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498-0262

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March 13, 1979

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR, BUREAU FOR ASIA

FROM : Dennis J. Brennan, ASIA/PD

SUBJECT: Advice of Program Change
Asia Regional Energy Development

PROBLEM

None

Your approval is required for a Notification to the Congress that we intend to make a grant to the East-West Center for Energy and rural development studies.

DISCUSSION

The attached proposal from the East-West Resources System Institute of the East-West Center has been reviewed and found to be a sound means to initiate a rural energy development project. The attached Advice of Program Change has been prepared to advise the Congress that we intend to obligate $500,000 for this activity in FY 1979. We anticipate that the activity will last five years and involve a life of project cost of $1,700,000.

RECOMMENDATION

That you sign the attached Advice of Program Change

Attachment:
Advice of Program Change

DAA/ASIA:FWSchieck
ASIA/DP:RHalligan
GC/ASIA:HMorris
ASIA/TR:TMArndt
ASIA/PD:MMPehl

ASIA/PD:JRNussbaum:pjs
3/13/79

AGENCY FOR INTERNATIONAL DEVELOPMENT

ADVICE OF PROGRAM CHANGE

March 13, 1979

Country:	Asia Regional
Project Title:	Energy Development
Project Number:	498-0262
CP Reference:	None
Appropriation Category:	Selected Development Problems
Intended FY 1979 Obligation:	$500,000

This is to advise that AID intends to obligate $500,000 in FY 1979 for the above referenced project.

This obligation will enable AID to support the first two years of a five year program of the East-West Center, Honolulu, Hawaii to assist Asian countries in studying energy and rural development problems. The project will include analyses of specific country rural energy problems. This activity was not anticipated at the time the FY 79 Congressional Presentation was prepared and grew out of initiatives of the East-West Center during the latter half of 1978.

Annex: Activity DataSheet

[illegible]
[illegible]
cc:

[illegible]

Best Available Document

PROGRAM: ASIA REGIONAL

ACTIVITY DATA SHEET

CP 79-85

TITLE	FUNDS	PROPOSED OBLIGATION (In thousands of dollars)		
Energy Development	Selected Development Problems	FY 79 500		LIFE OF PROJECT 5,700
NUMBER 498-0262 GRANT [X] LOAN [ ] / NEW [X] CONTINUING [ ]	PRIOR REFERENCE ---	INITIAL OBLIGATION FY 79	ESTIMATED FINAL OBLIGATION FY 82	ESTIMATED COMPLETION DATE OF PROJECT FY 84

Purpose: To search out, adapt, and apply selected alternative energy sources and related policies so as to reduce the dependence of Asian nations on imported fossil fuels.

Background: Most Asian LDCs clearly recognize the need to reduce dependency on fossil fuel imports; maximize the use of renewable energy resources; and use available energy supplies as efficiently as possible. However, expertise and facilities vital to the development of energy policy and planning are severely lacking in the region. A.I.D. foresees the opportunity for an effective initial support effort which, in addition to meeting needs for facilities and personnel, would also provide opportunities to test and apply technical innovations by which alternative energy sources can be tapped and utilized.

To assist in providing data and analysis necessary for Asian countries to meet the energy needs of their peoples, particularly in rural areas, the East-West Center, East-West Resources Systems Institute has proposed to study energy and rural development concerns of a number of Asian countries. The East-West Center already has assisted in organizing seminars and workshops at which Asian scholars, experts, and concerned officials can exchange experiences and prepare for energy related decisions vital to the Asian Region. The East-West Center proposes to expand this assistance and to initiate specific country studies of rural energy requirements starting in May 1979.

Host Country and Other Donors: A number of Asian countries already provide funds to the East-West Center and send personnel to participate in its activities. It is expected that such support for the East-WestCenter will continue. In the initial two years of the project the East-West Center expects to provide $1,400,000 from other resources.

FY 79 Program: A specific support grant will be made to the East-West Center for the initial two years of a five-year activity in research and analyses, training, and workshops and seminars dealing with national and regional energy policy problems.

Beneficiaries: Studies being undertaken under the project will improve the ability of Asian governments and institutions to serve energy needs of rural populations and will train officials and researchers from Asian countries in the techniques of meeting rural energy needs.

A.I.D.-Financed Inputs: ($ thousands)

	FY 79	All Years
Grant to East-West Center	500	1,700
Support of Energy Centers	-	4,000
	500	5,700

U.S. FINANCING (In thousands of dollars)	Obligations	Expenditures	Unliquidated
Through September 30, 1977	-	-	-
Estimated Fiscal Year 1978	-	-	-
Estimated through September 30, 1978	-	-	-
		Future Year Obligations	Estimated Total Cost
Proposed Fiscal Year 1979	500	5,200	5,700

PRINCIPAL CONTRACTORS OR AGENCIES

East-West Center

East-West Resources Systems Institute

MAR 16 1979

MAR 16 2 40 PM '79

ACTION

ACTION MEMORANDUM FOR THE AA/ASIA, Mr. John H. Sullivan

FROM: ASIA/PD, Dennis J. Brennan

Approval _____

Disapproval _____

SUBJECT: Approval of Grant to East-West Center

Problem

Your approval is required for a grant for the first two years of an energy and rural development study by the Resources Systems Institute of the East-West Center.

Background

We have reviewed and recommedd approval of a proposal for a five year activity at the East-West Center to undertake research and analysis of rural energy problems, train scholars and officials from Asian countries and organize workshops and seminars on specific energy problems. Under the proposalsthe East-West Center will undertake at least two specific country studies in collaboration with host countries.

A request has been made for $701,000 AID support for the first two years. Budget availability limits us to $500,000 at this time; we expect this will carry the activity into FY 1981. The activity will be evaluated before further funding is sought.

Funds may not be provided for this grant until the expiration of an Advise of Program Change sent to the Congress March 15. Accordingly the effective date for the grant will be March 30 if there is no bbjection from the Congress.

