

Proj. 4970266

[Handwritten initials]

(2)

PD-AAD-911-81

UNCLASSIFIED

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

135 p.

PROJECT PAPER

497-266

Proposal and Recommendations
For the Review of the
Development Loan Committee

INDONESIA - Science and Technology

AID-DLC/P-2241

UNCLASSIFIED

PART I. SUMMARY AND RECOMMENDATIONS

Part I (A) Project Face Sheet

AGENCY FOR INTERNATIONAL DEVELOPMENT		1. TRANSACTION CODE A A ADD C CHANGE D DELETE		PP
PROJECT PAPER FACESHEET		2. DOCUMENT CODE 3		
3. COUNTRY ENTITY USAID/Indonesia		4. DOCUMENT REVISION NUMBER		
5. PROJECT NUMBER (7 digits) 197-0266	6. BUREAU/OFFICE A. SYMBOL B. CODE		7. PROJECT TITLE (Maximum 40 characters) SCIENCE AND TECHNOLOGY (LOAN/GRANT): Practical Application for Development	
8. ESTIMATED FY OF PROJECT COMPLETION FY 82		9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY 77 B. QUARTER C. FINAL FY 81 (Enter 1, 2, 3, or 4)		

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$) -

A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)	300		300	1,500		1,500
(LOAN)	5,000		5,000	5,000		5,000
OTHER U.S.						
HOST COUNTRY		50	50			
OTHER DONOR(S)					2,200	2,200
TOTALS	5,300	50	5,350	6,500	2,200	8,700

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY 77		H. 2ND FY 78		K. 3RD FY 79	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) ST	B750			300	5,000	300	-	300	-
(2)									
(3)									
(4)									
TOTALS				300	5,000	300	-	300	-

A. APPROPRIATION	N. 4TH FY 80		O. 5TH FY 81		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED
	D. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1)	300	-	300	-	1,500	5,000	MM YY 10 79
(2)							
(3)							
(4)							
TOTALS	300	-	300	-	1,500	5,000	

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 NO
 2 YES

14. ORIGINATING OFFICE CLEARANCE		15. DATE DOCUMENT RECEIVED IN AID/W. OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION	
SIGNATURE	S. J. Littlefield Acting Director USAID/Indonesia	DATE SIGNED	MM DD YY 08 10 77
TITLE			

(PART I)

3. Recommendations

Loan: \$5,000,000 to the Government of Indonesia for a five year project. Terms: Repayment of principal and payment of interest within 40 years, including a 10-year grace period of repayment of principal, with interest at 2% (two percent) per annum during the grace period, and 3% (three percent) per annum thereafter.

Grant: \$1,500,000 (\$300,000/year for five years)

Borrower's Contribution: \$2,200,000 in cash or in-kind, i.e. not less than 75% of the total project cost.

Local Currency Costs Financing Authority be issued.

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

UNCLASSIFIED

AID-DLC/P-2241

September 1, 1977

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Indonesia - Science and Technology

Attached for your review are recommendations for authorization of a loan/grant to the Government of Indonesia ("Borrower") of not to exceed Six Million Five Hundred Thousand Dollars (\$6,500,000) - Loan in the amount of Five Million Dollars (\$5,000,000) and a related Grant in the amount of One Million Five Hundred Thousand Dollars (\$1,500,000) to assist in financing certain foreign exchange and local currency costs of goods and services required for the project. The loan/grant project will provide a means for scientific and technological institutions to plan and conduct research activities that will be of benefit to the people of Indonesia.

This loan/grant proposal is scheduled for consideration by the Development Loan Staff Committee on Friday, September 9, 1977 at 2:30 p.m. in Room 3886 New State.

Please note that your concurrence or objection is due by the close of business on Wednesday, September 14, 1977. If you are a voting member, a poll sheet has been enclosed for your response.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analysis
Annexes A - C
E - H

SCIENCE AND TECHNOLOGY (LOAN/GRANT)
Practical Application for
Development
(Project No. 497-0266)

PROJECT PAPER

Table of Contents

	<u>Page</u>
PART I	
<u>SUMMARY AND RECOMMENDATIONS</u>	
A. Face Sheet	1
B. Recommendations	2
C. Summary Description of the Project	3
D. Summary Findings	15
E. Project Issues	16
PART II	
<u>BACKGROUND AND PROJECT DESCRIPTION</u>	
A. Background	19
B. Detailed Project Description	23
C. Criteria for Selection of Subactivities	45
PART III	
<u>PROJECT ANALYSIS</u>	
A. Technical Analysis Including Environmental Assessment	47
B. Financial Analysis	50
C. Social Soundness Analysis and Benefit Incidence	54
D. Economic Analysis	66
E. Impact Upon Women	70
PART IV	
<u>IMPLEMENTATION PLANNING</u>	
A. Administrative Arrangements	71
B. Implementation Plan	74
C. Evaluation Plan	75
D. Conditions, Covenants and Negotiating Status	77

ANNEXES

	Page
A. PRP Approval Messages	Annex-A-1
B. Project Technical Details (Illustrative Subactivities)	
(1) Subactivity 1: Standards Policy and Systems, Instrument Repairs and Calibration, Measurement Services, and Quality Control Improvement	B-1-1
(2) Subactivity 2: Alternative Energy Sources for Rural Areas	B-2-1
(3) Subactivity 3: Aquatic Resources Development	B-3-1
(4) Subactivity 4: Resource and Environmental Mapping and Evaluation through Remote Sensing	B-4-1
(5) Subactivity 5: Survey, Assessment, and Mapping Geological Resources, Land Information and Geologic Hazards	B-5-1
(6) Subactivity 6: Weather Forecasting for Fisherman and Farmers	B-6-1
C. Logical Framework Matrix	C-1
*D. Statutory Checklist	D-1
E. Borrower/Grantee's Application for Assistance	E-1
F. Draft Authorizing Document	F-1
G. The Organization of Research, Science and Technology in the Government of Indonesia, by Dr. S.B. Joedono	G-1
H. Initial Environmental Examination	H-1

*Annexes not included in final printed version of PP; they can be found in the official project file maintained at ASIA/PD.

(PART I)

C. Summary Description of the ProjectAbstract

SCIENCE AND TECHNOLOGY (LOAN/GRANT):
Practical Application for Development

The GOI has recognized social justice with a thrust on improving the incomes and quality of life of the majority of its citizens as a key national objective in its current and planned five-year plans. The GOI also recognizes that to achieve the objective, it must develop appropriate policies and programs, and have well-managed and efficient institutions capable of adapting and using scientific principles and technological advances to improve the lives of the average, poor and rural Indonesian. At the present, over 150 institutions deal with some aspect of research, development or technical service, but most are poorly managed and inefficient, and their policies are not well developed. Whether involved in agricultural research, small industry and product development, or health and safety standards, there is a need for improvement in policy development and management capability.

The GOI social justice goal is consonant with the objectives of AID and the Congress. The overall objective of this project is defined as follows:

"To provide a strong indigenous capacity in selected Indonesian scientific and technological institutions to plan and conduct research and development activities in ways that will benefit Indonesia's majority, and offer opportunities for increased productivity, income, and improvements in the quality of life."

The methodology will be to use established, recognized, U.S. institutions to assist the Government of Indonesia through technological transfer and adaptation over an initial five year period. "Two closely related assistance activities" (Activities "A" and "B") will provide

the project's main thrust. One (Activity "A") will be developing and strengthening technological and research policies which meet the project's objective, stated above. The other (Activity "B") will be to strengthen the management and capabilities of a broad spectrum of existing institutions to improve their quality, self-reliability, effectiveness, and increased relevance of a particular service or research project's objectives to social and economic development goals. A second related thrust is a group of "subactivities" dealing with specific S&T related topics and specific institutions. Some illustrative examples of subactivities are dealing with improved safety and quality standards, alternative energy sources, geological hazard planning, improvement of rural development planning tools and information, and aquatic resource development in a rural area, all under specific institutional leadership.

Project management will be by the Minister of State for Research, his staff, and the staff of involved institutions. AID management will be through the Science and Technology Advisor, USAID/Indonesia. A management and evaluation committee, chaired by the Minister, will guide the project.

Background

The Government of Indonesia has placed major emphasis in its Second Five-Year plan on social justice with the basic thrust on improving the incomes and quality of life of the majority of its citizens. This thrust is strengthened in the Third Five Year Plan, now in final stages of preparation.

The problems of attaining these goals, however, are staggering. In a country of 3,000 inhabited islands and about 135,000,000 people, limited accessible arable land, and an extremely high poverty level, there is no easy solution to bettering the lives of about 100 million needy Indonesians with low incomes, limited or no access to services (health, education, etc.), few job opportunities, and limited hopefulness for the future of their children. The Government of Indonesia has given priority to agriculture and rural development. The Government of Indonesia, however, recognizes that determined efforts must also be made in other areas, including increased economic activities and promoting a better quality of life. To this end the importance of the adaptation of modern techniques to local systems is recognized. More importantly,

the essentiality of developing technologies suitable to local conditions in areas of little relevance to the modern world-wide scientific network. For example, in a keynote policy address, the Minister of State for Research stated:

"Again I cannot stress enough how important it is that high level manpower training programmes be formulated and implemented in a concentrated way so as to develop both scientists and high quality research institutes. It is important that there are local institutions that can focus on problems of great importance to the societies concerned, otherwise important work may be left undone, not finding a place in the research priorities of rich countries. For instance special attention should be given to research on such problems as nitrogen fixation for grains, pest resistant crop varieties, schistosomiasis, river blindness in arid and semi-arid lands, tropical watershed management and so on.

"Research should also focus on the improvement and adaptation of technologies developed in the industrial world, but it should also focus on the development of completely new technologies that are specifically geared to the requirements of each developing country and that reflect each country's factor endowments and resource availability and constraints, and the need for a pattern of research that leads to investments that concentrate on the needs of the lower income groups, and that raise the productivity of the poorer part of the population."

The Government of Indonesia has created a multitude of research, engineering and service institutes with the charter of developing technologies in various fields which will broaden the scope of economic activities for the majority of Indonesia citizens. Much good work has been done. A few examples are, (a) the National Institute of Chemistry is working on the formulation and production of nutritious products from soybeans; (b) the Ceramics Research Institute is working with small scale rural industry in establishing capabilities to produce brick, tile, pipe, etc.; (c) the Leather Research Institute develops production techniques and markets for leather from small producers of animal hides; (d) the Batik and Handicrafts Research Institute addresses technical problems in village arts and handicrafts produced by cottage industries. (For a further description of illustrative, on-going activities, see the Social Soundness Analysis, Part III-C.)

Among the 150 or so research and service institutes, few concentrate on basic scientific research for two reasons. First, the policy of the government is to develop usable technology to allow it to meet its social goals, in effect,

appropriate technology in light of prevailing economic and social conditions; secondly, the skill training and emphasis to perform basic research does not exist to a meaningful extent. AID is not planning, through this or any other project, to provide such skills. This project, therefore, will support technologies and applied ("goal-oriented") science, and will not support basic science which is pursued to advance man's understanding of nature and the universe, rather than developing useful applications of that knowledge. This statement should not be interpreted to demean the importance of basic science, which is the body of scientific knowledge and the base upon which applied science and technology is built, but rather to indicate the focus and limits of this particular project, intended solely to turn scientific knowledge to the benefit of people in Indonesia.

A key restraining factor which is becoming increasingly evident to GOI policy makers is that while the goals are sound and budgetary resources are becoming increasingly available (in GOI FY year 1977-1978 the budget for science and technology was increased by 35.5%), the existing structure is largely inefficient and does not possess the needed competence to translate overall goals into workable policies and programs. Therefore, assistance has been requested from the United States in the strengthening of the existing structure which has been created to implement these policies to reach social justice goals.

As mentioned above, there are two major weaknesses in the implementation of an appropriate scientific and technology program in Indonesia; (1) insufficient experience to develop policies and translate them into programs, and (2) insufficient institutional ability to manage programs to attain maximum results. Therefore, this project will concentrate upon improving the capacity of the Indonesian research and service establishment in these two areas.

The main thrust will be a direct attack upon these problems through the following broad-based activities:

Activity "A" - A series of development seminars, study groups and special studies of key S&T-related topics and issues, to develop national and institutional policies.

This "policy development" activity would be carried out jointly by a U.S. institution, the National Academy of Sciences, and the GOI Ministry of State for Research (augmented if necessary by the staff of LIPI, the GOI National Institute of Sciences) in areas such as reducing post-harvest food losses, alternative energy policies, food technology and nutrition policies, environmental aspects of development, policies to reverse forest

depletion, policies to mitigate losses from natural disasters, etc. The joint effort by the U.S. experts and Indonesian policy makers will not only provide important policy recommendations which can be absorbed directly in five year development plans or policies, but will also provide experience to and develop capacity in Indonesian institutions to focus on key policy questions in a meaningful manner.

Activity "B" - Training and education to strengthen the institutional and R&D project management capability within Indonesian research, development and service institutions by developing in-service training programs, techniques and instructional materials, and relating their programs more to the needs of the majority.

This "R&D management" training will expand upon an earlier and highly successful program of annual training workshops, and build an indigenous Indonesian capability to teach management techniques to a broad spectrum of Indonesian science and technology related institutions, both to make their programs more related to the needs of the average, poor Indonesian, and to make their administration and operation more effective.

While strengthening the capacity of the general Indonesian technological structure to develop workable policies and implement programs through this main thrust, a closely related second thrust will implement some individual subactivities with a few selected institutions on a few selected development topics of high priority to the GOI, and in which U.S. institutions have particular expertise, and with a great potential for benefit for Indonesia's poor majority. Thus, while the broader development of capacities is underway as set forth in Activities "A" and "B" above, specific programs will be carried on as subactivities to test and optimize the systems and methodologies being developed, and to adapt technical assistance to the Indonesian environment and system, while at the same time providing products which will have an overall impact on the Indonesian goal of social justice. Both the activities and subactivities will be approved on the basis of jointly developed and approved selection criteria.

Several examples of subactivities now under discussion, and how they relate to the social goals of the GOI follow:

Illustrative Subactivity (a). Standards, Measurement Services and Quality Control:

The Indonesian Government believes that a major factor in increasing incomes is the development of labor intensive small and middle scale industries to absorb the 1,200,000 annual new entrants into the ranks of the unemployed. Unfortunately, experience to date has shown that many of the small industries created to date, through a lack of quality control, cannot compete in the Indonesian market against imported goods. Small industry creation is useless if it cannot find a market for its products. A system of standards and quality controls is a basic factor in helping small industries become viable. In many cases, such as food and water quality, it is also essential to the safety, nutrition and health of the individual.

Illustrative Subactivity (b). Alternative Energy Sources for Rural Areas:

A wide body of knowledge exists concerning energy generation in addition to fossil fuel, hydroelectric and nuclear energy generation. A few examples are methane gas, generated from agricultural and livestock wastes, chars and oils generated from dry agricultural waste, (all readily available in Indonesia), solar power, wind power, geothermal energy and so on. It is planned to analyze this knowledge in light of Indonesian conditions to develop systems for making such systems available in the villages. This program has three powerful objectives (a) conservation of scarce fossil fuel and hydro resources, (b) retarding the rapid consumption of firewood which is devastating forests and causing soil erosion, especially in Java, and more importantly (c) providing to low income people an improvement in life quality at a price they can afford, e.g. energy for pumps to provide potable water, light for education, increased home industry, clean fuel for cooking and household uses, etc.

9

Illustrative Subactivity (c). Weather Forecasting for Fishermen and Farmers:

Currently there is no system of weather forecasting designed for fishermen and a limited and ineffective system for farmers, with resultant unfavorable effects on their safety, efficiency and production. It is very important that a farmer knows when a heavy rain or dry spell is predicted so that he can plan his planting, harvesting, grain drying and other farming activities accordingly. The local small-boat fisherman should also know when severe squalls are expected in his fishing area, to know whether to stay in port, or to move to other fishing grounds.

Weather forecasting systems is an area in which worldwide knowledge is steadily expanding. The translation of this knowledge into practical systems adapted to Indonesian conditions and needs should be of major benefit to the small food producers that we are all trying to help.

These are but a few examples of the types of subactivities which this project will support. A list of subactivities which AID is now discussing with the GOI, and their relationship to the overall social welfare goals of the GOI is included in Annex B, and in the Social Soundness Analysis, Part III C.

At the completion of the project we expect the following conditions will exist:

1. A substantially improved capacity will exist within the Indonesian scientific community to translate overall goals into meaningful policies and programs capable of implementation in Indonesian conditions, for the benefit of the Indonesian majority.
2. Relationships will be strengthened between high quality U.S. institutions and Indonesian institutions which will provide a valuable exchange of information, new technologies and capabilities. (In view of the relationship of certain U.S. institutions with other LDCs, the spread effect will be far beyond Indonesian development. For example, if Indonesia develops a workable system for

say harnessing wind power at the village level, such information could be transmitted to other LDCs through the U.S. institution and AID and vice versa).

3. Workable policies and programs will have been developed in coordination with policy makers and, hopefully, included in the overall development program in areas such as reducing post harvest food losses (estimated at least 30% of production); viable small industry programs will have been developed; cheap and clean energy to the low income population will be available, etc.

4. Specific activities of importance to the development program will be implemented, such as standards policies and systems for small industry and consumer goods and safety, the management of aquatic resources to increase protein availabilities, the opening of new lands made possible by resource mapping, the movement of threatened people out of disaster prone areas prior to the disaster (earthquakes, volcanic eruptions and so forth) because of knowledge made available through geological assessment and mapping.

The development of such a capability and program is an essential complement to other activities of the GOI supported by AID and other donors, whose objectives are to raise incomes and improve life quality, e.g. improved agricultural research and production, mass education, area development, increased fish production, nutrition efforts, development of economic activities at the village level in addition to agriculture, health extension and family planning (quality control for the production of contraceptives), etc.

The Project

The project will total at least \$8.7 million, of which \$6.5 million will be provided by AID (\$5 million loan and \$1.5 million grant) and at least \$2.2 million by the GOI in cash and in-kind. Of the amount financed by AID, approximately \$2 million will be required in local currency to help finance such costs as per diem, local travel, local office support personnel, supplies and equipment, house rental and education allowances for long-term consultants, utilities, car rental or chauffeur, local communications, report reproduction, translations, etc.

The project will implement the general institutional activity of policy development and R&D management improvement, as well as more specific subactivities, all following agreed-upon criteria, i.e.:

1. The subactivity should contribute to the overall project objective of "providing a strong, indigenous capacity in selected GOI scientific and technological institutions to plan and conduct research and development

(R&D) in ways that will benefit Indonesia's majority, and offer opportunities for increased productivity, income and improvements in the quality of life."

2. The subactivity should contribute to the project requirement of having a preponderant thrust which benefits the poor, that is, benefiting the majority of Indonesian citizens.
3. The subactivity should be ranked for priority by measuring its likely benefit to the majority of Indonesian citizens, such as whether the institutions involved and the specific subactivity objectives relate to such things as increased agricultural output, expanding rural employment opportunities, increasing personal safety, contributing to rural energy needs, assisting rural planners and developers, improving nutrition and health, preventing environmental and natural resource degradation, improving low-cost shelter, expanding markets for rural produces, etc.
4. The subactivity should offer possibilities for creative application of science and technology to rural and remote areas, through rural development and benefits to rural, low-income populations, although urban benefits are not excluded, e.g. improved food standards benefit all.
5. The subactivity should enhance and develop institutional capacity to relate institutional policies and programs to the needs and problems of the majority, in an efficient way.
6. The subactivity should fit with current or planned GOI socio-economic development goals and priorities (i.e., the five year development plans) to insure GOI budgetary support for local costs and priority for counterpart manpower commitments, etc.
7. The subactivity should have a feasibility study as its first phase to determine the likelihood of success and to provide detail and direction to the scope of work and subactivity management, unless there have been sufficient forerunner activities to satisfy this requirement.
8. The subactivity should develop a utilization or continuation plan to enhance the spread effect of beneficial results.
9. The subactivity should contain a clear element of improving the institutional self-reliability of the specific Indonesian research, development, engineering or public service institution involved.

10. The subactivity should be periodically evaluated annually or more frequently by a GOI evaluation committee, augmented by one or two AID representatives. Other non-Indonesian persons may be invited as desired. The evaluations shall include "course correction" recommendations, e.g. to insure maximum benefit to the Indonesian people.
11. The subactivity shall be certified by the GOI as being timely, in view of the many external factors which can affect the progress of an activity.
12. The subactivity shall be rated by USAID and the GOI as having a high chance of success, using as a guide such factors as forerunner activities, GOI priorities, timeliness, need, personnel involved, competition, corollary support, etc.
13. The subactivity will encourage a systematic, multi-disciplinary, and - where appropriate - interagency approach to encourage rational design and full cooperation of various agencies and institutions concerned in the subject matter. (Technical management of a specific subactivity may be delegated by the Minister of State for Research to the most appropriate agency or institution, with the oversight responsibility being retained by the Minister of State for Research, as the overall project administrator and manager).
14. The subactivity will be approved by USAID as being within the foreign assistance guidelines of the Congress and AID.

Six specific subactivities are currently under discussion between AID and the GOI which amount to considerably more than the total project amount. As the selection criteria are applied, and as feasibility studies or forerunner activities indicate, the activities finally approved will be reduced to the amount of available funds.

Currently two activities and three subactivities can be quickly ready for funding, and meet the above criteria. Some have the necessary forerunner activities or studies completed. These activities are; (A) Science, Technology and Research Policy Development, (B) Manpower Development in R&D Management, and the subactivities; (2) Alternative Energy Sources for Rural Areas, (3) Aquatic Resource Development, and (5) Survey, Assessment, and Mapping of Geological Resources, Land Information and Geologic Hazards, and can be implemented upon completion of the "conditions precedent" described in Part IV-D.

The project will be administered by the Minister of State for Research and his staff. Individual activities/sub-activities will be technically implemented by the particular research institute involved, except for science policy development, which will be retained directly in the Research Ministry. Under the direction of the Minister of State for Research, a Science and Technology Project Management and Evaluation Committee is being established with membership of all the concerned agencies and institutes. See Part IV-A for a detailed analysis of the administrative and management arrangements.

The activities/subactivities, if all were accepted, would require loan/grant funds of approximately \$9,659,000 rather than the \$6,500,000 requested. Therefore, selection among the subactivities will be made by priority, timeliness and other factors so that the total will be within the \$6.5 million loan/grant funds expected. However, it is recommended that if the available funds are committed by the first two years and the project is proceeding well, that a decision be made in the third year whether additional loan/grant funds should be sought to (a) proceed with the subactivities originally set aside, (b) revise/expand the subactivities originally funded, (c) develop follow-on loan/grant funding for new activities/subactivities under a time extension and funding expansion, or (d) any combination of these.

Two Governmental agencies, the Cabinet Secretariat and the National Development Planning Agency, BAPPENAS, oversee all technical assistance to Indonesia to assure compatibility with the national planning activities and objectives, and to avoid duplication of effort, or inadvertent competition. GOI agencies clear their programs and projects with these agencies, to be sure activities/subactivities are coordinated and compatible with other donor support, and that they fit in with GOI overall planning. In the case of this Project, it has been reviewed by the Minister of State for Research, who will administer the overall project, and by the institutional leadership for the various activities and illustrative subactivities. The Minister of State for Research has cleared the concept and his administration authority with the President of Indonesia, BAPPENAS, and the Cabinet Secretariat. The basis for this Project has been published by BAPPENAS in its 1977-78 "Bluebook" of requests for foreign assistance, with its highest priority "A". Therefore, we do not see any difficulty in GOI budgeting or program approval for the various agencies to be involved in Activities or Subactivities under this Project.

It is recommended that grant financing should be used particularly for, (a) feasibility studies and experimental pilot programs under the various activities/subactivities

where, because of GOI fiscal year and budget cycles or similar reasons loan funding would cause delay, (b) certain evaluation costs such as those of outside experts, (c) ad hoc expenses for consultants and participants where there is some difficulty with loan financing, such as provision of adequate housing for long term consultants, or an activity which although clearly beneficial to the attainment of activity/subactivity objective, is not possible or desirable under loan funding because of timing, GOI practice or regulations (e.g. using U.S. carriers), or administrative cycles, etc.

It is recommended that FAA Section 106 funds be used for this project. It is worthwhile noting, however, that because of the multidisciplinary character of the project, including its wide ranging socioeconomic benefits, it will have positive impacts to varying degrees on the purposes of FAA Sections 103, 104 (health), and particularly on 105 (human resources development) and 107, in addition to 106. See activity/sub-activity descriptions and project analysis section for detail.

D. Summary Findings

The Mission has determined the proposed activities and subactivities to be technically and financially feasible for completion during the five year life of the Project. The Implementing Agency has been examined and is believed to have the capacity to carry out its responsibilities under the Project. There appear to be no financial constraints to prevent the Government of Indonesia from providing the required minimal funding for Project implementation, and the expectation is that it will be considerably more. The dual activities (science policy development and R&D management) can be implemented quickly, since forerunner activities have laid the groundwork and proved the concepts. Several subactivities can be selected and started the first year, and all selected subactivities are expected to be started by the end of the second year. The Social Soundness and other analyses have proven positive. Loan authorization is encouraged at the earliest possible time.

E. Project Issues

The central issue raised at the PRP review was whether the focus of the project was predominately and sufficiently directed toward assisting the poor. The reviewing committee directed that the project should be based upon a primary concern for relating science and technology (and research development) to the needs and problems of the majority of Indonesians, which clearly includes the needy and poor. Furthermore, the PRP review committee asked that emphasis be placed on the institutionalizing of this concern through policies and institutions which effectively translate the benefits of S&T and R&D to the majority of the Indonesian people. Finally, the committee instructed that criteria be developed to insure that the preponderant thrust of the activities under the project will reflect the initial concern.

These points were discussed with the GOI, and as they parallel stated GOI objectives, they were accepted and confirmed in writing by the GOI. The project activity and subactivity proposals were then modified to the extent necessary by applying the criteria and objective suggested by the PRP reviewing committee, to clearly show this thrust. The beneficiaries have also been more closely defined, as described in the Social Soundness Analysis, Part III-C.

The primary change in the overall project was to redefine the objective, which is now to help provide a

"strong, indigenous capacity in selected GOI scientific and technological institutions to plan and conduct research and development (R&D) activities in ways that will benefit Indonesia's majority and offer opportunities for increased productivity, income, and improvements in the quality of life."

