person-day and other site specific considerations). Location of a tree planting site will affect the viability of dendrothermal plants and more importantly, the benefits tree farmer association members derive from the production and sale of biomass as an economic activity. In addition to the unknowns concerning tree production, estimated capital costs of the power plants vary widely from $700/KW to $1,500/KW further complicating the determination of economic feasibility. NEA's recently purchased plants have had capital costs of about $800/KWH. The following section discusses some of the economic considerations of the NEA program and Annex F presents cost, production and revenue projections under relatively conservative assumptions. Many benefits expected from the program such as those from reforestation and employment generation are not quantified and will be left to this project to evaluate in detail.

1. Tree Farmers:

Tables 1, 2 and 3 in Annex F present projected cash flow statements for a 100 has. module tree farmer association, for the individual tree farm family and for a 3-MW power plant under poorer than average site conditions. An analysis of these figures shows that a farm family growing trees for energy could significantly improve its financial position as a result of this program's activities. Real income (in today's prices) will probably be in the range of $600 (₱4,500)/yr. within the first four years, increase to around $870 (₱6,500)/yr. in the 5th and 6th years and average over $1,600 (₱12,000)/yr. from Year 7 onwards. When escalation is added, the viability of the program increases markedly. These amounts would be net of repayments (principal and interest) for housing and loans advanced to develop the plantation.

They include an estimated non-cash income of approximately $160 (₱1,200)/yr. under today's prices. A further assumption is made that tree planting would not be a full time activity. Notwithstanding the opportunity to earn more cash income from labor payments for plantation development, the farm family would probably continue to allocate substantial time to growing food crops or participating in harvests of palay grown on the lowlands which is a seasonal family activity and wherein harvesters generally receive payments in kind.

A recent survey in five geographically disbursed locations indicates an average income of less than $330 (₱2,500)/yr. for 60 percent of the families living in the uplands. An additional 27 percent earn from $330 to $530 (₱2,500-₱4,000)/yr. and less than 2 percent earn $800 (₱6,000)/yr. and over. Based upon these comparisons, farmers producing biomass for energy would be in the top 13 percent income bracket of upland farmers from Years 1-4, with incomes increasing by 50 percent in Years 5-6 and by 200 percent from Year 7 onwards.

2. Power Plant:

Variables of load factors, percentage of downtime and other site specific considerations coupled with the broad range of capital cost estimates make it extremely difficult to accurately analyze or quantify the financial feasibility of operating a biomass fueled electric power plant.

Considering the increasing cost of oil, and given the fact that fuel costs are the major expense in conventional power plant generations, NEA's dendro-thermal program looks promising. The analysis in Tables 3 and 4 indicates that, plant operating costs notwithstanding (fuel, depreciation, amortization of principal/interest), a dendro-thermal plant using today's prices could pay farmers $17.00/BDT for wood, and still operate at a profit while selling power at $0.80/KWH to consumers - whereas power from a diesel plant would cost $0.0915. Although wood pricing will be critical to both farmer income and plant viability, $0.080/KWH is a quite acceptable price in the world of renewable energy systems and compare favorably with the cost of producing power in rural areas of the Philippines today. As mentioned earlier the proposed project will assist NEA and the coops in working out financially sound and equitable pricing policies. At today's prices dendro cannot compete with large coal fired plants, however, it does offer benefits beyond power production and deserves serious consideration where loads and service areas justify.

3. National Economy:

Fuel costs to operate a 3-MW power plant producing 14.7 million KWH/yr. would be $0.35 (₱2.60)/million using biomass, as against $1.56 (₱117)/million for diesel fuel. This indicates a fuel savings in foreign exchange

of $1.56 million per power plant. However, taxes and refining costs amount to roughly 50 percent of fuel costs. Therefore, we project a net savings in foreign exchange in the neighborhood of $800,000/yr./ 3-MW plant. On the five pilot sites where AID inputs are proposed, foreign exchange savings should exceed $4 million annually. Even if the program only partially reaches its target of over 200 plants, the savings become very significant.

B. Social Soundness Analysis:

1. General:

The direct beneficiaries of the dendro-thermal/reforestation project sites will be the squatters themselves - about 22,000 primarily kainginero or slash-and-burn farmers and their families. By being provided with an opportunity for stable employment combined with secure land use rights, the families in tree farmer associations should benefit from both increased physical and economic security.

But this is an experimental approach, there are no models to follow and traditional resettlement schemes have generally failed for a variety of reasons1/. Acutely aware of these facts, NEA and AID are concerned that the settlement aspects be correctly designed to maximize the benefits and to cushion any negative impact that might occur. The AID project will provide technical assistance for studies and consultancies at initial stages at the five pilot sites as well as support/consultation to the NEA for exploring social and cultural issues and for technical guidance in all forestry aspects. These studies and analysis will help to assure that the project affects first beneficiaries positively, both socially and economically. The purpose of this section is to explore the social acceptability and the probable effects of the first project phase, the plantation scheme, on the beneficiaries, and to highlight remaining questions that project technical assistance might deal with and learn from on the five pilot sites.

2. Project Beneficiary Profile:

Annex B of the Philippine CDSS provides a general profile of upland farmers, including "kaingineros".

1/ See, for example, McAndrew, John P., "Andam-Mouswag: A lesson learned?" Philippine Studies 26 (1978) p. 391-425; Fernandez, Carlos A., "Blueprints, Realities and Success in a Frontier Resettlement Community, "Philippine Sociological Review, October 1972 (20, 1-2) pp. 176-183.

The squatter families in the pilot sites share similar characteristics. Income data is available only from one site, Clark, where average farm family income is estimated at around ₱3,000 (US $400). In the more remote site in Nabas, Aklan average income is probably even lower due the isolation of the province. Roads are minimal in the provinces which reduces accessibility to good markets and usually results in lower prices for local products.

Land tenure usually poses a real problem to rural poor families, few are known to own their lands and most have been squatting on public land or have farmed in the area as tenants.[1/] Many, groups on public lands migrate, practice slash-and-burn agriculture and leave as the soil is depleted or as they are forced off by authorities. Where tenancy arrangements exist, a portion of the palay, sugarcane or rootcrop goes to the landlord as land rental; the most common sharing arrangement is a 50-50 basis, depending on the land quality, crop risks and cost of inputs. Soil fertility is low, and the terrain may have scattered rocky areas or steep slopes; the farmer stays by reason of land availability rather than choice. The Pangasinan site for instance, is farmed by social outcasts who have drifted to the hills from other parts of the same province. Because he has no legal stake in the land, and because the soil depletes quickly, the squatter will move on after a few planting seasons.

On the five pilot sites, the population is varied, with Negritos in the Sacobia site and some non-Christian groups in other island sites. The majority, however, are Christian Filipinos who have migrated to the hills because of available land.

2. Social Acceptability and Impact:

Security:

The farm families in the first twenty associations to be organized were attracted to the scheme for two main reasons - economic stability and physical stability. The farmer has little to risk in the short-term because participating families are being permitted to continue using small plots for home gardens during tree planting stages while associations are maturing and longer range land

1/ At Clark, 7% reported that they "owned" their lands by virtue of occupancy length. Geographically, the land is public.

use plans are resolved. The promise of residential security and steady work has been adequate incentive for farmer/family interest initially.

It is probably the land issue that will remain the most important one to the farmer. On the positive side, the fifty year lease should secure land tenure for association membership; assuming the recruitment and selection procedure is fair, the kainginero stands to benefit from the land tenure arrangement. However, there is still the question of whether the people will be sufficiently interested over the long-term to give up the slash-and-burn life-style. Second, though the squatter has lived in or around forested land, his occupation has been as a farmer, seasonal laborer, or day worker rather than as a forest worker. What is his point of view and commitment to work that may require training and possibly a more disciplined orientation and life style?

The dendro model has tried to meld a package of economic and social incentives that will keep the farmer attracted to the association and the land. If forestry training programs and assistance are available to the worker, the adaptation problems to a forestry job should be minimal. If public services and housing are installed in a timely procedure and as scheduled, the farmer will soon find the opportunity cost of migrating is too high. Other resettlement schemes in the Philippines, though offering security, seem not to have carried out plans for employment, services, or a host of other necessities. In this case, it is most important that the security aspects with which the NEA recruited the farmer, i.e., land tenure and employment, followed by social services, are delivered on schedule by the agencies involved.

Income:

The present farm family income is erratic and up to 50% of the tenant's crop may go to his landlord. In the peak palay harvest August-November, he is busy with his own land or working on someone else's as day labor. After February sales and repayment of loans, however, little is left for the family; the following months are lean until another advance and cropping begins. For the seasonal laborer (up to 1/5 of the farmers on the Clark lands) the cycle is much the same but the average annual income is lower.

Payments for meeting planting and maintenance requirements will provide a steady income for the family. NEA has budgeted about

₱4000 annually or more cash income than the average kainginero family scrapes by with currently. Moreover, two other sources will provide some supplement to the family's income. First, the present association farmers are continuing to plant their own subsistence gardens; the AID project will add an agriculturist (horticulturist) on NEA staff to advise on future home garden plots as well as planting at appropriate areas of the plantation. Second, community income will be increased as labor demands arise from power plant construction and operation. This should benefit the association families first and adjoining barangay communities with underemployed labor second.

Possible spin-off industries, increased employment and cottage industry growth has also been mentioned in several related studies as adding to family income. The project does provide for planners to study industrial components (steam use and alternative uses of wood byproducts), do market surveys and design some packages to attract entrepreneurs. On the consumer level, village needs for services such as retail kiosk, barber, farm equipment repair, etc., should generate some additional income for families. However, stable employment on the plantation and the home garden plots are the two income attractions. These two points are being stressed by NEA officers during recruitment.

Housing and Settlement Facilities:

NEA community organizers report that prospective farmer association members have asked for potable water and good housing to be provided early on in the plantation development schedule. The request for better water supplies is not unusual, however, the importance placed on a house built with borrowed money, was surprising. Further interviews with farmers have revealed that these prospective association members would perceive construction of a new house as evidence of sincerity on the part of the government, and assurance that they are not being asked to grow a crop (wood) which they would have difficulty in selling at a later date. Award of a house would evidently be considered a form of "earnest money" or cash advance against future crop harvests. Since wood harvests will be realized in approximately four years, considerably longer than crops the farmer is accustomed to, farmers evidently want a larger-than-usual advance (in the form of a house) to assure them a buyer will indeed be on hand after several years of waiting for the wood crop to mature. Viewed from this perspective the farmers position is easily understood.

The housing that has been planned for the squatters is a two to three room, lightweight building, appropriate for the farmers both in size and cost. Several architectural plans exist, ranging from ₱7,000 to ₱21,000 (the plan for Pangasinan is for ₱14,000 plus labor). The space and quality will be in excess of what the farmer has ever had - and the housing should particularly benefit women and children because these two groups spend much time at and around the home. It will offer more space and will be well-constructed, with adjoining gardens and play areas.

Acceptance of the housing scheme will depend on the farmer's understanding of the loan concept and his ability to meet the costs (and amortization) of the house. The farmers interviewed realized that housing would no longer be free but said that they would be willing to pay for better houses once their income increased. NEA plans for annual payments of about ₱2000 would be within the farmer's ability to pay by year 5 and easily affordable by year 7 when his income should be in the range of ₱14,000/annum. (See economic analysis). The NEA staff will carefully promote the housing scheme to educate the family on the loan responsibilities of it.

Of the settlement facilities, probably the provision of water soon after housing construction is the most sought after by women in the community. Next families have asked for meeting halls, schools and road improvements. At each site, it is imperative that the NEA team involve the families from the first, asking assistance and participation in organizing the settlement plans. Families involved by the Ministry of Agrarian Reform have helped to build their own houses, to select well sites and to maintain roads. If the people are encouraged from the beginning, adaptation might be easier as well as mistakes minimized on siting, spacing and other variable requirements of the facilities.

Power:

As the energy component of the project commences, after year four, association families along with existing NEA coop consumers will benefit by receiving a consistent electricity supply at reasonable rates. Socioeconomic benefits which can be attributed to the introduction of electricity into the rural areas has recently been documented by several AID evaluation studies by Philippine universities, most recently, 1977 AID-financed NEA survey. The 1977 survey found that the rural household desired electricity mainly because they felt that lighting increases their quality of life, added to peace and order in the barangay and increased educational activity. Data on electrified schools, street lights and sharing of some appliances in the sample areas support these feelings.

Environmental and Industry:

An AID feasibility study of a dendro-thermal plant on Panay provides some idea of possible effects the plant will have on settler families. This includes such items as the positive effectives of about 100 new jobs created for men in the community. Adverse impacts mentioned were possible traffic congestion and increased hazard to the people and animals along the route, extra noise or traffic-related air pollution. The primary direct environmental effect on the people would be some ash emission which could be screened at the plant. Neither AID nor NEA officials, however, really know what these will be; the present sugar-cane industry in Negros using the dendro plants has never been studied from the viewpoint of social impact. This is the reason that the Mission has included funds both for studies and for environmental and applied anthropology advisors to function on a national overall project advisory capacity.

4. Potential Displacement:

Despite the incentives in favor of squatters participating in the program, there exists the possibility that some illegal users of the public lands will reject the program and thereby be displaced by the dendro activities. There is no indication what the potential displacement may be. In the pilot phase any displacement will be minor as the five (5) project sites are very sparsely inhabited. The project anthropologists will be responsible for monitoring the program effects on non-participating squatters and other users of the land. As dendro projects are replicated, this issue may become more important. Whether displacement results from the program or not, the reality is that continued abuse of forest lands will surely displace the majority of users, as their livelihoods become no longer ecologically sustainable.