In the expectation that you will approve the grant below, we are preparing a conditional agreement with the East-West Center covering this grant for signature by yourself and an East-West Center representative March 22.

Recommendation

That you approve the proposed grant to East-West Center for Energy Rural Development studies, conditional on expiration of notification to the Congress without objection.

Approval _____

Disapproval _____

Date _____

Clearances:

GC/ASIA:HMorris _____ Date 3/16/79
ASIA/DP:RHalligan _____ Date 3/16/79
ASIA/TR:~~RMacNut~~ NBrown (phone) _____ Date 3/16/79

ASIA/PD/EA:JRNussbaum:mab/am:3/15/79

Best Available Document

DEPARTMENT OF STATE

AGENCY FOR INTERNATIONAL DEVELOPMENT

DELEGATION OF CONTRACTING AUTHORITY TO

JOHN H. SULLIVAN

(REDELEGATION OF AUTHORITY NO. 99.1.79.27)

Pursuant to the authority delegated to me by Redelegation of Authority No. 99.1 (38 F.R. 12836) from the Assistant Administrator for Program and Management Services, I hereby redelegate to John H. Sullivan, Assistant Administrator for the Asia Bureau, authority to sign a specific support grant to the East-West Center, Resource Systems Institute, for the purpose of energy and rural development studies in an amount not to exceed $500,000.

The authority delegated herein is to be exercised in accordance with regulations, procedures, and policies promulgated within the Agency for International Development in effect at the time this authority is exercised.

This redelegation of authority is effective immediately.

MAR 21 1979
Date

Hugh L. Dwelley
Director
Office of Contract Management

498-0262
contract

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

22 MAR 1979

Resource Systems Institute
East-West Center
1777 East-West Road
Honolulu, Hawaii 96848

Subject: Grant No. AID/ASIA-G-1393

Gentlemen:

Pursuant to the authority contained in the Foreign Assistance Act of 1961, as amended, the Agency for International Development (hereinafter referred to as "A.I.D." or "Grantor") hereby grants to Resource Systems Institute of the East-West Center (hereinafter referred to as "Grantee" or "RSI") the sum of $500,000 to be obligated by amendment upon expiration of the Advice of Program Change to Congress to provide support for a two year program in Asia as more fully described in the attachment to this Grant entitled "Program Description."

This agreement is effective April 5, 1979 in the absence of any objection prior to that date from the Congress in response to A.I.D.'s Advice of Program Change dated March 15, 1979 covering this project.

This Grant is made to RSI on condition that the funds will be administered in accordance with the terms and conditions as set forth in Attachment 1 entitled "Program Description," and Attachment 2 entitled "Standard Provision," which have been agreed to by your organization.

Please sign the Statement of Assurance of Compliance, enclosed herein, and the original and seven (7) copies of this letter to acknowledge your acceptance of the conditions under which these funds have been granted.

Please return the Statement of Assurance of Compliance and the original and six (6) copies of this Grant to the Grant Officer.

Sincerely yours,

John H. Sullivan
Assistant Administrator
Bureau for Asia

Attachments:

1. Program Description, Schedule
2. Standard Provisions
3. Statement of Assurance of Compliance

ACCEPTED:

By: _____

Title: Director EWC - RSI

Date: 22 MAR 1973

498-0262

~~Cabled~~
~~Basic~~ From the
File HAR-026

STATE - A.I.D. - USIA
ROUTING SLIP

DATE 4-19-79

TO: Name or Title	Organ. Symbol	Room No.	Bldg.	Initials	Date
1.					
2.					
3.					
4.					
5.					

	Approval		For Your Information		Note and Return
	As Requested		Initial for Clearance		Per Conversation
	Comment		Investigate		Prepare Reply
	File		Justify		See Me
	For Correction		Necessary Action		Signature

REMARKS OR ADDITIONAL ROUTING

SUBJ: ~~Contract~~/Grant Amendment AID/ASIA-G-1393
Distribution + VALIDATION A-1

CM/SD/SUP, B. Nichols
SER/FM/PAD, ASD, FSB (ASIA/PD, M. Pabl)
PROJECT MGR., ~~ASIA/TR/STEP~~ M. Brown
USAID/EMBASSY, KDO, Craig (SUVA)
CONTRACTOR/GRANTEE,
Resource Systems Institute

This is your copy of the subject.

SIGNED: CM/ROD/ASIA, J. Cutrera

FROM: (Name and Org. Symbol)	ROOM NO. & BLDG.	PHONE NO.
	733 SA-14	59130

FORM 3-68 JF-29 (Formerly Forms DS-10, AID-5-50 & IA-68)

498-0262

MODIFICATION OF GRANT

1. Amendment No.	2. Effective Date	3. Grant No.	4. Effective Date
1	April 5, 1979	AID/ASIA-G-1393	April 5, 1979

5. Grantee (Name and Address)	6. Administered by-
Resource Systems Institute East-West Center 1777 East-West Road Honolulu, Hawaii 96848	Grant Officer Regional Operations Division - Asia Office of Contract Management Agency for International Development Washington, D.C. 20523
7. PIO/T No.- 498-0262-3-6497211 Appropriation No.- 72-1191021.6 Allotment Symbol-946-64-498-00-69-91	8. Previous PIO/T's- N/A

9. The above numbered Grant is hereby modified as follows:

1. The grant letter, paragraph 1, delete the words "to be obligated by amendment upon expiration of the Advice of Program Change to Congress."

2. Delete paragraph 2 of the grant letter in its entirety and substitute the following in lieu thereof:

"This Grant is effective and obligation is made as of April 5, 1979 and shall apply to commitments made by the Grantee in furtherance of program objectives during the period April 5, 1979 through April 4, 1981."

(Continued)

10. This amendment is entered into pursuant to the authority of the Foreign Assistance Act of 1961, as amended. Except as herein provided, all terms and conditions of the grant referenced in Block #3 remain unchanged and in full force and effect.