The reviewing committee also made clear that the intention here was "primary" and not that an exclusive relationship to the poor be required within the project's activities and subactivities, and in their respective detail. Nevertheless, the illustrative activities and subactivities described in this Project Paper lean more heavily toward this relationship and benefit to the poor than probably required. This is intentional, to insure that the maximum reasonable response to the issue and APAC guidelines has been made.

Minor issues (compared to the above issue) were questions on project management, relevance of prior AID experience

through central AID programs, relevance to low-income people, clarification of the relationship between S&T policy development and R&D management, specific illustrative subactivities, such as mapping activities, and the effect of the interrelationships on longer term developments, including possible follow-on project assistance by AID.

These questions have been answered in the redevelopment of the various elements of this project paper. The activity/subactivity descriptions and the social soundness statement now address the low-income relevance question, as do various specific modifications within the proposed activities and subactivities. A fifteen point list of activity/subactivity selection criteria (Part II-C) has been developed together with the GOI, based on the new project objective and the APAC guidelines, and now assure conformity with the condition of having a predominate thrust of assistance to the poor. The feasibility of activities/subactivities has been clarified as part of their respective descriptions, and suggested budgets have been added. The conditions precedent have been developed (Part IV-D). The feasibility appraisal (technical/environmental/economic/financial), the social soundness analysis, and the analysis of impact upon women have been made.

Regarding evidence of effective management and administrative arrangements and capabilities, a high-level Project Management and Evaluation Committee has been introduced to insure management and evaluation capability for the project as a whole. The conditions precedent now require evidence that a senior officer be appointed as a single point of responsibility and that sufficient staff will be provided for administration requirements, at both project activity and subactivity levels.

Where pertinent, for example in the dual project activities of science policy development and R&D management training, prior AID experience has been explained in greater detail, appraised, and its relevance to low-income peoples illustrated.

In the administrative analysis, the relationship and lines of authority of the Ministry of State for Research to other GOI entities is charted and explained, and the same is done for the multi-institutional agency "LIPI" (Indonesian Institute of Sciences) which has a headquarters staff of 300 and can provide staff support to the Research Ministry, as assigned, since it reports to the Minister of State for Research.

The coordination and central focus of the project has been strengthened by assigning the broad, multi-institutional activities of overall policy and management development to a central role under the Ministry and LIPI jurisdiction, with the illustrative subactivities, which deal with individual technical institutions, as a secondary thrust. This two-pronged approach should strengthen coordination and focus considerably, as the membership of the Management and Evaluation Committee will be composed of senior representatives from all activities, and all are under the Ministry of State for Research project oversight and administration responsibility. In addition, the Minister of State for Research chairs interagency committees which direct resource, mapping, evaluation and development, and geologic hazards, as well as having research policy coordination responsibility over the Mapping Coordination Agency, BAKOSURTANAL. The Geological Survey of Indonesia and BAKOSURTANAL have already agreed to these management arrangements.

The log frame matrix has been modified to reflect the changes made in the project orientation.

PART II. BACKGROUND AND PROJECT DESCRIPTION

A. Background

The GOI recognizes that the judicious application of practical scientific research findings and appropriate technologies must be central to its development plans, the managed exploitation and protection of its natural resources, and the welfare of its people. The present Five Year Development Plan places a very significant emphasis on science and technology, and the emphasis is expected to be even greater in the next Five Year Development Plan. The Minister of State for Research, Dr. Sumitro Djojohadikusumo, documented the importance of the technology-resource-society relationships in his speech, September, 1976, "Technology Economic Growth, and Environment". (a copy is available in ASIA/TR/SDP, AID/W). In an address, May 7, 1977, at the Bandung Technological University (ITB) U.S. Ambassador David D. Newsom pointed out, "It is obvious that the standard of living of the rural population cannot be raised without the input and contribution of technically trained people."

President Soeharto further spelled out how the GOI expects science and technology to contribute to development, at the Conference of University Rectors, February, 1977. He stated that science and technology be judged by their benefits for the Indonesian people and asked that emphasis be placed on making the findings of science and technology relevant to national development and to the needs of the Indonesian society.

In a July 18, 1977 speech at the opening of the Third Inter-Congress of the Pacific Science Association, on the theme "Appropriate Technology," President Soeharto included the following statements. "Although the development concepts and problems encountered by one country are different than the others, the majority of the developing countries are facing the same fundamental problem; namely how to advance the prosperity and well-being of their people. I therefore regard this Congress as one of the manifestations of the efforts of scientists and technological experts in their participation to ensure the success of the great struggle for the well-being and prosperity of the people."

... "The question remains how can we apply technology which must be dedicated to the well-being of mankind. Technology is for mankind. Not the contrary."

... "It is a fact that backwardness in the fields of science and technology becomes the obstacle of the developing nations."

... "To make the most correct selection of the imported technology and to adapt it with the local condition, the developing countries ought to step up their own ability in the fields of science and technology. Also it is through this increased ability that the existing traditional technology can become more efficient. What I mean by increasing the ability in the fields of science and technology actually covers the expansion of employment opportunities, institutions, working programmes and financing. Experts and vocational trainees would be increased in their quantity and quality."

... "Now Indonesia is entering the last years of her Second (Development) Plan, which apart from continuing economic development, efforts are undertaken to promote social development in a broader spectrum as well as the problems of manpower and equal distribution of income which are enjoying greater attention."

(All underlinings added to emphasize GOI commitment toward using science and technology as a tool toward direct social development and equal distribution of income).

The purpose of this Science and Technology Project is in accordance with President Soeharto's statements and follows closely the new directions of AID and of the Mission to make development aid responsive to the needs of the poor people. As pointed out so forcefully in recent Congressional hearings, the application of appropriate technologies is one of the important keys to development that does improve the life of the people. In the field of family planning, agriculture, food processing, nutrition, natural resource management, energy and education, the countries which are making progress are those with the capacity to understand and apply scientific and engineering principles coupled with marketing and business acumen.

Indonesia has both bountiful manpower and natural resources, and development depends to a large part on finding and applying technologies which will make it possible to employ the people effectively in exploiting the natural resources. To do this, it is necessary to produce creative leaders in science and technology and more effective science and technology institutions as well as better management and marketing procedures. With these factors, Indonesia can use its natural resources for the direct benefit of its millions of needy people.

Although this is the first project in this Mission to focus specifically on science and technology, there have been various projects before that have had significant science

and technology components, and several important U.S. institutions have been influential in providing the foundation upon which this project will build.

Most of the on-going Mission projects are concerned at least in part with the application of appropriate technologies. One of the reasons for the success of the Mission's Family Planning Program is that it has developed indigenous leaders, who are aware of the latest scientific findings in the field, and the program is making use of the latest research findings. One of the efforts in the Education Program is to develop the software which will make it possible to exploit the latest communication technologies including Indonesia's satellite. AID is financing a contract with the International Rice Research Institute to help bring to Indonesia the best techniques for growing rice and food crops. A contract with Auburn University is to help apply the best technologies in brackish water fish ponds. The Science and Technology Project will complement these important activities.

Past programs on which this project is based include that of the U.S. National Academy of Science. The Academy with AID grant funding cooperated with the top echelons of the Indonesian Government to present three major policy seminars. These were on food production, industrial research, and natural resource development, and they resulted in important policy decisions in these vital fields. For example, as a result of the seminar on natural resource development, Indonesia is more sophisticated and concerned about natural resource management and environmental protection.

From 1969 to 1974 the U.S. Geological Survey provided special technical assistance and training to the Geological Survey of Indonesia under an AID grant. The project established staff, facilities, and procedures for an initial program of systematic geological mapping and map publication. This helped to develop a basic mapping capability of this type in Indonesia, although further work and expanded activities are needed.

A suggested subactivity under the present project will build on this base and increase the capacity of the Geological Survey of Indonesia to provide more information on land use, soils, geological materials and seismic, flood and other geologic hazards, all of which directly affect human productivity, health and safety in Indonesia.

Some of the previous science and technology activities in Indonesia were part of, or grew out of, AID's worldwide

programs. The Denver Research Institute-AID/W program studied ways to make research institutions more effective. Out of their project activities in Indonesia, a series of research management seminars were developed (1975, 1976, 1977). These were sponsored by the Indonesian National Science Institute (LIPI) under the policy guidance of the Minister of State for Research. The Mission contributed the foreign currency costs for the Denver team, which prepared the curriculum and materials and held training courses for the institutions' leaders and for the research project managers. The suggested subactivity of this present project on research management is founded upon these previous successful activities.

The present project proposal results from the urgent request by the GOI for U.S. help in this vital science and technology area. It is understandable that Indonesia looks to AID for this assistance since the U.S. is recognized as the world leader in science and technology, and since the U.S. State Department has given much recognition to the importance of science and technology in the development process and has expressed a desire to share U.S. technological expertise with the developing countries.

The Mission prepared a Project Identification Document (PID) and later a PRP, both of which AID/W approved. A Science and Technology Advisor was added to the staff of the Mission in August, 1976. The Ambassador formed a special Science and Technology Country Team Committee with representatives from the various parts of the U.S. Mission to Indonesia and the AID Science and Technology Advisor was made chairman. The present proposed project, although perhaps the most important part, is only one part of the Country Team's thrust in the area of Science and Technology.

B. Project Description

The goal to which this project will contribute is the establishment of an indigenous, self-reliant technological community that is able to manage and exploit rationally and efficiently Indonesian natural and human resources for optimum contribution to the country's development, and the welfare of the majority of its citizens. Indonesia should be able to carry on the scientific research and development activities necessary to feed the development process with a minimum of external expertise. It should have control over its renewable resources so that the resource level is being at least maintained. Substitutes should be found for the non-renewable resources that are being depleted.

These accomplishments should be the result of long-range, foresighted national plans and policies, administered and pursued through relevant, effective and well managed science, technology, development and service institutions.

The end result should be Indonesian industries, products and markets which make it possible for the poor people to produce and to consume more and thereby greatly improve their standard of living.

The specific purpose of this project is to provide a strong indigenous capacity in selected Indonesian scientific and technological institutions to plan and coordinate research and development activities in ways that will benefit a majority of Indonesians, and offer opportunities for increased productivity, income and improvements in their quality of life.

We propose to achieve this purpose by concentrating our thrust on two key approaches. The first is policy determination and institutional and program management, as these closely related subjects are central to the development of Indonesian policies and programs relevant to the project goal of benefiting the average Indonesian and to the achievement of efficient institutions to carry out those policies and programs. This approach, which deals with national policies and a widespread of institutions, is described in detail later on in this section. It includes two principal Activities:

- (A) Science, Technology and Research Policy Development
Subtitle: Policies for Research, Development and Services which Benefit Indonesia's Majority, and,
- (B) Manpower, Development in R&D Management
Subtitle: Management Training to Improve Research, Development, Engineering and Service Institutions and Development Projects

While strengthening the capacity of the Indonesian technological structure in terms of policy formulation and research management, a second, supportive approach is a group of subactivities to test and optimize the systems and methodologies being developed and focused on discrete topics and institutions. There will be up to six subactivities which have been jointly planned by GOI and USAID.

The cost for the activities and the suggested subactivities will exceed the sum proposed for the project so the final selection may include fewer subactivities or, where possible, economies may be made. The subactivities most ready for implementation and most likely to be given priority are Alternative Energy Sources for Rural Areas; Aquatic Resource Development; and Survey, Assessment and Mapping of Geological Resources, Land Information and Geologic Hazards.

The six subactivities are listed below. Fuller descriptions and suggested budgets are found in Annex B.

LIST OF ILLUSTRATIVE SUBACTIVITIES
(See Annex B for detail)

- Subactivity 1 : Standards Policy and Systems, Instrument Repairs and Calibration, Measurement Services, and Quality Control Improvement
- Subtitle : Improving the Standards and Quality Control for the Benefit of the Majority of Indonesian Citizens
-
- Subactivity 2 : Alternative Energy Sources for Rural Areas
- Subtitle : Solar, Wind, Micro-hydro, Methane, Pyrolytic, Geothermal, and other Non-conventional Energy Sources for Village and Town Use
-
- Subactivity 3 : Aquatic Resources Development
- Subtitle : Developing, Expanding and Managing Indonesia's Aquatic Resources for the Benefit of Indonesians
-

Subactivity 4 : Resource and Environmental Mapping and Evaluation Through Remote Sensing

Subtitle : Using Aerial Photography and Satellite Imagery in Rural Development Planning

Subactivity 5 : Survey, Assessment and Mapping of Geological Resources, Land Information and Geologic Hazards

Subactivity 6 : Weather Forecasting for Fishermen and Farmers

Subtitle : Devising a System to Provide Weather Forecasts to Fishermen and Farmers

By the end of the project the following will have been achieved (EOPS):

- Policies relating science and technology to the needs of the average Indonesian at national and institutional levels will have been developed in specific areas, and will have been accepted into the formal planning processes, or will soon be accepted. Possible policy areas are reducing post-harvest food losses, standardization, geologic hazard mitigation, and the firewood problem, i.e. alternative energy sources. At least three national policies will have been established.

- Science, research, technology, development and service institutions whose personnel have taken the management courses will have improved institutional and project management, including selecting projects which are more relevant to Indonesian needs.

- An Indonesian cadre for institutional and project management teaching will have been developed, course materials will have been converted to the Indonesian context, an institutional base will have been established, and the spread effect will be visible.

- A teaching/research capability in aquatic resources will have been established at a university in a remote locality to serve the region.

- The several science and technology institutions related to the subactivities will be self-reliant and cost-effective

and will be involved in programs relevant to the needs of the majority of Indonesians.

- The instrumentation and technological equipment which are provided under the project will be in place and in use, to carry out the project activities.

- Perhaps most important of all, the GOI and the Indonesian public will have greater confidence in, and give greater support to their research, development, engineering and service institutions and activities, so that science and technology will make greater contributions to the development of this country and to the welfare of the people.

- Also, the institutions involved will have firm relationships with analog institutions in the United States, and in other countries. These relations will strengthen both the Indonesian institutions and their counterparts.

The project outputs which will be necessary to achieve the project purpose and end-of-project conditions include the following:

- The institutions will produce at least five major research studies each year related to vital human needs, and the results of such studies will be used to improve the lives of the poor people. Appropriate technologies of value to this objective will be demonstrated so that they can be applied to help development in the rural areas.

- Through some of the subactivities, basic materials will be prepared, such as instructional materials, and charts, statistical data, designs and models.

- Some 65 to 100 participants from Indonesian institutions involved in this project will return from short or long term training in the U.S. or third countries, and will assume leadership positions in their institutions in order to make important contributions to the project purpose.

Through the research findings and the demonstration of appropriate technologies, an opportunity for at least 10,000 new jobs will be demonstrated.

To achieve these outputs, there will need to be 20 man-years of long-term foreign consultants and another 20 man-years of short-term consultants. These will be needed to advise the leaders of the institutions, provide some of the leadership for workshops and seminars, and to advise the GOI on science and technology plans and policies.

The training inputs will include 70 man-years of academic training and about 34 man-years of short-term or non-academic training. There will be opportunities for at least 400 science and technology leaders to receive in-country training, through workshops, seminars, etc.

To support the technical assistance and training activities, there will be a need for an estimated 1.0 million dollars worth of commodities. These include such items as instructional materials; publications, research reports and technical abstracts; models and prototype instruments or mechanisms; and measurement and other specialized technological equipment.

The basic assumptions on which this project is based are that the U.S. has the technological expertise which can help to accelerate the development process of this country and provide inputs which benefit the poor Indonesian citizen. This also assumes that Indonesia now has the institutional and manpower base and is ready for the type of assistance which U.S. expertise can provide. This also assumes that technologies are available or can be discovered which are suitable to Indonesia's conditions and will thereby provide significant help to the poor people.

The project is also based on the demonstrated interest of Indonesia to use scientific and technological findings to accelerate the development process. There is ample evidence that the GOI's interest in this area can be expected to increase significantly.

The project will be administered in a collaborative style to support development objectives selected by the GOI which give a predominate thrust and highest priority to sub-activities and institutions which can have an important influence on improving the lives of the poorest of Indonesian citizens. The activities and subactivities will respond specifically to F.A.A. Section 103, the stimulation of small, labor-intensive enterprises in rural areas; Section 105, increasing manpower training in skills related to development and strengthening the management capabilities of institutions which enable the poor to participate in development; Section 106, alleviating energy, natural resource and environmental problems; and Section 107, promoting adaptive and appropriate technology.

It can be expected that the project will also contribute to the strengthening of interagency cooperation and governmental effectiveness because of the multidisciplinary nature of the topics covered and the interministerial interests and involvements in many of the projects, particularly in the policy development activity (A) and the institutional and project management activity (B).

**PROJECT ACTIVITY A. - SCIENCE, TECHNOLOGY AND RESEARCH
POLICY DEVELOPMENT**

**Subtitle: Policies for Research, Development and Services
which Benefit Indonesia's Majority**

Background

In bringing science, technology and engineering resources to bear upon raising the standard of living of the rural population of Indonesia (or elsewhere in the third world), one is confronted with many choices in policy and program development. Should an indigenous capacity be created? Should expatriates be used? For how long? To what extent? Where? When? Centralization vs. decentralization? Priorities? Material and design choices? The list of options and decisions seems endless. Given the parochial nature of many operational agencies in any government, and the multidisciplinary character of social and economic development, it is often difficult for a government, ministry or institution to settle on and develop a specific policy and program. In some cases there are no nationally-oriented policies for specific developmental sectors and subsectors. In other cases there are obsolete, inadequate or ineffective policies. In Indonesia these are often derived from Dutch policies from the colonial period, designed more to benefit the Dutch than Indonesians, or else the "policy" is simply a collection of current practices which evolved from lines of expediency, vested interests, local political power, and tradition, rather than being synthesized through integrated and rational planning in the interest of attaining a specific developmental goal. The National Planning Agency, "BAPPENAS", is doing a credible job in struggling with the many aspects of this problem, but looks to the Minister of State for Research for assistance and advice in those policies which involve science, technology and research, and their coordination. Therefore, the Minister of State for Research will have the prime responsibility for the proposed activity described herein, utilizing as required his own staff and the staff of the Indonesian Institute of Sciences, "LIPI", and appropriately coordinated with BAPPENAS, the Cabinet Secretariat, and other institutions that may be concerned.

The Proposed Activity; Purpose and Mechanism

It is often useful for highly expert and experienced outsiders, without vested interests and completely objective in viewpoint, to sit down with local policy makers to learn the issues, the various choices, and the local environment and constraints, and to then assist in developing a specific

policy. They may also help design the framework for a subsequent program based on the policy.

This proposed activity, "Science, Technology and Research Policy Development", will provide funding resources for such an interaction between the Government of Indonesia ministerial and institutional policy makers, and representatives of the most expert and prestigious level of the American scientific, technological, research, engineering, social and economic community. The objective of this activity is to reach the best possible developmental decisions and policy conclusions regarding the application of science and technology to the overall project objective of improving the standards of living for the great mass of needy Indonesian people. Such policies must be developed in sectors and subsectors in agriculture, water management, environment and conservation, small industry development, improvement of food, water and other consumer standards, rural transportation and markets, health, nutrition, low-cost shelter, etc., seemingly ad infinitum.

The mechanism to involve the most expert and prestigious level of expertise in this endeavor would be to utilize the unique U.S. National Academy of Sciences (NAS) system of assistance in policy development. The Academy, whose own unique characteristics are described later on, has extensive experience in providing such assistance to developing countries, utilizing four primary mechanisms: the Joint Seminar or Workshop, the Joint Study Group, the Joint Advisory Committee, and Special Studies.

The Joint Seminar or Workshop is usually a meeting of 6 to 8 NAS representatives with a larger number of developing country counterparts for a 1 to 2 week period to analyze jointly key priority policy issues relating to the application of science and technology to specific developmental problems. The theme of a particular workshop may be very broad, such as developing environmental policies, or very narrow, such as policies for promoting increased protein intake. The visiting group is selected specifically for the topic to be addressed, and is multidisciplinary and balanced in its nature. It works with local counterparts to reach conclusions and to develop joint policy recommendations. These are then put into the next five year development plan, or otherwise implemented by the local government, agency or institution.

The Joint Study Group may be established initially, or it may evolve from workshop discussions, and is a more in-depth consideration of a key problem area, requiring a greater degree of specific expertise, and requiring more time for discussions and analysis. Such an activity usually requires fewer people meeting several times over a longer period of time (1 to 2 years). At times, an Indonesian official may need to visit persons, institutions, or particular sites in the U.S. (or

third countries) for purposes relevant to the policy formulation, or for consultation, conferences, or special training.

The Joint Advisory Committee is an oversight body for the work of the workshops and study groups. It defines program directions, evaluates progress, identifies new needs and problems, and guides the continuing program of cooperation. Often it functions as a sounding board to sharpen initial program directions based on Indonesian definition of priority needs under the guidelines of this project, and serves to help guide the overall policy development program.

The Special Studies approach represents an exhaustive study of a specific topic by a U.S. and international panel of experts culminating in a report designed for policy makers. Typical reports of the Academy's special studies group, written under the auspices of the AID/NAS worldwide contract and published by the Academy, or jointly with the counterpart institution, are listed below.

- Appropriate Technologies for Developing Countries
- Ferrocement: Applications in Developing Countries
- Food Science in Developing Countries; A Selection of Unsolved Problems
- Aquatic Weed Management: Some Perspectives for Guyana
- More Water for Arid Lands: Promising Technologies and Research Opportunities
- Underexploited Tropical Plants with Promising Economic Value
- The Winged Bean: A High Protein Crop for the Tropics
- Energy for Rural Development: Renewable Resources and Alternative Technologies for Developing Countries
- Making Aquatic Weeds Useful: Some Perspectives for Developing Countries
- Resource Sensing from Space: Prospects for Developing Countries
- Ferrocement, a Versatile Construction Material: Its Increasing Use in Asia
- Natural Products for Sri Lanka's Future
- East Pakistan Land and Water Development as Related to Agriculture

Solar Energy in Developing Countries: Perspectives and Prospects

As can be seen by the titles alone, these studies all relate to rural development and the problems and opportunities of the poor.

In each of the above four mechanisms it would be necessary that appropriate preparations be made both in the U.S. and in Indonesia. Often field visits are required prior to or during the course of the activity in order to put subsequent discussions in proper perspective and to provide a data base and frame of reference for the subsequent consideration of policy issues.

As mentioned earlier, the workshops and study groups conclude their work with jointly elaborated recommendations. It is essential to stress this point, for ultimately it is Indonesian officials who must make the policy decisions relating to the five year development plans, either accepting or modifying the inputs provided by the joint discussions. The activities should not be seen as U.S. advice per se, but rather as an active, helpful and objective participation by U.S. scientists, technologists, engineers, economists, social scientists and other appropriate experts in Indonesian discussions of local policy issues and options. The U.S. knowledge and experience is thereby combined in a catalytic manner with the Indonesian knowledge, experience and understanding of the local problems and constraints, to derive an appropriate solution. Often such joint participation resolves local inter-departmental differences or perceptions in policy making, or serves to refine, confirm or otherwise "jell" a policy, or break a stalemate.

The Proposed U.S. Assistance Institution (Sole Source Justification)

The bilateral mechanisms and procedures described above are well developed and tested, and would be run by the experienced staff retained for this purpose by the National Academy of Sciences - National Research Council (including the National Academy of Engineering and the National Institute of Medicine). The NAS-NRC has played this catalytic role in policy development many times in the past, under AID and non-AID sponsorship. Working through a professional staff in the Academy's Commission on International Relations, under the guidance of the Academy's Board on Science and Technology for International Development ("BOSTID"), the Academy has put together specialized teams from U.S. Academia, Industry and Government, often augmented by non-American specialists, for a great variety of policy-making activities in concert with planners in many developing countries. A report of the past six years of the highly successful AID/NAS program (Contract CSD-2584) may be found in the "BOSTID Summary of Activities, 1970-76", published recently by the Academy's Commission on International Relations, and obtainable from the AID Office of

Science and Technology, Technical Assistance Bureau, or directly from the Academy's BOSTID staff.

An examination of the past AID/Academy program reveals that it has been involved in developing and conducting activities similar to the one being proposed in some 30 countries in Asia, Africa and Latin America. As implied earlier, the Academy's strength lies in its ability to call on distinguished representatives of the U.S. Science and Technology Community for short periods of voluntary or modestly-paid service on committees or panels concerned with policy development in the developing country context. The Academy was originally chartered by the Congress under the Administration of President Abraham Lincoln. In addition to its function to recognize, evaluate and award exceptional and meritorious service in the scientific, engineering, health and technological fields, it was given the charge of also acting as an independent advisory body to the U.S. Government, through a staff and body organized as the National Research Council, on scientific, technical and research matters. The NAS-NRC has developed many distinguished, standing committees and commissions for this purpose, and served the U.S. Government in this independent advisory capacity many hundreds of times, with distinction. Its credentials, objectivity and performance are internationally recognized. As an invitation to serve on an academy panel, study team or committee means recognition of excellence from the highest peer level, it is almost always accepted, meaning that the very cream of distinguished, broad-gauged American experts are willing and ready to serve.

The Academy has had specific experience in Indonesia in the form of many visits, and three USAID grant-funded policy workshops in the late sixties and early seventies convened at the request of the Government of Indonesia. One was on food production, one on industrial research and one on natural resources. The policy recommendations of the food and natural resources workshops were accepted almost without change into the Five-Year Development Plans. The Minister of State for Research and others have recognized the value of the Academy's policy development assistance system and unique capability for full cooperation in every respect of policy development, from project identification to definition of mechanisms, to selection of participants to joint discussions and to joint elaboration of conclusions and recommendations. The Minister has emphasized that he wishes a continuing relationship with the Academy, since there is no other organization with such qualifications and experience for this particular job.

The above description is intended to serve both as an explanation and as a justification for a sole source determination by AID for the Academy as the contractor. Reference is also made to the approved "sole source" determination by

AID under AID's central contract with the Academy (CSD-2584) for this type of activity. Copies should be available from the AID central contracting office, or from the Office of Science and Technology, Technical Assistance Bureau, if required.

The Proposed GOI Institutional Counterpart:

The Ministry of State for Research would serve as the counterpart institution, augmented as required by assistance from the GOI Institute of Sciences ("LIPI"), the State Planning Agency ("BAPPENAS"), or an operational agency such as the Ministry of Agriculture, dependent upon the specific subject matter at hand. The Minister of State for Research will also have his usual oversight responsibilities as administrator and manager for the overall project.