5. Summary:

In conclusion, the social acceptability and impact of the settlement scheme and plant operation are still unknown, but probably benefits will include family security, increased income and the community advantages of roads, meeting hall and school facilities. The men stand to benefit from having steady employment and additional training in their new work; the family income should increase due to the availability of year round employment[1/] and seasonal income fluctuations be smoothed out. Women and children should have better housing, water supply and

1/ See Economic Analysis for projections of labor demand in plantation development and harvesting.

community facilities. The AID technical assistance will explore means to maximize these benefits and to assist in a documentation and evaluation to provide guidance for other sites and improve the dendro model.

C. Technical Feasibility:

1. Forestry: (See Annex G for detailed discussion)

Man-made forests (i. e. forest plantations) are universally recognized as an integral part of any well-designed forest management/development plan. Much of the world's wood supply is produced from trees planted specifically to meet society's demand for timber. Several basic issues must be raised when examining the technical viability of a forest plantation. These issues include:

- What is the desired end-product?
- What ree species are best suited to meet this demand?
- Is the selected site suitable for these species?
- Can the plantation be properly developed and managed with the human resources that are available ?

NEA's primary objective is the production of a heat source, and energy must be considered the principal end product for at least the first decade of the plantation. Undoubtedly, forest plantations can produce the desired end product.1/

As regards the question of species, NEA is basing its initial plantation development efforts around Leucaena leucocephala. Leucaena is an excellent source of heat, grows quickly and coppices vigorously. It is further a legume and can improve soil fertility. However, tropical foresters and researchers are often hesitant to base the success of a reforestation or afforestation program on a single species. NEA planning has recognized the wisdom of this restraint and provided for two activities to broaden the range of species diversity. First, leucaena will be inter-cropped with other species as soon as leucaena grows tall enough to serve as a nurse crop (estimate - one year). Secondly, the growth of other trees is being promoted through protection of invasion species, which should lead to considerable natural regeneration of indigeneous growth mixed among leucaena. Since all trees can be burned, the need for energy and a mix of species are technically compatible.

1/ Recently concluded Bio-Energy '80 World Congress (Atlanta, Georgia, April 21-24, 1980) has emphasized that at present the most promising source of energy as an alternate to fossil fuels is wood.

Site selection criteria are numerous and it is important to recognize that all species (including leucaena) are selective to some degree. While leucaena does have its limits, there is also ample evidence that it will grow on a wide range of sites and produce large amounts of biomass. NEA's plan to include other species in the dendro thermal plantations should make reforestation feasible anywhere in the Philippines.

Management will probably be the most critical element in determining the degree of success that will be attained. The social, administrative, economic and environmental aspects of management are addressed elsewhere in this section. A principal objective of this project is to assist NEA in the design and application of effective management initiatives.

In summary, NEA's reforestation plans are based on accepted practices in forest management. Additionally, firewood plantations are perhaps the simplest and least complicated type of any reforestation activity.

2. Transport/Wood Handling:

A major logistical problem and expense associated with the concept of developing energy plantations to supply fuel for the direct production of electricity is the transport of wood from the plantation to the generating facility. Depending on the terrain, a number of different transport systems may be considered: trucking of whole stems, river transport, water flumes, trucking of wood chipped in satellite yards and cable tramways. Carabao skidding might be considered in conjunction with one or a combination of these methods.

In relatively flat terrain where existing roads serve the area designated for the plantation, or where a road network could be constructed at a reasonable cost, trucking of whole stems and/or woodchips in combination with carabao skidding will likely prove to be the most economical means of transport. However, most areas available for the tree plantations, including four of the five pilot sites, are located in relatively steep terrain which is not suitable

for other agricultural production. Water transport is not feasible because stream flows during the dry season are inadequate to float the required volume of logs down-stream; in addition, the increased moisture content of the wood will decrease the steam generation output and hence boiler efficiency. Under these conditions, it is likely that a permanent cableway in combination with carabao skidding and/or portable cable skidder may require less energy, do less environmental damage and be a viable alternative to access roads. Cableways currently in use in the Philippines for moving both whole logs and sawn lumber make use of portable field engine winches capable of yarding distances of up to 500 meters, thus covering an area of 60-70 has. from one setup. The timber is then transferred to a secondary cableway supported by gin pole towers. Timber supplied from two or more field-winch operations is then transferred to the main cableway at a transfer station and transported to the end use point. The primary cableway is supported by A-frame towers. A variation of this scheme incorporating cable transport methodology used in ski-lifts and other similar applications would appear to be appropriate for moving large volumes of relatively small logs over rough terrain.

Since the most reliable and economical wood transport system must be determined on the basis of specific site conditions, it is likely that a number of the transport modes discussed above will eventually be adopted. To assist NEA in developing the capability to design appropriate systems, the technical services of a wood handling/transport specialist will be provided for up to 4 years under the Reforestation/Rural Energy Project.

3. Power Generation:

Two basic systems have been used to convert biomass to electricity: direct combustion and gasification. The technologies for both systems are already well established.

Gasifiers were used extensively in Europe in the early 1900's to produce a low-BTU gas which could be burned directly in a boiler or cleaned and burned in a diesel/engine-generator with a small amount of diesel fuel. Recent experiments in the U. S. for using this process on a commercial scale have utilized feedstocks ranging from woodchips to corn cobs and cotton gin trash. Gasifier systems are available in a wide variety of sizes. Size is normally dictated by the size of available engines rather than by gasifier capacity.

Gasifier/engine -generators range from 10 KW to over 1 MW for multiple engines. Operating a manual feed, gasifier engine-generator is a relatively simple operation because the gasifier itself has few moving parts and operates at near ambient pressure. The gasification process does not require water or discharge liquid. Stack emissions are also relatively low, and the only other byproduct is an inert ash which can be readily disposed of in designated dump areas. Few companies currently manufacture gasification units, and they are usually produced on a single-order basis with a lead time of 4-6 months. Engine-generators are normally available.

The direct combustion of biomass to generate process heat and electricity also has a long history and is widely practiced in many countries today, including the U.S. and the Philippines. The forest products industry in the U.S. already derives about 40% of its annual energy requirements from trees, primarily through direct combustion. General considerations for the design of wood-fired thermal plants include fuel availability; steam, cooling and boiler feedwater requirements; and environmental restrictions. Wood combustion systems are more costly and larger in physical size than comparable units using fuel oil or coal; hence the major cost difference between a wood-fired and fossil fuel-fired plant will be in the combustion system and boiler. After the energy is converted to steam in the boiler, transformation of the steam into electricity requires similar equipment regardless of the fuel. Operating a steam-cycle system is more difficult because of the greater complexity of high pressure systems. However, a number of wood processing, rice and sugar mills in the Philippines have operated such systems successfully for many years. Emissions from boilers which combust biomass directly can normally be reduced to meet environmental standards with existing technology such as cyclones and wet scrubbers. Boilers also discharge water in the range of 150-200^{0}F which can cause harm to aquatic life of released indiscriminately into local steams. The inert ash produced is the same as the produced in the gasification process and can be disposed of in a similar manner. Steamcycle systems are governed by the availability of steam engines (30 KW - 3-MW) or steam turbines (100 KW - 3-MW). Turbines in the 100-500 KW size are not common and usually require lead times of lead times of 3-5 months for shipment. Boilers normally require a lead time of 5-8 months.

Both gasification and the direct combustion of biomass will be utilized under NEA's pilot program for developing renewable indigenous rural energy resources. 3-MW wood-burning steam thermal plants will

be installed at the Ilocos Norte, Pangasinan, Negros and Tarlac pilot sites. Equipment for these installations, including the boiler, turbine generator, and internal wood handling equipment will be provided under an already executed agreement with the French Government. A gasifier with two 400 kilowatt (KW) engine generators will be installed at the Panay site. We understand that these units will be the dual-fuel diesel engines manufactured by Duvant in France which operate with a mixture of about 90 percent low-Btu gas and 10 percent diesel fuel for initiating combustion. Equipment to be provided under the French credit will include the gasifier, gas scrubber, compressor, cooling system, alternator, and dual-fuel diesel engine. A more detailed description of each proposed site is included in Annex A.

D. Environmental Feasibility

This project involves pilot reforestation activities in five diverse sites in the Philippines. There is little or no past experience on which to confidently predict the environmental implications of this activity, particularly socio-cultural impacts. The planned nation-wide program involves resettlement into marginally productive lands. The concept proposed is new, and as with all innovative projects involving and in fact dependent on the human factor, there is wide range for mistake and failure and also tremendous opportunity to learn. By selecting five pilot sites to monitor closely, the likelihood of significantly disrupting the environment will be reduced. The physical and cultural effects of this program will be continuously monitored and closely evaluated throughout the execution of this project.

Employment generation is one obvious positive impact which can be expected. A number of kaingin (slash-and-burn) farmers will be employed during the plantation development stage, and a steady labor force will be required to provide a continuous supply of wood during power plant operations. On the negative side, the influx of workers into each area will result in an increased demand for housing, food, transportation and other public services and facilities.

The areas to be reforested under this program have been largely denuded by shifting cultivators. The reforestation effort will assist in reducing erosion and stabilizing the soil. In addition, tree species will be planted which are nitrogen-fixing, thereby improving soil conditions. While the growing trees will extract other nutrients from the soil, the overall biological impact is expected to be positive. However, an extended period of data collection at individual sites will be required to confirm this prediction.

The energy plantations to be developed under this activity will ultimately be harvested to supply fuel to power generating plants. The operation of these plants could result in air and water pollution if measures are not included in the design of these facilities to mitigate these effects. Significant environmental impacts can be expected to result from this program.

Technical assistance will be provided under this project to develop guidelines for monitoring environmental changes which may occur as a result of this activity and to develop a capability within the NEA to design future projects which will, to the greatest extent possible, mitigate possible adverse impacts both in physical and cultural terms.

A major output of this proposed technical assistance project will be the establishment of environmental guidelines and procedures to effectively apply them.

E. Administrative Feasibility

The National Electrification Administration (NEA) is the GOP implementing organization for the rural energy program which includes the development of the Philippine mini-hydro and dendro thermal energy resources. NEA will likewise be the implementing entity for the proposed reforestation/rural energy project. NEA was created by Republic Act 6038 in July 1969 and since that time has worked to establish a nationwide network of semi-autonomous rural electric cooperatives. As a national level entity, NEA secures and provides financing and technical assistance to the cooperatives, and serves as a regulating body as concerns coop power rates and maintenance of quality standards. There are currently 117 chartered rural electric cooperatives throughout the Philippines. AID has provided over $90.0 million to assist in the development of this very successful program. AID assistance is now terminating after 12 years. NEA is a mature and well staffed organization. It is our judgment that NEA requires no further technical assistance as regards their rural electrification program. Other donors such as the World Bank are continuing to provide capital financing and some limited technical assistance.

To implement the new rural energy program, NEA has created a rural energy development division. The division, created in the summer of 1979, is young, creative and motivated. It is staffed by well-educated professionals who have a solid management base in finance, engineering and community development. The proposed rural energy program, however, involves some disciplines and talents which are new to NEA. The proposed project is needed to assist NEA in these new areas.

The new NEA division, which will be responsible for this project, currently has about 70 employees. It is expected to grow to about 175 over the next two years as the program expands and qualified people are located and hired. This division will have the full support of NEA existing staff of over 200, as needed. The division has a contracting office and access to NEA's very experienced contracting staff. The division reports through the Deputy Administrator for Engineering to the Administrator. A copy of the organization chart for the rural energy development organization is in Annex E.

The Implementation Plan, Section V, provides details on how the proposed project will be implemented by NEA together with arrangements for supporting the U.S. consultants.

Of central importance to the rural energy project are the rural electric coops which will serve as the local level institutions to initiate the rural energy schemes, hold equity in the capital infrastructure, and be the ultimate consumer of the power produced. The existing coops range widely in size, financial viability and general management capability. Some are on remote islands and some serve mainly urban population centers. Some are self-generating and some buy wholesale power off the national grid. With the exception of those in Mindanao almost all the other coops are experiencing some degree of financial problem caused by the ever-increasing costs of power generated from imported fossil fuels. The coops desperately need to decrease their reliance on imported energy and are, therefore, in full support of the rural energy program to develop indigenous local energy sources. The coops and the mainly rural populations they serve will be the major long-term beneficiaries of the program.

AID teams have visited the five pilot sites and talked at length to the coop officers. The five coops have a good record in their handling of the rural electrification program. They are well staffed and considered capable of executing the new rural energy program given assistance as proposed in this project.

III. Financial Plan (AID Project):

This section will deal only with the proposed AID project. Overall economic and financial aspects of the nationwide program at the farmer, association, power plant and national level are addressed in Section III. A., the Economic Analysis.

A. Project Budget:

Detailed budget tables are provided in Annex C. A summary budget follows:

	AID Loan	AID Grant	NEA Contribution	Total
Filipino Consultants	331		222	553
U.S. Consultants		698[1/]	262[2/]	960
Training (Local)	46		50	96
Training (U.S.)		60		60
Equipment/Materials	435[3/]			435
Local Support			224[4/]	224
Sub-total	812	758	758	2,328
Contingency	122	114	113	349
Escalation	66	128	129	323
Total	1,000	1,000	1,000	3,000

1/ Salary and FX cost of U.S. consultants.

2/ Housing, utilities and related costs of U.S. consultants.

3/ Includes excess property where appropriate.

4/ Includes work related support of consultants, e.g., in-country travel and per diem.

B. Disbursement Schedule:

The proposed $2.0 million project, $1.0 million loan and $1.0 million grant, will be disbursed over a four(4) year period. The GOP contribution in direct support of the proposed project will be $1.0 million peso equivalent. The projected disbursement schedule follows:[1/]

Source of Funds	FY 80	FY 82	FY 83	FY 84	Total
AID Loan	600	140	140	120	1,000
AID Grant	200	300	300	200	1,000
GOP Contribution	210	290	280	220	1,000
Total	1010	730	720	540	3,000[2/]

AID grant funds are being used to support all U.S. based training and salaries and foreign exchange costs associated with the U.S. consultants. AID loan funds are being used to finance equipment and material imports (and excess property where appropriate), some local training and up to 60 percent of locally hired Filipino consultants.