11. Grantee is required to sign this document and return 7 copies to issuing office.

12. GRANTEE

BY: [signature]

Harrison Brown
(Name typed or printed)

TITLE: Director

DATE: April 10, 1979

UNITED STATES OF AMERICA
AGENCY FOR INTERNATIONAL DEVELOPMENT

BY: [signature]

Peter J. Howley JC
(Name typed or printed)

TITLE: Grant Officer

DATE: 17 APR 1979

3. Add the following at the bottom of page two of the grant letter:

"

FISCAL Data

Appropriation : 72-1191021.6

Allotment : 946-64-498-00-69-91

PIO/T No. : 498-0262-3-6497211

Project No. : 498-0262

Total Grant Amount: $500,000 "

4. Page 28 of Attachment A, delete section L in its entirety and substitute the following in lieu thereof:

"L. Grant Funding

The total grant amount will be $500,000.

A. Total A.I.D. dollar funds available for payment and allotted to this grant. $500,000

B. In the event A.I.D. determines that any disbursements under this Grant to a given country would not be permissable for statutory or policy reasons, it will so inform the Grantee who will cooperate in terminating any such disbursements."

All other terms and conditions of this grant remain the same.

SCHEDULE

PROGRAM DESCRIPTION

A. Purpose of Program

The purposes of the program to be undertaken under the grant will be:

1. To develop and undertake collaborative research and analysis activities with selected Asian research institutions on problems of energy, particularly as they relate to agriculture and rural development in Asia.

2. To train and involve cadres of Asian and American researchers and practitioners at the East-West Center in the analysis of country-specific and regional energy problems in Asia, thus preparing them to become involved with decision-making processes concerning energy-related and regional energy policy problems.

3. To organize workshops and seminars in cooperation with host institutions in developing countries in Asia, as well as at the East-West Center, dealing with specific aspects of national and regional energy policy problems.

B. Goals of the Research Effort

The primary goals of the program will be:

1. To obtain an understanding of energy flows in selected rural areas of several developing countries, with particular reference to the coupling of agricultural and related processes to trends in patterns of energy use. Commonalities and differences in climate, environment, social and economic structure and associated levels of urban development will be examined to identify their impacts on and relationships with the energy

problem of spatially rural communities.

2. To assess the impacts of changes in the supply of traditional forms of energy in relation to demand due either to rapid population growth, environmental degradation or combinations of both, on the nutritional health of rural populations and the access to basic human needs. In addition, a high priorty will be placed on the development of methodologies for the assessment of the economic, social and environmental impact of changes in patterns of energy use brought about by technical innovation and externally induced shifts in the rural product mix or the relative availability of associated labor and material factors of production.

3. To synthesize and compare alternative methodologies for assessing the mix of energy sources most appropriate at different stages of rural and agricultural development and to examine alternative energy policies which might be directed toward achieving patterns of rural energy use consistent with development goals. As part of this activity it is planned to identify within rural food, manufacturing, transportation and services systems, opportunities for utilizing conventional energy sources more efficiently or employing new technologies to provide energy from alternative sources.

Policy alternatives to be examined will apply both to agricultural development and to the non-agricultural rural sectors. With respect to the agricultural sector specifically, pricing, public investment and institutional policies directed at the promotion of increased farm productivity and local product market stability will be studied in terms of how these affect the supply and consumption of energy-intensive fertilizer and pesticide inputs and the energy intensity of technical improvements to the production process such as mechanized irrigation, land preparation and harvesting.

With respect to rural development in general, the impact on energy consumption patterns of policies directed at increased rural employment, environmental management, and commercial energy supply will be studied. This will include pricing and public investment policies to promote appropriate rural industries and infrastructure improvements that require increased energy use; reforestation and soil conservation to protect renewable energy resources; and policies with respect to the appropriate scale and degree of centralization of fuel and electricity supply systems.

C. Scope of Research

At the recent Asia-Pacific Energy Studies Conference, held at the Institute in July, 1978, attended by senior policy-makers and researchers from Australia, Canada, India, Indonesia, Iran, Japan, Pakistan, the Philippines, and the United States, a resounding consensus was registered in favor of extensive research on appropriate ways of assessing and meeting the energy needs of rural populations. The paradox of energy in rural areas of developing countries is that both too little and too much are used, and the task at hand is to find means to change the mix of energy used to better meet economic and social goals. Most of the energy used in rural areas of developing countries, other than human and animal labor, is obtained from fuel wood, crop residues and animal dung.[1] This energy is used in domestic activities, mainly food processing and preparation, and amounts to between two and three times the energy used in agricultural production and transportation.

New sources of energy and conservation of old sources are needed to offset a growing relative scarcity of traditional fuels in relation to

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[1] See the study by Revelle, 1977, based on data for India, China, Tanzania, Northern Nigeria, Northern Mexico, Bolivia, and Bangladesh, as reported by Brown, N.L. (Ed.), "Renewable Energy Resources and Rural Applications in the Developing World," AAAS Selected Symposium Series, 1977.

population growth, as evidenced for instance, in the hills of Nepal[2] and the uplands of India and Pakistan, and also in crowded lowlands including those of rural Bangladesh.[3] New energy is also needed to bolster rural productivity to keep pace with population growth and to improve the welfare of rural dwellers and thus to counteract the exodus to the already unmanageable and crowded cities. Cross-sectional studies of agricultural systems indicate that a rough relationship exists between non-domestic rural energy use and cereal yields. To improve agricultural productivity, more energy is needed to ensure a larger and more stable water supply, for increased fertility, for more rapid land preparation and harvesting to facilitate multiple cropping, and for improved transportation to reduce marketing costs and increase farmer incentives to boost productivity.

Even with adequate growth in agricultural productivity to meet food and raw material needs, however, employment in agriculture and agro-industries cannot match rural needs. Rural development strategies are required which will provide widespread increases in employment opportunities so as to maintain acceptably distributed levels of access to income and basic needs. This can be achieved with the development of rural industries and thus with the use of high quality (mainly electrical) energy in rural areas.