Subject Matter and Level of Effort for this Activity

The various topics for this activity will be selected on the basis of Indonesian developmental priorities and needs, provided that they meet the criteria developed for subactivity selection under this project and contribute toward the project objective. They should remain relatively undefined at this early stage, as one of the strengths of the Academy collaborative system is its flexibility and capability to respond to a suggested policy issue by arranging the visiting team or study group participation within four to six months after subject identification. On an informal basis, the Indonesian Institute of Sciences (LIPI) has suggested that the first policy workshop should again be on an aspect of food, specifically "reducing post harvest food losses". This is clearly within the project guidelines, and the topic is of major importance considering that from 30 to 50 percent of the food produced does not reach the mouths of the people but is lost somewhere en route because of mold, insects, rodents, transportation spillage, storage loss, spoilage, etc. Determining a policy to reduce this waste is beneficial both to the rural producers as well as to the rural users, who obviously have to pay higher prices when the supply is limited because of a high loss rate. Losses other than money are also involved, such as energy, water, soil nutrient and labor inputs into the production process.

Some illustrative topics have already been mentioned, that is: various subsectors in agriculture; water management; environment and conservation; small industry development; improvement of food, water and other standards; rural transportation and markets; health; nutrition; and low-cost shelters. Additional possibilities are policies for alternative energy; appropriate technology; soil conservation and renewal; erosion; disaster mitigation; remote sensing for land use planning and resource monitoring; aquatic resources; aquaculture; weather

forecasting for farmers and fishermen; map production for rural planning; aquatic weed utilization and control; deforestation and reforestation, small farm machinery, control of the "alang alang" sawgrass, etc.

Inputs and Outputs

The inputs for this software activity are relatively simple, being the efforts of the NAS and GOI collaborating teams. The GOI contribution would include the involvement and development of the subject, selection and organization of the Indonesian side of the joint activity, provision of background materials, arranging associated field trips, secretarial services, meeting space, local travel and per diem, and professional time involved in organization, management and production of briefing materials and reports.

Outputs are the recommendations from each activity, and output indicators are the completion of each workshop or activity, and eventually the written report.

Suggested Budget for Activity A. "Science, Technology and
Research Policy Development"

USAID Loan/Grant Funds (Five Years)

1) Four policy seminars @ \$50,000 per seminar for staff preparation time, all travel costs, report preparation and printing, and overhead.....	\$200,000
2) Joint Study Groups on three subjects @ \$50,000 per subject for staff preparation time, all travel costs, report preparation and printing, communication and overhead.....	150,000
3) One Joint Advisory Committee of three people for four and a half years, including staff support, all travel costs for two visits per year, ten days each, report preparation and printing, communication and overhead.....	135,000
4) Study visits to the U.S. and third countries, by Indonesian personnel, including staff support for arranging itineraries, accompanying group, communications and overhead, report preparation and printing. 15 person/visits.....	100,000
5) Evaluation activities and contingencies.....	<u>50,000</u>
Total loan/grant	\$635,000

Indonesian Contribution (budgeted and in-kind) (Five Years)

1) Counterpart and subordinate staff salaries and benefits.....	\$200,000
2) Space and facilities; local and visiting staff...	150,000
3) Local travel.....	50,000
4) Preparation of local briefing papers, translations, local reports, communications ...	<u>50,000</u>
Total GOI contribution	\$450,000

Activity B: Manpower Development in R&D Management

Subtitle : Management Training to Improve Research, Development, Engineering and Service Institutions and Development Projects

Background

Indonesia has a significant number (between 150 and 200) research, development, engineering, testing and service institutions to serve the needs of Indonesian society and development. Some of these are organized under the Directorate General of Small Scale Industry, Ministry of Industry, LIPI, (the GOI National Institute of Sciences); the Ministry of Agriculture; the Ministry of Health; the Ministry of Public Works; the 40 public universities, and other ministries or organizations.

These institutions represent the Indonesian capability to translate and apply modern science and technology for the benefit of the Indonesian people, leading to economic and social development. The ability of a country to accomplish this translation and application largely determines whether it is economically developed or still developing. The policies, effectiveness and orientation of the institutions involved in this process is critical.

Since so many institutions are already doing research, development, service and engineering work, the need is not to establish more institutions but to help them work more effectively, and to help them contribute more to national development objectives, particularly those which benefit rural development and the rural poor.

As many of the research and development institutions were established and managed by the Dutch during the colonial period, it is understandable that there is a lack of indigenous capability in management. With so many entities involved and with the rapid increase of research and development activities, the direction, coordination and management of the institutions and their activities presents a serious challenge since the growth of the R&D program developed from a relatively small infrastructure and manpower base. If the existing resources are to be used efficiently and effectively for agricultural development, small industry development, health services, standardization and quality control, rural planning, and hundreds of other activities which directly benefit the common man, it is necessary to improve the management capabilities.

The increased demand for research and development results to support the dynamics of development is not yet balanced by an adequate infrastructure and manpower base in the research institutions. The application of research results requires efficient R&D management capabilities at the national level, the agency or institutional level, and at the project level itself.

This management involves a selection of problems that have high priority in relation to development needs; a selection of R&D projects which will help solve the problems; and the careful planning, implementation, and evaluation of the projects.

Past Activities

The importance of improved research management was identified as early as 1970 when LIPI conducted a workshop on the selection and evaluation of R&D projects. This was followed by a course on R&D management in cooperation with Inveresk Research International of Great Britain. This course was for directors of research institutes from the government, the universities, and the private sector.

Indonesia participated later in the world-wide AID/W program conducted by the Denver Research Institute to improve the administration of research projects. This was followed by a series of intensive research management training seminars (1975, 1976, 1977) sponsored by LIPI and assisted by DRI under the policy guidance of the Minister of State for Research. These workshops were at the two levels; institution leadership and project management.

This proposed subactivity is a follow-on to these previous very successful projects which were funded under grant financing. The high level LIPI-DRI research management workshops produced among others the following conclusions.

"The development of R&D management is a continuous activity. The R&D management training workshops for senior institutional management, therefore, should be institutionalized and held annually. This would provide for the systematic and planned increase in quantity and quality of senior R&D managers."

"More involvement should be obtained from BAPPENAS and top Ministerial officials, particularly with respect to development needs".

"To insure institutionalization as necessary, to develop an Indonesian management training cadre".

"For future workshops, formal material based on Indonesian institutional experience should be prepared".

It will be noted that the activities described for this proposed subactivity will respond very closely to the needs expressed by the very knowledgeable group of Indonesian research managers who were in excellent position to see the value of the training.

Since that time a follow-up study was made to further evaluate the workshops. LIPI and DRI representatives went directly to the research institutes to assess the results of the workshops. They interviewed participants from the several workshops held in the past and were able to get a cross-section of opinions. They were able to ascertain some of the values of the seminars but also received excellent suggestions for making the workshops even more relevant to development needs.

The evaluation team found that indeed the workshops did have a significant impact. One university had already established a course patterned after the workshops, and another university was planning such a course. Twenty five percent of the participants had been promoted since the workshops indicating that, at least in part, the training helped them. Specific improvements were found in the management of the research institutions. Several had established a system of long range planning. Some had established effective methods for project evaluation based on what had been learned on evaluation techniques at the workshop. The subjective views of all the research managers were that the training was valuable to them and should be offered on a continuing basis.

For future workshops the participants suggested the following specific topics:

- Forecasting and planning
- Project Central Mechanisms
- Leadership and Motivation
- Proposal Writing
- Techno-economic feasibility studies.

Their suggestions will be very useful in planning future training activities.

As pointed out by the Indonesian research administrators above, training in selecting, planning, and implementing research projects is a continual need and process, particularly with Indonesia's large backlog of people who need such training. This project has as its immediate objective the provision of such training so as to increase the R&D management capabilities at the national, institutional and project levels. During this process there is to be research to determine the techniques and mechanisms of R&D management most suitable for Indonesia. The long range objective is to develop a local cadre of qualified research management trainers administered by a local institution under a local program so as to institutionalize R&D management and development training in Indonesia.

This will be accomplished through:

1. Research and development management training workshops sponsored by LIPI but with external technical assistance.
2. Developing and implementing a program and cadre to train the trainers, for the spread effect.
3. Developing indigenous-based (e.g. Indonesian language) instructional materials to use with management training programs.
4. Participant training in the U.S. for carefully selected Indonesian R&D management training leaders.
5. Special external expert consultation on specific management training problems and needs.

During the first two years of the project much of the R&D management training will be carried on by foreign experts while the Indonesian trainers are learning by participating in the training activities, and are receiving intensive participant training through special training programs in the U.S., and study visits to R&D management training programs abroad. In the last two years the in-country program will be handled primarily by the Indonesian trainers with only some consultation by foreign experts on specific training problems which may arise.

This program has been approved by BAPPENAS (National Dev. Planning Agency), and local funding is already being budgeted by LIPI in anticipation of using the Science and Technology Loan/Grant to supplement the local counterpart funds. This activity should be ready by the time the loan agreement is signed, for immediate implementation. Given the extent and success of the LIPI/DRI forerunner activity, the feasibility study normally required for project activities should not be necessary.

Beneficiaries

It is worthwhile to note in some detail how the institutions to be involved in this management training effort directly benefit the welfare and livelihood of the common man. A recent review of activities indicates the Leather Research Institute develops production techniques and markets for leather from small producers of animal hides. The Fisheries Research Institutes solve aquaculture and fisheries development problems. The several Agricultural Research Institutes address many practical agricultural problems. The Batik and Handicrafts Research Institute experiments with improved waxes and dyes for batik production and addresses technical problems in village arts, wood handicrafts and carved furniture. The Metallurgical Industries Development Center has helped reduce the price of water gates used in rural irrigation systems. The Electric Power Research Institute is involved in placing micro-hydroelectric power generators in isolated villages of Indonesia, 25 in place so far. The National Institute of Oceanology is involved in environmental studies to protect the aquatic resources of Ambon and Pulau Pari. IAPAN is concerned with solar heaters for villages. The Chemical Institutes of Surabaya and Bogor spearheaded a project that led to cleaning insuring the safety and quality of locally produced and packaged food products. The Regional Institute of Textile Technology works with the small scale textile and clothing industries of Indonesia. The Directorate of Road Research, with its twenty three provincial centers, works on rural transportation problems. The Directorate of Building Research is working on the development of low-cost building materials for rural areas as well as on programs aimed at the integrated development of slum areas. The National Institute of Chemistry is working on the formulation and production of nutritious products from soybeans. The National Institute of Instrumentation is working on equipment to process soybeans for the local food "tempe" as well as instrumentation for a national irrigation project being funded by the World Bank. The Ceramics Research Institute is working with small scale rural industry in establishing capabilities to produce brick, tile, pipe, and sanitary ware. The National Institute of Electricity and Electronics has a program to provide TV sets for educational purposes in approximately 10,000 villages. The Horticultural Research Institute is helping increase the quality of vegetable farmers' products. Hasanuddin University is working on increasing the effectiveness of sail boats for regional shipping and is developing an improved silk production process. The University of North Sumatra has programs aimed at developing and

transferring appropriate technology to rural users in the province, and also a program aimed at increasing the effectiveness of the role of the Javanese, Malayan, and Karo Batak women in the development process of North Sumatra.

The preponderant thrust of this activity will be to emphasize improved management of institutions and projects which deal directly with the daily problems and opportunities of the majority of Indonesians. It includes developing an Indonesian teaching capacity to continue the management training on a long term basis.

Outputs

The primary output of this activity will be more efficiently managed research, development and service institutions, with more carefully selected, designed and managed research, development and service products, all with more relevance to benefiting the life of the average Indonesian. These institutional and project improvements will result from approximately 8 workshops, with over 200 trainees. There will also be a teaching cadre of some 50 management teachers trained under the project, and an institutional base established for their activities. Nine top leaders will receive graduate degree training in the U.S., and 15 leaders each year will receive a special semester plus internship programs in the U.S. Instructional materials will have been converted from English language and the U.S. context to the Indonesian language and the Indonesian/Asian context. The training of project leaders to choose, plan, manage, conduct and utilize R&D projects whose results benefit poor, rural Indonesians, will potentially lead to thousands of new job opportunities.

"Predominate Capability" Justification for Denver Research Institute as Contractor

It is recommended that The Denver Research Institute (DRI), University of Denver, Denver, Colorado, be selected as contractor for Activity B for the following reasons:

1. The GOI cooperating institution LIPI (National Institute of Sciences), which will probably be the actual contracting, requests that DRI be the prime contractor for this project, and that DRI subcontract to other U.S. research management specialists or institutions where supplementary assistance is requested or agreed to by the GOI.
2. DRI has had close linkages with GOI research institutions over the past six or seven years which have resulted in

- significant and positive improvement in GOI research and service institutions, both in institutional leadership and in selecting and administering development-relevant projects;
3. DRI has conducted, in cooperation with LIPI, five successful research management training workshops in Indonesia, one in 1975, two in 1976, and two in 1977 (latter not completed at time of drafting), averaging 30 participants each.
 4. LIPI and DRI together conducted a post-workshop field evaluation with many workshop graduates and their institutions.
 5. In all respects DRI's relationship with Indonesian officials and DRI's performance in Indonesia has been outstanding.
 6. UNIDO recognized the DRI as the only U.S. institution among three institutions worldwide with specific capabilities for improving research management in developing countries.
 7. DRI, through the field experience cited above, is known to and respected by about 150 Indonesian R&D institution directors and project leaders.
 8. DRI, through the field experience cited above, has an exceptional in-depth and overall picture of the institutional structure, problems, potentials, people, and other aspects of the GOI R&D community.
 9. DRI has a long, general background of teaching R&D institution and project management, and at the beginning of this decade, established an international program to assist LDC research and service institutions to become more effective in their administration and to be more relevant to their country's needs in their R&D programs. AID/W, under a central program, awarded DRI a contract to do a worldwide comparative survey on the capabilities and needs of LDC R&D institutions, confirming the general need for management training, with several follow-up programs, including training workshops at both Denver and abroad, and linkages between DRI and LDC R&D institutions. Various Mission funded programs (e.g. USAID/Brazil and USAID/ROCAP) broadened and strengthened the DRI field experience in management training and technology transfer.
 10. Some of the above worldwide, centrally-funded DRI forerunner activities included Indonesian participation, both in DRI organized research workshops outside of Indonesia (Denver and Bangkok), and with several Indonesian institutions participating.

In summary, there seems no doubt that the DRI has a pre-dominant capability to continue such work in Indonesia under this activity and loan/grant. It should be recognized that one of the objectives of this activity is to create Indonesian self reliance and capability, and therefore no follow-on activities are foreseen, except for occasional "trouble shooting" or other specialized, limited assistance.

Tentative Program

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Workshops	2	2	2	2	Evaluation seminar
Expert Consultants (person months)	6.5	5.5	3	2	2
Academic Training (person years)	16.5	16.5	11	11	-
Non-academic Training (person months)	15	15	15	15	-

<u>Illustrative Budget (AID)</u>		(in thousands of dollars)				
	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>TOTAL</u>
Consultants	46	41	24	20	20	151
Academic Training	198	199	136	143	-	676
Non-academic Training	30	32	34	36	-	132
International Travel	93	75	75	76	11	330
Instructional Supplies	10	10	10	10	-	40
Indirect Costs	40	40	40	40	10	170
SUB TOTAL						<u>1,499</u> (1,500) =====
 <u>GOI</u>						
Workshops	50	55	60	65	70	300
Participant & Staff Salary	30	33	36	39	42	180
Local Travel	12	13	14	15	16	70
Facilities, Equipment Supplies	20	22	24	26	28	120
Miscellaneous	5	5	6	6	7	29
SUB TOTAL						<u>699</u> (700) =====
GRAND TOTAL					<u>2,200</u> =====

C. Criteria for the Selection of Subactivities

1. The subactivity should contribute to the overall project objective of "providing a strong, indigenous capacity in selected GOI scientific and technological institutions to plan and conduct research and development (R&D) in ways that will benefit Indonesia's majority, and offer opportunities for increased productivity, income and improvements in the quality of life".
2. The subactivity should contribute to the project requirement of having a preponderant thrust which benefits the poor, that is, benefiting the majority of Indonesian citizens.
3. The subactivity should be ranked for priority by measuring its likely benefit to the majority of Indonesian citizens, such as whether the institutions involved and the specific subactivity objectives relate to such things as increasing agricultural output, expanding rural employment opportunities, increasing personal safety, contributing to rural energy needs, assisting rural planners and developers, improving nutrition and health, preventing environmental and natural resource degradation, improving low-cost shelter, expanding markets for rural products, etc.
4. The subactivity should offer possibilities for creative application of science and technology to rural and remote areas through rural development and benefits to rural, low-income populations, although urban benefits are not excluded, e.g. improved food standards benefit all.
5. The subactivity should enhance and develop institutional capacity to relate institutional policies and programs to the needs and problems of the majority, in an efficient way.
6. The subactivity should fit with current or planned GOI socioeconomic development goals and priorities (i.e., the five year development plans) to insure GOI budgetary support for local costs and priority for counterpart manpower commitments, etc.
7. The subactivity should have a feasibility study as its first phase to determine the likelihood of success and to provide detail and direction to the scope of work and subactivity management, unless there have been sufficient forerunner activities to satisfy this requirement.

8. The subactivity should develop a utilization or continuation plan to enhance the spread effect of beneficial results.
9. The subactivity should contain a clear element of improving the institutional self-reliability of the specific Indonesian research, development, engineering or public service institution involved.
10. The subactivity should be periodically evaluated annually or more frequently by a GOI evaluation committee, augmented by AID representatives. Other non-Indonesian persons may be invited as desired. The evaluations shall include course correction recommendations, e.g. to insure maximum benefit to the Indonesian people.
11. The subactivity shall be certified by the GOI as being timely, in view of the many external factors which can affect the progress of an activity.
12. The subactivity shall be rated by USAID and the GOI as having a high chance of success, using as a guide such factors as forerunner activities, GOI priorities, timeliness, need, personnel involved, competition, corollary support, etc.
13. The subactivity will encourage a systematic, multi-disciplinary, and - where appropriate - interagency approach to encourage rational design and full cooperation of various agencies and institutions concerned in the subject matter. (Technical management of a specific subactivity may be delegated by the Minister of State for Research to the most appropriate agency or institution, with the oversight responsibility being retained by the Minister of State for Research, as the overall project administrator and manager.)
14. The subactivity will be approved by USAID as being within the foreign assistance guidelines of the Congress and AID.

PART III. PROJECT ANALYSIS

A. Technical Analysis including Environmental Assessment, and FAA Section 611

This project is designed to assist in developing appropriate technology policies and programs, and well-managed and efficient institutions, which will adapt and use scientific principles and technological advances to improve the lives of the poor, rural Indonesian. The institutions, and some of the policies, are already in place. On the whole, these science related institutions are not as well managed nor as efficient as they should be. Their professional staff capabilities must be strengthened, and their policies need to be better developed, both at national and institutional levels.

There is ample evidence that the GOI has recognized the importance of science, technology, research and technical services for Indonesia's social and economic development. This is shown by; (1) the annual increases -- 35.5% last year -- in the science and technology sector of the national budget; (2) the prominence of science and technology throughout the Second Five Year Development Plan just ending and in the planning for the Third Five Year Development Plan; (3) the various statements by President Soeharto exhorting universities and the research community to increase their research programs in quantity and quality, and to orient them toward the well-being and prosperity of the Indonesian people; and (4) the creation several years ago of a Minister of State for Research. The GOI desire is clearly to build a self-reliant Indonesian R&D community focused on the needs of the average Indonesian citizens, working through a network of efficient and well qualified technical institutions.

The roots of this project spring from the findings of a qualified AID/ technical officer from TA/CST who made a science and technology survey in Indonesia in early 1976, at the invitation of the GOI Minister of State for Research. Through the AID officer's in-depth series of discussions with the leadership of about twenty-six institutions dealing with various aspects of science, technology and research, there emerged a pattern of need for technical assistance from U.S. institutions. This, augmented by nearly a year of continued discussions between USAID and the GOI, evolved into the present project, focused on high priority areas and institutions. The need and timeliness of this project was officially certified by its inclusion with a designation of top priority in the 1977-1978 "bluebook" of requests for foreign technical assistance, issued by the GOI National Development Planning Agency (BAPPENAS).

Since the task of upgrading some 150 research, development and service institutions would be beyond the financing capability of a single donor, this project has selected key interaction points and activities which are manageable with the available resources. Based on priorities, timeliness, AID and Congressional guidance, and relevance to social and economic development needs, the GOI and USAID have set forth two major project activities; (1) policy development and (2) research management, and up to six subactivities with a specific institutional and technological focus. The proposed subactivities deal with standards, alternative energy sources, aquatic resources development, geological hazards and land use mapping, and weather forecasting for fishermen and farmers.

It is anticipated that some of the subactivities may evolve in future years into separate projects. For example, science and technology policy development, standards and quality improvement and aquatic resource development are continuing, broad activities which may need specific, outside technical assistance for many years. Other activities such as the R&D management improvement should achieve within the five year life-of-project the necessary Indonesian capability to continue the development without outside assistance, other than occasional help on some specific problem.

The major activities in this project are based on highly successful forerunner activities which have proved the feasibility of the selected approach. The National Academy of Science has had a very significant relationship with the Ministry of State for Research in technology policy development, and the Denver Research Institute had co-sponsored with the Indonesian Science Institute (LIPI) a series of valuable research management training seminars.

In regard to the institutional and technological subactivities, the National Bureau of Standards has worked with analog Indonesian institutions and their personnel on standards development and quality control. The U.S. Geological Survey has worked with the Geological Survey Institute of Indonesia and the National Mapping Coordination Institute, BAKOSURTANAL under a 1969-74 grant-funded project.

Although the activities are not specifically directed at job creation, it is expected that up to 10,000 jobs will eventually be created as a result of improved research on matters directly affecting the poor, such as the development of additional energy sources.

The activities in this project are vital to development. Previous AID experience has shown that the U.S. can provide the necessary expertise. The GOI has the desire and the basic technical and administrative institutions required to utilize the U.S. assistance to the fullest. Past experience indicates that the estimated project costs are sound and realistic, and that the approaches are technically feasible.

Regarding the environmental aspects, the reader is referred to the "Initial Environmental Examination" made in the PRP, and its "Negative Determination" approved by USAID/Indonesia and AA/ASIA. That determination was based on the fact that this project is wholly concerned with analysis, workshops, studies, management, policy development, data collection surveys, mapping and planning, education and training, and limited research and development, not going beyond the testing and demonstration stages, and as such will have no impact upon the environment. In many cases, particularly through various educational, training and policy development activities, there should evolve an increased awareness of the need for environmental protection.

The requirements of FAA Section 611(a) have been met by developing illustrative subactivities totalling well over the amount of the loan/grant expected to be available, and by including in the "Conditions Precedent" (Part IV.D.2.A.), a requirement for a feasibility study as the first phase of any activity or subactivity where there has not been fore-runner activity which proved feasibility. There are no local legislative requirements for this project. The remaining subsections of FAA Section 611 do not apply to this project.

(PART III)**n. Financial Analysis****a. Proposed Methods of Financing**

The traditional letter of commitment method of payment will be used for all AID Geographic Code 941 procurements. For local source procurement, the dollar equivalent of rupiah costs will be covered on a direct disbursement basis.

b. Analysis of Activity/Subactivity Suggested Budgets

Table (1) following, presents a tabulation of the overall activities and illustrative subactivities which could fall under this five year project. In the hypothetical situation of all subactivities being funded, there would be a \$9,650,000 loan/grant requirement, and an estimated \$6,084,000 in cash or in kind. GOI contribution. As the proposed loan of \$5.0 million and the proposed grant of \$1.5 million totals only \$6,500,000, a selection will be made from the illustrative subactivities, (including possibly some new subactivities which meet requirements) so that totals will not exceed the funds available.

Table (2) shows how this might be managed if, say activities A and B, and subactivities 2, 3 and 5 (i.e. 5a and 5b) were selected. The total would now be about \$6,844,000 loan/grant funds requirement which would require paring down by 5% to \$6,500,000, with an estimated \$4,134,000 (pared down by 5% to \$3,900,000) in cash or in kind as the possible GOI contribution which would represent 39% of the project total. The GOI contribution will not be known until the specific subactivities are chosen, and the involved institutions more closely work out the value of their expected contribution. The GOI contribution in any case will exceed 25% of the Project total.

(all figures in thousands of dollars)

LOAN/GRANT FUNDS	ACTIVITIES (See Proj. Desc. II-7)		ILLUSTRATIVE SUBACTIVITIES (see Annex B)							TOTALS
	A	F	1	2	3	4	5a	5b	6	
Major Activity Breakdown										
Long-term Consultants (including travel)	-	-	345	455	350	160	500	200	270	2280
Short-term Consultants (including travel)	505	301	150	205	214	375	260	460	355	3075
Academic (degree) Participant training	-	776	-	-	170	-	-	-	-	946
Short-term Participant training	-	132	100	-	76	100	150	20	80	658
Commodities	-	10	100	215	140	200	140	400	200	1435
Others (special workshop costs)	-	-	155	150	90	-	-	-	-	395
Indirect costs; contingen- cies, evaluation	50	170	100	75	100	50	150	100	75	870
Loan/Grant totals:	635	1409	950	1190	1140	885	1200	1180	980	9659
GOI CONTRIBUTION (Cash or in-kind)										
Salaries of counterparts and participant trainees	200	180	350	100	280	400	500	400	450	2860
Value of project related facil., space, services	200	120	150	350	125	140	380	255	150	1870
Local travel (local and/or visiting staff)	50	70	50	-	125	60	200	170	200	925
Others	-	329	-	100	-	-	-	-	-	429
GOI contribution totals:	450	699	550	630	450	600	1080	825	800	6084

(TABLE 1)

(all figures in thousands of dollars)

LOAN/GRANT FUNDS	ACTIVITIES (See Proj.Desc.II-D)		Hypothetical Selection Subactivities (See Annex B)				TOTALS
	A	B	2	3	5a	5b	
Major Activity Breakdown							
Long-term Consultants (including travel)	-	-	455	350	500	200	1,505
Short-term Consultants (including travel)	585	381	295	214	260	460	2,195
Academic (degree) Participant training	-	776	-	170	-	-	946
Short-term Participant Training	-	132	-	76	150	20	378
Commodities	-	40	215	140	140	400	935
Others (e.g. special workshop costs)	-	-	150	90	-	-	240
Indirect costs; contingen- cies, evaluation	50	170	75	100	150	100	645
Loan/Grant totals:	635	1,499	1,190	1,140	1,200	1,180	6,844 *
GOI CONTRIBUTION (cash or in-kind)							
Salaries of counterparts and participant trainees	200	180	100	230	500	400	1,660
Value of Project related facil., space, services	200	120	350	125	380	255	1,430
Local travel (local and/or visiting staff)	50	70	-	125	200	170	615
Others	-	329	100	-	-	-	429
GOI contribution totals:	450	699	630	450	1,080	825	4,134 *

*reduce by
5% to
(6,500)

*reduce by
5% to
(3,800)

(TABLE 2)

From a financial analysis point of view, it is important to note that this project will deal wholly with Government of Indonesia agencies and institutions of a non-revenue producing nature. These institutions are established research, development, scientific, technological, educational or service institutions, serving the public through various Ministries, or dealing directly with the President and the Minister of State for Research. They therefore all have a history of fiscal responsibility, and established institutional budgets. As the GOI has already certified approval of this program in principle by both the BAPPENAS request for the loan (Annex E) and the issuance of the requirement in the 1977-78 "Bluebook" of requests for foreign technical assistance, with its highest priority, the concerned institutions need only to insert their budget requests to cover staffing and other counterpart costs during their regular annual budget submissions. Assurance that this will be done in a timely and correct manner will be by the Research Minister's staff and by the Management and Evaluation Committee. GOI budget submissions are normally done in the fall, with last minute changes possible in December and even in January, for the GOI fiscal year starting on April 1.

