UNCLASSIFIED
CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Technologies for the Rural Poor	386-0465	USAID/India

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) 83-4

☒ REGULAR EVALUATION ☐ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent	B. Final Obligation Expected	C. Final Input Delivery	A. Total	$ 2.7 million	From (month/yr.)	April 82
FY 78	FY 78	FY 85	B. U.S.	$ 2.0 " Grant	To (month/yr.)	June 83
					Date of Evaluation Review	June 30, 83

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
1. Follow up with National Institute of Communicable Disease (NICD) and Centers for Disease Control (CDC) in order to determine whether to continue with "Field Evaluation of Serological Tests of Malaria" or drop it.	R.K. Berry	August 31, 83
2. Take up the issue of operation and maintenance of the facility and villagers' participation in the project with the GOI.	R.K. Berry D.C. Masters	December 31, 83

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS None

☐ Project Paper ☐ Implementation Plan e.g., CPI Network ☐ Other (Specify)
☐ Financial Plan ☐ PIO/T
☐ Logical Framework ☐ PIO/C ☐ Other (Specify)
☐ Project Agreement ☐ PIO/P

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

A. ☒ Continue Project Without Change
B. ☐ Change Project Design and/or ☐ Change Implementation Plan
C. ☐ Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

R.K. Berry, Project Officer
Office of Project Development
Frank J. Young, Chief (Acting), Program Office
Clearance: PD:DCMasters DD:RBrown

12. Mission/AID/W Office Director Approval

Signature
Typed Name Priscilla M. Boughton
Director
Date 1 August 1983

AID 1330-15 (3-78)

USAID, New Delhi
PES - Part II

Progress Review

Project No. & Title: 386-0465, Technologies for the Rural Poor (TRP)

Summary

This project was designed to finance dollar costs of sub-projects to support the application of science and technology for rural development. The primary focus was on non-conventional energy projects with a small amount of grant allocated to activities in agriculture and health plus exchange of scientific visits. The project agreement was signed on August 26, 1978 containing general guidelines and criteria for the submission of proposed subprojects. Protracted delays occurred in the submission of sub-projects that met the technical, economic and social criteria of the project. The major problems causing these delays were insufficiently specific guidance and criteria for approval of sub-projects, inadequate staff attention both by the Government of India (GOI) and USAID and delays in the GOI approval process. As discussed in the regular evaluation of the project (USAID/India PES No. 81-2 dated April 9, 1981), these guidelines were revised and much improved dialogue took place between the Department of Science & Technology (DST) and USAID during 1979-80 on the directions of the project with more staff attention from DST and USAID. Consequently, as of December 1981, seven sub-projects totalling Dollars 1,940,000 were committed and approved. The remaining Dollars o0,000 was retained for miscellaneous activities such as exchange of scientific visits out of which Dollars 30,000 have already been spent. A brief description of each of the sub-projects, current status and problems and constraints is attached (Attachment 'A'). Since the average life of these sub-projects is three years, the Project Assistance Completion Date (PACD) has been extended from September 30, 1981 to December 31, 1984. Out of seven sub-projects, one project with National Academy of Sciences (NAS) has been completed. The remaining sub-projects except one (CDC/NICD sub-project on Malaria Epidemiology) are progressing satisfactorily. Out of $2 million, $1.3 million have been spent as of June 30, 1983.

Attachment 'A'

SUMMARY DESCRIPTION OF SUB-PROJECTS

1. Sub-Project Title

Development and Application of Decentralized Energy Systems Utilizing Non-Conventional Energy Sources

Collaborative Institutions

Bharat Heavy Electricals Ltd./ Central Electronics Ltd. and Jet Propulsion Laboratories

Date Approved	Agreement Signed	Amount	Duration	Amount Disbursed	GOI Contribution
06/12/80	08/29/80	$713,000	3 years	$525,198	Rs.5,012,000

Summary Description:

The objective of the project is to design, develop and install and test solar energy systems for the efficient utilization of solar energy in Indian villages. The total system is comprised of two sub systems: solar photovoltaic and solar thermal power generation. The total capacity of solar photovoltaic (CEL/JPL) will be 7 KW peak and the capacity of solar thermal (BHEL/JPL) will be approximately 22 KW peak.