An objective of RSI's collaborative research program in energy use and rural development is to establish methodologies for deriving the most appropriate mix of energy types to best facilitate rapid development by

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[2]Report of the Ad Hoc Seminar on the Development of Small Scale Hydropower and Fertilizer Production in Nepal, 1977, The Asia Society.

[3]Tyers, 1977, "Optimal Resource Allocation in Transitional Agriculture - Case Studies in Bangladesh," Ph.D. Dissertation, Harvard University.

meeting domestic, agricultural and rural industrial needs. To do this requires that the social values of specific end uses be estimated in the light of the objectives and publicly-defined measures of effectiveness associated with the rural development effort. For example, the social value of electric lighting in rural areas can either be evaluated in terms of the cost of its nearest substitute or the social cost of its complete absence.

Once a social value can be established for each end use, the task becomes one of assigning scarce renewable and non-renewable energy resources, and scarce capital for improvements of efficiency with respect to end uses. It is both in the valuation and end uses and the methodology for assessing the most appropriate mix of energy sources and technologies that the research conducted at RSI, in collaboration with other Institutes at the East-West Center and Asian institutions, is expected to be most productive.

The role of large-scale electrification schemes in rural development is now being questioned. One problem is that such projects have often been ineffective in actually bringing electricity to a significant number of people. Now, however, criticism is being aimed at a more fundamental level. Some analysts believe that large amounts of electricity will not be needed nor will they be desirable in rural economies in the foreseeable future. Electricity, as it has been traditionally generated, requires fuels which in many instances can be more efficiently utilized directly. It also has required centralized and relatively sophisticated generating capacity plus substantial and costly distribution facilities. These two characteristics taken together require that a fairly large demand potential exist for electrification to be justified purely on economic grounds. However, in most villages in the developing world, demand for electricity is minimal.

This is not to say that the demand for energy is small, only that the

need for the higher quality energy contained in electricity is small. Nevertheless, electricity, while perhaps not suited to the tasks requiring most energy in rural settings (cooking and heating), is absolutely necessary and very desirable for certain activities. These activities are not easily conducted with other sources of energy but may not add up to enough energy demand to justify centralized rural electrification. The quality of life in rural areas might be substantially improved with the introduction of small amounts of easily maintained decentralized electrical capacity.

In rural settings, electricity may have a place in the economy and welfare of the community similar to the role vitamins have in its nutrition - beneficial and essential for growth but needed only in small amounts. Thus, electricity, as an essential part of energy nutrition, might be attractive in some rural settings even if it had to be provided at high cost.

There are several possible vitamin-like tasks that small amounts of electricity are able to perform:

1. Pumping - to reach new water sources and to augment as well as replace human and animal labor.
2. Lighting - to increase the effective day length, encourage literacy, and provide flexibility of schedules.
3. Communication - running telephones, television and radio sets to be used for education and training as well as news and entertainment.
4. Food processing - selected techniques to achieve improved storage life and nutritional yield and reduce human drudgery.
5. Fertilizer production - to use locally available fertilizer raw materials and thereby increase agricultural productivity in regions where transportation is prohibitively expensive and where a dependence on external sources is undesirable.

In addition, the availability of small amounts of electricity can lead to the development of local technological innovations.

Much more research is needed to identify the demand for electricity in the rural parts of developing countries and to establish the usefulness of small amounts of electricity. The marginal utility of small amounts of vitamin energy is probably large but more work is needed to establish its character. With energy as with food, research is needed to assess the minimum as well as the optimal level of all the various nutrients so that social and economic growth can be achieved. A well-balanced energy diet will undoubtedly include some electricity for high-value end uses.

Among the end use considered in this research program which are likely to justify the use of small amounts of electricity, we cite as an example, the electric arc fertilizer generator being developed to meet the needs of individual farms. This development shows promise of being technically as well as economically feasible for some types of farm sites. The process produces nitrogen dioxide by combining the nitrogen and oxygen of air in an electric arc discharge. Nitrogen dioxide, when passed through water produces nitric acid, which in turn can be used to produce calcium nitrate by passing it through limestone or calcium nitrate and phosphoric acid by passing it through rock phosphate.[4]

The generator has distinct potential for use by small farms of villages, particularly in remote hilly areas or islands where high transportation costs make chemically manufactured fertilizers unavailable at low prices.

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[4]Sheldon and Treharne, Nov. 1978, "Local Phosphate Rock and Limestone Deposits as Raw Materials for Local Fertilizer Supply," Proceedings of small scale mining of the world conference, United Nations Institute for Training and Research.

The system can be powered by either a conventional electricity source or by a renewable energy source such as hydropower, wind power, or solar power.

The RSI does not plan to become directly involved with the development of hardware for energy use and conversion. Rather, we plan to evaluate new technologies as they appear, assess the uncertainties from the engineering, economic and social points of view and then develop field tests which are designed to decrease those uncertainties. We hope to serve as a bridge between hardware developers and end-users.

D. Research Plan

In view of the high priority assigned to energy and rural development by the July energy studies conference, it is visualized that this research program will be undertaken within the context of the Asia-Pacific Energy Studies Consortium which representatives of the nine participating countries agreed to establish.[5] At the request of the members, the Resource Systems Institute is to provide the base for the Consortium secretariat in the initial period. The Executive Secretary to the Asia-Pacific Energy Studies Consortium has recently been appointed and will, from his base at the Institute, initiate early consultations with Consortium representatives to arrange appropriate sponsorship for the energy and rural development program.

An initial activity in the formulation of a research and analysis program would be the organization of an international workshop to undertake the preparation of a program design. Subsequent studies by country teams would be organized in two phases:

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[5]Asia-Pacific Energy Studies Conference, held at the East-West Center, Honolulu, Hawaii, July 26-28, 1978.

I. Analysis of existing energy flows in selected agrarian areas.

II. Assessment of alternative technologies and energy mixes and study of energy policy alternatives for the achievement of specific patterns of energy use.