C. Social Soundness Analysis and Benefit Incidence

a. Sociocultural Feasibility

The basic thrust of this project is to improve the institutional capability of selected institutions which have the responsibility for utilizing applied science and technology for development. While the Government of Indonesia has stated its goal of social justice, until recently there has been insufficient attention paid to the development of appropriate technology, employment generation through small industry development, and technical services to rural development needs. In addition, the growing worldwide interest in conservation and environmental protection is becoming a priority area in Indonesia as she witnesses growing pollution, devastation of watersheds and advancing environmental degradation.

Indonesia is similar to many developing countries in that there is a small modern sector which makes nearly full use of modern scientific technologies on a commercial basis, and there is the larger traditional sector which has lived in much the same fashion for centuries. The traditional sector has been opened partially to scientific advances and there have been significant improvements brought about through the miracle grain varieties, the new and more effective ways for combating diseases, and methodologies for population control. By and large, however, the scientific and technological advances have been geared to the industrial societies and the gap between the modern sector and the traditional rural sector has increased. This project is part of a worldwide movement to direct the efforts of science and technology more to the solution of problems in the rural sector and particularly to meet more effectively the needs of the poor. Developing and managing rural natural resources is a key.

The Government of Indonesia has become increasingly aware of this gap and the need to develop systems, processes and products which are relevant to local situations, needs and resources.

The Government is also placing increased emphasis on the need for analysis of the social implications of research and technology. The State Minister for Research in a recent policy statement remarked,

"Failure to recognize a social and even a political function in fundamental research would be regrettable. Science as such is a product of history and of society, and as such science owes as much to the social

environment as to the work of the scientists. A concept of science, based on an analysis of the interactions between science, technology and society would result in the formulation of strategies embodying new priorities related to the needs of social progress and to the solution of the major problems that we face. These priorities would include: the challenge of eradicating poverty and starvation, overcoming energy problems including the energy needs of the poor such as by development of substitutes for firewood ... and not least, in meeting the challenge of a more equitable distribution of productive capacity and employment openings."

This project is designed to assist selected scientific research and service institutions to translate the above goals into workable programs. The preparation and analysis of the social impact of individual activity/subactivity on potential beneficiaries is part of the criteria subactivity selection. We intend to enhance the capabilities of the institutions to perform relevant social analysis through pertinent training and advisory services. As all activities will be carried out by indigenous institutions and as the sociocultural element will be built into each subactivity, we believe that the sociocultural feasibility will be assured.

b. Spread Effects

This project, which is an institutional and human resource development project based upon existing research, development and service institutions, will use current systems delivery and rural programs for disseminating information to the broad population. There is considerable room for improvement in the existing dissemination system, and both subactivity detail and project management will encourage expansion and improvement in dissemination and utilization, particularly in the development of follow-on projects which could enhance the widespread utilization of the products of the various research and development institutions. Inherent in this objective is the larger goal of expanding the relevance of the Indonesian R&D institutions' activities and products to benefit the majority and to further enhance the spread effect.

Further, as the institutions gain experience and skill in project formulation and implementation, it is assumed that additional activities of a development nature will be undertaken, as well as more effective implementation of on-going activities. In addition, several of the sub-activities now under consideration will be on-going activities with the benefits continuing to accrue over the years, and the output of many of these activities will be used as a direct input into major Indonesian programs. As an example, a high priority program of the Government of Indonesia is transmigration with the dual purpose of increasing agricultural production and relieving congestion on the island of Java (Java currently has over 86 million inhabitants, one of the highest population densities in the world.) A problem which has plagued the program so far is lack of accurate data on site suitability and work opportunities for transmigrants. A system for utilizing this rather advanced technology to obtain data needed by decision makers can have a very direct impact on this group of the poor. Transmigrants traditionally are recruited from the landless or those who have insufficient land, one-half hectare or less, to feed a family. It is essential that the land he is to be given is properly mapped and of adequate quality. In Indonesia it is doubtful if this could be accomplished effectively without the use of satellite technology, and a variety of land-use maps designed as tools for rural planners. Geologic hazards studies and maps directly affect the safety of people in earthquake, volcanic, landslide and flood susceptible areas.

Another activity under consideration which will have a substantial spread effect is alternative energy sources for rural areas. The determination of suitable energy sources for local conditions and the development and adaptation of the necessary technology, e.g. methane (biogas) generators, solar water heaters, windmills, etc., could be duplicated throughout the 3,000 inhabited islands of Indonesia quite rapidly, with corresponding increases in the standard of living, productivity and a potential decrease in the denuding of hillsides for firewood (a practice which is having increasingly serious consequences for the watersheds so necessary for food production and prevention of soil erosion.)

Each subactivity will be reviewed as to its (a) spread effect, (b) applicability to other programs of the Government of Indonesia which are directed towards rural development, and (c) beneficiaries.

When we consider the high percentage of poor within the overall population, a great deal of progress in terms of economic development for Indonesia's needy can be made through

carefully selected technological transfer and local development and adaptation. The focus should be on using and promoting local natural resources, local labor, and local institutions in ways that will particularly benefit the poor and offer opportunities for increased productivity, income and quality of life. Project activities, therefore, will preponderantly affect, directly and indirectly, the basic needs of people: i.e. food, water, energy, shelter, clothing, safety, remunerative and productive employment, local markets, local transportation, and local communications.

The process of using technology to benefit about 100 million needy Indonesians will not come about overnight, nor will it come about solely by the activities of teams of foreign experts working in Indonesia under this project, nor will it come about through simply borrowing technologies from the industrialized world. It must arise from within Indonesia, through (1) the development of effective policies and procedures which have the economic and social betterment of the majority as their objective, (2) the constant improvement of local research and development institutions which do or can relate to that objective, and (3) the steady development of the skilled manpower necessary to institute the right policies, manage the procedures and systems, and effectively apply the results of their efforts to benefit the poor. The role of visiting experts will be to make their broad experience and perceptions available to Indonesia through advisory and teaching mechanisms in a close collaborative mode.

For a project of this nature, composed of overall activities and more specialized subactivities, designed to strengthen the institutional capacity while at the same time producing a valuable output, it is difficult to quantify the beneficiaries in any precise manner. However, we are confident that the potential for assisting large numbers of poor Indonesians is vast. For example, there are about 32 million farmers and fishermen in the active labor force of 47 million. If a weather forecasting system could be developed which could provide better information than now exists (which is very little), a real and positive benefit would accrue to the farmers and fishermen.

The criteria shown in Part IIC for subactivity selection and approval are quite clear in indicating that each subactivity must be designed to benefit the majority of the Indonesian people.

The paragraphs below suggest how the various illustrative subactivities now under consideration might impact directly on the poor and needy of Indonesia through selected Indonesian research, development, engineering, and service institutions. In each instance, the preponderant and primary thrust of the activity will benefit the majority, particularly those in rural and remote areas, by ultimately improving their productivity and income levels and their quality of life.

ACTIVITY A: SCIENCE, TECHNOLOGY AND RESEARCH POLICY DEVELOPMENT

Subtitle: Policies for Research, Development and Services Which Benefit Indonesia's Majority

The GOI correctly looks upon this project as a mechanism to obtain the objective advice of broad-gauged and experienced American experts and policymakers (on occasion augmented by third country experts) for assistance in specific policy formulation. The U.S. National Academy of Sciences has provided such advisory services in the past (on AID grant funds) in food production, in industrial research, and in natural resource development. The proposal for the first policy development workshop under this subactivity has already been suggested by the GOI, "Reducing post harvest food losses". As up to 50% of food produced never reaches people's mouths for a variety of reasons, this is indeed an important development sector to address.

This effort will concentrate on developing policies which relate directly to the needs of the poor. These might be policies for low-cost shelter; for water purification; for environmental protection and improvement; for small industry development in rural areas; for agricultural improvement; for soil protection and erosion control; for forestry conservation and development as a renewable resource; for coastal fisheries development; for meeting rural energy needs; for appropriate technology; and for the many other possible activities which directly affect the millions of needy Indonesians and their living standards.

ACTIVITY B: MANPOWER DEVELOPMENT IN R&D MANAGEMENT

Subtitle: Management Training to Improve Research, Development, Engineering and Service Institutions and Development Projects

The main objective of this effort is to upgrade the management capabilities of a spectrum of existing Indonesian applied research, development and service institutions, so that (1) their projects are relevant to Indonesian resources and needs, (2) their execution of projects is effective, (3) the products of their technological development work are brought to the attention of the end users through demonstrations, reports and market development and (4) their management capability is sufficient to implement the other sub-activities to be conducted under this loan/grant project. These institutions are predominantly concerned with the problems of rural development. For example, the Leather Research Institute develops production techniques and markets for leather from small producers of animal hides, the Fisheries Research Institutes solve aquaculture and fisheries development problems, the several Agricultural Research Institutes address many practical agricultural problems, the Batik and Handicrafts Research Institute experiments with improved waxes and dyes for batik production, and addresses technical problems in village arts, wood handicrafts and carved furniture.

The Metal Industries Development Center has helped reduce the price of water gates used in rural irrigation systems, the Electric Power Research Institute is involved in placing micro-hydroelectric power generators in isolated villages of Indonesia (25 in place so far), the National Institute of Oceanology is involved in environmental studies to protect the aquatic resources of Ambon and Pulau Pari, LAPAN (Space and Aeronautics Institute) is concerned with solar water heaters for villages, the Chemical Institutes of Surabaya and Bogor spearheaded a project that led to cleaning up industrial pollution destroying fish in the Surabaya bay, the nine Regional Chemical Research Institutes are also active insuring the safety and quality of locally produced and packaged food products, the Regional Institute of Textile Technology works with the small scale textile and clothing industries of Indonesia, the Directorate of Road Research with its twenty three provincial centers works on rural transportation problems, the Directorate of Building Research is working on the development of low-cost building materials for rural areas as well as programs aimed at the integrated development of slum areas, the National Institute of Chemistry is working on the formulation and production of nutritious products from soybeans, the National Institute of Instrumentation is working on equipment to process soybeans for the local food "tempe" as well as instrumentation for a national irrigation project being funded by the World Bank, the Ceramics Research Institute is working with small scale rural industry in establishing capabilities to produce brick, tile, pipe, and sanitary ware, the National Institute of Electricity and Electronics is working on providing TV sets

for educational purposes in approximately 10,000 villages, and the Horticultural Research Institute is helping increase the quality of vegetable farmers products. Hasanuddin University is working on increasing the effectiveness of sail boats for regional shipping as well as developing an improved silk production process, and the University of North Sumatra has programs aimed at developing and transferring appropriate technology to rural users in the province, as well as a program aimed at increasing the effectiveness of the role of the Javanese, Malayan, and Karo Batak women in the development process of North Sumatra.

The preponderant thrust of this activity will be to emphasize improved management of institutions and projects which deal directly with the daily problems and opportunities of the majority of Indonesians. It includes developing an Indonesian teaching capacity to continue the management training on a long term basis.

ILLUSTRATIVE SUBACTIVITY 1: STANDARDS POLICY AND SYSTEMS,
INSTRUMENT REPAIRS AND CALIBRATION,
MEASUREMENT SERVICES, AND QUALITY
CONTROL IMPROVEMENT

Subtitle: Improving Standards and Quality
Control for the Benefit of the
Majority of Indonesian Citizens

The development of standards for safety and health, environmental quality, market development, conservation of materials and resources, effective use of energy, to name only a few, is essential to any development effort to bring growth and equity to a developing country. There are few standards nationally accepted in Indonesia today. Food quality, water quality, cleanliness for health reasons, and the quality of materials required for a decent daily life, such as clothing, minimal housing, transportation to work, basic agricultural equipment, cookstoves, etc., commonly are sub-standard and in the end are paid for in terms of low quality nutrition, health, shelter, and risk of life and scarce money. The consumer is helpless to determine whether the brakes on the bus he may take to work meet safety standards, whether the water he drinks meets purity standards, whether the food he eats is bacteria-free, whether the cookstove he uses is energy efficient, whether the shovel he buys will soon break, or whether his new water container will soon leak.

Enforcement of standards for assurance of uniform quality to protect both the consumer and producer can be pursued only if standards policies and criteria are

determined and accepted. Normally this is done by reaching a consensus between the consumer, the producer and the government as to what constitutes an acceptable standard satisfactory to all parties. Reliable instrumentation, and services for measurements relating to standards and quality are a key part of the equation.

This subactivity is to provide advisory services, training, and limited instrumentation for the application of standards' measurement and instrumentation, all related to quality control and improvement, and to the establishment of markets, particularly for the rural, small-scale producer. The preponderant emphasis of the activity will be on those standards and quality factors that directly affect the poorer consumer and the small-scale producer. Consumer related examples are improvement in the quality and safety of food, water, shelter, everyday clothing, local mass transport, local communications for marketing, and basic agricultural equipment and other products required by the Indonesian consumer in the lower economic levels. Producer-related standards are to be primarily for new and improved small-scale production facilities, services, products and markets which will generate new employment opportunities, particularly in rural and remote areas.

ILLUSTRATIVE SUBACTIVITY 2: ALTERNATIVE ENERGY SOURCES FOR RURAL AREAS

Subtitle:

Solar, Wind, Micro-hydro, Methane, Pyrolytic, Geothermal, and other Nonconventional Energy Sources for Village and Town Use

This subactivity explicitly deals with developing effective, acceptable and economic energy sources for rural villages and towns where there is insufficient fossil fuel or hydro-electric energy available, at least to the low income families. The project will also look for alternatives to firewood and conventional charcoal. The energy will be used primarily for agricultural purposes, cooking, water heating, small industry development, and local materials processing (including food processing such as rice drying). The project will be conducted through the Development Technology Center (DTC) of the Institute of Technology in Bandung (ITB) where the development of alternative energy sources is one of the principal goals.

The DTC is developing, under other donor assistance projects (e.g., the Dutch Government) the necessary extension service and field station network to test and demonstrate various designs and approaches for alternative energy, and,

if proved feasible from technical, economic and socio-cultural viewpoints, to spread the technology to villages to promote employment through small industry development and provide for other energy needs.

This subactivity will provide U.S. experience and research results through consultants, provide for training and education, supply critical but limited instrumentation, and pay for necessary materials in the collaborative effort of designing alternative energy sources to be found through this subactivity. Several important side effects are the environmental benefits of reversing forest depletion through the lessening of dependence upon firewood foraging in rural areas, and waste reduction through waste utilization for energy purposes, and reduction of the need to gather and carry firewood which is traditionally a burden assigned to the housewife.

ILLUSTRATIVE SUBACTIVITY 3: AQUATIC RESOURCES DEVELOPMENT

Subtitle: Developing, Expanding and Managing Indonesia's Aquatic Resources for the Benefit of Indonesia

The extent of the aquatic resources available in Indonesia is immense and obvious. The importance of fisheries to the diet of Indonesians is demonstrated by the fact that about 70% of their animal protein intake presently comes from fish and fisheries products. Nevertheless, the GOI is only now attempting to evolve integrated national plans to educate sufficient aquatic specialists to be able to balance needs with supply, open new fisheries and marketing techniques, insure the renewability of stocks, develop coastlines, and protect the aquatic and coastal environment. Disastrous effects on Indonesian nutrition can occur from stock depletion by local overfishing, for example, or from ecological disturbance by industrial waste affecting shoreline or river fisheries, or by use of explosives in reef areas.

As so many Indonesian towns and villages border shorelines or rivers, millions are engaged in local fisheries and as there is insufficient fish protein to meet demand (fish is the cheapest of animal proteins), there is no doubt that this aquatic resource subactivity has potential for directly benefiting the majority of rural Indonesians. Because so many factors and interests are involved, it must be approached from an integrated viewpoint to evolve the institutional resources, human resources and data needed for planning, and to develop a long term national plan for effective manpower and resource development. U.S. advisory services, training and other technical assistance will be

focused particularly on those aspects that will benefit the Indonesian majority. Pattimura University, an isolated and small university on the small fishing-oriented island of Ambon, south of Ceram in the Mollucas, Eastern Indonesia, is planned to be the target of most of this subactivity. Pattimura University has been recently charged by the GOI to develop a teaching and applied research competence in fisheries, in order to become a center of excellence for the fishing communities of this remote region, and to develop fisheries through extension services and research on fishing problems and opportunities.

ILLUSTRATIVE SUBACTIVITY 4: RESOURCE AND ENVIRONMENTAL MAPPING AND EVALUATION THROUGH REMOTE SENSING

Subtitle: Using Aerial Photography and Satellite Imagery in Rural Development Planning

The difficult and remote terrain typical in Indonesia, for example Kalimantan on the island of Borneo and Irian Jaya on the island of New Guinea, makes it difficult for central agencies to monitor and plan for many development sectors such as agricultural development and expansion (including crop and disease assessment), transmigration, forestation, marine pollution control (e.g. oil spills over fishing grounds), rural transportation, erosion monitoring, disaster assessment (e.g. landslide evaluation in mountainous areas) and aquifer detection and water control (e.g. assessment of flooded or drought areas). The GOI is aware of the utility of remote sensing for this purpose, and as the U.S. is the world leader in the techniques, it looks to the U.S. for technical assistance, including advice and training. A recent World Bank loan provides the GOI the capital assistance needed for map-making equipment necessary to reproduce information and data from remote sensing and other sources onto planning maps. The U.S. technical assistance would focus on the processing and analytical methodology necessary to translate remote sensing data into forms useful to rural planners. Social benefits would arise from the improved planning data base for rural development.

ILLUSTRATIVE SUBACTIVITY 5: SURVEY, ASSESSMENT, AND MAPPING OF GEOLOGICAL RESOURCES AND HAZARDS

Subtitle: (a) Mapping Soils, Geological Structures and Types Important to Rural Agriculture, Erosion Control and Small Industry Development; and (b) Mapping Geological Hazards such as Earthquake Faults, Volcanic Activity, Landslide and Flood Dangers, for Mitigation Purposes

Knowledge of soils, gravels, clays and minerals is required for planning new agricultural areas, erosion control, and small industry development (e.g. local industry based upon clays for tiles or bricks, sand and gravel for concrete, limestone for cement, stone for the polished stone handicraft industry, etc.). Geological and disaster risk mapping is also important in planning for flood control and water distribution, detecting faults from seismic activity, providing guidance in planning the location of a transmigrant village, a rural area road or an irrigation system dam, stability required in a low-cost house design, all concerned with rural development and the interests of the rural majority. Geologists can check and map the relative soil stability of hill and mountain sides, which again are critical to planning the location of villages, roads and other public works. Volcanoes can be instrumented to report automatically their activity level, and risk maps can be made to show likely eruption vents and the probable direction of lava flows, all of which directly affect the disaster evacuation plans for endangered villages nearby. Flood prediction maps can be constructed as guides for planning.

Indonesia is beset by many natural disasters, particularly earthquakes, floods and volcanoes. Such natural disasters are no respecter of rich or poor, but events, such as the recent earthquakes in Guatemala, Turkey and Peru and Indonesia itself clearly show that the rural poor suffer the most when natural disasters strike. The development of geological risk maps and related activities will benefit them directly since it will encourage and make possible disaster mitigation planning and activities.

The U.S.G.S. (U.S. Geological Survey) would provide the technical assistance, specialized equipment and services, and training necessary for this activity on surveying, assessing and mapping of geological resources and hazards.

ILLUSTRATIVE SUBACTIVITY 6. WEATHER FORECASTING FOR FISHERMEN AND FARMERS

Subtitle: Devising a System to Provide Weather Forecasts to Fishermen and Farmers

The Director of the GOI Meteorological Service has confirmed to the Mission that there is absolutely no system in Indonesia to provide weather forecasts to fishermen and very little service provided to rural farmers. The value of such a system to improved farming and fishing is obvious. This activity would explore the situation, and develop, test, demonstrate and publicize solutions. Possibilities

include equipping certain fishing boats with weather data collection and reporting apparatus, and relaying forecasts through fishing cooperatives, fishing village leaders, flag warning systems, etc. This subactivity will necessarily include some equipment in addition to technical advisory and training services.

D. Economic Analysis

The prime objective of this project is to increase the institutional capacity and self-reliance of selected GOI institutions which relate science and technology to development, and to influence their research and development policies and procedures to increase benefits to the welfare of the majority of Indonesians. The methodology is to use technical assistance which includes technical and management education and training (i.e. manpower development), advisory services by experts, limited equipment and instrumentation, and selected scientific publications.

The traditional tools of economic analysis, i.e. economic cost/benefit analysis and cost effectiveness techniques, do not lend themselves to the analysis of this type of project, which is primarily training, and institutional and policy development. Therefore, an alternative approach has been selected. It will be demonstrated that the economic costs of the project are reasonable, even moderate, in relation to the sphere of institutional activity involved, and that the potential benefits are many times the economic investment. The important point is that the project's activities and subactivities are not designed to engage in supporting basic research, but are designed instead to promote the development of policies, methodologies and techniques which relate science and technology to socio-economic advances, particularly those which apply to the needs, aspirations and opportunities of the majority of Indonesians, which are considered among the poor majority of the world, by any standard.

Because of the nature of applied research, the probability of returns are higher than for basic research, and economic returns can be expected to occur in a relatively short time period. Nevertheless, it is not possible to quantify returns for the project as a whole, nor by the area of subactivity. What is proposed is that the likely returns be identified in a general way and illustrated by activity and subactivity, thereby demonstrating the economic rationale for the project.

The Activity "A", on Science, Technology and Research Policy Development, may stimulate the development of policies which will have great economic impact. For example, a policy development activity on environmental quality may develop policies which eventually save fisheries from pollution or soils from erosion, with obvious economic benefits. The first policy development workshop or seminar under this activity is to be on "Policies for Reducing Post-Harvest Food Losses". The U.S. National Academy of Sciences has estimated that post-production food losses range between

30 and 50 per cent in developing countries. The dollar value of even a five per cent reduction in losses in the annual rice crop alone amounts to the staggering sum of \$176 million. In addition, there are also hidden losses in energy, soil nutrients, water, human and animal labor, fertilizer, and all the other inputs that go into production of food, which if produced but never eaten, becomes a total loss to the economy.

Activity "B", concerned with improving the institutional and project management of a great variety of research, development, service and similar scientific and technical institutions, also can have great economic impact. An illustrative example would be a ceramics research and development institute, which, because of poor management and project selection techniques, is wasting money on poorly run R&D projects which are not relevant to Indonesia's socio-economic needs or capabilities. Management and project selection training could provide stimulus for more rational and efficient pursuit of R&D projects, including for example a reduction in the energy cost of firing roofing tiles. If the R&D were successful, the economic value of the energy saved would be significant in a country which produces millions of roofing tiles per year. Similarly, a forest products or chemical research institute may develop a cheap, effective treatment to protect wood from termites, again with great economic value. However, unless the institutional and project management capabilities of such institutes are improved, they are unlikely to be able to achieve such results and economic benefits for the country.

Subactivity #1, on standards, quality control, measurements and instrumentation will provide significant economic (and social) benefits by promoting standards for food, water, low-cost housing, safety, and consumer goods. Quality control and correct measurement services will have great impact on market development, which will increase small industry and jobs, and reduce waste. Improvements in instrumentation repair and maintenance will have immediate benefit in saving the original capital investment.

As the value of conventional energy resources has shot up in the last few years, the appreciation of developing suitable substitutes for increasingly scarce fossil fuels has also increased. Subactivity #2, to develop appropriate energy substitutes for village level use in Indonesia, based on solar energy, wind energy, biogas from animal and other wet waste, pyrolytic char, oil and gas from dry agricultural waste, geothermal energy and other sources has a large economic potential. With some analysts projecting that Indonesia will be a net oil importer by 1985, this activity takes on even more importance. Any substitute for kerosene will save the

government millions of dollars, as it now subsidizes kerosene by 50 to 60% in order to keep it competitive with firewood gleaning, which meanwhile is devastating the remaining forest resource on the overpopulated island of Java.

The aquatic resource development subactivity (#3) is intended to develop a regional research and educational capacity at Pattimura University, Ambon, for fisheries resource development, focused on the thousands of artisanal-level fishermen in the Mollucan area, and eastward. Many of them depend upon skipjack tuna, which is a large and valuable fishery resource in the region. The live bait used in this type of fishing industry has been declining rapidly, probably due to ecological damage to reefs and shoreline waters. Unless the causes are determined and effective methods of reversing the trend are developed, there will continue to be negative effects on the tuna fishing industry, bait fishing, local boat building, and the coastal economies as a whole. At the moment, although aware of this local problem, Pattimura University does not have the capacity to address such a problem. This proposed subactivity would develop a fisheries center of excellence at Pattimura that is capable of addressing these types of problems.

Other subactivities (#4 and #5) are intended to produce planning tools in the form of specialized studies and maps for regional planners, and develop a local capacity to continue producing such studies and maps without continued technical assistance. One subactivity would utilize remote sensing sources (aircraft and satellite) to provide certain data and detail that would be considerably more expensive if obtained by conventional ground-based methods. The other subactivity would establish a capability to produce soil and geological maps, and also geologic hazard studies and "risk" maps, for earthquake fault zones, and for volcanic, flood and landslide risk areas. The creation of data base sources, useful in addressing these problems has the potential for large economic returns in monetary terms, resources and human lives. Such data and maps keep a regional planner from making costly mistakes in important decisions such as siting transmigration villages, irrigation dams, new agricultural lands, farm-to-market roads, or in designing low-cost housing which, in certain seismic areas, should be earthquake resistant. The economic benefits of making the correct decision can be enormous in each case.