The NEA contribution will finance local support costs of U.S. and Filipino consultants including housing for the U.S. consultants and in-country transport and per diem for all consultants. NEA will additionally finance not less than 40 percent of the salary and related costs of the Filipino consultants and a portion of the local training costs.

C. Disbursement Procedure:

U.S. consultants, equipment and materials imports will follow normal AID disbursement procedures using either direct letter of commitment or the letter of commitment/letter of credit procedure.

We will use a modified Fixed Amount Reimbursement procedure for loan financing of peso costs. Under the procedure up to 60 percent of salary costs of Filipino consultants will be reimbursed to NEA periodically over the life of project upon presentation of documentation prescribed in Fixed Amount Reimbursement Agreements. In-country training costs financed under the loans will likewise be paid in accordance with a Fixed Amount Reimbursement Agreement.

1/ A detailed disbursement schedule is in Annex I.

2/ Includes escalation and contingency.

IV. Implementation Plan (AID Project):

The following are the implementation considerations for the four-year AID-assisted technical assistance package. Administrative feasibility questions relevant to the nationwide program are discussed in Section III. E. This section relates only to the AID project.

A. Implementation Schedule:

	Project Month
Obligation	0
Conditions Precedent Met	2
Contracting for Consultants Begins	3
Commodity Procurement Begins	3
First Consultant Contracts Let	5
Contract for Environmental Handbook Let	5
First Award for Commodities	6
Baseline Evaluation Begins	6
Long-term Consultants on Board	11
Silviculture Program Begins	11
Contract for Accounting/Mgmt Systems Let	11
Commodities Arrive	12
Charcoal with Coal Study Begins	15
Mid-Project Evaluation	24
Local Manufacture Study	26
Wood Pricing Study Begins	30

Implementation Schedule	Project Month
National Policy Study Begins	36
Alternative Uses of Wood Study	36
Cogeneration Study	36
Final External Evaluation	44
Project Completion/Consultants Terminate	48

*Training will be sponsored periodically throughout the project.

B. Project Management System:

NEA - Consultants hired under the AID-assisted project will be assigned to NEA or Coop counterparts in the organizational unit appropriate to his or her field of expertise. The AID coordinator will report to the head of the rural energy division and will be responsible for assisting the division head with the management of the AID-financed resources.

AID - AID will use its project committee system to monitor this project. The Chairman will be from the Office of Project Development (OPD). Members of the committee will be from the Office of Agriculture and Rural Development, USAID's energy advisor, OPD's Engineering Division and the Program Office. The Mission has sufficient manpower to effectively monitor this project.

C. Contracting/Procurement:

Technical Assistance - It is anticipated that the foreign as well as local consulting services will be of a Personal Services Contract type. Contracts will generally be of a Host Country type, but in some cases AID direct contracts may be used. Specific waivers of AID's host country contract policy will be sought in all cases prior to proceeding with a direct AID contract. AID Handbook 11 will be used for Host Country Contracting. GOP procedures will be used for local contracts, with AID loan reimbursing on a modified Fixed Amount Reimbursement basis for a percentage of the direct salary and related costs of the consultants.

NEA has a long and reasonably successful history of working with AID-financed contracts and of contracting for and managing foreign and local consultants.

The new rural energy division has a project management staff which is responsible for the contracting function and monitoring from a legal and financial standpoint. The project management staff is also responsible for handling the local support/logistics function for foreign consultants including housing, customs clearance of personal property, etc. When the rural energy staff needs help, NEA's experienced central staff will be available.

Equipment/Materials - Imported commodities will follow standard AID Handbook 11 procedures. All commodity procurement is expected to be completed in project year 1. The rural energy division project management staff will perform the procurement assisted by the central NEA staff which is familiar with AID procurement procedures.

V. Evaluation Arrangements:

A major objective of this project is to test approaches to designing a viable model for the NEA rural energy development program. Thus, the project has a major continuing evaluation process to modify and refine the model. Baseline data/information will be collected on the five pilot sites at the onset of the project and an evaluation will be held at month 24 (halfway into the project) and a major external evaluation will be made at the end of the five-year project period. Near the end of year four sufficient evidence should exist on the forestry/farmer aspect of pilot activities to evaluate the feasibility of the schemes or models up to the point the first wood harvests begin. Evaluation of the long-term viability of the models cannot take place until several years of operating experience are in hand, and are, therefore, not included in this project. If AID, at some future point, finances actual power plants the longer term evaluation questions can be addressed as part of that project.

The evaluations, in addition to considering purpose achievement, will consider such questions as the following:

-- Land acquisition and tenure: While for the most part marginal public lands will be used for wood plantations, many of these lands have squatters who must be absorbed by the program or displaced. Farmers/farmer associations will require appropriate job security or tenure. Methods of acquiring and holding land must be evaluated.

-- Farmer Motivation: Methods developed to attract farmers to engage in efficient wood production over the long-term under an arrangement which makes timely price adjustments to reflect national and international economic conditions will be evaluated. While the financial rewards of selling wood to the coop will be significant, these returns cannot be realized until year four of any particular project. Ways to keep farmers motivated during the early years of the dendro project including adequate operating credit will be evaluated.

-- Farmer Selection: Akin to farmer motivation is the selection of plantation farmers. The criteria used will be evaluated. While NEA's preliminary criteria will permit broad open participation, selection of farmers must be fully evaluated.

-- Accounting/Management System: The system whereby the Association members are kept apprised of their financial liability, income, assets, etc. will be a critical question as regards equity. This system must be evaluated.

-- Reforestation/Environmental Impacts: One important GOP objective is the reforestation of denuded areas, which should result in improved environmental conditions and concurrently restore land productivity in terms of timber, food and water. NEA's approach is to make reforestation an attractive economic activity for small-scale upland farmers. Evaluation of the project should also be undertaken from this perspective and determine to what degree these inter-related objectives can be achieved by application of NEA's strategy.

The above are only a handful of the many questions concerning overall business, forestry and farm level questions which will be addressed in the final evaluation. Development of evaluation criteria and questions on the nationwide program will be a process which will continue through the execution of the proposed technical assistance project.

To assist in the evaluation process, a documentation (information) specialist will be hired to insure the timely flow of information on project experience.

Funding for the baseline and final evaluation are included in this project.

VI. Conditions Precedent and Covenants:

A. Condition Precedent

Only one project specific condition precedent to initial disbursement will be placed in the Project Agreement. This will require the GOP to show evidence that adequate peso funds have been made available for the local support of the consultants.

B. Covenants will be negotiated in the Project Agreement which require the NEA to:

- provide adequate counterpart personnel
- provide counterpart peso funding for the support of the AID-financed consultants in years 2, 3 and 4 to include housing, in-country travel and per diem as appropriate.
- provide adequate office, library and laboratory space.
- perform annual joint AID/NEA project evaluations.
- perform a final evaluation.

ANNEXES

A. Summary of Project Provinces Sites and Map

B. Logical Framework

C. Budget Tables (Technical Assistance and Equipment/Materials)

D. Summary Scope of Work for Technical Assistance

E. NEA Organization Chart

F. Economic and Financial Feasibility

G. Forestry Details

H. Project Application

I. 611(e) Certification

J. Statutory Checklist

K. PID Approval Cable

Province Description

The NEA selected the pilot sites in the five provinces because each offered a variety of conditions for documentation and also had capable, enthusiastic cooperative staff. They are all provinces that contain past, or on-going USAID project involvement. The list below shows the site by location, and the accompanying site descriptions and map gives basic geographic, population and economic data.

Site Location - Rural Energy/Reforestation Plantations

Island	Province	Municipality
Luzon	Tarlac	Bamban (Sacobia)
Luzon	Pangasinan	Bolinao
Luzon	Ilocos Norte	Solsona
Panay	Aklan	Nabas
Negros	Negros Occidental	Kanloan

Land Area and Population

The provinces range from 792,600 hectares in Negros Occidental to 181,800 hectares in Aklan. About one-third of the area in the four provinces is either forested or unclassified public land. In Ilocos Norte, largely undeveloped, about two-thirds, or 260,000 hectares is forestland.

Most of the forestlands in the three Luzon provinces has been logged historically. The forestlands consist of some timber and low value land cover, mainly cogon grass. In Pangasinan, larger stands of timber remain because the land slopes steeply. In both Pangasinan and Aklan, one-third or more of the land area has a slope above 30^{o}, making commercial logging difficult without adequate roads or technology. Negros Occidental, by contrast, is largely cultivated and less than 28 percent remains as forest lands. Four of the provinces have coastlines where limestone or coral deposits cover the acreage, making it difficult for agricultural use.

Transportation consists of a national road network with secondary roads provided by provincial departments. The national roads coverage is limited, ranging from 142 Km. in Aklan to 967 Km. in Negros Occidental. Within each pilot site roads are almost non-existent and consist of a dirt or rock trail that continues 3 to 4 kilometers beyond the survey markings.

Pangasinan and Negros Occidental have largest populations, with 1.5 million and 1.8 million inhabitants, respectively. Population in all provinces is heavily rural, varying from 91% in Aklan to 66% in Negros Occidental. Only Negros Occidental had a rural/urban distribution close to the national average, which in 1975 was about 65% rural and 35% urban. Density is also an indicator of the rural, relatively high density of 435.9 inhabitants per Km^2, where small farms dot the lowland rice areas.

Most of the residents are native born in all provinces except Tarlac. In Pangasinan the population is mainly lowland Filipino and migration is low, both to and within the province. The ethnic group in Negros Occidental is relatively homogeneous with 80% speaking Ilongo. Only in Tarlac has recent migration occurred due to the Clark base facilities. There is a small Negrito population scattered throughout the province, and the urban areas contain a mixture from nearby provinces.

Economic Activities

The major source of income in all provinces is agriculture, and over one-half of the population are employed in this sector. Major crops in the Luzon provinces are palay, sugarcane, mangoes, tobacco and vegetables. The other two provinces farm sugarcane, corn, palay and coconut. Negros Occidental is the country's largest sugarcane producer and processor. Manufacturing accounts for a small portion of employment, ranging from 1% in Ilocos Norte to about 12% in Aklan.

Water and Electricity Supply

There is no comparative income data for the provinces, but the information on household source and use of utilities and water can be taken as a surrogate for standard of living in each area. Presently electric cooperatives service all of the rural areas, and household use of electricity is probably higher than the data from 1975. At that time, however, only 7% of households in Aklan and only 9% in Ilocos Norte had electricity for lighting. The majority of the households during that period relied on kerosene for lighting. Available data also shows the available electric supply to vary widely, from .46 kilowatt hours/person (KwH) to .96 KwH. Water source also varied through the comparative provinces; the majority of households in two provinces, Pangasinan and Tarlac households, were serviced by pumped water (individual or communal), this number dropped to less than one-third in Aklan and Ilocos Norte. In those provinces, the water source reported by the largest single group was an open well.

Site Description - Ilocos Norte

The bio-mass plantation will be located on public lands in the towns of Solsona and Dingras on 3,500 hectares of hilly to mountainous land with elevations ranging from 100-700 meters above sea level. Slopes range from 5% to an estimated 60%, with most of the terrain between 25 and 40% gradients.

The soil is of the Louisiana clay series, which are soils that have developed primarily through the weathering of sandstone. GOP Bureau of Soils Analysis indicates an average Ph of 4.8 on areas tested so far. However, an aerial survey by AID and NEA personnel revealed that there are numerous sites (perhaps as much as 30% of the area) where limestone outcroppings are evident. It is assumed that soils derived from weathered limestone will not be acidic and their Ph ranges will be in excess of 5.5.

Ilocos Norte has two distinct seasons. From July to December, the southwest monsoons bring rain, with most precipitation occurring from September to November. Average annual rainfall totals approximately 1500 mm. From January to June, this province receives virtually no rainfall.

Approximately 40% of the area is covered with grass and second growth trees (invasion species). 50% of the land is covered with cogon and other grasses, while an estimated 10% has patches of residual forest growing in gullies.

Part of the plantation site has been reforested by the Bureau of Forest Development. Approximately 67 has. have already been planted to ipil-ipil (leucaena) and approximately 15 has. to mahogany (Swietenia macrophylla), narra (Pterocarpus indicus), and Benguet pine (Pinus keysia). The leucaena trees are one year old while other species range between 2 and 12 years of age.

The plantation site is bisected by the Gasgas River, a rapid flowing stream with alternating shallows and deep pools. NEA engineering consultants have estimated a stream flow of 9,246 GPM (.66 cu.m./sec.) at the driest time of the year.

Solsona, within which most of the plantation area is located, had a population of 14,000 people at the last census (1975) and Dingras, 25,500 inhabitants. Bureau of Census figures place the maximum population density of Solsona at 99 persons/km^2. Dingras has a maximum density of 300 persons/km^2. In both municipalities, most of the residents

reside on a narrow strip of level, arable land extending from the China Sea coastline inland to an average of about 5 km.

65.5% of the inhabitants are engaged in agricultural, fisheries, wood cutting and related activities.

In 1975, approximately 13% of those reaching school age were not in school at Solsona while the figure for Dingras was 14%. In both municipalities, approximately 51% of the population has attended between 1-6 years of elementary education.

The 1979 CDSS (USAID/Manila)[1/] estimates that 80% of upland farmers and 85% landless rural poor families live below the poverty threshold. This assumption probably holds true for upland residents of Dingras and Solsona based upon an expected low level of productivity on mountainous areas within the region and limited opportunities for seasonal employment on the lowlands. The CDSS places the incidence of poverty in Ilocos Norte province at 65%.[2/] Landless rural poor inhabitants will make up the majority of prospective members in the farmer associations that will develop the bio-mass plantation.

Both municipalities are connected to the Maharlika Highway (that runs throughout Luzon) by concrete and asphalt roads. A new road is being constructed through the plantation site which will connect Solsona to the province of Kalinga-Apayao in the Cordillera mountain range that bisects most of the Island of Luzon. Accessibility is generally very good.