At suitable intervals during this two-phase process, workshops would be held for successive refinement of program goals, exchange and clarification of analytical methods, and formulation of conclusions relevant to policy issues and future work.

The initial program workshop, after introductory discussion of research and analysis goals and organizing approaches, will undertake to identify research issues for the analysis of existing energy flows, and to formulate a preliminary program design. The resulting methodological framework would serve as a common reference point in defining the major boundaries and content of the individual country studies. Basic methodological parameters would be devised in such a way as to allow for further refinement and adaptation to specific in-country conditions.

The workshop activities will be devoted to elaborating a field research program design which would examine national and local level variances in those factors which seem to account for relative levels of efficiency and equity in energy use in differing rural environments in several countries. More explicitly, a methodology would be devised to measure how variations within the following categories, among others, condition energy flows within the larger rural economy.

(1) Variations in agro-climatic and physical conditions; lowland vs. upland agronomy, soil, water, and seasonal differences, etc.

(2) Variations in cropping patterns, multiple cropping, cropping intensity, food and non-food crops, etc.

(3) Variations in micro socio-economic conditions; distribution of farm size, ownership of production assets, village size, land-man ratio, etc.

(4) Variations in sub-regional networks; access to marketing; patterns of and access to processing and transport facilities, etc.

(5) Variations in the effects of national policy parameters on local situations; relative factor pricing with respect to agricultural inputs (fertilizer, credit, mechanization), agricultural taxation, etc.

An assessment of the above characteristics, as they condition energy use and energy flows within the rural sector should begin to yield some profile of those socio-economic factors which seem to account for different performance levels in energy availability and use. This analysis will serve the dual function of (1) allowing for the identification of those areas where marginal changes in current rural development strategies would allow for incremental gains in energy efficiency and equity and (2) illuminating those constraints which may necessitate more basic structural and/or technological change to enhance efficiency and equity. In each of these categories, analysis can proceed to elaborate various policy configurations in terms of their impact upon energy utilization and the wider short and long-term trade-offs involved in the adoption of a particular rural and agricultural development strategy (see, for example, item 7 on page 12).

The workshop would conclude by preparing a consistent analytical framework for use by country teams as they proceed, in the context of individual country needs and goals, to refine and elaborate the methodology for application in selected areas in their own country.

While it is not possible to predict the number and timing of country studies to be initiated following the planning workshop, this proposal assumes that it would be advantageous and feasible for two country teams to mount such studies in the first year and two or more in the second year. This would provide variety among the ecological and institutional situations under study, and would stimulate clarification of research goals, concepts and methods through periodic workshops and consultations.

In each country, the institution(s) assuming primary responsibility for the study might, after initial preparation, organize a planning workshop to facilitate the involvement of policy agencies, interest groups, and other institutions and individuals directly concerned with rural development and related energy issues. The host institution(s) would invite participants from RSI and other country institutions to this and subsequent program workshops.

The country team would establish the plan for the Phase I study of existing energy flows in selected areas in mutual consultation with RSI. It is assumed that a substantial proportion of in-country costs would be met by the sponsoring country agencies.

The Phase I design for each country study would reflect specific goals and dimensions identified by the country team. The objective of Phase I studies taken as a whole would be, through the research experience gained in study of existing energy flows, to develop a basis of common understanding among country teams that willprovide a strong conceptual approach to the complex process of assessing alternative future in Phase II.

Illustratively, the scope of micro-studies of the selected rural areas would cover intersectoral, locational, and distributional aspects of energy availability or scarcity including linkages with food, nutrition

and agricultural systems; irrigation; storage, inventory, processing and distribution; transportation; communication; rural industry; and provision of such basic human needs as housing, education, clothing, health and sanitation.

An illustrative sequence of steps that might be performed in each micro-region could be:

1. Properly designed study of primary production and exchange activities in the chosen agrarian sector(s), with attention to modes of work organization and to annual as well as seasonal variability.

2. Partitioning of such activities into those directly involved in food production, trade, translocation, processing, storage and distribution, and those which otherwise sustain rural family and community activities and functions.

3. Definition of input and output components of these activities such as energy, land, labor, raw materials, cash and other relevant categories in mutually consistent terms.

4. Descriptive input-output analyses of subsets of activities, and analysis of scalar and spatial or flow characteristics.

5. Description and analysis of distributive and social effects, and of institutional constraints.

6. Devising and applying a calculus that is socially appropriate but capable of wide application for evaluating these inputs and outputs in quantitative or ranked terms (e.g., money, nutrition, labor intensity, social services categorized by importance, i.e., can function without, cannot do without, can do without but poorly).

7. Initial analysis and appraisal of materials and energy functions and flow patterns in these systems that are amenable to change and those that represent constraints or seem highly sensitive to change. This would

be a basis for designing subsequent analyses in Phase II that could, for example, examine the effect on agricultural productivity of changes in energy availability.

At suitable intervals in the course of country studies, and upon completion and exchange of the first draft studies workshops or conferences would be held to draw generally-applicable findings and conclusions, and to define goals and procedures for the future-oriented phase of the program.

As a preface to field research in Phase II, the international team would undertake to define explicit goals and criteria for assessing potential technologies, and would also establish specific working hypotheses and related modes of analysis to guide choice and study of alternative technologies and energy mixes. The technologies to be examined in Phase II would include those potentially capable of realization over varying time horizons. These would include technologies that are "off-the-shelf," i.e., in use in some areas but not yet adapted or applied in other areas; those in advance pilot and R & D stages or with high probability of successful R D & E; and those for which the assessment of longer-term R & D priorities may be indicated.

In addition to studies in the evaluation of rural development strategies emphasizing alternative technologies and energy mixes, some attention will be given to formulating the best combination of policy instruments, including public investment and pricing policies, by which each strategy might be carried out.