The last illustrative subactivity (#6) deals with developing a system to forecast weather for Indonesian fishermen and farmers. Again, the economic returns are potentially very large, considering the value of lost crops because sudden rains were not predicted and the farmers not warned during a crop drying period, causing a post-harvest

food loss, or boats and crops were lost because of unpredicted storms.

All these cases illustrate the potential economic returns of better research and development through known techniques and scientific methods, adapted to the local conditions and needs. Indonesia cannot hire or request foreign scientific assistance forever, but must develop its own institutions, manpower and policy-making capability to overcome its development problems and make economic progress for the people and the nation. This project will assist greatly in attaining these goals. While it is not possible to quantify the economic benefits that will accrue to this project, the potential returns of any one of the contemplated activities indicates that this investment in technological transfer and institution building is highly desirable.

(PART III)

E. Impact Upon Women

Although science and engineering are often considered to be primarily masculine activities, in Indonesia women have managed to achieve leadership positions in those fields. Much of the development activities for this project were with the National Institute of Science, (LIPI), and three of the professional women who have leadership roles in that institute were heavily relied upon in the process. Two of them will doubtlessly be leaders in administering two of the activities: research management training and the proposed subactivity on standardization. Other professional women will play key roles in the other subactivities as they are developed. As in past workshops, a significant proportion of the participants in the research management activities will be women.

USAID has made its case clear that it expects more women to participate in the development process, so that the process can be accelerated with this better exploitation of the human resource potential. Within Indonesia there is a definite trend in this direction as indicated by the ever-increasing percentage of women nominated by the GOI for participant training. The training activities in this present project will encourage more opportunities for women in keeping up with this trend.

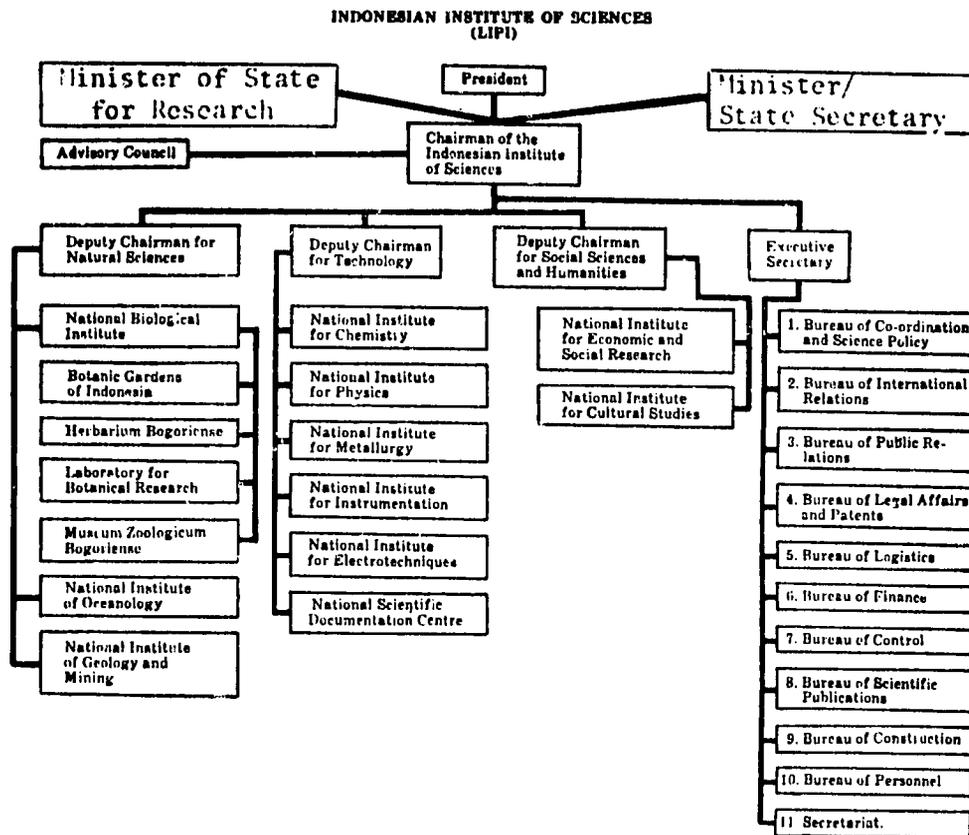
The beneficial results of the project is to have an impact on all the rural folk, men and women alike. Better food standards, safety from natural hazards, and new job opportunities will benefit families as a whole. Some activities, however, will have a direct impact on women. For example, success in developing alternative sources of energy in the rural areas may relieve the need to forage firewood, often a woman's burden, and frees her for more productive activities. Methane gas from bio-gas generators may make cooking better and easier. Although an activity such as weather forecasting for fishermen may have a more direct effect upon men, these will also be important to women. For example, the fisherman's loss of life resulting from an unpredicted storm places a burden on his widow who must now care for the family by herself.

PART IV. IMPLEMENTATION PLANNING

A. Administrative Arrangements

The overall management responsibility for this project will be directly under the Minister of State for Research and his senior staff. The organization of research, science and technology in the Government of Indonesia is described in Annex G, including the Minister's relationships with other GOI entities.

The Research Ministry, although small, is not encumbered by day-to-day operational responsibilities, but rather, under the Minister's direction, develops and coordinates research policies, and coordinates, supervises and manages the activities of a group of important "non-ministerial" R&D institutions, which report directly to the President as well as to the State Minister for Research. These institutions are: LIPI (Indonesian Institute of Sciences) which in itself administers ten R&D institutions and a central technical documentation and information center; (see organizational chart, Fig. 1); BAKOSURTANAL, which is charged with coordination and management of all mapping activities in Indonesia; BATAN, the nuclear energy and research institute; LAPAN, the space and aeronautics institute; and the Central Bureau of Statistics. In addition, the State Minister for Research advises the state planning agency BAPPENAS, and chairs a group of interministerial councils and committees, such as the National Committee on the Inventory and Evaluation of Natural Resources and a newly formed committee on earthquakes, which give him additional management authority in the general sector of science, technology and research. He has also been named as the principle authority responsible for the implementation and organization of the "PUSPIPTK", a multi-agency center for research, science and technology to be constructed over the next ten years in Serpong, on the outskirts of Jakarta.



(LIPI personnel total 2000; including 300 in LIPI Headquarters)

FIGURE 1

In the case of subactivities other than science policy development, technical management is expected to be delegated to the leadership of the LIPI or non-LIPI institutions involved in the specific subactivity, or to LIPI Headquarters, with the Research Ministry providing oversight. Science, technology and research policy development activities would remain under the Minister of State for Research, but with LIPI assisting with operational details.

For management assistance to the project, a Science and Technology Project Management and Evaluation Committee will be established. This will provide a forum for planning, managing and administering the project as a coherent entity. It will insure the overall project objective is reached, and concurrently be available for evaluation requirements, augmented by outside evaluation experts. Such a committee will also be able to resolve issues, problems and bottlenecks as they arise.

The committee may meet as often as quarterly, and it will have a major annual review session to which expert objective observers may be invited to assist on the evaluation and redesigning of the several subactivities.

The funding of each subactivity will be through a contract with a U.S. government agency or private institution. The USAID Science and Technology Advisor and his local professional assistant will monitor the contracts.

Both Activities A & B (science policy, and R&D management) have had grant-funded forerunner activities whereby the Mission acted as direct contractor on behalf of the GOI. As the proposed contractor (the National Academy of Sciences) for Activity A is a quasi-governmental agency with a Basic Ordering Agreement with AID, the Mission again would be direct contractor. For Activity B, we wish to discuss further with the GOI (LIPI) the pros and cons of direct contracting (as before) or host country contracting with the Denver Research Institute, presuming the DKI is approved as contractor under the predominate capability justification outlined elsewhere in this PP.

In the case of the Subactivities, the Mission will execute grant agreement and PIO documents for those subactivities which deal with U.S. Government Agencies, i.e. No. 1 (U.S. National Bureau of Standards), Nos. 4 and 5 (U.S. Geological Survey) and No. 6 (U.S. National Oceanographic and Atmospheric Agency). The Mission would also act as direct contractor for No. 2, if the Georgia Institute of Technology is approved as contractor (predominate capability) and the State of Georgia law does not allow state institutions to enter into contracts with foreign governments.

If it does, the Mission will discuss the pros and cons of direct versus host country contracting with the GOI (Institute of Technology, Bandung) and the same for the Subactivity No. 3 (Aquatic Resource Development) with GOI (LIPI), before making a decision.

AID/W technical backstopping will be by ASIA/TR/SDP. Mutual benefits in regard to the various subactivities of the project can be obtained through interaction with TAB/OST.

(PART IV)**B. Implementation Plan**

- | | |
|-----------------------|---|
| 1. September 15, 1977 | Loan/grant authorization |
| 2. September 30, 1977 | Grant agreement signed |
| 3. November 30, 1977 | Loan agreement signed |
| 4. December 31, 1977 | Conditions Precedent to
initial disbursement met |
| 5. March 31, 1978 | Contracts for Activities
A and B signed |
| 6. May 31, 1978 | Contract signed for first
subactivity |
| 7. May 31, 1979 | Contract signed for last
subactivity |
| 8. August 31, 1979 | Letter of Commitment issued
for last subactivity |
| 9. September 31, 1979 | Letter of Credit opened for
last subactivity |
| 10. November 30, 1982 | Final disbursement late. |

C. Evaluation Plan

A major evaluation of the project as a whole and all the activities and subactivities underway for over six months will be made annually to prepare a Project Evaluation Summary (PES). The evaluation will be to determine whether the inputs were being made as planned, whether the outputs were being produced as projected, and whether the project was moving toward the expected end-of-project conditions. This evaluation will, on the basis of the findings, suggest any project design and implementation changes necessary to make the project more realistic and effective.

This annual evaluation will be made by a Government of Indonesia Science and Technology Project Management and Evaluation Committee, which includes USAID/Indonesia representation. The annual evaluation may require the Committee to be augmented on an ad hoc basis by additional representatives from AID/W, major project contractors, or other experts. The Management and Evaluation Committee will also be in charge, as the title indicates, of managing and guiding the project and evaluating the progress on a periodic basis, probably quarterly. Its Honorary Chairman will be the Minister of State for Research. His senior staff member responsible for the project will be Chairman, with another of the Minister's senior staff members as Deputy Chairman. Committee members will include representatives from the Cabinet Secretariat (SEKAB), the National Planning Agency (BAPPENAS), and the GOI agencies directly involved in the activities and subactivities. The USAID Project Manager and one other USAID officer will assist on this Committee.

An evaluation activity may also be built into specific activities/subactivities, e.g. Activity B (R&D Management) will have an "Evaluation Workshop" in its final year.

The most important day-to-day evaluation and resulting small "course corrections" will be through the close project monitoring by the Minister of State for Research's senior staff officer assigned to manage the overall project, and his counterpart, the USAID/Indonesia Project Manager.

We are also considering the feasibility of planning and conducting several field evaluations within a reasonable time after implementation of any activities/subactivities under this project, to determine their effectiveness in reaching the specific field objective of the activity or subactivity, particularly to record and optimize benefits to the poor. Foreign consultants will likely be required for

....

this type of evaluation activity, both for objectivity and for explaining and demonstrating evaluation techniques to GOI counterparts, to build local evaluation skills. Grant funds would be used to finance such field evaluations and foreign consultant participation.

(PART IV)**D. Conditions, Covenants and Negotiating Status**

The following conditions precedent to initial disbursement for specific components of the project are contemplated:

1. Prior to the first disbursement or to the issuance of any commitment document under the Loan for the purpose of financing Activities and Subactivities under the Loan, the Borrower shall submit to A.I.D. in form and substance satisfactory to A.I.D.:

a. Evidence that the Science and Technology Project Management and Evaluation Committee is established and is ready to implement and to evaluate the project.

b. Evidence that the Borrower has committed itself to contribute to the overall project, on a timely basis, at least 25% of the required funds, either in cash, i.e. directly budgeted for counterpart activities, or in-kind, i.e. equivalent value of local costs such as salary and benefits for counterpart personnel while working on project activities, travel and support costs for local personnel while engaged in counterpart activities, and equivalent rental value of space used for project activities. The Borrower will document these expenditures by listing such contributions periodically by activity and sub-activity. The minimum GOI contribution will be \$2,200,000, that is 25% of the project total.

c. Evidence that the Borrower will assign a senior individual with necessary staff support at the Ministry of State for Research as the point of contact and responsible person for the day-to-day management of the overall project.

d. An opinion of the Minister of Justice of the Borrower that the Loan Agreement has been duly authorized and/or ratified by, and executed on behalf of the Borrower, and that it constitutes a valid and legally binding obligation of the Borrower in accordance with all of its terms.

e. A statement of the names of the persons authorized to represent the Government on behalf of this loan/grant and specimen signatures of such persons.

2. Prior to the first disbursement or to the issuance of any commitment document under the Loan for the purpose of financing an individual activity or subactivity, the Borrower shall submit to A.I.D. in form and substance satisfactory to A.I.D.:

a. A design for a feasibility study for that activity/subactivity unless it is agreed in writing that forerunner activities have been sufficient for satisfying this requirement.

b. A description of the activity/subactivity with objectives, scope of work, budget, and an implementation plan.

c. A clearance on the activity/subactivity by the Science and Technology Project Management and Evaluation Committee.

d. Evidence that a senior individual, with necessary staff, has been assigned by the appropriate institution or institutions as the point of contact and responsible person for the day-to-day management of the activity/subactivity.

e. Evidence that the Borrower's prospective implementing agency or institution for the activity/subactivity possesses the organizational and manpower capacity to carry out the activities according to the program, budget and time frame planned.

3. Borrower Covenants

a. Adherence will be made to the General Covenants established in the Loan Agreement.

b. Borrower shall provide all other resources in addition to this loan necessary for the timely and effective implementation of the project.

c. Borrower shall ensure that each student trained in the United States under the project shall be guaranteed a position at his home institution or elsewhere in the GOI commensurate with his training.

ANNEX C

**Project Design Summary
Logical Framework**

(Printed on Facing Pages - 2 Parts)

PROJECT DESIGN
LOGICAL

Project Title & Number: Science and Technology Loan/Grant; Project No. 497-0266

SUMMARY
FRAMEWORK

Abbe G
Pg. C-1

14 of Projects
Fr. FY 77 to FY 82
Total US Funding \$6.5 mil (\$5.5 mil loan)
Date Prepared: 8/27/77 (91.5 mil)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS																				
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>Establish an indigenous, self-reliant scientific and technological community that is able to manage and exploit rationally Indonesian natural and human resources for optimum contribution to the country's development and the welfare of the majority of its citizens.</p>	<p>Measures of Goal Achievement:</p> <ul style="list-style-type: none"> -New indigenous industries and markets relevant to rural and urban poor developed and demonstrated. -National policies and plans for resource development and assistance to the poor being determined, published and executed. -Smaller percentages of expatriates being used in scientific Research and Development (R&D) without a corresponding reduction in institutional outputs. -Selected renewable resource levels being maintained, although resources are being exploited. -Substitutes being found for non-renewable resources being depleted, e.g. energy sources. 	<p>Survey of S&T institutions and agencies.</p> <p>Selected resource surveys.</p> <p>Research findings, and evaluation of their relevance to needs of Indonesian majority.</p> <p>Examine Indonesia's science and technology policies and plans.</p>	<p>Assumptions for achieving goal targets:</p> <p>There are feasible renewable resources which can be substituted for non-renewable resources, e.g. alternative energies to substitute for fossil fuels in rural areas.</p> <p>Relevant sectors of the national plan will be based on research and development findings and products.</p> <p>Continued political and economic stability.</p> <p>Continued GOI commitment to improve the quality of life and socioeconomic development of the majority of Indonesians.</p>																				
<p>Project Purpose:</p> <p>To provide a strong indigenous capacity in selected GOI scientific and technological institutions to plan and conduct research and development (R&D) activities in ways that will benefit Indonesia's majority, and offer opportunities for increased productivity, employment, income, and improvements in quality of life.</p>	<p>Conditions that will indicate purpose has been achieved:</p> <ul style="list-style-type: none"> -End of project status. -Selected S&T sectoral and institutional development policies and plans (such as reducing post harvest food losses, environmental protection, and consumer goods and safety) will have been initiated. -The selected S&T institutions will be using management practices developed and learned through this project. -Maps and informational materials being used by regional planners. -Management courses for R&D entities will be established and taught by Indonesians. -Aquatic resource teaching and research capability to serve a remote region is achieved. -Increased level of government and public support of S&T activities achieved. 	<p>Examine published policy, and observe how development plan is being implemented:</p> <p>Observation of management practice.</p> <p>Evaluation by management experts.</p> <p>Check that study courses are being taught, their course materials, and by whom?</p> <p>Check that planners are using new maps and materials.</p> <p>Check national budget for S&T's share, monitor press attention to S&T sector.</p> <p>Joint USAID/GOI evaluation.</p>	<p>Assumptions for achieving purpose:</p> <p>Continued strong federal budget support for the science, technical and research sector.</p> <p>Continued support for the Ministry of State for Research, and associated S&T institutions.</p>																				
<p>Outputs:</p> <ol style="list-style-type: none"> 1. Science policies in selected fields established and plans developed. 2. Key S&T institutions self-reliant, cost-effective and relevant to the needs of the majority. 3. International linkages with analog institutions established (primarily GOI-US). 4. Research products being used for benefit of needy, especially in rural areas. 5. Key S&T institutions will have trained manpower for key positions. 6. Commodities will have been delivered, installed, and used in research program keyed to development needs. 7. Maps, charts, and data required for an informational base for selected land use and disaster planning. 8. Workshops, seminars and publications resulting in GOI and public awareness of potential of usefulness of S&T activities to needy. 9. New or adapted technologies demonstrated in rural areas. 10. New job opportunities generated through small industry development. <p>Agents:</p> <p>Technical Assistance</p> <ul style="list-style-type: none"> Short-Term Experts Long-Term Experts <p>Training Abroad</p> <ul style="list-style-type: none"> Academic Short-Term <p>In-Country Training</p> <ul style="list-style-type: none"> Documentation (primarily documentation, scientific instruments & equipment) <p>Indirect Costs (Overhead, Central Management, etc)</p>	<p>Magnitude of Outputs:</p> <ol style="list-style-type: none"> 1. A stated policy and a published plan for each of 3 to 5 areas. 2. 4-5 key S&T institutions. 3. At least 5 linkages with top US institutions. 4. At least 5 major research studies being carried on each year. 5. At least 3 people academically trained abroad (average) for each of 3-7 key institutions. From 30-80 will have short-term training abroad. At least 400 persons trained in-country. 6,7. (not quantifiable at this stage) 8. At least 3 major workshops each year with resultant reports. Reports from 10 workshops and research studies each year. 10. One major scientific publication each year. <p>Implementation Target (Type and Quantity)</p> <table border="1"> <tr> <th colspan="2">Technical Assistance</th> <th colspan="2">\$ Budget</th> </tr> <tr> <td>Short-Term Experts</td> <td>20 person years</td> <td>1.2</td> <td>.4</td> </tr> <tr> <td>Long-Term Experts</td> <td>20 person years</td> <td>1.0</td> <td>.4</td> </tr> </table> <p>Training Abroad</p> <table border="1"> <tr> <td>Academic</td> <td>70 person years</td> <td>0.8</td> <td>.2</td> </tr> <tr> <td>Short-Term</td> <td>35 person years</td> <td>0.8</td> <td>.2</td> </tr> </table> <p>In-Country Training Support 0.4 1.5</p> <p>Commodities (S&T publications, instruments, and equipment) 1.3</p> <p>Indirect Costs 1.0 5 6.5 3.0</p>	Technical Assistance		\$ Budget		Short-Term Experts	20 person years	1.2	.4	Long-Term Experts	20 person years	1.0	.4	Academic	70 person years	0.8	.2	Short-Term	35 person years	0.8	.2	<ol style="list-style-type: none"> 1. Examine plans and review reports of policy workshops and study groups. 2. Check that key entities will have no or very few expatriates; do cost effectiveness studies; do relevance-to-poor evaluation studies. 3. Study documents establishing linkages. 4. Surveys and research being conducted and results reported. 5. Participant training reports; reports from workshops, etc. 6,7. Survey data materials. 8. Review workshops reports, survey publications 9. Survey of demonstration activities. 10. Review small industry reports, and make field inspections of demonstrations. 	<p>Assumptions for achieving outputs: It will be beneficial to Indonesian institutions to have linkages with analog institutions in the U.S. and other countries. Research of S&T entities can produce results needed for assisting the majority.</p> <p>Technologies are available or can be found that are suited to Indonesia's development needs, particularly in generating increased employment and income, increased productivity, and new sources of energy that are easily useable by the poorer elements of the population.</p>
Technical Assistance		\$ Budget																					
Short-Term Experts	20 person years	1.2	.4																				
Long-Term Experts	20 person years	1.0	.4																				
Academic	70 person years	0.8	.2																				
Short-Term	35 person years	0.8	.2																				
		<ol style="list-style-type: none"> 1. Reports of contractors on sub-projects. 2. Monitoring by S&T Advisor. 	<p>Assumptions for providing inputs:</p> <p>It will be possible for S&T institutes to release key personnel for further study abroad.</p> <p>Scientific and technological institutes (especially U.S.) will provide technical assistance that can be adapted to the situation in Indonesia.</p>																				

Illustrative Subactivity 1: Standards Policy and Systems,
Instrument Repairs and Calibration,
Measurement Services, and Quality
Control Improvement

Subtitle : Improving Standards and Quality
Control for the Benefit of the
Majority of Indonesian Citizens

The development of a coherent standards policy and system is a key factor in national development, including the most elementary food processing and manufacturing facilities. The situation in Indonesia today shows that the planning, programming, formulation, amendment, adoption, dissemination and implementation of national standards is incomplete and fragmented among various Government of Indonesia (GOI) ministries, lacking over-all policy direction and coordination.

The national system which clearly needs to be established will encompass planning, programming, formulation, adoption, dissemination to individual citizens with no technical background, and implementation. Of these, the planning, programming and adoption of national standards should be centralized under the responsibility of a central interagency committee. Formulation and implementation may be decentralized, that is to say, they may be entrusted to various ministries and institutes, with the central committee acting as the prime mover and the coordinating forum. In 1974, LIPI was entrusted to undertake the task to set up this national system with the help of other ministries and institutes. In this context, several tasks have been carried out, such as evolving concepts for a national standardization system, establishment of interministerial "Division Councils" to develop plans for improvements in standardization and standards formulation, and for establishing the foundation for the central focal point. LIPI is the responsible agency for this standardization activity. A UNIDO expert has reviewed the GOI standardization situation, and his recommendation are supportive of the GOI views and approach.

This subactivity would be to assist LIPI, (1) in its role in the central standardization system, (2) in its function as the overall standardization coordinator, (3) in the infusion of a measurement capability where needed and in strengthening the ability of the secretariat, particularly for the following areas:

- (1) Formulation of national standardization policy
- (2) Formulation of consensus standards
- (3) Certification marking
- (4) Dissemination of measurement capability
- (5) Implementation of standards
- (6) Promotion of standards and quality control
- (7) Institutional organization (division councils, general council, technical committees, etc.)

- (8) Research and development for quality improvement
- (9) Support of priorities for actions in furtherance of the majority of Indonesians

Technical assistance will include education and training, advisory services and equipment provision.

Under leadership of the LIPI National Instrumentation Institute (Lembaga Instrumentasi Nasional, "LIN") an interagency system ("KIM") for calibration, instrumentation and measurement has been formed. LIN itself serves the dual function of developing simple instruments (such as student microscopes) and of training on the making, installation and use of instruments by technicians from manufacturing industry. LIN also provides a service for installing, calibrating or maintaining instruments purchased from abroad for small and medium scale industry. As instruments are necessary for testing and measuring in many agricultural, consumer standards, health, nutritional and other activities, help in instrument selection and maintenance is important. Conformity with standards almost always involves a measurement process that needs to be learned, especially by small-scale operators, so training is also needed.

Technical assistance and advisory services are especially desired by the GOI in the related problems of instrumentation (specification, maintenance, repair, etc.), calibration, metrology, and establishment of quality control, as these aspects all interrelate with improved standards. These should make it much easier for small and medium scale industry to use simple instruments to measure the uniformity of raw materials, control processes (such as the temperature of an oven, the pressure in a vessel etc.) and judge the quality of a product (such as furniture from home industry). Standards development also relates closely to environmental aspects and health, such as determining auto emission standards and water pollution, quality control to insure that local production can meet standard limits of chemical or microbiological contaminations. It insures that contaminant measurement instruments are properly calibrated and used to measure the level of unhealthful pollutants and emissions. Effective environmental and health protection legislation and enforcement cannot evolve without this concurrent development of standards, quality control, measurement and instrumentation.

Within LIPI, the responsibility for this subproject is expected to be shared by the LIPI Deputy Chairman for Technology, and by the Director of LIPI/LIN, the National Instrumentation Institute. LIPI has been chairing a special interministerial council to develop plans for improvements in standardization, instrumentation, metrology, etc. for over a year, and the council's conclusions on organization, objectives, etc. are in advanced stages. Also, a technical survey (NBS/GOI) has been held, under central AID funding in June 1977, providing the necessary base for loan/grant technical assistance activities. The loan/grant proposed would be used to help

implement the recommendations derived from surveys and other standards studies and activities.

As a world-renowned, objective, governmental, non-profit institution, the U.S. National Bureau of Standards (NBS), Department of Commerce, is in a unique position to provide or organize the many aspects of technical assistance and advice required. The GOI has a high regard for the NBS and therefore desires a linkage directly with the NBS under this loan/grant project. The NBS will use its own manpower and material resources for the assistance required; but where appropriate, the NBS will also obtain consultants or subcontractors, for instance from U.S. professional organizations, other government agencies, and private industry. On occasion, foreign experts may be used. The NBS will make the determination of need and the selection of any other people and institutions to be involved, and will coordinate and administer the arrangement in consultation with USAID/Indonesia. The GOI, of course, must concur before the fact with any organization, individual or activity to be involved. USAID would play its usual role in guidance to insure adherence to Congressional mandates and AID policies and regulations, as well as monitoring, overall supervision, evaluation, etc.