The proposed dendro-thermal plant site is on 10 has. of level land only 100 meters away from the Gasgas River, 400 meters from the closest electric power distribution line (13.2/7.62 KV) and 11 km. away from the provincial grid, a 69 KV line.

The Ilocos Norte Electric Cooperative (INEC) handles distribution of electricity within area covered by the plantation and throughout the province of Ilocos Norte. The service area has a combined peak demand of 8000 KW and a base demand of 3000 KW. There is an ample market for all the power that would be produced by the proposed 3 MW dendro-thermal plant.

1/ See Table 2, page 7.
2/ See Table 3, page 21.

Pangasinan (Bolinao) Pilot Site

The Pangasinan Electric Cooperative, Inc. (PANELCO) has selected for development as a dendro fuel plantation an area of unutilized public land overlooking the South China Sea at the extreme northeast side of Pangasinan Province in municipality of Bolinao, barangays of Catuday, Estanza, Ilog-Malinao, Pator and Tupa.

Long-term (50 years) legal arrangements have been made by the PANELCO for use of ± 1450 hectares of public lands which in the past have been considered marginal, uneconomic and physically unsuitable for food crop production. Initially, 1250 hectares are to be developed. The area is covered with small second growth trees, brush, vines and grass at present and has been an illegal source of some wood for local charcoal production in recent years. Native ipil-ipil is growing well on the site in scattered locations which provides some confidence in the capacity of the land to produce dendro fuel.

The site is on a modified low ridge line very near the South China Sea. Elevations are low, not exceeding 200 meters. The hilly surface of the site, with slopes varying from moderate to steep, is clay and clay loam partially covered with limestone rocks and silica crystals of varying sizes. Soil tests of the site have not been completed yet but it is known that the soil has a limestone base and 77 different species of trees including ipil-ipil (native) thrive in the area. It rains in the area over 100 days per year with distinct wet and dry seasons.

The site has been divided into ten (10) modules (farmer associations) for administrative and production management purposes. One hundred local resident families (10 per unit) have been organized to develop and operate the dendro plantation. Some of these had been obtaining part of their subsistence and limited income through illegal use of small isolated productive patches of the public lands for growing some family food and other parts of the area as a source of wood for their small charcoal making enterprises. It is understood that anyone who was known to have been depending on the use of the site for all or part of his families' subsistence was given an opportunity to be part of the dendro plantation organization. By July 1980, dendro association members had already cleared and direct seeded about one-fourth of the site with ipil-ipil to take advantage of the 1980 rainy season which normally begins in May or June.

An adequate water supply is available for use of the planned 3 megawatts (MW) dendro thermal generating plant which is expected to replace or complement the oil fired plant currently in use by PANELCO. PANELCO currently services more than 7000 users in nine municipalities which use over 1.7 MW. Load for 1984 is forecast to be over 4.5 MW. Any excess production will be available to the grid for use elsewhere.

The plantation site is easily accessible by an unsurfaced barangay road during dry weather but during the rainy season a truck or four-wheel drive vehicle might be required for the last three or four kilometers. It appears that several modes of transportation will be possible for transporting the wood from plantation to power plant with the final choice to be based on economic analysis of alternative costs.

Sacobia (Clark) Pilot Site

The Sacobia site is located about 70 miles north of Manila in the Municipality of Bamban, Tarlac. Sacobia is the site of a Ministry of Human Settlements area development program and includes some 5,600 has. The area development program includes provisions for forestry, agriculture and small and medium scale industry projects among others. Of this area, about 4,000 has. have been identified for reforestation and agro-forestation activities. Up to 3,000 has. will be available for use by NEA for short rotation bio-mass production. The 3,000 has. is estimated to be able to produce wood sufficient to produce power in excess of 7000 KW. Load will not be a problem since the site is near the Central Luzon load center and only 12 Km. from the Luzon grid. Initial plans are to install 3000 KW steam plants at the site.

Sacobia is just north of the Clark Military facility and until 1979 it was under U.S. military jurisdiction. The power plant site is on the north shore of the Sacobia River about 12 Km. west of the major north-south Luzon highway. Because the site was under U.S. control until recently, it was not heavily settled. There are, however, pockets of squatters and Negritos in the area. The Ministry of Human Settlements has now begun opening parts of the land to settlers. The Association member will be a part of the Sacobia development scheme.

Bamban has a population of about 30,000. With 600 additional families projected to settle the newly opened lands, the population will increase to about 34,000. Settlers will be composed primarily of squatters around the Clark facility and kaingineros (slash-and-burn farmers) and long-term farmer squatters currently on these lands. Unemployment and underemployment are serious problems for these people. Association members will be selected primarily from the kaingineros and squatter farmers classes.

Sacobia has about 25% good farmable lands. The remaining 4,000 has. is hilly to mountainous with some slopes approaching 90^{o}, however most ranges between 25 and 60 degrees. The soil is generally sandy and acidic and agricultural lime may be required. Soil mapping has been completed and rainfall information from Clark is available going back to World War II. Annual rainfall averages about 2200 mm/yr. There are two distinct seasons -- rainy, June through December and the dry season, January through May. The lands are badly deforested with only small pockets of trees growing in protected and mainly inaccessible ravines. Grass such as cogon and talahib dominate the landscape and soil erosion is widespread.

A 69 KV transmission, about 12 Km. in length, will be required to connect the power plant along the Sacobia river to the grid. Feeder roads exist into the site but improvements will be required. A combination of roads and cableway transport will probably be the most economical for transporting fuel wood from the plantation to the power plant.

Panay (Aklan) Pilot Site

The site selected for the Panay power plant and energy plantation is in the Nabas Reforestation Area on the northwest coast of the island in the province of Aklan. The reforestation area covers some 4,200 has., half of which would be designated for short rotation biomass production. The estimated generating potential of the area based on a yield of 10 over-dry tons per hectare per year is about 4 megawatts. Initial plans are to install two (2) 400 KW gasification units at this site.

Both the fuel production area and the plant site are located in the Municipality of Nabas. The plant site is located on the east bank of and adjacent to the Gibon River, approximately 1.5 kilometers upstream from its entrance into the Sibuyan Sea.

The nearest population center is Nabas, 6 kilometers southeast of the plant site, with some 1,500 inhabitants. The rural population of the Municipality, about 15,000, is confined primarily to the level coastal plain where rice farming predominates. There are few squatters in the reforestation area itself. Demographic data for the Province of Aklan indicates that of the male population between the ages of 15 and 60 about 75% are gainfully employed. However, roughly 63% participate in agricultural activities, many of which are seasonal. This group represents a potential source of project association members.

Logging and kaingin (slash and burn) operations have cleared the reforestation area of most trees. The resulting vegetation is secondary forest and extensive grasses, with cogon dominant. Some small areas of native forest are scattered in ravines and on steep slopes where they escaped the land clearing efforts of kaingineros. The land is hilly to mountainous, starting with low ridges at the coast and extending up to elevations of 7,800 feet. Moderately steep slopes from 10^{o} to 30^{o} are most frequent, while slopes in excess of 45^{o} are not uncommon. The area around Nabas receives an average monthly rainfall of about 120 mm. March and April are the driest months of the year. Less than 2.5 mm of rainfall occur during each of these months. While no detailed soil mapping has been done, soils in the area have generally been developed from the weathering of soft sedimentary rocks such as shale and sandstone. The PH of the soil is estimated at about 5.0 which may necessitate the use of up to 2 tons of agricultural lime per hectare to attain the predicted growth rates.

A 69 KV transmission line currently extends to Kalibo, about 35 kilometers east of Nabas. A 69 KV circuit is scheduled for construction from Kalibo to Nabas in 1983. To interconnect the generating facilities to be constructed at the reforestation site, a further 6-kilometer extension of this transmission line will be required.

An all-weather coastal road from Nabas fords the Gibon River near the proposed plant site. However, there are no existing roads in the Nabas Reforestation Area. Narrow footpaths provide the only access. The terrain is such that a cableway system for transporting wood from the plantation to the generating facility may prove to be more economical than the construction of access roads for truck transport.

Negros Occidental (Kanlaon) Pilot Site

The site selected for the power generating facility and energy plantation on Negros is some 35 kilometers southeast of Bacolod in the Mt. Kanlaon National Park. The area covers about 4,000 hectares. The designated land is bordered on the north by the Bago River.

The area is grassland which has been denuded by the operation of kaingin squatters. Some 100-200 of these squatter families are currently living in an area adjacent to the land selected for the energy plantation. These families will likely be given the opportunity to participate in the reforestation program. While no effort has yet been made to organize these farmers into associations, the Bureau of Forest Development has signed an agreement with the Provincial Government which would permit the relocation of some 100 families into the designated area to begin reforestation efforts.

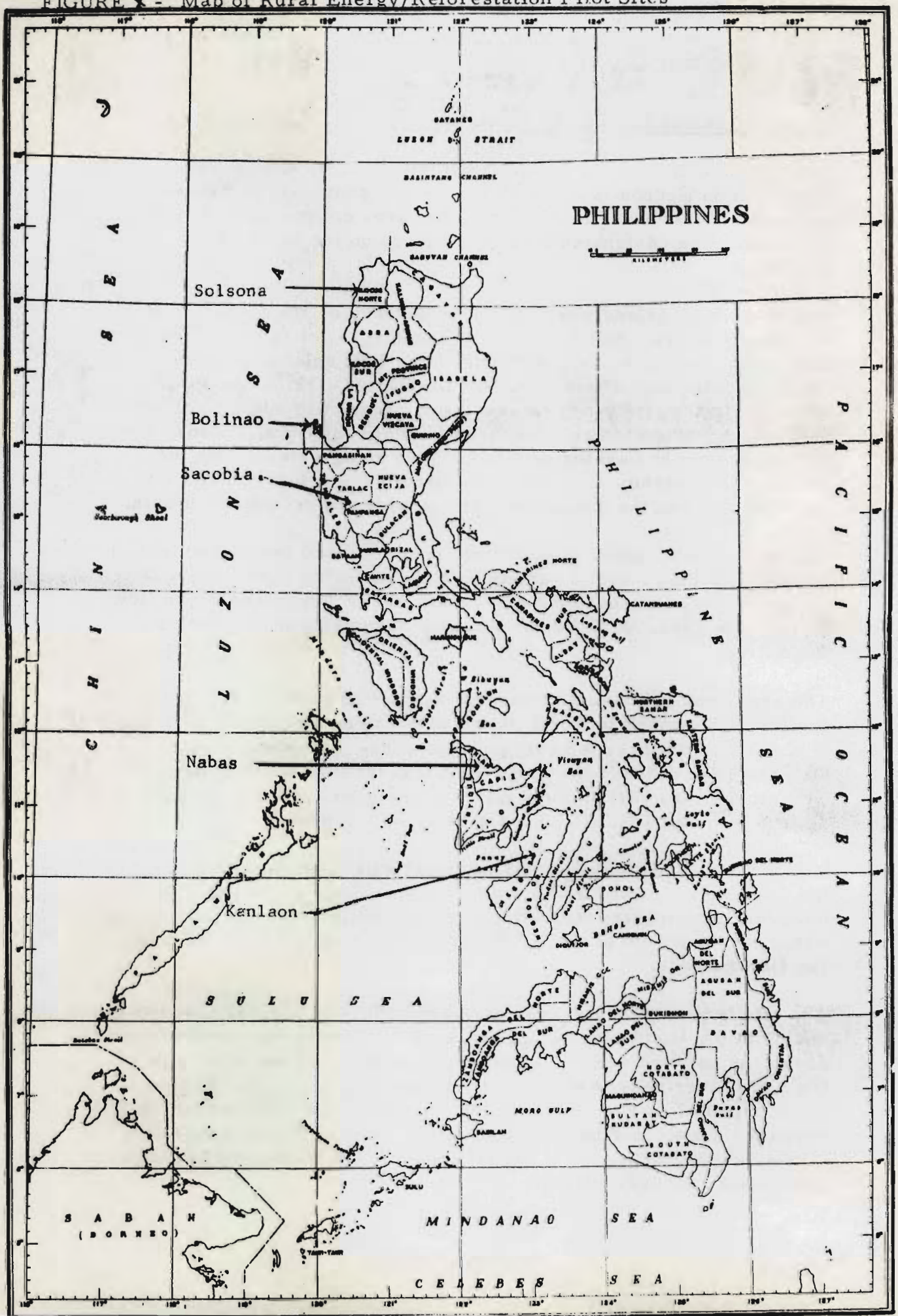
The site chosen ranges in elevation from 900-1500 feet. The terrain is rolling to hilly, with a variety of slopes ranging from nearly flat to very steep adjacent to the numerous creeks and rivers which flow through the area. All of these streams eventually drain into the Bago River.

The area does not have pronounced rainy/dry seasons. It is relatively dry from December to April and receives an average monthly rainfall of about 150 mm over the remaining months. Soil samples taken in the area were classified as Guimbalaon loam with a PH of about 5.6. Organic matters varied from 1.5 to 4.5%, with available phosphorus about 6 ppm and available potassium about 140 ppm.

A 3-MW wood-fired steam thermal plant will be installed adjacent to the Bago River. Detailed flow data for the River is not yet available; however, preliminary indications are that boiler makeup and cooling water requirements of about 200 gpm can be easily met even during low flow periods.

The site is presently inaccessible by vehicle, the closest paved road ending at the Mambucal resort some 10 kilometers southeast of the area. An unpaved earth road through Pandanon on the north side of the Bago River passes within 2-3 kilometers of the site. In view of the substantial investment required to construct a road network to serve the area, consideration may be given to siting the generating facility on the north side of the river with wood transported to the plant via a cableway system.