At the simplest level, goals for assessing choices among alternative technologies and energy mixes might be framed in such direct terms as:

1. Increasing the share of value added produced by poor communities close to rural resource sites, or in close-by market towns and growth centers.

2. Concurrent increase in the income of the groups concerned.

3. Improving lateral communication and the expansion of labor-intensive economic activities strengthening linkages among hamlets and communities in agrarian regions.

By bringing together both technologists and policy analysts from the U.S. and cooperating Asia and Pacific countries at the outset of Phase II, it should be possible to form certain working hypotheses that would serve to guide and economize the field research and analyses to be conducted.

We visualize, for present planning purposes, that country studies would require an average of 18 months for Phase I and a like period for Phase II. Assuming the studies are initiated on a staggered basis, some four studies could be completed during the two-year period. Considering the RSI's institutional relationships in Asia and the intrinsic interests of the countries, the most likely candidates for such studies would be Bangladesh, India, Indonesia, Malaysia, Nepal, Pakistan, the Philippines, South Korea, Sri Lanka, and Thailand.* In addition, consideration shall be given the inclusion of one of the Pacific Island nations.

E. Expected Achievements of the RSI Five-Year Program

The broad result of the cooperative research program is seen as the identification and possible widening of energy policy and technology options toward improved productivity and attainment of basic human needs in rural communities of South and Southeast Asia. Documents, analytical methods, field implementation and building of institutional capabilities and personal

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*Please see the attached appendix for a list of possible cooperating institutions in each of these countries.

B. India (continued)

Center for Development Studies, Trivandrum

Center for Farm Mechanization Studies, Bhopal (linked to UNDP-Los Banos agricultural mechanization research program)

Department of Science and Technology, Council on Scientific and Industrial Research, New Delhi

Indian Agricultural Research Institute of the Ministry of Agriculture and Rural Development

Indian Institute of Management, Ahmedabad and Calcutta

Institute of Economic Growth, University of Delhi

C. Indonesia

Agricultural Development Council, Bogor

Bandung Institute of Technology, Bandung

Bogor Agricultural University, Bogor

Hasanuddin University, Makassar

Lembaga Ilmu Pengetahuan Indonesia (LIPI) Jakarta

Ministry of Research and Technology, Jakarta

D. Malaysia

The Malaysian Agriculture Research and Development Institute (MARDI) Selangor

The National Institute of Public Administration Jalan Ilmu, Petaling Jaya

The University of Malaya, Kuala Lumpur

The Universiti Sains Malaysia, Penang

skills to expand and apply these options are visualized as follows, in preliminary terms.

1. Country reports: Preliminary and Final Reports

Each country team is expected to produce a Preliminary and Final Report, at the end of Phases I and II, respectively. Illustratively, content of country reports would be on the following lines.

Preliminary Report

a. Analysis of existing energy flows in rural areas, if appropriate in matrix form showing energy source, quality and technological characteristics on one axis and end use sector, function, scale and location on the other axis.

b. Identification and quantification of constraints on agricultural and related sectoral development, and on attainment of basic human needs in rural areas attributable to absence, inefficiency or costs of energy.

c. Preliminary formulation of criteria for evaluating social, economic and environmental effects of alternative energy technologies.

d. Scope, focus and design outline for Phase II studies.

Final Report

a. Identification of energy source and quality, or energy mixes, appropriate for each functional or sectoral application derived from "b" above.

b. Reports on field tests applying evaluation criteria to design concepts or prototypes experimentally introduced by cooperating institutes.

c. Refinement of social, economic and environmental assessment criteria based on field test experience.

d. Policy guidelines with respect to public investment, research and development, pricing, locational incentives and institutional requirements toward implementation of the energy options identified and evaluated in the country research.

e. Institutional and manpower capabilities to implement above.

2. Synthesis of Country Reports: one Preliminary and one Final Report

The content of country reports would be assessed in comparative form to draw generalizable conclusions, and region- or location-specific variations, for presentation in the overall program report.

3. Institutional Development

A primary objective of this category of the program would be to strengthen the capabilities of key cooperating institutions in participating developing countries in Asia and the Pacific to undertake the necessary pilot programs in applied research, development, and the implementation of small-scale, decentralized energy sources in rural areas. It is perceived that this category of the grant would also provide opportunity for the cooperating institutions to further develop capabilities enabling them to interact more effectively with regional (subnational), national and international agencies concerned with various aspects through which energy policy serves rural development goals.

Applied research materials as well as information and communication linkages created through the program would be designed to provide a continuing resource in each of the cooperating institutions.

4. Upgrading of Applied Research Skills for Indigenous Staff

It is estimated that some 40-50 staff members from the cooperating institutions in the developing countries in Asia and the Pacific would be engaged fulltime during one or both phases of the program. Their involvement with the program would be both at the Resource Systems Institute, working as members of the project team, and also back at their home institutions. The primary objective of this category of the program would be to upgrade the skills of these staff members in the necessary continuum of applied

research, development, and implementation. There would be joint follow up on their use of this new knowledge upon their return home by both the cooperating institution and RSI.

A smaller, select number of this group would also be engaged in the interrelationships of (1) applied research, development and implementation, and (2) the policy relevance of their professional experience and their interdisciplinary skills.

5. Other Publications

On an illustrative basis, the following types of publications are anticipated over and above the Country and Program Reports:

a. Manuals on socio-economic and environmental assessment criteria and techniques

b. Field technology evaluation monographs

c. Case studies on field project development related to energy and rural development (these case studies would be written in the framework of an integrated project planning and management cycle).

F. Cooperating Institutions

With the evolution of this program on energy and rural development we would hope to work closely with such centers of energy research in the United States as the Lawrence Laboratories at Berkeley, the Jet Propulsion Laboratory in Pasadena, Argonne, Brookhaven and Oak Ridge National Laboratories, and Stony Brook. We would also hope to interact with energy groups at Cornell, the University of California (Berkeley, Davis and San Diego) and Wisconsin.