The development of a useful standards policy and system will be affected by hundreds of variables, and involve many interests and organization, including private industry and a range of governmental agencies, as well as requiring public acceptance, appropriate legislation, etc. Evaluation of success achieved by U.S. technical assistance might best be made by an independent group, probably under grant funding. As standards development is a long-term challenge, a larger, longer range implementation project may evolve; the evaluation group should advise on this. The benefits to Indonesian people and their society are discussed in Part III-C of this pp.

SUGGESTED BUDGET (FIVE YEARS)

1.	<u>NBS staff/consultants salaries, benefits, overhead for in-country training and assistance</u>	
	- 1 full-time NBS specialist at LIPI (4.5 years), incl. housing	\$275,000
	- TDY standards experts from U.S. (total 2 person years)	100,000
2.	<u>Travel</u>	
	<u>International travel</u>	
	- NBS resident consultant (with family) 8 RT, U.S. - Indonesia	20,000
	- TDY part-time specialists, 10 RT, U.S. - Indonesia	25,000
	<u>Local travel and per diem</u>	
	- TDY specialists(1/3 rd) and Resident Specialist (2/3rds)	75,000
3.	Equipment, commodities, small instruments	100,000
4.	Special training workshop in a decentralized location	75,000
5.	Training of LIPI staff in the U.S. (10, at 3 to 6 months each) incl. international travel	100,000
6.	Special vocational training course at LIPI/LIN Bandung	80,000
7.	Contingencies and miscellaneous (e.g. evaluation activities)	100,000
	TOTAL LOAN/GRANT	<hr/> \$950,000 *****

INDONESIAN CONTRIBUTION

(~~estimated~~ actual or in-kind; five year totals)

1). Counterpart and subordinate staff salaries and benefits, including trinees in the U.S.	\$350,000
2). Space and facilities; local staff	50,000
3). Space and facilities; visiting staff	100,000
4). Local Travel	<u>50,000</u>
TOTAL GOI CONTRIBUTION	<u>\$550,000</u> =====

Illustrative Subactivity 2: Alternative Energy Sources for Rural Areas

Subtitle : Solar, Wind, Micro-hydro, Methane, Pyrolytic, Geothermal, and other Nonconventional Energy Sources for Village and Town Use

Attention to rural village needs and the energy crisis has sharpened awareness of the need to look for practical energy sources which are alternative to the large, centralized conventional sources (fossil fuels, hydroelectric, and nuclear). This is particularly true for the rural areas of developing countries, as conventional energy sources, such as electricity, piped gas, and gasoline or diesel fuels may not be available to them for decades due to cost, lack of power lines, geographic isolation, and other distribution problems. Indonesia, along with other countries, is interested in viable alternatives, such as solar energy, wind energy, biogas (methane from manure) pyrolytic conversion (gas, oils and char from dry agricultural waste), energy plantations (planting fast growing trees for fuel use), and micro-hydro systems. One natural alternative, foraging for firewood, has had a devastating effect, particularly in Java, and must have a technological substitute to a meaningful degree as soon as possible. Meanwhile, heavily subsidized kerosene is being offered as a less-than-satisfactory substitute, considering its foreign and local currency costs and other factors.

Indonesian's new (about three years old) active and successful appropriate technology center, the Development Technology Center, (DTC) of the Institute of Technology, Bandung (ITB), has formed an interdisciplinary committee on rural energy needs, and has started a small R&D and extension service program on developing local power sources, mainly for the rural areas, in the form of autonomous or decentralized systems.

The objective of the proposed subactivity is to combine the present resources and experience of the DTC with the Engineering Experiment Station at the Georgia Institute of Technology or another suitable U.S. institution, in a cooperative rural development effort, focusing on the following scientific and technological approaches:

- a. The development of alternative sources of energy for rural food processing and preservation industries, including the building or appropriate demonstration units which have the potential of increasing food utilization and decreasing food losses in the rural areas.

An inventory of rural waste types and volumes to determine the feasibility of developing alternative sources of energy (charcoal, biogas, pyrolytic oil, etc.). The construction and testing of appropriate demonstration units, which may be replicated for widespread utilization to relieve the demand for petroleum derivatives and wood for fuels in rural areas.

- c. A joint, in-depth analysis of appropriate alternative energy development including, but not restricted to, rural electrification and solar and wind energy potentials. Development of demonstration units which incorporate alternative sources of energy and which can be replicated in quantity, at moderate cost.
- d. The active stimulation of small-scale industry in rural areas which can utilize alternative sources of energy and appropriate technology. The provision of management and technical assistance to rural industries to help them expand and diversify thereby increasing rural employment opportunities.
- e. The provision of assistance and training for entrepreneurs interested in the establishment of new ventures based on the findings of the program.

The DTC is unusual in that it does not receive operational funds from its parent institution. It secures its program funds as payments for the services it renders to the GOI and to private entities. It must perform its work well, since it does not depend on government or university subsidies in order to exist. Its success is shown by the fact that it is a growing organization which has been able to attract a staff of well trained, innovative, dedicated Indonesians. It is also attracting support from various donor agencies, especially T.O.O.L. of the Netherlands, which is supporting a DTC rural extension system, which will help in the spread and utilization process for products of this subactivity.

Monetary inputs in this subproject will provide for salaries, travel, and per diem for U.S. technical and training assistance, funds for selected instruments and equipment, special training and education in the U.S. or third countries, a full-time project director and forty man-months of specialist time, local materials costs, a project vehicle, and local staff support. The GOI contribution will fund DTC professional inputs, space and utility costs, executive planning and other elements. Outputs will be feasible alternative sources for energy for rural areas, including demonstrations and field applications, development of new or improved small industry and employment, and improved capabilities within the Development Technology Center.

A detailed plan was submitted by the Development Technology Center to the Government of Indonesia in September, 1976, based upon an earlier proposal for about two and one-half years technical assistance and training. This will need to be modified into a five-year plan, but this can be done in short order, and this subactivity, which is of high priority to both the GOI and AID, can therefore start quickly, once loan and grant funds are authorized and the loan signed.

Predominate Capability Statement

The Georgia Institute of Technology (Georgia Tech), one of the foremost

scientific and engineering institutions in the United States, has as a sub-unit the Engineering Experiment Station, an applied research arm with more than 750 professional and support personnel. The Economic Development Laboratory of the Station has been active for more than 20 years in a broad program of economic development activities and since 1964, has had projects in many countries of the world, particularly in the field of small industry development, but also in alternative energy projects such as solar energy development and pyrolytic conversion. The Georgia Institute of Technology has the largest solar energy R&D program in the U.S., at this time.

Georgia Tech also acts as a focal point for a network of organizations and institutions involved in small industry development and appropriate technology. It has an AID 211(d) Grant to enable it to develop its capabilities in these areas.

An "umbrella" institutional linkage agreement between Georgia Tech and the DTC was formalized in August, 1976. Technical assistance and training from Georgia Tech will assist DTC in broadening its program and becoming more effective as an institution for appropriate technology development and application, particularly in application and extension service.

SUGGESTED BUDGET

U.S. staff and consultant salaries, benefits,
and overhead, for in-country training and
technical assistance

1. 1 full-time resident specialist (with family) (Project Director/Bandung); (five years)	\$ 400,000
2. Various TDY specialists (45 man-months) with U.S. staff support	250,000
3. Local Indonesian support personnel (secretary, driver, field workers)	150,000

Travel

International travel and per diem

- 1 full-time specialist (with family) 8 RT US - Indonesia	20,000
- 10 TDY part-time specialists; 10 RT US - Indonesia	25,000

Local travel and per diem

- Local travel and per diem for full-time and TDY specialists	55,000
- Vehicle (4 wheel drive), maintenance, repair, operating costs	20,000
- Equipment and instrumentation, office furniture and supplies, etc.	50,000
- Materials and local labor for experimental and prototype energy-converter constructions	145,000
- Contingencies and miscellaneous (e.g. evaluation costs)	75,000

TOTAL LOAN/GRANT

\$1,190,000

INDONESIAN CONTRIBUTIONS

1. Counterpart and subordinate staff salaries and benefits; 5 years	\$100,000
2. Space and facilities; local staff	80,000
3. Space and facilities; visiting staff	70,000
4. Workshop facilities; auxiliary transportation and miscellaneous	200,000
	<hr/>
TOTAL GOI CONTRIBUTIONS	\$450,000
	=====

Illustrative Subactivity 3: Aquatic Resources Development

Subtitle : Developing, expanding and managing Indonesia's aquatic resources for the benefit of Indonesians

Background

As an immense archipelagic nation, the importance of the development and management of Indonesia's aquatic and coastal resources to Indonesia's social and economic development should be clear. Yet Indonesia has done relatively little oceanographic work in its home waters to date because of such key factors as lack of specialized data, trained personnel, specialized documentation and equipment, insufficient or inadequate ships and operational funds, and geographic isolation from the oceanographic centers of the world, such as the United States. Until recently there has been a low priority in funding and planning. For example, there is only one Ph.D. level oceanographer presently working in this field in Indonesia, a graphic example of the inadequacy of the present situation.

The Government of Indonesia has recently become aware of the importance and urgency of developing its oceanographic and limnologic (freshwater) manpower and facilities. In late 1975 and early 1976, Mr. James Brodie, a UNESCO expert, made a survey at GOI request of the fisheries and oceanographic situation, and arrived at recommendations for upgrading and expanding activities in this critical sector on a nationwide basis. As a result, the Minister of State for Research has identified this natural resource area as a priority developmental target for Indonesia. Fish, shellfish and crustacea, both natural stocks and cultured, are a renewable resource if their exploitation is properly managed and they are protected from pollution and overfishing and other deleterious actions. Fishing expansion will provide large amounts of animal protein food to rural populations, provide great numbers of rural job opportunities, and provide increased market potentials. Improved knowledge of the characteristics of Indonesian waters will also help in other important developmental areas, such as hydrographic charting for ship and boat safety, current and sediment studies necessary to determine optimal designs for ports and entry channels, and protection of reefs and coastlines and other aquatic environmental features.

The multidisciplinary aspects of aquatic resource development are so immense in complexity, size and importance that this subactivity must be limited in its scope to have much effect, that is, it must have a focus geographically and institutionally. To assist the Mission and the GOI in determining how to arrive at such a focus, the services of one of the leading oceanographic administrators in the United States were obtained. During a short TDY, funded by Project Development and Support Funds, Dr. Robert B. Abel, who was director of the U.S. Federal Sea Grant Program for over ten years, visited Indonesia for discussions with government and university officials concerned with the problem, and to visit selected institutions.

As a result of Dr. Abel's findings and recommendations, the best approach for assistance by AID appears to be primary concentration on upgrading the new Fisheries Faculty at the remote and small Pattimura University, Ambon, South Moluccas, with some concurrent support being given to upgrading the new, small National Institute of Oceanology (LON) field research station, located on the Pattimura campus at Poka, near Ambon city. The approach would also encourage the two organizations to work together for the benefit of the aquatic resource community of the region, e.g. local fishermen and boat builders.

National Institute of Oceanology (LON)

LON is clearly intended to be a driving force in marine science in Indonesia. It recently moved to new, enlarged quarters in a very appropriate location on the Ancol Waterfront of Jakarta. Its director is the indicated person to head this subactivity because of both his experience and top-level (Ph.D.) training, and his position as executive secretary in several new GOI interagency committees to promote aquatic resource development. LON also has a major oceanographic and fisheries research ship.

Pattimura University

This struggling university located in a remote area in the eastern islands of Indonesia has been charged by the GOI to establish itself as an aquatic resource center of excellence to serve the deprived eastern region east of Sulawesi including the Moluccas and Irian Jaya, and the immense stretches of seas between and around these islands.

Pattimura University in addition to its excellent geographical position to provide such a function has some inherited physical facilities from a large Russian building project abandoned in the mid-sixties. These are to be made into an excellent aquatic resources center. The LON Poka Field Research Station is located on this new Pattimura campus and there will be arrangements with LON so that it can use the station's facilities freely. The young staff of the new Fisheries Faculty lack experience but they are enthusiastic and dedicated to building their institution and program so that these are of real service to the people and to national development.

Dr. Abel further reported the following,

"According to what might be considered unconventional criteria, this was the most impressive institution visited. First we were not expected, since we apparently arrived before the letter announcing our visit. Under the circumstances, the manner in which the entire cadre of deans was mobilized - on a Saturday evening and again on Sunday morning, was, at minimum, dramatic!

"Second, for an institution that by U.S. standards would be considered rural and isolated in the extreme, this group appears to have a large, broad charter, and moreover, appears to understand it and thoroughly appreciate its significance.

"Third, the group appears extraordinarily sensitive to what they are and where they ought to be going in terms of needs and opportunities to help the common man.

"Fourth, the physical shell exists, and it would be a pity not to capitalize on it. The Soviets were in the process of constructing a (marine sciences) showpiece enterprise when they were apparently caught by the shifting political winds. There now stands at Poka a massive complex of (large concrete) buildings, designed as classrooms, laboratories, shops, central library and administrative quarters, fairly begging for utilization. We were shown an excellent plan for developing this complex.

"Fifth, there is apparently a close geographical and working relationship with the small LIPI/LON field station already at Poka".

This Pattimura University - LON oceanology complex obviously has great possibilities, but it badly needs assistance if it is to exploit its resources effectively and reach its potential.

- The objectives of this project would be to help in the following:
1. To develop research projects which would,
 - a) determine optimal sustainable fishing yields; the largest catch which would not reduce the viability of the respective stocks;
 - b) discover new fishing grounds;
 - c) improve the quality of the fish delivered to the plate;
 - d) protect against foreign and domestic destruction of fishing grounds;
 - e) develop an understanding of protective ecology and means to prevent overfishing, destruction of coral reef habitats, and pollution;
 - f) develop programs in marine plant technology by which the poor people may become self-employed seaweed farmers;
 - g) develop better information on useful but little known or unexploited marine organisms;
 - h) develop appropriate technologies so that people have better tools and techniques for exploiting the sea resources.
 - i). develop a aquatic instrument and equipment repair system.

2. To develop educational programs which would,
 - a) upgrade the effectiveness of the research program;
 - b) provide more and better teachers and trainers;
 - c) develop a well-trained, effective cadre of extension agents who can convey improved understanding and techniques to the fishermen and to generally improve their lot.
 - d) increase public awareness of the marine and coastal environments and greater sensitivity to the problems and opportunities therein.
3. To develop leaders in this area who understand the needs and the situation so that they can ably represent their government in the complex, sophisticated negotiations that characterize international fisheries agreements.

The beneficiaries of such a program are to be the average citizens who as a result of the program will have better fishing baits, better inter-island transportation, and a more secure future with greater protection of the environment and the renewable resources. The program will help to solve such practical problems as the growing scarcity of live bait, which is basic to ship-jack tuna fishing along the coastline of Ambon and adjacent islands. Possible causes are pollution, use of explosives on reefs, damage to soft corals by Japanese travelers operating under GOI concessions, or other reasons. The cause must be pinpointed and remedies found quickly in the interest of the local fishing community.

Following is the proposed program and budget for this aquatic resources activity. These are tentative. The first phase of the activity is to be a feasibility study to refine the objectives and to sharpen the scope of work, divided between the cooperating institutions.

Proposed Program

LON (National Institute of Oceanology)

- Feasibility; study 4 person months
- Short-term expert consultants; Poka Station; 8 person months
- Experimental program for aquatic science instrument repair services, probably between LON and LIPI/LIN (National Instrumentation Inst.)
- Aquatic resource documentation development, Poka Station
- Short, non-academic training, Poka Station, 2 month-5 participants
- Overall administrative responsibility

Pattimura University

- Long-term consultants 2 at 2 1/2 years
- Short-term consultants 6 at 3 months
- Academic training , 5 participants for 2 years
- Short-term, non-academic training, 6 participants at 3 months
- Aquatic resources library materials and equipment
- Oceanographic instrumentation and equipment

Illustrative Budget (loan/grant funds)

Feasibility study	\$ 32,000
Long-term advisors	350,000
Short-term advisors	182,000
Academic training	120,000
Non-academic training	56,000
International travel	70,000
Instrument Repair Experimental Project	40,000
Library and documentation center	60,000
Oceanographic instrumentation and equipment	80,000
Education	50,000
Indirect costs, contingencies, evaluation	100,000
	<hr/>
Loan/grant funds total	\$1,140,000
	=====

GOI contribution

Counterpart and participant salaries (including trainees in the U.S.)	\$280,000
In-country travel	125,000
Facilities, equipment and supplies	125,000
Miscellaneous, communications, etc	100,000
	<hr/>
GOI contribution total	\$630,000
	=====

Illustrative Subactivity 4: Resource and Environmental Mapping and Evaluation through Remote Sensing

Subtitle : Using Aerial Photography and Satellite Imagery in Rural Development Planning

Rural development in Indonesia requires careful planning to insure that natural resources such as forest, land and water are initially surveyed and then judiciously managed in their use for supporting the livelihood of the rural people and the economic development of the country, all with full attention to conservation of the environment. Survey and mapping of natural resources is of high priority in Indonesian developmental plans, but by its nature, and particularly in difficult or remote terrain, conventional surveying is costly and very long term. Great technological advances have been made in recent years in developing various remote sensing devices, such as airborne specialized cameras, side-looking radar, gravimeters and magnetometers, as well as earth resource satellites such as ERTS and its follow-on satellite LANDSAT. These can all be of use in surveying resources for rural development planning.

The United States is the world leader in remote sensing techniques, particularly LANDSAT imaging and interpretation, and the cost of the research and development has been with public funds.

The U.S. government is willing to assist developing countries by making available to them various imagery produced by ERTS and LANDSAT as well as to provide other techniques. What is necessary is a local capability to interpret the imagery or other data, and to apply the results in local planning e.g. resource management, land use policies and management, and demography.

A small, AID-sponsored, remote sensing training and applications program was instituted in Indonesia between 1970 and 1975, and was coordinated within the Indonesian Government by the mapping agency BAKOSURTANAL with the help of the U.S. Geological Survey. A start was made on basic remote sensing applications in most of the Indonesian agencies concerned with natural resources, land use planning and rural development.

This proposed subactivity will build upon results of the earlier project and will introduce more advanced and specialized remote sensing techniques, develop better facilities for multidisciplinary remote sensing studies, and train Indonesian geoscientists and rural planners in the more advanced applications of remote sensing. The subactivity will involve applications in cartography, agriculture, forestry, rangeland management, crop disease assessment, environmental monitoring, water resources and management, water pollution detection, oceanography, geology and soils determination, and geologic hazard assessment. Nearly all of these directly pertain to the livelihood and benefit of the rural dweller.

This subactivity will further utilize the LANDSAT satellite data covering Indonesia for data interpretation, imagery enhancement, applications research, and training in selected areas and problems in the various earth science disciplines. It will also selectively use the new systems on LANDSAT-3(C), SEASAT, MAGSAT and other satellites as they become available, and will explore the feasibility of using Data Collection System (DCS) for collecting and monitoring volcanologic, hydrologic, seismic, and other change phenomena. It will also promote the use of airborne remote sensing systems.

In February, 1976 the GOI and the World Bank signed an agreement for collaboration in a "National Resource Survey and Mapping Project," based upon a \$13 million World Bank loan and a matching \$13 million commitment of GOI funds. The project is concerned with the establishment over the next five years (but likely to be increased to seven years) of a national resource survey and mapping institution capable of providing the resource data required for development planning. The World Bank loan will fund construction of facilities, acquisition of equipment, materials and technical assistance to complete the base-mapping of Indonesia, and will initiate a systematic inventory of the natural resource base. Canada (CIDA) and the GOI are currently discussing a complementary assistance project for aerial photo coverage at the scale of 1/50,000 for producing orthophoto base maps; that is, photo coverage true to scale, for all of Indonesia. Australia is also making a contribution and the Netherlands is discussing assistance possibilities.

BAKOSURTANAL, under the direction of the Minister for Research, is the GOI agency responsible for this survey and related matters.

Remote sensing is vital to this inventory. The World Bank project will provide Indonesia with the capability of producing its own base and resource maps. Missing from the equation is the factoring in, particularly at larger scales (1:100,000 and 1:250,000), of remote sensed data derived especially from imagery from U.S. resource satellites, EPTS, LANDSAT, etc., and from data processing and analytical techniques developed in the U.S.

In the first two years of the SGT Loan/grant project it is likely that USGS personnel will also be invited to provide limited technical assistance and coordinating and planning assistance under funding from the World Bank loan project. Therefore, the need for the activity described herein will be about 1979, that is, the last three years of the five year AID loan.

However, the associated SGT grant funds may be required immediately (late 1977 or early 1978) for technical assistance in planning the detail of the loan project, to insure that it is compatible and complementary to the GOI/World Bank project, i.e., a feasibility study.

Generally speaking, the USGS will provide remote sensing specialists in the earth science disciplines listed earlier, or subcontract for other specialists not within the USGS organization, to visit Indonesia at designated times to conduct training seminars and symposia on remote sensing applications. These specialists will also work with and advise Indonesian

counterparts on actual applications, that is, on-the-job training. The USGS will draw on the expertise and facilities of its own personnel and technical centers, such as the EROS Data Center, Astrogeology Center, USGS Research Staffs, and the USGS Sioux Falls Remote Sensing Training Center, and will also draw upon the expertise and facilities of universities, research institutes, private industry and other governmental agencies such as the space agency, NASA.

USGS/GOI coordination and scheduling will be arranged through a senior USGS specialist headquartered in Indonesia, and a senior Indonesian counterpart, either from BAKOSURTANAL or the Geological Survey of Indonesia. Coordination of the activity in Indonesia will be handled by the National Committee on the Inventory and Evaluation of Natural Resources, chaired by the Minister of State for Research. Various Indonesian agencies that are concerned will hold membership on a remote sensing subcommittee, to insure coordination.

Measurable outputs will be in the form of new maps and publications which depended in part or in whole on remote-sensed data, and revisions, corrections, improvements or updatings of older maps and publications currently being used by rural development planners and resource and conservation managers. In addition, there will be a cadre of people trained in remote sensing survey techniques and utilization.

The U.S. Geological Survey, Department of the Interior, would arrange for the staff input, both working in Indonesia and in the U.S. USGS would also provide remote sensing data, enhancement and processing services and other support requirements. Specialized training services would be arranged for and/or supplied by the U.S.G.S. Technical assistance services would include advice on and assistance in the purchase of minimum equipment requirements, as well as providing their actual cost under subactivity funds. GOI counterpart funds will cover housing, local travel, office space, miscellaneous support costs, and salaries, local travel costs for GOI counterparts and participants.

Suggested Budget (three years)
USAID Loan/Grant Funds

1.	<u>USGS staff/consultants salaries, benefits, overhead for in-country training and assistance</u>	
	1 full-time remote sensing coordinator (with family) 2.5 person years	\$150,000
	5 part-time remote sensing specialists 3 person years. (Includes feasibility study)	300,000
2.	<u>Travel</u>	
	<u>International travel and per diem</u>	
	1 USGS full-time staff (with family) 4 RT, US - Indonesia TDY	10,000
	5 part-time specialists, 10 RT US - Indonesia	25,000
	<u>Local (per diem only)</u>	
	TDY specialists only, 3 person years	50,000
3.	Equipment commodities and data processing	200,000
4.	Training in the U.S. of ten Indonesian participants to augment training given in Indonesia, including travel and per diem	100,000
5.	Contingencies and miscellaneous, including evaluation costs	50,000
	TOTAL Loan/Grant	<hr/> \$885,000 =====

INDONESIAN CONTRIBUTION

1. Counterpart and subordinate staff salaries and benefits; three years, including trainees in the U.S.	\$400,000
2. Space and facilities; local staff	75,000
3. Space and facilities; visiting USGS staff	40,000
4. Local housing, visiting USGS staff (2.5 years)	25,000
5. Local travel; visiting USGS staff	20,000
6. Local travel; local staff	40,000
	<hr/>
TOTAL GOI CONTRIBUTION	\$600,000 =====

Illustrative Subactivity 5: Survey, Assessment, and Mapping of Geological Resources, Land Information and Geological Hazards

- Subtitle** :
- a). Mapping Soils and Geological Structures and Types Important to Rural Agriculture, Erosion Control and Small Industry Development;
 - b). Surveying, Assessing and Mapping Geologic Hazards such as Earthquake Faults, Volcanic Activity, Landslide and Flood Dangers, for Mitigation Purposes

These two closely related subactivities described below would be coordinated through the National Committee on Inventory and Evaluation of Natural Resources and a planned "Earthquake" Committee, both chaired by the Minister of State for Research, who will also be the administrator of the overall "Science and Technology" Project. The Geological Survey of Indonesia, a unit of the Ministry of Mines, would be the primary operational agency involved, as explained below. The U.S. counterparts for both subactivities would be the U.S. Geological Survey (USGS), Department of the Interior, under a PASA.

Subactivity 5a) Geological Resources and Land Information

From 1969 to 1975, the U.S. Geological Survey (USGS) provided special technical assistance and training to the Geological Survey of Indonesian (GSI) under an AID grant. The project established staff, facilities, and procedures for an effective program of systematic geological and land information mapping and map publication, and all parties considered it a success in helping to develop a basic mapping capability of this type in Indonesia. This proposed subactivity will be to further expand and strengthen the capacity of the GSI, especially for providing geological, resources and land classification maps and appraisals in support of Indonesia's Five Year Development Plans, and as primary tools for rural development planners. More specifically, this subactivity will increase the capacity of the GSI to provide information on geologic materials and conditions that directly affect human productivity, health and safety in Indonesia. It will develop a capability in GSI for providing detailed maps and information on such subjects of direct concern to human activity such as; the distribution and composition of geologic materials that affect soil fertility and land use; geochemical characteristics, metal contents and contaminants in soils; geologic conditions affecting erosion, drainage, water supply, and waste disposal; geologic units containing soil conditioners and natural fertilizers; foundation conditions and construction materials for housing, roads, utilities, and dams in rural areas; raw materials for energy.

The subactivity will establish a system for collecting, interpreting and presenting such information in a manner most understandable and useable in regional and rural development programs, comparable to the Land Information and Analysis program of the U.S. Geological Survey.

Despite the success of the earlier, grant-funded project, the GSI still feels deficient in its capacity to collect, synthesize, and evaluate information specifically applicable to human productivity, health and safety, and to present this information in a way that is useful in agricultural and employment generation programs. Moreover, the GSI needs additional technologies and capabilities for identification and assessment of geological resources and conditions as a follow-up of the mapping now underway. This subactivity will help increase the effectiveness of the on-going work of the GSI, and its contribution to regional development planning and land-use assessment, in cooperation with other natural resources agencies in Indonesia.