FIGURE X - Map of Rural Energy/Reforestation Pilot Sites



AID 1020-28 (1-73)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

ANNEX B

Life of Project:
From FY 80 to FY 84
Total U. S. Funding $2.9 million
Date Prepared: 10 July 1980

Project Title & Number: REFORESTATION/RURAL ENERGY PROJECT (492-0352)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: (A-1) To exploit indigenous renewable energy resources in rural areas on an economic and environmental sound basis.	**Measures of Goal Achievement: (A-2)** Operating dendro thermal and mini-hydro plants providing power to the electric coops at prices competitive with power from oil fired plants.	(A-3) NEA Reports MOE Reports	**Assumptions for achieving goal targets: (A-4)** 1. Capital financing can be found 2. Dendro and mini-hydro are economic (oil prices continue to increase) 3. Coops can manage program 4. Institutional arrangements viable 5. Suitable sites can be located 6. Tree species continue to thrive 7. Tree farmers stay with program 8. Coops support program
Project Purpose: (B-1) To develop the capability within the National Electrification Administration to plan and implement reforestation/rural energy activities (dendro thermal power generation) on a nationwide basis.	**Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)** A. A cadre of professionals exist at NEA capable of taking over the responsibilities of the consultants for the expansion of the nationwide program. B. Five pilot coops will have developed in-house technical and administrative capability to implement project through wood harvesting and utilization phase. C. Pilot project sites are ready to begin wood harvesting. Evaluation of the sites are completed and final report issued.	(B-3) End of Project Evaluation.	**Assumptions for achieving purpose: (B-4)** 1. NEA continues to lead program 2. Qualified NEA counterparts hired
Project Outputs: (C-1). A. Trained Personnel (NEA/Coops/Farmer Associations) - Forestry (nursery operations/planting/harvesting/maintenance) - Community Organization/Association Management - Cableway Systems - Financial Management/Accounting - Land Use Planning B. Pilot Projects Operating - Full evaluation after 4 years - Experience of pilot sites fully documented C. Technical Studies - Silviculture program operating - Accounting Management System developed - Environmental Analysis Handbook complete - Wood pricing scheme completed - Land use guidelines developed - Alternative wood use study complete - Cogeneration/industry study complete - Local manufacturing study complete D. Policy Studies - Rural energy policy (National Dendro Thermal Policy) - Economics (Macro/Micro)	**Magnitude of Outputs: (C-2)** A. All specific studies, systems design and implementation guidance are finalized and accepted by NEA. B. The National Policy Study, based on experiences at five sites and special technical level studies, is accepted by NEA. C. Trained professionals at NEA, and pilot coops power plants and association in technical and management areas.	(C-3) Studies, analyses, report by NEA, coops and consultants	**Assumptions for achieving outputs: (C-4)** 1. NEA budgeted funds provided 2. Qualified consultants and training available
Project Inputs: (D-1) U.S. Consultants Filipino Consultants In-country Training U.S. Training Equipment NEA Support	**Implementation Target (Type and Quantity) (D-2)** P/M: 160, 790, 200, 20, -, - ($000): 1,245, 703, 120, 80, 500, 352 $3,000	(D-3) Contracts Shipping reports NEA budget	**Assumptions for providing inputs: (D-4)** AID Agreement signed

Reforestation/Rural Energy ($000)
Estimated Project Costs, Annual Values

	81	82	83	84	Total
AID Loan					
Filipino Consultants	74	98	90	69	331
Local Training	13	12	11	10	46
Equipment	435	-	-	-	435
Subtotal	522	110	101	79	812
Contingency (15%)	78	17	15	12	122
Escalation*	-	13	24	29	66
LOAN TOTAL	600	140	140	120	1,000
AID Grant					
U.S. Consultants	157	221	202	118	698
U.S. Training	17	16	14	13	60
SUB-TOTAL	174	237	216	131	758
Contingency (15%)	26	36	32	20	114
Escalation*	-	27	52	49	128
GRANT TOTAL	200	300	300	200	1,000
NEA Contribution					
Filipino Consultants	47	60	60	55	222
U.S. Consultants	57	80	80	45	262
Local Training	13	24	13	-	50
Local Support	66	65	48	45	224
SUB-TOTAL	183	229	201	145	758
Contingency (15%)	27	34	30	22	113
Escalation*	-	27	49	53	129
TOTAL	210	290	280	220	1,000

*All figures escalated at 10% compounded annually from 1982-1984.

BUDGET DETAILS - **Illustrative** Technical Assistance (contingency and escalation included in line items)

Fixed Price Studies	AID Financed (US $) Grant	Loan	GOP Financed (US $)	Total (US $)
Accounting /Mgmt Systems	-	70,000	-	70,000
Evaluation Baseline	-	35,000	-	35,000
Environmental Handbook	35,000	-	-	35,000
Charcoal/Coal	20,000	-	20,000	40,000
Economics/Pricing	20,000	25,000	-	45,000
Soils	-	15,000	-	15,000
National Policy Study	-	20,000	-	20,000
Sub-Total Studies	75,000	165,000	20,000	260,000

U.S. Consultants	(P/M)	AID Financed (US $) Grant	Loan	GOP Financed (US $)	Total (US $)
AID Coordinator	48	230,000	-	125,000	355,000
Silviculturist	12	120,000	-	-	120,000
Foresters	48	230,000	-	125,000	355,000
Land Use Planner	24	115,000	-	75,000	190,000
Cogeneration/Industry	6	60,000	-	-	60,000
Alternative Wood Use	6	60,000	-	-	60,000
Local Manufacturing	3	30,000	-	-	30,000
Sub-Total U.S. Consultants	147	845,000	-	325,000	1,170,000

Filipino Consultants	(P/M)	AID Financed (US $) Grant	Loan	GOP Financed (US $)	Total (US $)
Local Forester	240	-	64,000	56,000	120,000
National Forester	96	-	51,000	45,000	96,000
Lab Technician	48	-	13,000	11,000	24,000
Transport/Wood Handling	48	-	25,000	23,000	48,000
Land Use Planner	48	-	20,000	18,000	38,000
Horticulturist	48	-	25,000	23,000	48,000
Cogeneration/ Industry	24	-	13,000	11,000	24,000
Alternative Wood Use	24	-	13,000	11,000	24,000
Applied Anthropologist	48	-	25,000	23,000	48,000
Local Manufacturing	12	-	7,000	5,000	12,000
Documentation Specialist	36	-	19,000	17,000	36,000
Sub-Total Filipino Consultants	672	-	275,000	243,000	518,000
Total Tech. Assistance		920,000	440,000	588,000	
Grant Total					$1,948,000

BUDGET DETAILS - Illustrative Equipment/Materials

Vehicles	Quantity	Unit Cost (CIF)	Total	
Sports Van (4x4)	1	$15,500	$ 15,500	
Jeep type (4x4)	3	12,000	36,000	
Pick-up Crew cab (4x4)	5	12,000	60,000	
Wagoner type (4x4)	2	13,750	27,500	
Sub-total				139,000

Audio Visual/Office Equipment

Items	Quantity	Unit Price	Estimated Cost
Slide Projector, Kodak Ektagraphic, Mod. B-2AR	2	$ 350	$ 700
Sound Movie Projector, Kodak Pagent M-250 S-R	1	850	850
Amplifier, public address	1	300	300
Speakers, JBL L-40, 2 way, w/ enclosure	2	160	320
Microphone, E. V. Cardroid	4	75	300
Megaphone, 15 watt	2	175	350
Porta Cassette Tape recorder/Player	2	250	500
Blackboards, 4" x 6", w/ stand	4	175	700
Camera (Body), Canon, A-1	1	400	400
Camera accessories, case, lenses, flash, bag	1 set	600	600
Offset Duplicating Machine, AB Dick M-350	1	9,250	9,250
Duplicating Machine Supplies	1 set	-	2,355
Master Maker, AB Dick M-153	1	9,050	9,050

Audio Visual/Office Equipment (cont'd.)

Items	Quantity	Unit Price	Estimated Cost
Paper cutter power	1	$ 2,000	$ 2,000
Sticher (wire)	1	2,500	2,500
Typwriter (manual), 13" carr., Olympia	2	335	670
Typewriter (electric) IBM, 15.5" selectric	3	800	2,400
Telephone, desk, rotary dial	3	60	180
Calculator, print/display, Monroe M-1450	2	525	1,050
Binder/Punching Machine, Combo, Model PC 100	1	550	550
Collator, A.B. Dick, M7815	1	4,150	4,150
Leroy lettering set	2	185	370
Sub-total			39,195

Forestry/Field Equipment

Items	Quantity	Unit Price	Estimated Cost
Side Winder II Model T-8000-2, Long Reach Winch w/ 125 Ft. of Cable; 14.7 to 1 Gear Ratio	5 units	$ 350	$ 1,750
Snatch Block (Pulleys) Model 67323	15 units	30	450
Sport King MKI 7x35 MM Binoculars, Model 91093	10 units	150	1,500
Hand and Pole Pruning Saws Model 81090	60 pcs	12	720
Long Reach Lopping Shears Model 79070	60 pcs	18	1,080
Hand Twist Earth Augurs Model 77013	10 pcs	18	180

Forestry/Field Equipment (cont'd.)

Items	Quantity	Unit Price	Estimated Cost	
Rain Gauge Model 89018 w/ stick	25 units	$ 200	$ 5,000	
Tripod Gauge Support Model 89019	25 pcs	50	1,250	
Ratchet Cut Hand Prunning Shear Model 81168	60 pcs	12	720	
KBC Three Planting Bar Model 69041C	5 doz	280	1,400	
RINDT Planting Hoes Model 69097	25 pcs	40	1,000	
Seedling Hoe Model 69060B	2 doz	280	560	
Hazel Hoe Model 69057B	2 doz	280	560	
Shovels	50 units	20	1,000	
Grinding Stone Carborundum	30 units	10	300	
Black Smith Shop sets	20 units	800	16,000	
River Gauging Equipment	22 units	4,000	88,000	
Sub-total				121,470

Two-way Radio Equipment

Items	Quantity	Unit Price	Estimated Cost	
Hand operator, w/charges	12 units	$ 1,500	$18,000	
Automobile power boster 50 watts w/ antenna	7 units	1,500	10,500	
Sub-total				28,500

Silvicultural Lab

Items				
Glassware, refrigerators, sterilizers, measuring equipment, etc.			40,000	
Lab supplies			15,000	
Sub-total				55,000

Books

	Total	
For NEA	$ 16,000	
For Power Plant	4,000	
Sub-total		20,000
Excess Property (Machine Shop Equipment)	$ 30,000	
		30,000
TOTAL		$ 433,165
Contingency 15%		64,975
GRAND TOTAL - Equipment/ Materials		$498,140
	Say.....	$ 500,000

Summary of Scopes of Work for Technical Assistance and Fixed Price Studies

Fixed Price Studies

1. Accounting/Management Systems

To work out a basic accounting and management system that Association farmers can understand and that Association officers can implement; to design schedule and allocation of work and other organization/group activities. To develop and provide training materials and courses that explain all systems.

2. Baseline/Evaluation

To document farmer income and living situations at the dendro sites. To prepare site-specific studies on the impact of the projects on the farmers during the first four years of the project, to project where and why cultural resistance may occur, and to recommend adaptations in promotion or design of settlement aspects to accommodate the farm groups. To design preliminary coursework for NEA staff training on cultural variables and field survey work.

3. Environmental Handbook

To work on national level, advise or assist NEA in studies on probable effects of both plantation and power plant on the environment. This effort will cover both ecosystem and human impact, as well as point out adaptations necessary to cushion negative impacts. Prepare Environmental Handbook with guidance to reduce negative environmental effects and to perform site specific analyses.

4. Charcoal/Coal

To provide technical advice to the GOP agencies involved with conversion to coal power on the viability of mixing coal with charcoal to reduce pollution and develop efficiently operating power plants. Advise on possible use of improved pyrolitic conversion techniques using fuel wood plantation output as material for producing commercial charcoal, and utilizing by-products to help energize some aspects of plant operations.

5. Economics/Wood Pricing

To study pricing strategies, project harvest rates, economic fuel costs, relative BTU and burning efficiency, selling cost of electricity, world price of fossil fuels, incorporating attractive incomes to farmers, measuring volumes delivered at plantation site in order to develop a better understanding of the actual economics involved in this type of program - both in specific projects and for potential replication.

6. Soil Analysis

To prepare analysis on site specific soils, and make recommendations on proper treatment, use, etc. for continued wood production. To train personnel on proper soil/water monitoring and data collection techniques.

7. National Policy Study

To develop a proposed national policy concerning dendro thermal efforts, taking into account implementation experience in pilot areas, including economic, social, environmental and technical variables. Study the inclusion of other small scale upland farmers occupying private lands and integration of NEA program with other upland development activities.

Technical Assistance Consultancies

1. AID Coordinator

To provide support to NEA by acting as a coordinator of AID project, and to provide technical advice and management assistance in coordinating activities, timing assignments and supervising training elements.

2. Silviculturists and Laboratory Operations

To develop and operate a central silviculture lab at NEA. To research and recommend appropriate plantation trees species for each site, and develop data on the properties of the tree for fuel, feed and erosion control. Design multi-species reforestation plans for each site. Would include testing, genetic selection on ipil-ipil and other species, also identification and multiplication of superior genetic material (design and monitor a program for this purpose). Included will be adaptation of other, secondary forest or fruit trees for plantation sites.

3. National Foresters

To assist in nursery establishment, plantation development and forestry equipment and personnel training requirements. Insure all phases of plantation development are proceeding on schedule through technical training and site supervision. Assist on forestry planning. Design training programs for development of in-house forest management capabilities at coop and association levels.

4. Local Level Foresters and Upland Agriculturists

For extension work and advice to Association farmers on nursery establishment, plantation development and maintenance, forest regeneration strategies, orchard development, forage and livestock production, food production. Coordinate with land use planner, environmentalist, industry expert, national level forester and silviculturist. To visit sites frequently, train farmers in improved techniques.