The two parallel tests will proceed in two phases: Phase I will cover system design and will last about one year; and Phase II will cover system fabrication and village testing and last two years. Both systems will be used to generate electricity, primarily for water pumping and small-scale enterprieses.

The implementing agencies, Bharat Heavy Electricals Ltd. (BHEL), Hyderabad, Central Electronics Limited (CEL), Sahibabad, U.P. and Jet Propulsion Laboratories (JPL), Pasadena, California had their first conference at JPL, Pasadena during May 16-30, 1981. During this conference the scope of activities, information exchange procedures, base line configuration of solar thermal and solar photovoltaic systems were discussed and systems components and design activities ere initiated.

Current Status

Installation of the television and radio set in the community centre at the project site 'Salojipally' is complete alongwith four tube lights. All these are being powered by photovoltaic panels on the roof of the community centre. A $60M^3$ capacity biogas plant along-

with a borewell, 3 hp biogas pumpset and 5000 gallon overhead tank have been installed for supplying drinking water to the village through eight community taps. Civil construction work for office cum storage space, solar thermal and solar photovoltaic control rooms is complete. Four borewells have been dug at different locations selected by Central Ground Water Board according to their geophysical and hydrogeological survey. It has been found that water capacity from these borewells are 400-1500 imperial gallons/hr. With this output it may not be possible to irrigate the anticipated acreage of land envisaged earlier.

Mr. Royal Harrison, JPL visited India during December 11-16, 1982 to review the project management with the implementing agencies. A meeting of sponsoring institutions (USAID/GOI) and the implementing agencies (BHEL/CEL/JPL) was held on December 16, 1982 at the Department of Non Coverntional Energy Sources (DNES), Technology Bhavan to review the progress of the project. The meeting was chaired by Mr. Maheshwar Dayal, Secretary, CASE. Mr. Harrison explained the status of both solar thermal and photovoltaic activities and identified the problem areas such as shortage of funds in JPL budget, load management and distribution and custom clearance of equipment which may effect the schedule of the project and requested CASE and AID to take immediate steps. Mr. Dayal assured the necessary help in getting waiver for custom clearance and urged BHEL, CEL and JPL to make every effort to complete the project as scheduled

USAID has approved JPL's request for an increase of $153,000 in the dollar budget (from $560,000 to $713,000) and extension of contract period from September 30, 1983 to February 1, 1984 to complete the project. The increase was necessary because of increases in the cost of equipment required to be procured from the U.S. due to inflation and additional JPL labor required to complete the project. BHEL has also requested the GOI to increase the rupee budget from Rs.4.2 million to Rs.8.1 million. We understand that BHEL's request is being favorably considered.

Procurement Action

BHEL received first consignment from JPL in February 1983 containing steam engines, photovoltaic materials and some control instruments. All the materials for facet fabrication under JPL procurement list have been purchased and shipped to BHEL. BHEL has initiated procurement action for all the materials required to be purchased locally for facet fabrication. JPL procurement and testing of PV modules have been completed. CEL has initiated jointly with BHEL the activities for installation and commissioning of PV system at Solojipally.

Problems and Constraints

1. Because of serious drop in the local water table there is less groundwater available at Salojipally for irrigation than had been originally thought. Since much of the power to be generated by the solar plant was to be used for irrigation pumps, this raises the prospect of surplus capacity based on current design. BHEL engineers have suggested that small scale industries be set up in the village to absorb the surplus power. Since rice is the main crop grown around the area the potential of setting up a rice mill in the village are good. However, it is not clear whether the water problem is of a permanent nature or is related to the current drought conditions afflicting much of the South India. We intend to follow up with the Central Govt. Water Board on the findings of the most recent geological survey. Once the "normal" water table is determined we can make plans for the practical use of any surplus energy capacity.

2. Another problem relates to recurring costs and sustainability of the project once AID/BHEL/CEL/JPL participation ends. So far the extent to which the village will be willing and able to contribute to the operation and maintenance of the facility and the extent to which their efforts will have to be supplemented by visiting or resident engineering assistance has not been established. Also, the source of continuing outside support needs to be identified.