As a multipurpose natural resources survey, mapping and information program, this subactivity will be under the policy direction of the Chairman of the interministerial National Committee on Inventory and Evaluation of Natural Resources. The Chairman is the Minister of State for Research, who will also administer the Science and Technology grant/loan project, thereby assuring policy direction to the subactivity. Under the policy direction of the Minister of State for Research, other agencies may be involved such as the Mapping Coordination Agency "BAKOSURTANAL", (a non-ministerial agency), although most of the actual work and institutional assistance will affect the GSI, under the Ministry of Mines. The Research Minister's leadership will strengthen the interinstitutional relationship which the Committee fosters.

To achieve the broad objectives, the USGS will assist the GSI, through the Committee, in three principal categories of activity. Each activity will involve consultation, demonstration, and training services by USGS specialists, working with Indonesian counterparts, to develop further the capacity of the GSI for independent operation in the future. The three categories, and activities under each, are as follows:

- A. Procedures for preparation and publication of geologic, resources, landclassification maps and reports, including special-purpose maps useful in planning agricultural, construction, and land-use programs in rural areas, involving:
 - (1) Guiding and improving the technical editing and scientific interpretations of geologic and land-information maps and reports.
 - (2) Improving and expanding the cartographic capacity for preparing maps and illustrations.
 - (3) Preparing interpretive resources and landclassification maps (showing in non-technical terms the particular geologic, resource, and environmental features of importance for human

activity and regional development planning).

B. Technology for identifying and assessing resources:

- (1) Evaluating and demonstrating geophysical, geochemical, and analytical techniques useful in the study and appraisal of geologic materials and raw materials for local agricultural and industrial use.
- (2) Demonstrating marine sampling and geophysical techniques for extending geological mapping into coastal and offshore areas.
- (3) Introducing improved concepts and techniques for mapping and assessing raw materials for local use.

C. Technology and procedures for regional planning, resource appraisal, and program development:

- (1) Introducing data-handing and data analysis systems for resource and environmental appraisal studies.
- (2) Guidance in preparing and presenting resource and environmental appraisal.
- (3) Guidance in developing capacity to participate and benefit from relevant international programs.

In carrying out the above, existing computer capacity (US or Indonesian) will be used. AID funded inputs will consist of salary, travel and per diem for the part or full-time services of USGS specialists to work with designated Indonesian counterparts. Total USGS specialist services for this subactivity are expected to be 12 person years. This will include 2 full time specialists for a total of 9 person years, plus 2 to 4 part-time specialists each year for a total of 3 person years.

Other inputs include:

- Equipment and commodities
- Data processing
- Training of 10 Indonesians, 3 to 6 months each in U.S. institutions

GOI inputs will include the support of counterparts and subordinate staff, space, and facilities. The GOI will provide office space, housing, local travel for the USGS consultants as well as local miscellaneous project support costs. A five year project is estimated to cost \$1,000,000 (average \$200,000 per year) in loan funds, augmented by \$200,000 (average \$40,000 per year) in grant funds.

Outputs of this subactivity will be the further development of a local capability to survey resources, analyze data, and produce high quality maps and information which pertain particularly to the development of rural Indonesia.

SUGGESTED BUDGET (FIVE YEARS)

AID Loan/Grant Funds

1.	<u>USGS staff or consultant salaries, benefits and overhead for in-country training and assistance</u>	
	2 full-time specialists (incl. families), for 4.5 years each (total 9 person-years)	\$ 450,000
	2 to 4 part-time TDY specialists (total 3 person-years)	150,000
2.	<u>Travel and per diem for USGS staff/consultants International (travel and per diem)</u>	
	Full-time specialists and families, incl. home leave, 16 RT US - Indonesia	50,000
	Part-time specialists (TDY), 20 RT US - Indonesia	60,000
	<u>Local Travel</u>	
	TDY personnel; per diem only	50,000
3.	Equipment, commodities and data processing	140,000
4.	Training of 10 Indonesians, 4 to 6 months each, in U.S. institutions, incl. international travel/per diem	150,000
5.	Contingencies, Miscellaneous (e.g. evaluation activities)	100,000
	TOTAL LOAN/GRANT	<hr/> \$1,200,000 =====

Indonesian Contribution

(estimated actual or in-kind); five year totals.

1. Counterpart and subordinate staff salaries and benefits; five years (including trainees in the U.S.)	\$ 500,000
2. Space and facilities; local staff	200,000
3. Space and facilities; visiting USGS staff	100,000
4. Local housing; visiting USGS staff	80,000
5. Local travel; visiting USGS staff	100,000
6. Local travel; local staff	100,000
	<hr/>
TOTAL GOI CONTRIBUTION	\$1,080,000 =====

Subactivity 5b: Surveying, Assessing and Mapping Geologic Hazards such as Earthquake Faults, Volcanic Activity, Landslide and Flood Dangers, For Mitigation Purposes

Indonesia lies at the junction of three major crustal plates which impinge against each other, causing a variety of natural and active geologic forces including earthquakes, volcanoes and unstable ground (sinking and landslides) and heavy financial, human and natural resources losses over relatively short periods of time. Much of this loss and suffering can be mitigated through better knowledge of the natural phenomena, establishing an early warning system, and by producing risk maps for informing national and local planners of the likelihood in specific locations of risks to buildings, villages, cities, dam, bridges, communication lines, and roads, so that rational decisions can be made concerning design and location prior to construction.

The GOI is planning to establish a national agency for earthquake disaster mitigation, and the Director General of Mines has asked the USGS (U.S. Geological Survey) to assist. During the grant-funded 1969-1974 geological mapping program between the USGS and the Geological Survey of Indonesia, an introduction to this topic was made. The GSI and the USGS produced a small-scale map showing the general location of major geologic structures in relation to the volcanoes and epicenters of past earthquakes.

With this as a starting point, and using the basic geological mapping capability developed in the earlier project, it is now possible to undertake a new project to develop an expanded GOI capability for producing more detailed and specific surveys, assessments and maps, including risk maps, for geologically hazardous areas within Indonesia.

In addition to the relationships of this project to GOI/AID socio-economic development goals, it directly relates to AID's humanitarian and disaster assistance mandate.

The administration of the subactivity would be similar to the proposed subactivity on Geologic Resources and Land Information. The two projects would be closely interrelated with each other and with the proposed Remote Sensing subactivity.

Overall policy guidance would be by the Minister of State for Research, as loan administrator, as chairman of the National Committee on Inventory and Evaluation of Natural Resources and as chairman of a new "Earthquake Committee." The bulk of the technical assistance and training would be to increase the contribution of the GSI to the proposed national disaster mitigation agency being planned for Indonesia, by the GOI.

The subactivity would be closely coordinated with a UNESCO regional

seismograph network project with which the USGS is also involved, in cooperation with the Directorate of Meteorology and Geophysics of the Ministry of Communications which is responsible for the national seismograph network in Indonesia. The USGS would assist the GSI in coordination with Mapping Coordination Agency (BAKOSURTANAL) and other Indonesian agencies, in the following activities:

- (a) Initiating a program to identify and map active faults, landslide and unstable ground, volcanic and other phenomena related to geologic hazards, with the aid of remote sensing technology.
- (b) Enlarging and improving instrument networks to monitor seismic, volcanic and other active phenomena, similar to those networks established and used by the USGS, as a basis for developing better understanding of geologic processes that constitute hazards in Indonesia, and as a basis for warning and prediction. Developing a satellite data collection system for monitoring seismic and volcanic events.
- (c) Preparing and issuing risk and other maps and reports covering hazard areas, with recommendations to reduce hazards in order to mitigate losses, and preparing a seismotectonic map of Indonesia.
- (d) Organizing an effective hazard information and warning system.

The USGS is exceptionally well qualified for this assistance, as the USGS is well known to the Indonesians, knows Indonesia, and has a similar working program in the U.S. based upon its earthquake research program in California and its volcano research center in Hawaii.

Inputs would include one full-time USGS specialist for 3 years, and 1-3 part-time specialists each year for 4 years for a total of 5 person years. For adequate transfer of capability one Indonesian counterpart per USGS specialist would be required, plus supplemental staff for training and participation in the project. Loan and grant fund requirements for a five year project are estimated \$650,000 for technical assistance, \$400,000 for specialized equipment, and \$100,000 for special requirements such as short-term study trip abroad and evaluation. Local office space, housing, and travel costs for the USGS specialists would be paid by GOI counterpart funds as well as miscellaneous support costs.

Outputs, in addition to institutional and manpower development, would include a well-planned and operating hazard monitoring system, an effective information and early warning system, and a series of risk maps and reports for national planners.

It may be noted that this subactivity is entirely of direct benefit to the rural, average citizen, since its objective is reduction of death, injury, and personal property loss (especially individual housing) from earthquakes, volcanoes, floods, and landslides, as well as the employment dislocations caused by natural disasters.

SUGGESTED BUDGET (FIVE YEARS)

USAID Loan/Grant funds

1) <u>USGS staff/consultants salaries, benefits, overhead for in-country training and assistance</u>	
1 full-time specialist (with family), 3 person years	\$ 180,000
1 to 3 part-time TDY specialists each year for 4 years, totalling 5 person years	350,000
2) <u>Travel</u>	
<u>International travel and per diem</u>	
1 USGS full-time staff (with family); 8RT, US - Indonesia	20,000
8 TDY part-time specialists, RT, US - Indonesia	20,000
<u>Local (per diem only)</u>	
TDY specialists only, five person years	90,000
3) Equipment, commodities and data processing	400,000
4) Training and study trips (short-term) of 2 to 3 Indonesians abroad including travel and per diem	20,000
5) Contingencies and miscellaneous, incl. evaluation costs	100,000
 TOTAL LOAN/GRANT	 ----- \$1,180,000 =====

Indonesian Contribution

1) Counterpart and subordinate staff salaries and benefits; five years (including trainees in the U.S.)	\$ 400,000
2) Space and facilities; local staff	150,000
3) Space and facilities; visiting staff	75,000
4) Local housing; visiting USGS staff	30,000
5) Local travel; visiting USGS staff	85,000
6) Local travel; local staff	85,000
 	<hr/>
TOTAL GOI CONTRIBUTION	\$ 825,000 =====

Illustrative Subactivity 6: Weather Forecasting for Fishermen and Farmers

Subtitle : Devising a System to Provide Weather Forecasts to Fishermen and Farmers

Indonesia, as a large, archipelagic nation, is attempting to establish a practical national communications system. The recently inaugurated synchronous satellite communications system over Indonesia is an example of progress in this field. Any communications system, in addition to its value to communications for business, industry, education, administration and private communication, can also serve to bring synoptic meteorological field data to a central point for processing and analysis, and to relay weather predictions back to the field. If weather predictions do not quickly get to the potential users, particularly farmers and boat operators, the predictions are useless to them for their planning.

The importance of weather forecasting for large commercial interests such as scheduled airlines, large shipping companies and public utilities is so well recognized that there are, to varying degrees, forecasting and communications systems already existing which serve their needs. As determined in a 1973 AID study* the neglected parties are the rural farmers and fishermen. This subactivity would provide a start on establishing an integrated system that would reach rural and outlying farming and fishing centers with weather information on a timely basis. It is very important that a farmer knows when a heavy rain or dry spell is predicted so that he can plan his planting, harvesting, grain drying, and other farming activities accordingly. The local small-boat fisherman should also know when severe squalls are expected in his fishing area to know whether to stay in port or move to other fishing grounds. At this time there is no such service to fishermen, and an inadequate service to farmers.

The Weather Service of the United States National Oceanic and Atmospheric Administration (NOAA), Department of Commerce, is very experienced in developing viable systems for the acquisition, processing,

* Report to the Government of Indonesia on Meteorological Service Programs for Agriculture and Hydrology, by Halbert E. Root, USAID, Meteorological consultant, November, 1973.

analysing, and interpretation of weather data, and the delivery of forecasts to the public as well as developing microclimatic studies. For this subactivity it is proposed to a PASA be negotiated with NOAA which would work with the GOI Center for Meteorology and Geophysics, Ministry of Communications, including appropriate relationships and coordination with the non-Ministerial agencies LAPAN (space) and BAKOSURTANAL (mapping coordination) both under the policy jurisdiction of the Minister of State for Research. As local winds, rains and sunshine are a natural resource, their vagaries are of interest to him under his natural resources policy responsibilities. In addition, the activity would be coordinated with other GOI and regional agencies dealing with farmers and fishermen, particular the Ministry of Agriculture, and with international organizations such as FAO and the WMO.

This subactivity would also help provide microclimatic data on proposed transmigration areas as an important element to transmigration planning. Such information from the Center for Meteorology and Geology would be very important to the planning operations of the Ministry of Manpower, Transmigration, and Cooperatives.

The suggested budget represent a level of effort in providing as inputs NOAA expertise for technical assistance and local training, purchase of selected equipment such as transmitters/receivers computer, time, and limited training and education in the U.S. The GOI would provide counterpart personnel, and local costs for NOAA staff or consultants involved in the project.

Outputs of this joint subactivity would be a study of the present weather forecasting and communications situation, an analysis of potential ways to establish an effective forecasting system to serve Indonesia's farmers and fishermen, a joint selection of the most cost-effective system, and the development and initial steps in the establishment, testing and demonstration of such a system. Institutional and manpower development would be included. The long-term establishment of the system would be the responsibility of the GOI, perhaps augmented by additional donor assistance. All activities would be closely coordinated with the World Meteorological Organization (WMO).

SUGGESTED BUDGET (FOUR YEARS)

USAID Loan/Grant funds

NOAA staff/consultants; salaries, benefits, overhead,
for in-country training and assistance

- | | |
|---|-----------|
| 1) 1 full-time resident specialist (with family)
4 person years | \$250,000 |
| 2) 2 part-time TDY/specialists agrometeorologists,
equipment experts, etc., each year; totalling
4 person years | 250,000 |

Travel

International travel and per diem

- | | |
|---|--------|
| 3) 1 full-time staff (with family); 8RT, US - Indonesia | 20,000 |
| 4) TDY part-time specialists; 12RT, US - Indonesia | 30,000 |

Local (per diem only)

- | | |
|---|---------|
| 5) TDY specialists only, four person years | 75,000 |
| 6) Equipment, commodities and data processing | 200,000 |
| 7) Training and study trips (short and medium term)
at U.S. institutions, for 2 or 3 Indonesians,
including travel and per diem | 80,000 |
| 8) Contingencies and miscellaneous, incl.
evaluation costs | 75,000 |

TOTAL LOAN/GRANT

\$980,000
=====

Indonesian Contribution

1) Counterpart and subordinate staff salaries and benefits; four years (including salaries of trainees in the U.S.)	\$450,000
2) Space and facilities; local staff	100,000
3) Space and facilities; visiting staff	50,000
4) Local travel; local and visiting staff	200,000
	<hr/>
TOTAL GOI CONTRIBUTION	\$800,000 =====

UNCLASSIFIED
Department of State

ANNEX A(1)
OUTGOING
TELEGRAM

PAGE 01 STATE 136216
ORIGIN AID-27

2814

INFO OCT-01 OES-07 IGA-02 H-02 /039 R

DRAFTED BY ASIA/PD: RSQUEENER: IS

APPROVED BY AA/ASIA: JHSULLIVAN

ASIA/PD: JRMCCABE

DAA/ASIA: MHBADLER

ASIA/TR: ABJACOBS (PHONE)

ASIA/IK: BEDUPUIS (DRAFT)

ASIA/DP: WLEFES (PHONE)

GC/ASIA: CSTEPHENSON (PHONE)

PPC/DPRE: PMATHESON (PHONE)

ASIA/PD: MMPEHL

DESIRED DISTRIBUTION

7K ACTION 8ASIA 4 CHRON 2 3 4 8 INFO IDC PPC GCFLD 4ASIA 6 GCASIA 27P

-----132001Z 053036 /63

P 131829Z JUN 77

FM SECSTATE WASHDC

TO AMEMBASSY JAKARTA PRIORITY

UNCLAS STATE 136216

AIDAC

E. O. 11652: N/A

TAGS:

SUBJECT: SCIENCE AND TECHNOLOGY PRP

REFS: A) JAKARTA 7409, (B) STATE 114723

APPRECIATE PROMPT RESPONSE AND AFFIRMATION OF PRINCIPLES BY
GOI. PRP APPROVED. SEPTEL FOLLOWS RESPONDING TO PARA 3
REF A. VANCE

UNCLASSIFIED

**ACTION
COPY**

UNCLASSIFIED
Department of State

**ANNEX A (2)
INCOMING
TELEGRAM**

PAGE 01 JAKART 07409 070742Z
ACTION ~~AID-20~~

2499

INFO OCT-01 H-02 OES-07 IGA-02 /032 W
-----070745Z 093877 /17
P 070612Z JUN 77

FM AMEMBASSY JAKARTA
TO SECSTATE WASHDC PRIORITY 1561

UNCLAS JAKARTA 7409

AIDAC

E. O. 11652: N/A

SUBJ: SCIENCE AND TECHNOLOGY LOAN/GRANT PRP AND PP

REF: STATE 114723

1. MISSION APPRECIATES THE APAC APPROVAL OF S&T PRP, AND THE GUIDANCE PROVIDED REFTEL FOR INSURING THAT THE PROJECT WILL BE PREPONDERANTLY RELEVANT AND BENEFICIAL TO THE POOR MAJORITY OF INDONESIANS. MISSION AND GOI WILL DO ALL THAT IS FEASIBLE TO COMPLY WITH REFTEL GUIDANCE IN BOTH SPIRIT AND LETTER.
2. MISSION HAS INFORMED GOI OF THE THREE PRINCIPLES CITED REFTEL, AND TODAY (JUNE 7) HAS RECEIVED WRITTEN CONFIRMATION THAT THE GOVERNMENT OF INDONESIA IS IN AGREEMENT THAT THE THREE PRINCIPLES SHOULD UNDERLIE THE CONCEPT AND EXECUTION OF THE SCIENCE AND TECHNOLOGY PROJECT PRESENTLY UNDER NEGOTIATION.
3. REQUEST PDS FUNDING BE RELEASED ASAP. FOR VISIT DR. ROBERT ABEL (ETD U. S. ABOUT JUNE 16) AND THE DENVER RESEARCH INSTITUTE MANAGEMENT WORKSHOPS THIS AUTOMN. ASIA/TR/SDP (ALAN JACOBS) HAS DETAILS. PLEASE CABLE CONFIRMATION, PRIORITY, FOLLOWED BY ABEL'S ETA & FLIGHT NUMBER.
NEWSOM

UNCLASSIFIED

UNCLASSIFIED
Department of State

ANNEX A (3)
OUTGOING
TELEGRAM

PAGE 01 STATE 126313
ORIGIN AID-28

0476

STATE 126313

INFO OCT-01 OES-07 IGA-02 EA-09 /039 R

DRAFTED BY ASIA/TR/SOP: ABJACOBS/ASIA/PD/EA: RSQUEENER
APPROVED BY A/AA/ASIA: HMBADLER
A/DAA/ASIA: DDCOHEN

ASIA /PD: ARLOVE
ASIA/IK: BEDUPUIS (DRAFT)
PPC/DPRE: PMATHESON (DRAFT)
ASIA/DP: RMEHAN (DRAFT)
ASIA/TR: ADOLY (DRAFT)
CC/ASIA: HMORRIS (DRAFT)
PPC/RD: EGRIFTEL (DRAFT)
ASIA/TR: ADOLY (DRAFT)
A/AID/WID: FTHOMPSON (INFO)
GC/ASIA: HMORRIS (DRAFT)

P 012146Z JUN 77

FM SECRETARY WASHDC
TO AMEMBASSY JAKARTA PRIORITY

UNCLAS STATE 126313

AIDAC

E.O. 11652: N/A

TAGS:

SUBJECT: SCIENCE AND TECHNOLOGY PRP (497-0266)

REF: STATE 114723

1. APAC APPROVES SCIENCE AND TECHNOLOGY PRP SUBJECT TO FOLLOWING CONDITIONS: (A) PROJECT DEMONSTRATE PRIMARY CONCERN FOR RELATING SCIENCE AND TECHNOLOGY (S/T) TO NEEDS/PROBLEMS OF INDONESIAN POOR MAJORITY (B) AT PURPOSE LEVEL, EMPHASIS BE PLACED ON INSTITUTIONALIZATION OF THIS CONCERN AND OPERATIONAL CAPACITY TO TRANSLATE CONCERN INTO EFFECTIVE APPLICATION OF S/T FOR BENEFIT OF POOR MAJORITY; (C) MUTUALLY AGREED CRITERIA BE DEVELOPED FOR SELECTING ACTIVITIES CONSISTENT WITH OVERALL PROJECT EMPHASIS (EXAMPLES ARE SUPPLIED BELOW). DEFINITIVE PRP APPROVAL WILL BE GIVEN UPON CONFIRMATION THAT ALL FOREGOING PRINCIPLES ARE ACCEPTABLE TO GOI. FOLLOWING PARAGRAPHS ELABORATE ON THESE PRINCIPLES AND PROVIDE ADDITIONAL GUIDANCE FOR PP PREPARATION.

2. PROJECT PURPOSE SHOULD BE REVISED TO READ: QTE TO PROVIDE STRONG, INDIGENOUS CAPACITY IN SELECTED GOI SCIENTIFIC AND TECHNOLOGICAL INSTITUTIONS TO PLAN

AND CONDUCT RESEARCH AND DEVELOPMENT (R AND D) ACTIVITIES IN WAYS THAT WILL BENEFIT INDONESIA'S POOR MAJORITY AND OFFER OPPORTUNITIES FOR INCREASED PRODUCTIVITY, INCOME, AND QUALITY OF LIFE. UNQUOTE.

3. SELECTION CRITERIA FOR PROJECT ACTIVITIES SHOULD INCLUDE AT LEAST FOLLOWING CONSIDERATIONS: (A) PREPOND-ERANT THRUST OF ACTIVITY BENEFITS POOR MAJORITY (ACTIVITY MIGHT ENRICH SOME SUB-ACTIVITIES OR PROGRAMS WITH LESS DIRECT RELEVANCE TO NEEDS OF POOR MAJORITY; INTENTION HERE IS PRIMARY, NOT EXCLUSIVE RELATIONSHIP TO POOR); (B) PRIORITY BE GIVEN TO ACTIVITIES WITH HIGH POTENTIAL FOR INCREASING AGRICULTURAL OUTPUT, EXPANDING RURAL EMPLOY-MENT OPPORTUNITIES, IMPROVING NUTRITION, ETC; (C) ACTIV-ITY OFFERS POSSIBILITIES FOR CREATIVE APPLICATION OF S/T TO RURAL AND REMOTE AREAS, WITH FORESEEABLE DEVELOPMENT OF THE AREA'S POTENTIAL AND BENEFITS TO LOW-INCOME FAM-ILIES; AND (D) ACTIVITY WILL ENHANCE INSTITUTIONAL CAPACITY TO RELATE APPROPRIATE S/T TO NEEDS/PROBLEMS OF POOR MAJORITY REACHING THE IMPACT OF ACTIVITY ITSELF.

FYI. IN OUR VIEW, APPLICATION OF SUCH CRITERIA WILL TEND TO DEFINE PERMISSIBLE BOUNDARIES FOR ACTIVITIES DESCRIBED IN CURRENT VERSION OF PRP. FOR EXAMPLE, STANDARDS ACTIVITY WILL SATISFY CRITERIA TO EXTENT IT CONCENTRATES ON FOOD, WATER, SHELTER, SMALL-SCALE INDUSTRIAL OUTPUT, ETC. END FYI.

4. PLANNING OF SPECIFIC ACTIVITIES: WE AGREE WITH PRP STRATEGY TO SATISFY 611 (A) REQUIREMENTS, I.E., BY (A) IDENTIFYING A NUMBER OF POSSIBLE ACTIVITIES WHOSE TOTAL COST WELL EXCEEDS AVAILABLE PROJECT FINANCING, (B) ESTABLISHING EFFECTIVE ADMINISTRATIVE MACHINERY FOR PLANNING, APPRAISING, AND APPROVING ACTIVITIES, AND (C) DEFINING ACTIVITY SELECTION CRITERIA. FOR ACTIVITIES WHICH ARE REASONABLY CERTAIN TO BE FINANCED UNDER SUBJECT PROJECT, PP SHOULD PROVIDE DETAILED FEASIBILITY ANALYSIS, PLANS, AND COST ESTIMATES. FOR ACTIVITIES TO BE AGREED UPON SUBSEQUENT TO PROJECT AUTHORIZATION, PRECONDITIONS FOR USAID APPROVAL (PAGE 12 OF PRP) SHOULD BE EXPANDED TO INCLUDE CONFORMITY WITH CRITERIA DESCRIBED PARA 3 ABOVE, FEASIBILITY APPRAISAL (TECHNICAL/ ENVIRONMENTAL/ECONOMIC/FINANCIAL), SOCIAL SOUNDNESS ANALYSIS INCLUDING ANALYSIS OF IMPACT ON WOMEN (BOTH AS PARTICIPANTS AND AS DIRECT BENEFICIARIES OF PROJECT ACTIVITIES), AND EVIDENCE OF EFFECTIVE ADMINISTRATIVE ARRANGEMENTS AND CAPABILITIES.

5. RELEVANCE OF PRIOR AID EXPERIENCE - MANY OF PROPOSED ACTIVITIES (S AND T POLICY; R AND D MANAGEMENT; STANDARDIZATION) HAVE BEEN CARRIED OUT IN OTHER COUNTRIES WITH AID FINANCING, RELYING FOR TECHNICAL SERVICES ON SAME U.S. AGENCIES (NAS; DRI; HBS) WHO ARE EXPECTED TO ASSIST THE GOI. PP SHOULD INCLUDE AN APPRAISAL OF THIS PAST EXPERIENCE, WAYS IN WHICH SUCH ACTIVITIES HAVE RELATED TO LOW-INCOME PEOPLES (PREFERABLY BY DESIGN) AND RELEVANCE OF THIS EXPERIENCE TO INDONESIA'S NEEDS WITH PARTICULAR ATTENTION TO SPECIAL CIRCUMSTANCES OR CONDITIONS THAT INCREASE EFFECTIVENESS OF SUCH ACTIVITIES.

6. ADMINISTRATIVE ANALYSIS - WE UNDERSTAND THAT MINISTRY OF STATE FOR RESEARCH IS SMALL ENTITY COMPOSED OF MINISTER AND CORE GROUP OF TECHNICAL EXPERTS. PP SHOULD ASSESS MINISTRY'S CAPABILITIES TO ADMINISTER SUBJECT PROJECT, ITS LINES OF AUTHORITY OVER AGENCIES RESPONSIBLE FOR IMPLEMENTATION OF PROJECT ACTIVITIES AND LINES OF COORDINATION WITH OTHER CONCERNED MINISTRIES, AND POSSIBLE NEED FOR STAFF INCREASES/UPGRADING TO ASSURE EFFECTIVE PROJECT ADMINISTRATION.