5. Applied Anthropologist

To work with NEA officers on documentation and adaptation of recruitment and selection procedures, to study other issues on farmersettlements and community services. To work with NEA officer on development of training curricula for local NEA staff that trains them how to (a) explain the project locally to farmers/coops; (b) document specific instances of difficulty and provide some recommendations for changes; (c) provide information on cultural considerations (such as adequate compensation, etc.).

6. Land Use Planners

To assist in land use planning for optimum profitability and environmentally sound methodology, with responsibility for economic projections and suitability of appropriate multiple land use planting systems. Design basis for making economic choices between land use. Integrate technical recommendations with farmer preferences and capabilities. Design training program to develop land use planning capabilities at coop level.

7. Horticulturists

To assist NEA cooperatives and associations in developing backyard gardens and using lands suitable for agriculture for the production of agricultural commodities, including fruit trees. Advise on planting, harvesting agricultural inputs, etc. Develop an agricultural diversification program for association members.

8. Transport/Wood Handling

To devise and test cable transport systems, or other systems, for different terrains; to advise on design and fabrication of prototype hardware for GOP plantations. To test other types of wood handling systems necessary in less steep terrains. To develop local level expertise in wood harvesting and handling methodology.

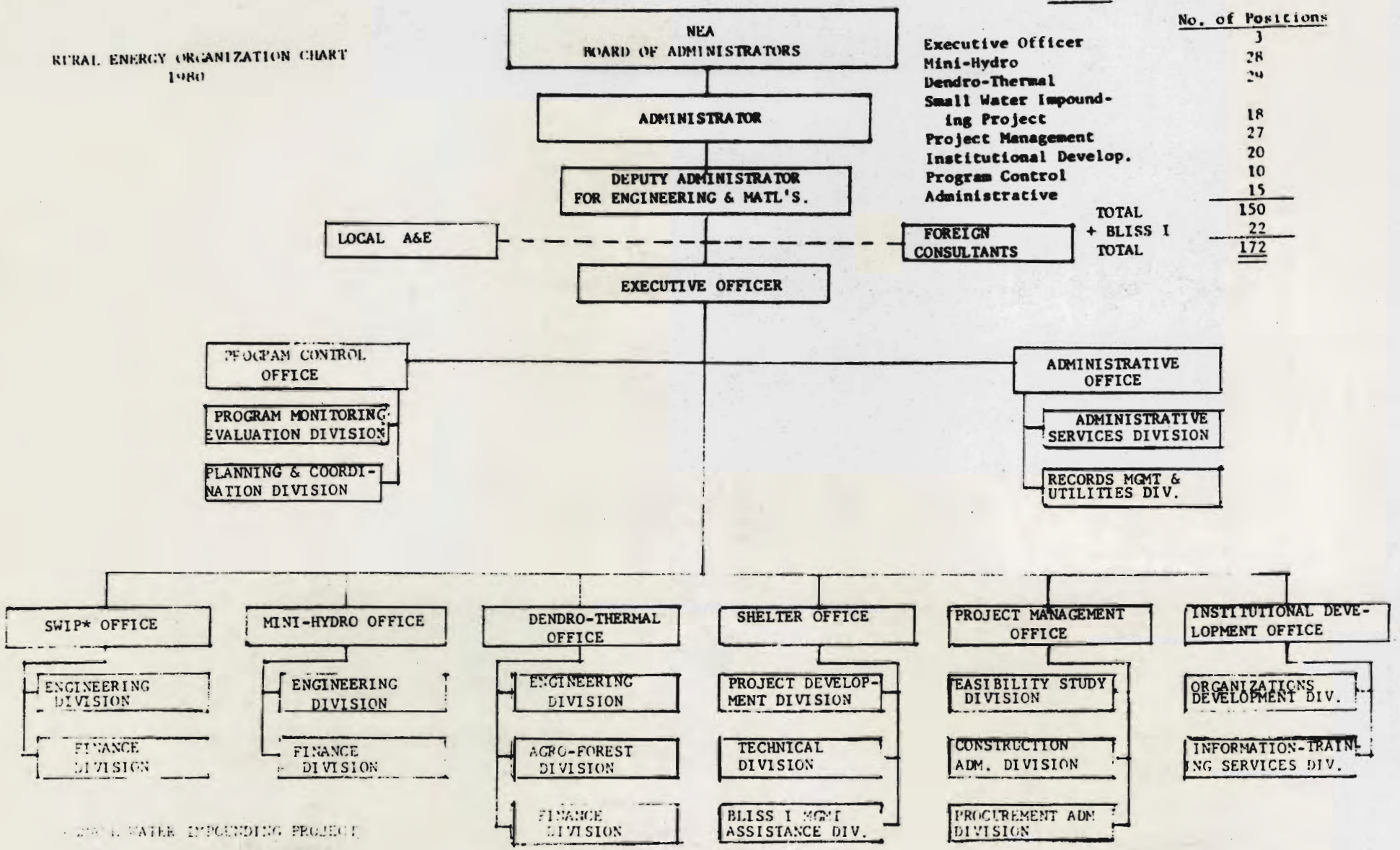
9. Cogeneration/Industry and Alternative Wood Uses

To determine how to use steam exhausted from plants, such as for food drying, ice production, wood processing, to develop and market plans to interested industries, survey local industry of sites, area required for plants, etc. To determine other market for excess wood, other forestry products, such as leaves for industrial feedstock, etc., to survey local markets, devise recommendations for use in possible spin-off industries. Design training program to develop expertise at the coop level. Coordinate with silviculturalist and land use planner on design of planting programs to include species that have promise for industrial use/marketing, (e.g. palm leaves for fans, pandans for mats, fruits and nuts suitable for food processing, etc.)

10. Local Manufacture Development

To conduct feasibility studies, investigate or assess local manufacturing capabilities for industrial boilers, pumps and other ancillary power plant related equipment not presently manufactured in Philippines.

RURAL ENERGY ORGANIZATION CHART
1980



SUMMARY

	No. of Positions
Executive Officer	3
Mini-Hydro	28
Dendro-Thermal	29
Small Water Impounding Project	18
Project Management	27
Institutional Develop.	20
Program Control	10
Administrative	15
TOTAL	150
+ BLISS I	22
TOTAL	172

* SMALL WATER IMPOUNDING PROJECT

ANNEX III

Economic and Financial Feasibility

This Annex includes the following four tables:

Table 1. Projected Cash Flow of the Tree Farmer Association:

This table presents the cash position of a typical Association showing collective sources of funds and expenses or application of funds of the Association in the production and sale of wood to the power plants. Surpluses are distributed to the member farmers as Association dividends.

Table 2. Projected Cash Flow of the Tree Farmer Family:

This table shows the cash flow of the tree farmer family. Labor payments are paid by the Association from sales of wood and dividends paid from the Association's surplus. While it is possible that dividends from the operation of the power plants will be paid, they are not itemized in this table.

Table 3. Projected Cash Flow for the Power Plant Corporation:

This table presents the cash flow position of the power plant assuming start-up in Year 5.

Table 4. Comparative Generating Cost Analysis:

This table shows the relative costs of operating a 3-MW dendro plant vs a 3-MW diesel plant. The analysis uses today's prices.

Note: Tables 1-3 include a 10% escalation factor for variable costs e.g., plantation development, harvest costs, etc. and income compounded annually from Year 1.

TABLE 1

Projected Tree Farmer Association Cash Flow Statement (in $)[1/]
100 Has. Plantation Module (10 families)
(Escalation 10% Compounded Annually)

	Y		E		A		R			S
	1	2	3	4	5	6	7	8	9	10
Source										
Wood Sales[2/]	-	-	-	-	18,670	30,800	45,170	49,690	55,660	61,130
Application										
Plantation Development Operations	8,544	10,179	11,277	12,396	3,080	107				
Harvesting	-	-	-	-	14,600	16,100	17,700	19,500	21,400	23,600
Repayment of Plantation Development Loan[3/]										
a) Principal	-	-	-	-	-	3,907	3,907	3,907	3,907	3,907
b) Interest on Balance	-	-	-	-	-	4,689	4,376	4,064	3,752	3,439
					17,680	24,803	25,983	27,471	29,059	30,946
Surplus (Deficit)[4/]	(8,544)	(10,179)	(11,277)	(12,396)	990	5,597	19,187	22,219	26,601	30,184

1/ Detailed breakdown is available at USAID/Manila.

2/ Projected gross income in current prices is $25,500/yr. (15 BDT growth rate / ha./yr. x 4 yrs. x 25 has. harvested/yr. x $17/BDT.) This is discounted by 50% in yr. 5 and 25% in yr. 6 to compensate for growth rates lower than NEA has projected. No discounts after yr. 6. Coppice growth on stumps harvested in earlier years should compensate for any production short falls on the 25 has. harvested within any given year. Wood sales projections account for compounded escalation.

3/ Proposed NEA schedule for amortization of principal and payment of interest. (8%, 15 yr.)

4/ Retained Earnings or Dividends specific application to be determined.

TABLE 2

Projected Tree Farmer Families Cash Flow Statement ($)
(10 families/module)
(Escalation 10% Compounded Annually)

	Y			E		A		R		S
	1	2	3	4	5	6	7	8	9	10
Source										
A. From Plantation										
Labor payments[1/ 2/]	433	499	550	605	1,335	1,610	1,770	1,950	2,140	2,360
Profit share from wood sales[3/]	-	-	-	-	99	559	1,918	2,221	2,660	3,018
B. From Farming[4/] (or outside employment)	160	176	192	213	234	258	283	312	342	378
SUB-TOTAL	593	675	742	818	1,668	2,427	3,971	4,483	5,142	5,756
Application										
A. Repayment of housing loan[5/]	-	-	-	-	267	267	267	267	267	267
Surplus[6/]	593	675	742	818	1,401	2,160	3,704	4,216	4,875	5,489

1/ Detailed backup data available at USAID/Manila.

2/ Assuming that one family could supply 500 mandays of labor/yr. (Father-250, mother 150, children 100), labor demand exceeds supply until yr. 5. Family labor supply would meet varying percentages of demand as follows; yr. 1-75%; yr.2-63%; yr.3-63%; yr.4-63%; yr.5-80%, yr.6-99%. Labor payments are discounted accordingly so that supply would meet demand, with corresponding labor payments to the family. Labor payments are made by association from Plantation Development loan.

3/ 10% of surplus (deficit) on Table 1.

4/ Mostly non-cash income; the value of produce from home garden plots, or shares in palay harvests on the lowlands that hillyland families usually participate in seasonably.

5/ NEA's proposed annual payments.

6/ Farmer disposable income.

TABLE 3

Projected Cash Flow Statement for 3-MW Dendro Thermal Power Plant Corporation ($000)
(Escalation 10% Compounded Annually)

	Y 1	E 2	E 3	E 4	A 5	A 6	A 7	R 8	R 9	S 10
(Plant Capital Cost: $4,200,000)										
Source										
Sale of electric power[1/]	-	-	-	-	1,750	1,930	2,122	2,337	2,565	2,829
Application										
Operating Expenses										
Cost of Fuelwood[2/]	-	-	-	-	506	558	614	676	742	818
Other Operating Expenses[3/]	-	-	-	-	239	264	290	319	351	387
Repayment of Loan Principal[4/]	-	-	-	-	210	210	210	210	210	210
Repayment of Loan Interest[4/]	-	-	-	-	336	319	303	285	269	252
SUB-TOTAL					1,291	1,351	1,417	1,490	1,572	1,667
Surplus[5/]	-	-	-	-	459	579	705	847	993	1,162

1/ 3,000 KW x 24 hrs/day x 365 days/yr. x 95% availability x 60% load factor (14,976,600 KWH) x $0.080/KWH plus compounded escalation 10%/yr. In 1979, production costs of the forty-nine rural electric coops with generating capabilities ranged between $0.081 to $.108 KWH per KWH. These costs represent 60 to 80% of a consumer's electric bill. Power was sold to consumers at prices ranging from $0.095 to $0.187 KWH.

2/ NEA estimates a need for 100 tons/day, thus; 100 tons x 365 days/yr. x 95% availability x 60% load factor x $17 ton plus escalation. 100 tons/day would supply 343 billion BTU/yr. to produce 14.9 million KWH.

3/ NEA figures.

4/ Assuming 20 years term at 8% from date of commissioning of plant.

5/ Retained earnings or dividends to be determined.

TABLE 4

Comparative Generating Costs
(3-MW Units)

	Dendro Thermal	Diesel (slow-speed)
Capital Cost/KW	$ 1,400[1/]	$ 500
Heat Value - Fuel	5,400 BTU/lb. @ 35% moisture	150,000 BTU/gal.
Cost of fuel (incl. transportation)	$25.00/green ton	$ 1.15/gal.
Fuel cost/million BTU	$ 2.10	$ 7.67
Heat Rate BTU/KWH	18,000	10,000
Fuel Cost/KWH	$ 0.0375	$ 0.0771
O&M Cost/KWH	$ 0.0062	$ 0.0019
Fuel plus O&M/KWH	$ 0.0437	$ 0.0794
Fixed Charges/KWH	.0352	0.0125
Generating Costs/KWH[2/]	.0789	0.0915

1/ Capital costs of plants NEA has recently purchased from the French and British are about $800.00/KW excluding installation.
2/ Cost per KWH at Bus Bar.

Forestry Details

NEA through its rural electric cooperatives is already planting forest energy farms of fast growing tree species to produce biomass to fuel dendro-thermal plants. Trees will be harvested on rotational cycles that are designed to attain a sustained yield wherein the volume of wood removed from the plantation in any given year does not exceed the rate of growth. Sustained yield is a standard concept in forest management and is attainable, provided cultural practices, harvesting schedules, harvesting methods and species selection decisions are appropriate and properly implemented.

Leucaena leucocephala[1/] is proposed by NEA as the major species for initial plantation establishment. Leucaena is a genus of Central American trees and shrubs with about 10 species, the largest and fastest growing being Leucaena leucocephala.[2/] Spanish conquistadores are credited with introducing this genus to the Philippines, probably sometime after the conquest of Mexico in 1565 when trade was organized between Acapulco and Manila.