Although it is premature to indicate the specific Asian institutions with which we would be working, our staff has developed a close working relationship with the South East Asia Regional Center for Graduate Study and Research in Agriculture (SEARCA) in the Philippines and a linkup with that organization on problems of the food-energy interface may well be desirable.

For the most part, however, this program would be organized in consultation with and through the auspices of the Asia-Pacific Energy Studies Consortium, now in the process of formation. This Consortium had its origin in a conference which was organized and hosted by RSI in July 1978 and in which representatives from Australia, Canada, India, Indonesia, Iran, Japan, Pakistan, the Philippines and the United States participated. Several of the participants were of ministerial rank and others included heads of research organizations in the nations involved. The conferees reached nearly unanimous agreement on common research priorities and the problem of energy in relation to rural development was high on the list. In addition, the group agreed to establish an Asia-Pacific Energy Studies Consortium for the purpose of sharing information, undertaking joint research, developing common methodologies and sponsoring workshops on energy-related topics of mutual interest. All of the nations in the region will be invited to participate in the consortium's affairs.

In consultation with consortium members, agreements for cost-sharing will be worked out to meet the costs of in-country research teams as well as other costs that can be met in local currencies in implementing the energy and rural development research program.

F. Workshops and Conferences

Style and atmosphere of the East-West Center operations provide a focus around which people from East and West can interact as they study, give and receive training, exchange ideas and views, and conduct cooperative activities. These generally range from the more technical or workshop and seminar level to broadly integrative interchanges of ideas.

Meeting arrangements envisaged for energy and associated policy issues are workshops for joint research planning, seminars to discuss and refine research findings and large-scale conferences. Approximately 10 appropriately timed meetings will be organized within the purview of this grant, which will enable holding many of these professional assemblies in developing Asian countries in addition to those to be planned for Hawaii.

G. Information and Communication

Using a computer linkup, the Resource Systems Institute is now linked with the resource data bases of the U.S. Geological Survey in Menlo Park, Denver and Washington. We also have the capability of engaging in computer conferences via satellite involving participants spread over large parts of the world. It is our hope that the participating institutions in the Asia-Pacific Energy Studies Consortium will eventually be linked so that we can readily exchange data and engage in conferences via computer. We also hope to link ourselves with other energy information banks such as that now being developed at Stony Brook. It is our particular intention to link up with those Asian institutions which are directly involved with the research program dealing with energy problems of rural areas.

It is also our intention to develop at the Resource Systems Institute a research materials collection which will provide investigators with most of the basic energy-related materials they might need.

E. Evaluation

After 18 months from the program's initiation these accomplishments are expected:

1. Design of the research and analysis program will have been cooperatively established and adopted by a network of eight to twelve institutions in five or six countries.

2. Some six in-country and two regional workshops for methodological, training and analytical phases of the program will have been held involving 40 to 50 staff members of cooperating institutions as well as relevant policy officials and institute directors.

3. Two Phase I country studies will be approaching completion and steps taken to define major components of the Preliminary Synthesis Report; two to four additional country studies will be in advanced field activity stages.

4. Staff exchanges of some six visiting researchers and fellows for period of fieldwork and joint study, including analytical phases at RSI, will have occurred or be in progress involving from one month to a year in the exchange institution.

5. Preliminary drafts of (a) manuals on socio-economic assessment methodology and (b) field technology evaluation methods will be under review by all participating institutions.

6. Six case histories on field energy-related project development will be completed.

7. A preliminary monograph on rural energy policy issues will be in an advanced stage of completion, for review and discussion leading to publication as well as to program definition for Phase II.

Procedures for periodic evaluation of progress toward these and later program achievements will be established early in the program through cooperative planning by RSI, a representative of AID, and representatives of a cross-section of participating country institutes.

I. Personnel and Level of Activity

The following members of the RSI research staff are expected to be involved with this program:

Saleem Ahmed	Agriculture
John Bardach	Marine Resources
Harrison Brown	Resource Planning
Fredrich Burian	Information Technology
Louis J. Goodman	Technology and Management
Donald G. Green	Agriculture, Adult and Extension Education
Bruce Koppel	Rural Sociology and Technology Assessment
Richard Morse	Development Economics
Allan Phillips	Agricultural Engineering
Richard Sheldon	Geology of Resources
Corazon Siddayao	Resource and Development Economics
Kirk R. Smith	Energy Policy
Rodney Tyers	Applied Systems Analysis, Agricultural Systems
Kim Woodard	International Energy Policy
Barbara Yount	Writer - Editor

The proportion of time spent on this project will vary from individual to individual and from year to year. During the first year, the pool of professional research persons available for the project will be increased from 14 to 17. Every endeavor will be made to recruit women professional staff members for these positions.

In addition, research staff of other East-West Center institutes will be available as the work impinges upon their areas of expertise and interest.

We hope to have persons from other U.S. institutions intimately associated with this program in appropriate capacities. For example, Professor Roger Revelle, of the University of California at San Diego, who is deeply interested in rural energy problems, has agreed to work closely with us as a consultant on the development of the research aspects of the program.

The anticipated total effort which would be charged to the grant, including research, training grants and workshops over the two years of the program is shown in Table 1. In the first year seven senior research workers at RSI would be involved in the project one-half to three-quarter time each. In addition the services of a program officer and other support staff would be involved one-half time to handle the complicated logistics of workshops and the trainees program.

The RSI will contribute to this program during the first year a roughly equivalent number of 6 person-years of professional services which will include:

1. The principal investigator (Harrison Brown), part time.

2. The Executive Secretary of the Asia-Pacific Energy Studies Consortium, part time.

3. Resource geologist (Richard Sheldon), part time. He is assigned to the RSI by the U.S. Geological Survey.

4. Approximately 5 person-years of work by other professional staff. In addition, the program will be backed up by professional staff from other parts of the East-West Center.