7. COORDINATED APPROACH TO SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT - THERE IS A SUGGESTION ON PAGE 6 THAT S AND T POLICY AND R AND D MANAGEMENT ACTIVITIES WILL HELP PROVIDE CENTRAL PROJECT FOCUS. PP SHOULD CLARIFY (A) INTERACTION BETWEEN THESE TWO ACTIVITIES AND PROPOSED ACTIVITIES IN RESOURCE MAPPING, EVALUATION, AND DEVELOP-MENT AND (B) EFFECT OF THESE TWO ACTIVITIES ON LONGER-TERM DEVELOPMENTS IN SCIENCE AND TECHNOLOGY (INCLUDING POSSIBLE FOLLOW-ON PROJECT ASSISTANCE BY AID).

8. LOG FRAME MATRIX SHOULD BE MODIFIED SO THAT END-PROJECT CONDITIONS REFLECT PROJECT ORIENTATION SUGGESTED PARA. 1 ABOVE. CHRISTOPHER

UNCLASSIFIED



REPUBLIC OF INDONESIA
NATIONAL DEVELOPMENT PLANNING AGENCY
JAKARTA, INDONESIA

No.: 1792/D.I/S/TT.

August 11, 1977.

Miss Sarah J. Littlefield,
Acting Director,
US-AID Mission to Indonesia,
c/o American Embassy,
Jakarta.

Dear Miss Littlefield,

Subject: Science and Technology Project

We hereby request from the US-AID for a loan of up to five million US dollars (\$5,000,000.-) and a grant of up to one and one-half million US dollars (\$1,500,000.-) to assist in financing the cost of a project designed to strengthen indigenous capacity in research, science and technology.

The main thrust of the project is to strengthen inter-ministry and inter-agency policy and program development, and to increase research management capability through education and in-service training.

Thank you for your kind cooperation.

Sincerely yours,



Rahleh Afiff
Rahleh Afiff
Deputy Chairman

- cc. 1. Minister of State for Research
2. Secretary of Cabinet

DRAFT AUTHORIZING DOCUMENT

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

A.I.D. Loan No.

LOAN AUTHORIZATION

Provided under: Sect. 106; Special Development Problems
(Indonesia: Science and Technology Loan/Grant Project)

Pursuant to the authority vested in me as Assistant Administrator, Bureau of Asia, Agency for International Development (A.I.D.) by the Foreign Assistance Act of 1961, as amended ("Act"), and the delegations of authority issued thereunder, I hereby authorize the establishment of a Loan pursuant to Part I, Chapter 1, Section 106, and Chapter 2, Title I, the Development Loan Fund, of said Act to the Government of the Republic of Indonesia ("Borrower") of not to exceed Five Million United States Dollars (\$5,000,000) to assist in financing the United States Dollar and local currency costs of professional services and related materials, and equipment for upgrading selected science, technology, research and technical service institutions, policies and programs, the Loan to be subject to the following terms and conditions:

1. Terms of Repayment and Interest Rate

Borrower shall repay the Loan to A.I.D. in United States Dollars within forty (40) years from the date of the first disbursement under the Loan, including a grace period of not to exceed ten (10) years. Borrower shall pay to A.I.D. in United States dollars interest at the rate of two percent (2%) per annum during the grace period and three percent (3%) per annum thereafter on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

2. Other Terms and Conditions

a. Except as A.I.D. may otherwise agree in writing:

(1) Goods and service financed under the Loan shall have their source and origin in Indonesia and countries

included in A.I.D. Geographic Code 941;

(2) Appropriate provision shall be made to the effect that, as conditions precedent to the use of loan funds:

Evidence that the Science and Technology Project Management and Evaluation Committee is established and is ready to implement and to evaluate the project.

3. Prior to the first disbursement or to the issuance of any commitment document under the Loan for the purpose of financing an individual activity or subactivity, the Borrower shall submit to A.I.D. in form and substance satisfactory to A.I.D.:

a. A design for a feasibility study for that activity/subactivity unless it is agreed in writing that forerunner activities have been sufficient for satisfying this requirement.

b. A description of the activity/subactivity with objectives, scope of work, budget, and an implementation plan.

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

Date

The Organization of Research, Science and Technology in
the Government of Indonesia

by: Dr. S.R. Joedono

The General Structure of the State and the Government

Under the Constitution, power is vested in the people and exercised through the People's Consultative Assembly, a 900-member legislative body designated by the Constitution as being the Highest Organ of State.

Subsidiary to the Assembly, five High Organs of State exist. These are: The Supreme Court; The Supreme Advisory Council, an advisory panel of limited number of distinguished members of society to counsel the President; the People's Representative Council, a 460-member parliament; the Finance Supervisory Agency, an independent agency to oversee the accounts of Government; and Government itself, representing the executive arm of the State.

Like the President of the US, the President of the Republic of Indonesia is both Head of State and Head of Government. Unlike the President of the US, the President of Indonesia is not elected by the people (through the Council of Electors) but is elected by the People's Consultative Assembly. As in the US where the three branches of government are independent of each other, the five High Organs of the State are also autonomous. Parliament must approve the Government budget. Unlike the US system of government, members of the Supreme Court, the Supreme Advisory Council, members of the Finance Advisory Agency and cabinet members of Government or their equivalent do not require confirmation of appointment by parliament.

Leaving aside representatives of the GOI abroad, the Government can be conveniently divided into the Central Government headed by the President and residing in Jakarta, and Regional Governments headed by Governors residing in the 27 Provinces of Indonesia.

In turn, as illustrated by the attached Chart, the Central Government can be seen to consist of two parts: the Office of the President and the various Departments headed by Ministers.

Quite like the White House, the Office of the President consists of the President, the Vice President, several Presidential Advisors with Ministerial Rank and a number of regulatory, staff, support and implementing agencies directly reporting to the President but overseen on the President's behalf by one or more Presidential Advisors with Ministerial Rank.

To distinguish government agencies reporting to the President from Departments headed by Ministers, these agencies are called Non-Departmental Government Agencies. At present, sixteen of these exist. Examples are: BAPPENAS, the National Development Planning Agency; BAKIN, the National Intelligence Coordinating Agency; BULOG, the National Food Logistics Agency; the National Archives; the Central Bureau of Statistics; BKKBN, the National Family Planning Coordination Agency; BKPI, the Investment Coordination Board; BAKN, the Civil Service Office; etc. Of these sixteen, four execute missions involving research development, science and technology: BATAN, the National Atomic Energy Agency; LAPAN, the National Space and Aeronautics Agency; BAKOSURTANAL, the National Coordinating Agency for Surveying and Mapping; and LIPI, the Indonesian Institute of Sciences.

To distinguish Presidential Advisors with Ministerial Rank from Ministers in charge of Departments, the Ministers with advisory and coordinating staff functions are called Ministers of State. At present, five of these exist. The Minister of State for Economics, Finance and Industry is the top-ranking advisor to the President in policy issues in economics, finance and industry and on behalf of the President coordinates the activities of all Departments and Non-Departmental Government Agencies in these fields, such as the Departments of Finance, Agriculture, Industry, Mining, Trade, Communications, and such Non-Departmental Government Agencies as BAPPENAS, (Planning); BULOG (Logistics); BKPI (Investments) plus the Central Bank. The Minister of State for Social Welfare executes similar functions with respect to questions related to social security, youth, the role of women and family planning. The Minister of State for Administrative Improvement is in charge of all questions regarding the structure, personnel and administrative procedures of all organs of government, including government enterprises. The Minister of State for Research is the highest science advisor and has the two-fold task of assisting the President in formulating government policy with respect to research, science and technology, and to assist the President in overseeing the activities of BATAN, the National Atomic Energy Agency; LAPAN, the National Space and Aeronautics Agency; BAKOSURTANAL, the National Coordinating Agency for Surveying and Mapping; and LIPI, the Indonesian Institute for Science. Legally, the Minister also has powers of oversight over the R & D activities of Departments, universities and government enterprises but in actual practice, exercise of this power has been minimal.

The fifth Minister of State, the Minister/State Secretary, differs from other Ministers of State by being an administrative coordinator rather than a coordinator of programs and a advisor on substantive policy. Broadly, the Minister/State Secretary assists the President in carrying out his functions as Head of State (especially in matters of diplomacy) and as Head of Government (in matters relating to the cabinet, the President's function as Supreme Commander, etc) in addition to being in charge of the Presidential Household. Also, the Minister is in charge of the personnel and budget support of all the Offices of the Ministers of State and of all Non-Departmental Agencies. In short, the Minister/State Secretary is the Minister in charge of the President's Office.

Research, Science and Technology in the Structure of Government

Government activities in research, science and technology are undertaken by a multiplicity of institutes, laboratories and centers within Non-Departmental Government Agencies, within Departments, within Government Universities, and within government enterprises (public utilities and public corporations).

While difficult to implement in practice, conceptually, there is a difference in function and scope of operation between research and development activities in these four types of government agencies consistent with the differences in function between the four types of agencies themselves.

In theory, research, science and technology development in Departments is primarily basic and applied science in the subject matters assigned to the Department for regulation, supervision and development. Hence, research and development in the Department of Agriculture will involve studies, experimentation, pilot project development etc. related to the mission of the Department to increase and diversify food production, to efficiently manage renewable natural resources, to develop agriculture-based industries, and to market agricultural commodities both domestically and abroad. Similarly, research and development in the Department of Health would be concerned with the development of new drugs and medicines, with the prevention of diseases, with delivery systems for health care, etc. Activities in research, science and technology development in Departments would, in other words, be problem-oriented in the sense of being geared to providing the scientific and technological input for Government decision-making and program-implementation in the exercise of regulatory and development functions.

The same problem and subject-matter orientation would characterize research, science and technology activity in Non-Departmental Government Agencies. The difference from Departmental R & D activity would lie in the fact that the problems confronted by Non-Departmental Agencies would be inter-departmental or cross-ministerial in nature, or would, for historical or policy reasons, be outside the purview of any existing Department. The conduct of surveys, censuses, mapping operations, etc. for the purpose of presenting social, cultural, political, economic, resources information in various forms would be an example of the former, while atomic energy research and development would be an example of the latter.

Corporations would of course undertake those R & D activities relevant to product, process and market development in their respective fields.

Universities would undertake research and development projects relevant to the widening of scientific knowledge in general and to the development and application of theory in particular. In addition, since 1969, universities have been given the function of "service to the public". This has meant that increasingly, research and development in the universities has

been geared to solving societal and government problems.

Over-all, the general trend since the early 1970's has been towards a great upsurge in problem-oriented research, experimentation, and technology-development in all types of Government agencies. R & D for solving government problems of regulation and development has by far outshadowed R & D for the development of science itself. While unavoidable in view of the nature of the immediate needs of society and of Government at this time and commendable from the "relevance to society" point of view, this trend has of late caused some concern for two reasons. First, with most activities of almost all institutes and laboratories being geared to problem-solving research and development the distinction in functions between Department R & D Units, Non-Department Government R & D Units, university research and development organizations and R & D Units within government enterprises has become increasingly vague. More importantly, the realization has dawned that neglect of theory and theory-related research will eventually limit the very capacity to solve scientific problems of a more practical nature.

R & D Within Non-Departmental Agencies

Of the sixteen Non-Departmental Government Agencies, only four carry out research, science and technology as the core of their mission. The thirteen others have regulatory, program-implementation, coordination, and staff-support function and from this point of view resemble Departments with the important distinction mentioned previously that these functions are inter-ministerial in nature. Within these thirteen, R & D is mission-oriented and problem-solving in nature.

In addition to overseeing and carrying out exploration, BATAN, the National Atomic Energy Agency is engaged in the application of isotopes to industrial, agricultural and medicine uses, centered in its research laboratory near Jakarta. Two small US-supplied reactors provide the nuclear around which two other units are built in Bandung and Yogyakarta, respectively. A major thrust of BATAN's activities for the next five to ten years will be in the direction of operating a nuclear-powered electricity plant by 1985, located in Serpong, 15 miles to the Southwest of Jakarta. BATAN's operations in nuclear power development are periodically reviewed by the Atomic Energy Council, an inter-ministerial policy-making council chaired by the President. Since 1974, the President has authorized the Minister of State for Research to chair Council meetings on his behalf.

Programs of LAPAN, the National Space and Aeronautics Agency, are influenced by the fact that at present and in the foreseeable future, for practical purposes Indonesian involvement in space science and technology means the application of space technology developed elsewhere to problems of development. Three problem areas have been designated high priority for space technology application: satellite technology for resource inventory and evaluation; weather monitoring; and communications. Manpower development is critical to LAPAN's ability to carry out these priority missions and is therefore at the heart of its programs.

With basemap and thematic map production scattered among many Departments (Defense and Security, Mining, Communications, Interior), the origin of the creation of BAKOSURTANAL, the National Coordination Agency for Surveying and Mapping, lay in the need for coordination and the adoption of common technical standards among Government Departments. Research, BAKOSURTANAL's functions have been increased to emphasize natural resource inventory, mapping and evaluation. With IBRD loan funding, it is at present in the process of increasing its organizational and technical capability to basemap the whole of Indonesia while with CIDA (Canadian International Development Agency) loan assistance, forestry resources will be inventoried and their utility assessed. BAKOSURTANAL is the secretariat of the inter-ministerial Natural Resource Committee created by Presidential Decree in 1975 to determine joint programs for departmental activity in resource mapping, inventory and evaluation and use the results of these for policy in resource management by Government.

LIPI, the Indonesian Institute of Sciences, was created in 1967 by merging the Department of National Research, a policy-making and research-funding ministry with the National Research Institute, a research and development agency with laboratories and institutes oriented towards the basic sciences, with the idea of at some future date creating an Academy of Sciences along the lines of Academies of Sciences in Continental Europe. This combination of functions is reflected in its organization, in which directly below the Chairman, the Secretary of LIPI is in charge of science-policy making, international relations in science and science-promotion as well as of regular internal administrative support functions, while three Deputy Chairman are in charge of laboratories, institutes and other scientific establishments (e.g., the Botanical Gardens), each for the Natural Sciences; the Social Sciences and Humanities; and for Technology and Scientific Services; respectively. With the creation of the post of a Minister of State for Research, science policy-making has been made the task of the Minister, with LIPI providing the data base and the underlying analyses.

R & D Within Departments

By Presidential Decree Number 44 of 1974 on the "General Framework of the Organizational Structure of Department," research, scientific, and technology development institutes and laboratories are to be combined into a unified Departmental Research and Development Agency with the task of both setting R & D policy within the Department and implementing R & D activities to support the mission of the Department. This Agency would be headed by an Agency Chief with a rank equal to the Secretary General and the Director Generals of the Department directly below the Minister.

The creation of this new Agency within the structure of Departments represented a departure from the previously prevailing system of incorporating R & D units within the Directorates General (e.g., previously, the Institute for Water Research was a unit of the Directorate General of

Water Resource Development (Department of Public Works); the Fishery Technology Institute and both Marine and Inland Fishery Research Institutes units of the Directorate General of Fisheries (Department of Agriculture), etc.

To date, the experience in implementing this provision of Presidential Decree Number 44/74 seems to have been that except for the Departments of Agriculture, of Health, and of Education and Culture, most Departments which already had sizable R & D operations prior to the issuance of Decree Number 44/74, have found it difficult to adjust their structures to the Decree. Other Departments, with small or no R & D activities prior to 1974, have found it much easier to create the R & D Agency within their structures. The present situation with respect to R & D activities of Departments can be described as follows:

(1) Departments with a Single Unified R & D Agency

The majority of Departments, 12 out of 17, fall under this type. These Departments are: Foreign Affairs; Interior; Justice; Social Affairs; Health; Education and Culture; Religion; Manpower, Transmigration and Cooperatives; Information; Agriculture; Communications.

(2) Departments with R & D Centers supervised by Directorates General

In four Departments, i.e., Mines, Trade, Finance and Industry, R & D Centers exist to deal with problems related to the subject matter under the purview of a Directorate General. Their work programs are therefore developed in close coordination with those of their respective Directorates General. These units, are however, structurally independent of the Directorate General but at the same time are not integrated into a single R & D Agency, but nevertheless report to the Departmental Minister.

(3) Departments with R & D Centers remaining integrated with Directorates General

By simply renaming Institutes "Directorates," the Department of Public Works has been able to retain the incorporation of R & D institutes within Directorates General. The Institute for Water Research, for example, is now the Directorate for Water Research and remains a unit of the Directorate General of Water Resource Development.

A variant of this type is the Department of Defense and Security, which incorporates in its structure at the Department

level a Research and Development Center which in addition to doing its own research and development work, also coordinates the programs and budgets of research and development units of the army, navy, air force and police.

In all this, the structuring of units that provide scientific services (data processing, documentation services, standardization, etc) has not been uniform. Some Departments, like Public Works and Defense and Security have Data Processing Centers separate from R & D Centers within the Department, while in others, data processing units have been built into the R & D Centers or Agencies. The same is true for documentation centers. For some Departments, the maintenance and development of standards is a line function to be undertaken by operational Directorates, while for others this is a R & D related staff function, to be undertaken by R & D units. The Center for Geophysics and Meteorology of the Department of Communications which is responsible for earthquake monitoring and weather forecasting is not part of the R & D Agency of the Department but reports directly to the Minister.

R & D Organization within Universities

Two Government Departments supervise, fund and staff government-owned institutes of university-level education. The Department of Religion oversees several Government Institutes of Islamic Learning, while the Department of Education and Culture oversees 26 universities, 2 Institutes of Technology (at Bandung and Surabaya), 1 Agricultural University (at Bogor) and a dozen Institutes of Teaching and Education.

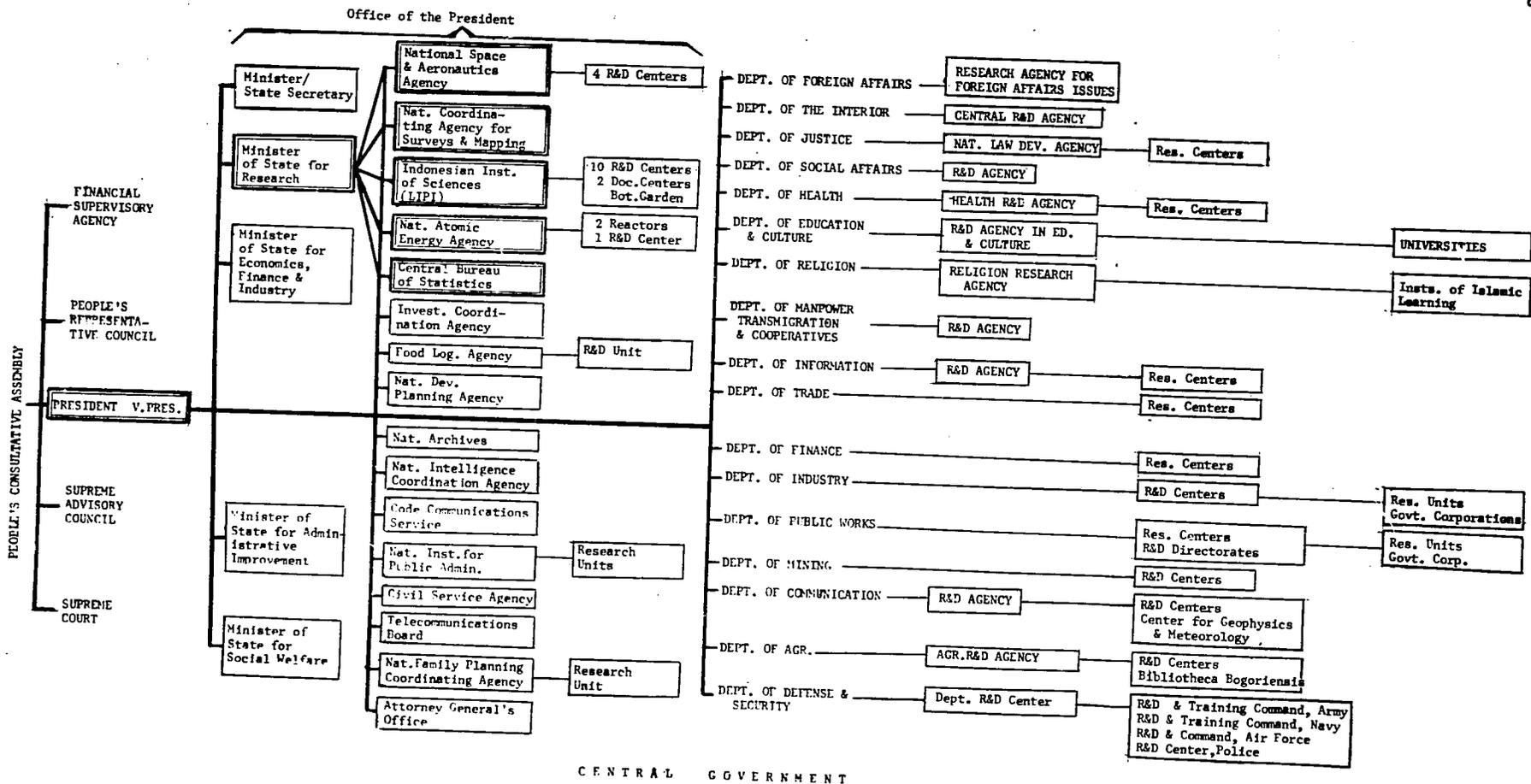
Research and development organization varies from one university to another. Some universities have research and/or development institutes at the university level while most have institutes at the Faculty level. In major universities such as for instance the University of Indonesia in Jakarta, Gadjah Mada University in Yogyakarta, the Institute of Technology in Bandung, research units both at the university and/or at the faculty level are set up so as to require no financial support from Government for their operations, and are self-supporting through contract-research and foreign grant support, for example the Development Technology Center, dealing with small business and industry and appropriate technology. Indeed, the ITB (Bandung Institute of Technology) has even set up a private for-profit research, consulting and engineering firm staffed by ITB teaching staff. Other universities, especially those outside Java, with the exception of perhaps Andalas University at Padang, West Sumatra, do not have the number of qualified personnel required for the creation and sustained operation of self-supporting research and development units.

In some universities, research and development is undertaken by individuals, either singly or in groups. These are in the majority of

cases supported by research grants either by the Department of Education and Culture or by foreign donors. In other cases, individual members of the teaching staff of a university may receive a contract to undertake research assignments.

R & D Within Government Enterprises

Some government-owned public utilities such as the State Electricity Corporation and the State Railway Corporation have sizable R & D operations. The Institute for Power Research of the State Electricity Corporation is active in high-voltage electrical current research. As mentioned previously, R & D in these corporations is product, process and market development oriented.



Initial Environmental Examination (With PRP 2/24/77)

Project Location: Indonesia

Project Title: Science and Technology Loan/Grant

Funding: FY77 (Loan) - \$5,000,000
FY77 through FY 81 (Grant) - \$300,000/year (Total \$1,500,000)

Life of Project: Five years

IIE Prepared by: ^{WHL} Wm. H. Littlewood
Science and Technology Advisor
USAID, Indonesia

Date: 16 Feb 1977

Environmental Action Recommended: Negative Determination

Concurrence: *

Thomas C. Niblock, Director

Date: Feb 1977

Asst. Admin/Director's Decision:

Approval:

Donald D. Cohen, A-DAA/ASIA

Date:

3/18/77
March 18, 1977

Disapproval: _____

*Face page of PRP signed by Mr. Niblock 2/24/77.

I. Examination of Nature, Scope and Magnitude of Environmental Impacts.

A. Description of Project

This project is concerned with analyses, workshops, studies, management, policy development, data collection, surveys, mapping, planning, education and training, and limited research and development, not going beyond the testing and demonstration stages.

B. Identification and Evaluation of Environmental Impacts

As indicated by the description above, this project in itself will have no impact on the environment, and therefore does not require the preparation of an Environmental Assessment or Environmental Impact Statement.

It is gratifying to note that some elements of this project may actually stimulate post-project attention to environmental aspects of the development process, both generally and specifically. For example, it is possible that one of the policy development workshops under this project might be on developing environmental policies for Indonesia. The development and demonstration of a solar energy cooker or a biogas (methane) generator using waste products will, if applied widely, provide an alternative for firewood scavenging, which is now a serious problem for managing the forest resource, particularly in Java where there are few forests left and where most of the population is concentrated.

II. Recommendations for Environmental Action

As the project has no effect in itself on the human environment, it is recommended that no Environmental Assessment or Impact Statement be prepared.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact
Identification
and
Evaluation 2/

Impact Areas and Sub-areas 1/

A. LAND USE

1. Changing the character of the land through:

a. Increasing the population ----- N

b. Extracting natural resources ----- N

c. Land clearing ----- N

d. Changing soil character ----- N

2. Altering natural defenses ----- N

3. Foreclosing important uses ----- N

4. Jeopardizing man or his works ----- N

5. Other factors

----- N

B. WATER QUALITY

1. Physical state of water ----- N

2. Chemical and biological states ----- N

3. Ecological balance ----- N

4. Other factors

----- N

1/ See Explanatory Notes for this form.

2/ Use the following symbols: N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

IMPACT IDENTIFICATION AND EVALUATION FORM

C. ATMOSPHERIC

- 1. Air additives ----- N
- 2. Air pollution ----- N
- 3. Noise pollution ----- N
- 4. Other factors ----- N
-
-

D. NATURAL RESOURCES

- 1. Diversion, altered use of water ----- N
- 2. Irreversible, inefficient commitments ----- N
- 3. Other factors ----- N
-
-

E. CULTURAL

- 1. Altering physical symbols ----- N
- 2. Dilution of cultural traditions ----- N
- 3. Other factors ----- N
-
-

F. SOCIOECONOMIC

- 1. Changes in economic/employment patterns ----- N
- 2. Changes in population ----- N
- 3. Changes in cultural patterns ----- N
- 4. Other factors ----- N
-
-

IMPACT IDENTIFICATION AND EVALUATION FORM

G. HEALTH

- 1. Changing a natural environment ----- N

- 2. Eliminating an ecosystem element ----- N

- 3. Other factors

_____ N

H. GENERAL

- 1. International impacts ----- N

- 2. Controversial impacts ----- N

- 3. Larger program impacts ----- N

- 4. Other factors

I. OTHER POSSIBLE IMPACTS (not listed above)

- _____ N

- _____
- _____

See attached Discussion of Impacts. (Not applicable)