This tree has been harvested as timber and firewood (from trunks and branches), grown for forage, fertilizer and food (leaves and seeds) and planted to shade other crops (e.g., coffee, cacao, black pepper, vanilla) and serve as a windbreak. Since leucaena is a legume it has also been planted to rejuvenate worn-out soils, just as clover, beans and other legumes have been used for centuries.

Seeds brought across the Pacific by conquistadores were the slow growing leucaena species common to Acapulco, the port of departure for galleons bound for the Far East. These species tend to grow as shrubs or small trees and in some countries were even considered undersirable weeds. However, where local populations and colonial plantation managers recognized the advantages of growing leucaena, the tree was planted and used for various purposes as cited above.

1/ Common names used in the Philippines include "ipil-ipil", "palo-maria," "Sta. Elena," "japines," etc.

2/ See "Leucaena, Promising Forage and Tree Crop for the Tropics," National Academy of Sciences, Washington, D.C., 1977 for complete description of this tree and further explanation of technical information cited in this section.

During the last 30 years, the larger, fast-growing tree type leucaena species native to Southern Mexico, Guatemala and El Salvador began to receive attention. These species grow into large trees that can reach 20 meters in height and are generally called "Salvadorean types" to distinguish them from the smaller species that originated from Acapulco.

About 15 years ago, the Salvadorean type Leucaena leucocephala was introduced in the Philippines. Growth rates were so impressive that after a few years leucaena attracted nationwide attention. Filipino foresters, farmers and researchers quickly coined the name "giant ipil-ipil" (i.e., giant leucaena). Trial plantings were made throughout the country and the demand for seeds soon became so great that prices of $125/kg. were common as recently as 1974. Fortunately, leucaena produces seeds early, often after only one year. This characteristic, plus widespread dispersal of plantings has since increased seed supplies and reduced prices to a reasonable level.1/

Leucaena leucocephala is a prodigious producer of bio-mass. Yields up to 100 cu. meters/hectare/year have been recorded in the Philippines and average yields are from 30-40 cu. meters/ha./yr. It is classified as a medium hardwood with a specific gravity averaging .54 (oven-dry basis). Salvadorea leucaena produces wood with a heating value of 4,170 to 4,445 cal. per kg. (7,500-8,300 Btu./lb.).

Seed availability is one reason cited by NEA for its choice of leucaena as the pioneer tree species that will be used to start plantation development. Additionally, leucaena is already growing successfully on or adjacent to almost all NEA energy forest farm sites, in backyard plots, along roadsides and in reforestation projects. Farmers have had an opportunity to observe its rapid growth and verify its multiple uses, particularly as firewood and forage. This on-site evidence of the trees' productive capacity should help win farmer acceptance of the species as a desirable tree for them to plant. Most Philippine farmers are familiar with leucaena's soil-building properties and also know about its ability to coppice2/ after it has been cut for firewood.

However, growth in small plots is not always indicative of results that would be obtained on the large plantations envisioned by NEA.

1/ $7.00/kg. as of July 1980.

2/ Coppice is a term used to describe a tree's ability to produce new shoots from a cut-off stump and the subsequent maturing of a shoot into a new tree trunk.

Upland tropical areas, such as those that would be available to produce bio-mass for energy are often characterized by considerable differences in soil types, slope conditions and other variables. For development of a successful plantation, adaptations need to be incorporated in planning and implementation so that proper cultural practices are employed to ensure good growth on a variety of sites.

Fortunately, leucaena has proven adaptable to a wide range of conditions. The tree is native to Central America where it is often subjected to long periods of drought. Leucaena develops deep root systems that allow the species to tap moisture several meters below the surface. In extreme drought, the tree will defoliate and go dormant until the rainy season at which time new leaves sprout and growth becomes vigorous once again. Despite having evolved in this climate, ipil-ipil also grows extremely well in wet tropical rainforest sites and in areas where climatic conditions vary between its natural habitat and the moist tropics.

While leucaena, like any other plant, prefers fertile soil, its deep root system allows it to thrive where other tropical plants would fail. Leucaena roots reach soil nutriets and water where short-rooted species cannot.

Perhaps the greatest limiting factors are acidity and elevation. Many tropical uplands have acidic soils. Where Ph ranges between 4.6-5, leucaena does not perform well. The tree is a legume, and like most legumes, is also sensitive to the phosporus deficiencies that are common in the tropics. Fortunately, acidity problems can be addressed economically and satisfactorily in most locations through simply applying lime and/or pelletizing leucaena seeds with lime and innoculating them with the appropriate strain of rhizobium. Phosphate deficiency limits leucaena's ability to use atmospheric nitrogen, with the assistance of nitrogen fixing rhizobium. The use of Phosphate fertilizers or using phosphorus during seed pelletization overcomes this weakness which usually is only significant during the first year of growth. After the first year, leucaena's deep root system taps phosporus that is available in the subsoil and this limiting factor is no longer a matter of serious concern. Small amounts of sulphur, molybdenum, zinc and copper also often result in dramatic improvement in yields.

Altitude affects the growth of all trees, leucaena included. Optimum conditions are from sea level up to approximately 500 meters. On the five sites that will be affected by this project, most of the land is

below 500 meters. Satisfactory growth can be expected up to 800 meters, providing, soil and climatic conditions are favorable. Above 800 meters leucaena usually does not grow fast enough to make this species a logical choice for short rotation cropping in the Philippines. However, one Philippine company has overcome this limiting factor successfully by gradual acclimatization through several generations of tree growth. 1/

As mentioned earlier, leucaena will coppice. This makes it an attractive species for energy plantations. Coppice regrowth can be successively harvested and the expense of replanting avoided. The giant leucaena strains have been growing in the Philippines for approximately 15 years. During this time, coppice regrowths have produced yields at least equal to original growth. This gives researchers and foresters reason to feel optimistic that the giant strain will perform in like manner as the smaller strains (Leucaena glauca) which have performed well from coppice regrowth over several centuries since first introduced into the Philippines.

However, the limitations cited above and the time span over which coppice growth has been observed (only about 10 years in the Philippines) make it important that NEA should consider alternatives to assure biomass production sufficient to fuel dendro-thermal plants. Several measures have been incorporated into NEA planning to provide alternatives in the event future results with leucaena do not confirm the optimistic predictions of foresters and forest researchers.

First, NEA will treat leucaena as a nurse crop for other species. During the second year of plantation development, other species, will be inter-planted under leucaena. This will include trees such as Gmelina arborea, Acacia auriculaeformis, Casuarina, Eucalyptus deglupta, narra (Pterocarpus indicus), Honduras mahogany (Swietenia macrophylla) and various fruit trees. Many of these species adapt to acidic soils more readily than leucaena. At least two of these

1/ At Benguet Consolidated Mining Co., Baguio City, trees were successively planted at gradually increasing elevations over a time span of 5-6 years with seeds for the next planting higher up the mountain collected from trees that grew well at the elevation just preceeding each upward movement. Trees were finally acclimated to grow at 1,300 meters.

species (gmelina and eucalyptus) grow at rates almost equal to NEA projections for leucaena.

NEA has conservatively estimated leucaena production at 10 BDT/HA/YR.[1/] Increments of 24-100 Cu. Mt./HA/YR have been measured in the Philippines and average increments are expected to be between 30-40 Cu. Mt./HA/YR or around 15-20 BDT/HA/YR.[2/] NEA projections thus have a safety factor of from 50% to 100%. Gmelina and eucalyptus, which have both been measured in the Philippines over longer periods than leucaena, yield between 28-43 Cu. Mt/HA/YR - not significantly lower than NEA's conservative projections for leucaena.

The long range plan is to continue harvesting leucaena as a firewood and using the tree as a nurse crop until a mixed forest of firewood, timber, and fruit tree species is developed. This process could take as long as 20 years. Once developed in this manner, however, farmers will be selling trees or fruits with much higher value per ha./yr. than leucaena. Dendro-thermal plants could be fired with manufacturing waste (slabs, sawdust and edgings) generated while processing trees into finished products. Gmelina, eucalyptus, narra, acacia and mahogany are some of the species that could be converted to lumber.

Secondly, NEA is now encouraging coop managers not to clear indigenous trees during plantation development. These trees are already growing and can be used for fuel. All five sites covered by this project are at least partially covered with various indigenous invasion species, among which the most common are "bogus" (Acalypha stipulacea klotz.), "binunga" (Macaranga tenarius), "Anagdung" (Trema cannabina), "inyam" (Antidesma impressinerve merr.) and "akleng parang" (Albizia procera). Leucaena can be interplanted among these trees whereever indigenous growth is not dense enough to completely shade planting sites.

Thirdly, coops are being encouraged to secure areas larger than the 1250 has. assumed sufficient to grow enough fuel wood to power a dendro-thermal plant. At Ilocos Norte, the coop will secure 3500 has. At Clark, 3000 has. are available. At Aklan, over 3000 has. is targeted. At Pangasinan, the plantation will be about 2000 has. Negros is still surveying the area that would be used for a bio-mass plantation. Areas larger than the 1500 has. minimum will provide a safety factor in two ways:

1/ BDT - bone dry tons.
2/ One cubic meter will weight slightly above .5 BDT.

1. If growth rates per hectare are less than expected, more area can be harvested per annum.

2. If regrowth for sustained yield is less than expected, more years can be allowed between cutting cycles.

All of these three alternative measures are technically sound. They will all help lead to development of reforested sites containing a mixture of species. This will make it possible to avoid the dangers inherent in monoculture plantings such as greater risk of diseases and pests.

At the start, leucaena will be planted on spacings of 1 x 1 meter; however, local coop managers and farmers are granted autonomy to make their own decisions as to the most appropriate spacing for their plantations. Again, variations in climatic conditions, terrain and soil dictate the need for flexibility.

Plantation development, as presently envisaged by NEA, will include growing food and forage crops whereever plots of land are level enough to make this feasible. The purpose of these activities will be to supply the food consumption requirements of the farmer association members. This will not conflict with technically correct forest management procedures, provided site selection is carefully planned and areas devoted to food and forage production are not large. Considering the terain of most plantation sites, it is not expected that more than 10 percent of the area will be suitable for agricultural production. The rest will stay in trees.

Wood harvesting systems are proposed to be a combination of labor intensive and modern practices. Felling, bucking, topping and skidding will be done by labor intensive methods using handtools and draft animals. This is feasible considering the small diameter of the logs that will be harvested. Animal skidding will bunch logs at wood landings where timber can be measured before being transported to the power plant or mill. Transport, discussed below, will be accomplished with cableways in rough terrain and through conventional methods (trucking) on moderate terrain.

Projected Potential Forest Destruction By "Kaingin" Farmers

Year	No. of "Kaingin" Families 1/	Annual Forest Destruction 2/	Cumulative Totals
80	500,000	250,000 has.	250,000 has.
84	512,500	256,250	506,250
82	525,300	262,650	768,900
83	534,430	262,210	1,031,110
84	547,790	273,890	1,304,000
85	561,480	280,740	1,584,740
86	575,520	287,760	1,872,500
87	589,900	294,950	2,167,450
88	604,650	302,320	2,469,770
89	619,770	309,890	2,779,660
90	635,260	317,630	3,097,290
91	651,140	325,570	3,422,860
92	667,420	333,710	3,756,570
93	684,100	342,050	4,098,620
94	701,200	350,600	4,449,220
95	718,730	359,360	4,808,580
96	736,700	368,350	5,176,930
97	755,120	377,560	5,554,490
98	774,000	387,000	5,941,490
99	793,350	396,670	6,338,160
2000	813,180	406,590	6,744,750

(6,774,750 has. / 8,000,000 has. = 85%)

1/ 2.5% annual population increase.
2/ At 0.5 ha./farmer/yr.
3/ "The Philippines", Farnsworth, C. F., published Jan. 1980 by Philippine Council for Agriculture and Resources Research (PCARR) and Forest Research Institute (FORI), quote Bonita and Revilla who estimated 8 million has. of land covered by forests in 1977.

Annex H

Note: Project application will be cabled to AID/Washington upon receipt.

Annex I

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
Manila, Philippines

Ramon Magsaysay Center
1680 Roxas Boulevard

Telephone: 59-80-11

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

I, ANTHONY M. SCHWARZWALDER, the principal officer of the Agency for International Development in the Philippines, having taken into account, among other things, the maintenance and utilization of projects in the Philippines previously financed or assisted by the United States, do hereby certify that in my judgment, the Philippines has both the financial capability and the human resources to effectively maintain and utilize the proposed Reforestation/Rural Energy.

This judgment is based upon the project analysis as detailed in the Reforestation/Rural Energy Project Paper and is subject to the conditions imposed therein.

Anthony M. Schwarzwalder
Anthony M. Schwarzwalder
Director, USAID/Philippines

7 Aug. '80
Date

ANNEX J
Page 1 of 7

PROJECT CHECKLIST - REFORESTATION/RURAL ENERGY

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FAA Sec. 653 (b); Sec. 634A. (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure)?

A.1.
(a) Congressional Notification Process
(b) Yes

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

2.(a) Yes
(b) Yes

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

3. N.A.

4. FAA Sec. 611(b); FY 79 App. Act Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?

4. N.A.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

5. Yes, see project paper annex.

6. FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

6. No

A.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

A.7
(a) Project should decrease the reliance on import oils.
(b) Farmer associations and power plants will operate as private enterprises.
(c) Electric coops will implement the pilot projects.
(d) No impact.
(e) Will increase the efficiency of forest wood production.
(f) No.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

8. Project will purchase U.S. commodities from U.S. private enterprise.

9. 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 U.S. are utilized to meet the cost of contractual and other services.

9. NEA will contribute 1/3 of project cost. Philippines is not an excess currency country.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?