Table 1
Anticipated Level of Activity

	Year 1		Year 2	
	All Sources	AID	All Sources	AID
Staff (persons-years)	9 1/3	3 1/3	11	5
Short-term Professional Services (av. 1 mo., including travel)	2	2	3	3
Workshops	4	1	5	2
Cost of Support of Researchers from Developing Countries	-	-	6	4
Staff Travel International (RT Hnl-Asia)	7	3	8	4

J. List of Possible Cooperating Institutions

It is to be noted that the following institutions have either already been working with the East-West Center in past projects, or have been visited during the past year by RSI staff after the research emphasis of RSI in food, energy, and raw materials had been determined. However, it must also be noted that these institutions have not yet been approached specifically with the intent of having them collaborate in the research that is the subject of this proposal. It is from this roster that we will select those most particularly suited for the work here outlined.

A. Bangladesh

Bangladesh Institute for Development Studies
Motijheel, Dacca

Comilla Institute for Rural Development, Comilla

The Agricultural University, Mymengsingh

The University of Dacca, Dacca

B. India

*Appropriate Technology Development Corporation, Lucknow

*Indian Institute of Science, Bangalore

*Institute for Social Development Studies
Patna, Bihar

*Sardar Patel Center for Economic and Social Research,
Ahmedabad

*Note: In the India context it appears necessary to visualize a core group of perhaps 3 or 4 institutions directly cooperating in the research, with strong communication flows with many additional entities. Those likely to consider themselves among the core group are marked with an asterisk (*). Examples of additional entities are also listed.

E. Nepal

Centre for Economic Development and Administration, Tribhuvan University, Kathmandu

Commission for Science and Technology, Kathmandu

National Planning Commission, Kathmandu

F. Pakistan

Agricultural Research Council, Ministry of Agriculture, Islamabad

Agriculture University, Faisalabad

Ministry of Petroleum and Natural Resources, Islamabad

Pakistan Institute of Development Economics, Islamabad

Planning Commission of the Government of Pakistan, Food and Agriculture Section, Islamabad

Sind Agriculture University, Tando Jam, Sind

G. Philippines

Central Luzon State University, Munoz, Nueva Icija

International Rice Research Institute, Los Banos

National Energy Development Board, Manila

National Irrigation Administration, Manila

National Science Development Board, Manila

SEARCA (Southeast Asian Research Council on Agriculture) University of the Philippines, Los Banos

Technology Research Center, Manila

University of the Philippines, Manila

H. South Korea

Korea Institute for Science and Technology (KIST)
Seoul

Korea Advanced Institute of Science, Seoul

Ministry of Agriculture & Forestry, Suweon

Seoul National University, Seoul

The Agricultural Development Corporation, Seoul

I. Sri Lanka

Agrarian Research and Training Institute, Colombo

Ceylon Electricity Board, Colombo

Ministry of Finance and Planning, Colombo

School of Agriculture, University of Sri Lanka, Peradeniya

Water Resources Board, Colombo

J. Thailand

Chiang Mai University, Chiang Mai

Chulalongkorn University, Bangkok

Kasetsart University, Bangkok

Khon Kaen University, Khon Kaen

The Asian Institute of Technology, Bangkok

The Committee for Investigations of the Lower
Mekong Basin, ESCAP, Bangkok

The Department of Agriculture and Fisheries, Bangkok

The National Research Council of Thailand, Bangkok

K. Reports

1. Annual Reports

The preliminary report should be submitted no later than 60 days after the end of the first year from the effective date of the grant and the final report no later than 60 days after the end of the second and final year of the grant. Six copies should be sent to ASIA/TR/STEP in AID/W.

2. Publications, Research Reports, Dissertations, Etc.

a. Submit two copies to ASIA/TR/STEP

b. Submit four copies, accompanied by a short abstract of approximately 200 words which highlight findings, results, etc., as described in the Guide to Writing Abstracts for A.I.D., to the Editor of ARDA/TA/PM in AID/W.

c. Submit at least annually with annual report or as produced.

d. In the rare case where you are able to supply but one copy, send it to the Editor of ARDA and he will make copies of it available as required. One of the copies to the Editor of ARDA should be printed or originally-typed for photographing for microfiche.

L. Grant Funding

The total grant amount will be $500,000.

A. Total A.I.D. dollar funds presently available for payment and allotted to this grant. -$0-

B. Additional funds set aside for this program which will be provided by grant amendment upon expiration of Advice of Program Change to Congress. $500,000

C. In the event A.I.D. determines that any disbursements under this Grant to a given country would not be permissable for statutory or policy reasons, it will so inform the Grantee who will cooperate in terminating any such disbursements.

M. Budget

	Year 1		Year 2	
	All Sources	AID	All Sources	AID
Staff Salaries*	282,000	72,000	310,500	90,000
Short-term Professional Services (av. 1 mo., including travel)	12,000	12,000	18,000	18,000
Workshops**	170,000	50,000	230,000	100,000
Cost of Support of Researchers from Developing Countries	---	---	30,000	20,000
Staff Travel International (RT Hnl/Asia)	17,500	7,500	20,000	10,000
Institute Administrative Support Cost***	72,500	58,500	76,000	62,000
TOTAL	554,000	200,000	684,500	300,0

* Includes mandatory increases after first year--estimated to be 5%. Also includes $4,000 for relocation expenses for two new professional staff (1st year).

** $80,000 appropriated funds from RSI will be maintained throughout the life of the grant. Also includes cost-sharing in-kind from cooperating institutions. It is assumed that RSI portion will be relatively constant each of the two years, but from experience we expect the cost-sharing to increase from the cooperating institutions.

*** This includes research reference materials, supplies, communications, publications, student help (secretarial), and domestic travel.

N. Special Provisions

The following provisions set forth in Attachment 2, Standard Provisions of this Grant, are hereby deleted:

Standard Provision No. 7B	Payment - Periodic Advance
Standard Provision No. 7C	Payment - Reimbursement
Standard Provision No. 12A	Title To and Use of Property (Grantee Title)
Standard Provision No. 12B	Title To and Care of Property (U.S. Government Title)