10. Philippines is not an excess currency country.

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

11. Yes

12. FY 79 App. Act Sec. 608. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar, or competing commodity?

12. N.A.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained

B.1
(a) Member of farmer associations will be among the poorest of the poor -- the upland slash-and-burn farmer. Labor intensive wood planting and harvesting will be optimized as well as the use of appropriate technology. Sizeable investments will be made in rural upland areas.

ANNEX J
Page 3 of 7

B.1.a.

basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

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

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

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

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

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

(ii) to help alleviate energy problems;

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

(iv) reconstruction after natural or manmade disaster;

(b) Rural Electric Cooperatives will help to implement the project and be among the primary beneficiaries.
(c) The project will encourage self-help.
(d) Wives and children of association farmers will benefit from increased incomes, better housing, schools, etc.
(e) Project will not directly encourage regional cooperation.

b.103. The project will directly increase upland productivity and income of rural poor as sustained yield forestry with viable markets are developed.

B.1.b.(4).

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

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

c. [107] Is appropriate effort placed on use of appropriate technology?

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

d. Yes

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to the Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

e. No. Grant is for T.A. and international training.

f. 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 civil education and training in skills required for effective participation in governmental and political processes essential to self-government.

f. The project is directed at the marginal upland farm. Use of Filipino technicians will be optimized. Farmer associations will be self-governed with full participation available to members.

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

g. Yes

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.

2.a. Available

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

b. N.A.

5C(3) - STANDARD ITEM CHECKLIST

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

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

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?	A.1. Yes
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?	2. Yes
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the United States on commodities financed?	3. Yes
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	4. N.A.
5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?	5. Yes
6. FAA Sec. 603. (a) Compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	6. Project complies
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the	7. Yes N.A.

A.7.

facilities of other Federal agencies will be utilized, are they paritcularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

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

9. FY 79 App. Act Sec. 105. Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States? — 9. Yes

B. Construction

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

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

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the United States not exceed $100 million? — 3. N.A.

C. Other Restrictions — C.1. Yes

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

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

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foriegn aid projects or activities of Communist-bloc countries, contrary to the best interests of the United States? — 3. Yes

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or guaranty of such transaction? — 4. Yes

C.

5. Will arrangements preclude use of financing:

5.a. N.A.

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

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

b. N.A.

c. FAA Sec. 660. To finance police training or other law enforcement assistance, except for narcotics programs?

c. N.A.

d. FAA Sec. 662. For CIA activities?

d. N.A.

e. FY 79 App. Act Sec. 104. To pay pensions, etc., for military personnel?

e. N.A.

f. FY 79 App. Act Sec. 106. To pay U.N. assessments?

f. N.A.

g. FY 79 App. Act Sec. 107. To carry out provisions of FAA sections 209(d) and 251(h)? (Transfer of FAA funds to multilateral organizations for lending.)

g. N.A.

h. N.A.

h. FY 79 App. Act Sec. 112. To finance the export of nuclear equipment, fuel, or technology or to train foreign nations in nuclear fields?

i. N.A.

i. FY 79 App. Act Sec. 601. To be used for publicity on propaganda purposes within United States not authorized by the Congress?

DEPARTMENT OF STATE

TELEGRAM

INCOMING
Amembassy, MANILA

CN: 1024W

ACTION:
AIDAC

INFO:
AMB
DCM
POL
POLR
CONS
DAO
ECOM
LGAT
LO
ADM
USIS
CPRP
JMAG
CEBU
AID
ADB
AGR
B&F
RMO
GSO
THU
DEA
PER
RSO
RSC
ATO
RCO
CRO
TSO

CRU
CY/INIT

UNCLASSIFIED
Classification

ANNEX K

NNNNVV MJA017EHE192
PP RUMVC
DE RUEHC 2992/01 1421043
ZNR UUUUU ZZH
P 210735Z MAY 80
FM SECSTATE WASHDC
TO AMEMBASSY MANILA PRIORITY 0469/0470
BT
UNCLAS STATE 132992

AMEMBASSY MANILA
1980 MAY 21 PM 7 34

AIDAC

CRU

E.O. 12065: NA

TAGS:

SUBJECT: APAC, PHILIPPINES REFORESTATION/RURAL ENERGY PID (492-0352)

REF: (A) STATE 100005 (B) MANILA 7755 (C) STATE 109207 (D) MANILA 08237 (E) MANILA 24340

1. APAC MET MAY 6 AND APPROVED SUBJECT PID. HOWEVER, DUE TO THE INNOVATIVE NATURE OF THE ACTIVITIES FOR WHICH TA IS TO BE PROVIDED, AUTHORITY FOR APPROVAL OF PP WAS KEPT IN WASHINGTON. IN ADDITION, THE FOLLOWING POINTS NEED TO BE ADDRESSED BY MISSION.

2. FUNDING: APAC UNDERSTANDS THAT OVER DOLS 4 MILLION LOAN FUNDS FROM DENDRO-THERMAL SUBPROJECT REMAIN UNPROGRAMMED IN THE NONCONVENTIONAL ENERGY PROJECT (492-0294). OUR REVIEW OF PAF FOR THAT PROJECT INDICATES PROPOSED REFORESTATION ACTIVITY COULD BE FUNDED FROM NONCONVENTIONAL ENERGY PROJECT. EVEN IF UP TO DOLS 2.0 MILLION WERE PROGRAMMED FOR A VARIETY OF FUTURE STUDIES/ACTIVITIES, E.G., PHOTOVOLTAICS, SOLAR PONDS, ETC., THERE WOULD STILL BE SUFFICIENT FUNDS AVAILABLE FOR REFORESTATION ACTIVITY AT PROPOSED LEVELS. IF MISSION CONFIRMS THIS ANALYSIS, MISSION SHOULD EXPLORE WITH GOP POSSIBILITY OF FUNDING PROPOSED REFORESTATION ACTIVITY FROM FUNDING PROVIDED UNDER PROJECT 492-0294. AID/W UNDERSTANDS THAT REFORESTATION PROJECT WOULD BE WITH NEA BUT BELIEVE MOE MIGHT ACCEPT SUGGESTION THAT 492-0294 FUNDS ORIGINALLY PROGRAMMED FOR DENDRO-THERMAL PROJECT BE SWITCHED TO NEA. IF MISSION AGREES AND DISCUSSIONS WITH GOP INDICATE THE ALTERNATIVE IS ACCEPTABLE, MISSION SHOULD FORWARD A DRAFT AMENDMENT

DIV	ACT	INF
OD		✓
F		
L		
F		
E		
I		
C		
OA		
OC		
FD		
HL		
NT		
PO		
OLH		
IIS		
AGA		
TRV		

UNCLASSIFIED
Classification

A78-057(1)

OF NONCONVENTIONAL ENERGY PAF INCLUDING, IF NECESSARY, A REQUEST FOR ADDITIONAL GRANT FUNDS FOR REFORESTATION EFFORTS. IF ON THE OTHER HAND, THIS PROVES NOT TO BE A FEASIBLE ALTERNATIVE, THE GOP AND MISSION SHOULD MAKE EVERY EFFORT TO REPROGRAM THE 0294 FUNDS IN QUESTION WITHIN THE PROJECT OR IN THE ABSENCE OF ALTERNATIVES, THEN TO CONSIDER DEOBLIGATION.

3. ISSUES: APAC CONCERNED WITH MANY UNRESOLVED FEASIBILITY QUESTIONS. AS PID RECOGNIZES, THESE INCLUDE FEASIBILITY ISSUES (SIZE AND DESIGN OF PLANTS: SOURCE OF PLANT COMPONENTS, LOCATION VIS A VIS EXISTING GRIDS: TRANSPORTATION OF WOOD, ETC.), AS WELL AS INSTITUTIONAL (E.G., COORDINATION WITH BFD), SOCIAL ISSUES (LAND TENURE, BFD LEASES, INCENTIVES NEEDED) AND ECONOMIC ISSUES (NEED AND EXTENT OF SUBSIDIES TO FARMERS, PRICES RECEIVED FOR WOOD: ALTERNATIVE END-USES OF TREES: ETC.). SINCE IT IS NOT REALISTIC TO EXPECT THESE ISSUES TO BE RESOLVED BEFORE PREPARATION AND SUBMISSION OF PP, APAC INTERPRETS PID ESSENTIALLY AS A PROPOSAL TO PROVIDE TECHNICAL ASSISTANCE TO THE GOP IN AN EFFORT TO RESOLVE THESE AS WELL AS OTHER FEASIBILITY ISSUES. PURPOSE OF PROJECT WOULD BE TO DEMONSTRATE FEASIBILITY OF GOP RURAL ENERGY PROJECT, TO A LEVEL AT WHICH AID AND OTHER DONORS MIGHT PROVIDE SUPPORT ON LARGER SCALE AT SOME FUTURE TIME. BELIEVE THIS IS ALSO MISSION'S VIEW OF PROJECT. ON THAT ASSUMPTION, APAC APPROVED PID, PROVIDED IT CLEARLY UNDERSTOOD BY GOP THAT AID/W INPUT LIMITED TO TA, AND NOT REPEAT NOT TO INCLUDE INPUTS (SUCH AS CONSTRUCTION, TREE SAPLINGS, PLANT COMPONENTS, ETC.) JUSTIFICATION OF WHICH WOULD DEPEND ON DEMONSTRATED FEASIBILITY OF DENDRO-THERMAL PROJECT.

4. PP SHOULD OUTLINE AND QUANTIFY IN AS MUCH DETAIL AS POSSIBLE, THE SCOPE, COST AND TIMING OF PROPOSED

TA. IOADDITION, PP NEEDS TO ADDRESS CERTAIN OTHER BASIC ISSUES. ONE OF THESE IS CLARIFICATION BASIC GOAL OF NEA PROJECT. WE UNDERSTAND FROM REF E PARA 6 THAT MAIN THRUST WOULD BE ON REFORESTATION FOR DENDRO-THERMAL ELECTRICAL GENERATION. REFORESTATION IS, HOWEVER, MEANS TO ONE OR MORE ENDS AND AID/W NOT YET CLEAR AS TO COMPATABILITY OF THIS OVERALL GOAL WITH OTHER PROJECT PURPOSES THAT HAVE BEEN MENTIONED, E.G., CONSERVATION/WATERSHED MANAGEMENT, RURAL EMPLOYMENT AND INCOME, ETC. OBVIOUSLY NEA PROJECT APPROACH AND DESIGN WILL DIFFER DEPENDING ON THE ANSWER TO THESE QUESTIONS (E.G., LOCATION AND SIZE OF PLANTATIONS: TYPE OF TREES GROWN: END-USE OF TREES, WILL ALL DIFFER DEPENDING ON PROJECT PURPOSES AND

OBJECTIVES). ANSWERS TO THESE QUESTIONS WILL IN TURN PERMIT PP TO IDENTIFY AND DEFINE BENEFICIARIES, THEIR ELIGIBILITY IN PROGRAM, RESETTLEMENT SCHEMES, ETC. THEY WILL ALSO AFFECT CREDIT AND/OR OTHER INCENTIVE SCHEMES NEEDED TO ATTRACT AND HELP FARMERS IN THE PROGRAM DURING THE TREE-GROWING PERIOD. PP SHOULD ALSO ADDRESS NEED TO EVALUATE IMPACT OF REFORESTATION EFFORT WHICH TAKES ON ADDED IMPORTANCE BECAUSE OF EXPERIMENTAL NATURE AND POTENTIAL REPLICABILITY OF PROJECT.

5. PROPOSED AID PARTICIPATION IN PILOT/DEMONSTRATION PROGRAMS: AID/W RECOGNIZES THAT PILOT PROJECTS MAY BE NECESSARY IN PLANNING AND DESIGN OF THE NEW PROGRAM. BECAUSE OF THIS, APAC IS NOT ADVERSE TO SUGGESTION REF D, PARA 5, THAT TA, IN ADDITION TO HELPING NEA OVERALL, SHOULD FOCUS ITS FIELD LEVEL WORK ON A LIMITED NUMBER OF SITES TO PROVIDE A PILOT FOR DESIGNING THE LARGER NATIONAL PROGRAM. PP SHOULD PHASE SUCH TA INPUTS SO AS TO PARALLEL RATHER THAN ANTICIPATE FEASIBILITY ANALYSIS.

6. EXTENSION SYSTEM: TO SUPPORT SUBSISTENCE FARMING DURING TREE GROWTH PERIOD, AN AGRICULTURAL EXTENSION SY COMPONENT COULD BE INSTRUMENTAL IN RESETTLEMENT SUCCESS. APAC REQUESTS MISSION CONSIDER BUILDING IN SUCH A COMPONENT. FYI RESETTLEMENT SCHEME IN INDONESIA APPARENTLY HAS HAD SOME SUCCESS WITH ITS HOME GARDEN PROGRAM. WE ARE REQUESTING USAID/JAKARTA TO SEND REPORT OF MR. SALIM (MINISTER, ENVIRONMENT AND NR) TO USAID/P ON THIS PROGRAM. END FYI.

7. IEE: APAC DOES NOT CONCUR WITH NEGATIVE DETERMINATION IN PID BECAUSE ACTIVITIES FOR WHICH PROJECT IS PROVIDING TA (SUCH AS LARGE SCALE REFORESTATION, TRANSPORTATION SYSTEMS) MAY HAVE SOME ADVERSE ENVIRONMENTAL EFFECTS. APAC RECOMMENDS RESUBMISSION OF IEE WITH ANALYSIS OF ENVIRONMENTAL IMPACTS OF ACTIVITIES THAT WILL BE SUPPORTED BY TA. THIS IEE SHOULD REVEAL THE NEED FOR ADDITIONAL ENVIRONMENTAL ANALYSIS, AND POSSIBLY AN EA. THESE CAN BE PERFORMED AFTER PP APPROVAL AND COULD BE DONE AS PART OF PROJECT.

8. PLEASE ADVISE AS TO ESTIMATED DATE OF PP SUBMISSION TO AID/W AND IF AID/W TDY CONTRACT ASSISTANCE IS NEEDED. MUSKIE
BT
2992

dh