At present one villager volunteers his services as custodian. Villagers appear to be interested in the benefits of the project but a system needs to be devised to elicit active participation of villagers with at least some defrayal of recurring costs. Cost sharing and benefit sharing schemes need to be addressed during the course of the project. We are pressing hard the GOI to complete the socio- economic analysis for the project. In the meantime, USAID is pursuing with the GOI the institutionalization of the project upon completion.

2. Sub-Project Title	Collaborative Institutions
Optimization of Solar Drying Systems for Agricultural Produce	Annamalai University/Colorado State University

Date Approved	Agreement Signed	Amount	Duration	Amount Disbursed	GOI Contribution
12/04/80	05/13/81	$200,000	3 years	$92,736	Rs.590,000

Summary Description:

Annamalai University (Annamalai) and Colorado State University (CSU) proposed to design and develop solar dryers for small farmers in India and for their possible application in the U.S. The project aims to develop (1) portable solar dryers for rural farmers and (2) a large scale stationary solar dryer for food processing.

The project will be completed in following three phases:

Phase I - Assessment of drying needs and conceptualization of solar devices which could meet these needs.

Phase II - Design and construction of these devices for side-by-side demonstration in Indian rural areas with the intent of securing comparative assessment of the schemes in terms of operational performance and farmers' opinions.

Phase III - Random deployment of a few top rated devices in villages to conform their utility and acceptability and to gain further information of performance and durability.

Current Status

Phase I was completed in November 1981. During the second phase a pilot plant for drying paddy with forced draught was designed and fabricated. The capacity of the plant was 50 kg/day with a collector area of 2 sq meters and dryer 75x45 cm size. Experiments were carried out in the pilot plant for nearly a month. Based on the results obtained from the pilot plant, a prototype of 1 ton/day capacity has been fabricated and erected in a nearby Rice Mill at Annamalainagar for field testing. Experiments are being carried out in the prototype since December 1982.

All major items of equipment to be purchased from the U.S. have been identified. Equipment worth $20,000 have been received and installed at Annamalai. Annamalai's request for remaining equipment worth $5,000 is being processed at CSU. The progress of the project is satisfactory.

Problems and Constraints:

None.

3. Sub-Project Title

Medium Temperature, High Efficiency Tracking and Non-Tracking Solar Energy Collectors for Rural and Industrial Application

Collaborative Institutions

Indian Institute of Science, Bangalore/University of Houston

Date Approved	Agreement Signed	Amount	Duration	Amount Disbursed	GOI Contribution
12/05/80	05/05/81	$400,000	3 years	$143,812	Rs.887,000

Summary Description:

The Indian Institute of Science (IIS), Bangalore and University of Houston (Houston) jointly proposed a five year project in two phases for the design, testing, demonstration and commercialization of solar parabolic concentrators suitable for the production of hot water and process steam for small-scale agro industries. Each phase will last for three years with a one year overlap. AID financing has been provided for Phase I, which involves design, testing and development of prototypes appropriate for production in India. During Phase II (which may or may not require Houston collaboration) solar systems suitable for the production of process steam for sericulture will be demonstrated at two villages near Bangalore, and commercialization will begin, if warranted.

Current Status

The design of parabolic concentrator, the studies related to process steam, the application to a silk weaving and printing industry and the development of black chrome selective coating (α = 0.92, E = 0.15) on receiver tubes (5' length and 3/4" diameter) have been completed. The studies on selective coatings by vacuum deposition technique is under progress. Mr. A. Thomas and Dr. S. Mohan of IIS, Bangalore visited U.S. during March 19 to June 19, 1982 to study the status of current technologies in the field of parabolic concentrator systems and selective coatings. Based on the knowledge gained in the U.S. the necessary improvements and modifications were made in the design of concentrator and development of selective coatings. It has been decided to install the demonstration system at a silk weaving and printing factory at Mysore. This factory is owned by Karnataka State Government. The total consumption of steam for the printing plant is 1200 kg/8 hrs. shift at 30-35 Lbs/Sq. inch pressure. IIS has planned to instal 200 M^2 of solar concentrators to meet half of the requirements of the process steam for printing plant. Dr. Richard Bannerot, the U.S. Principal Investigator plans to visit IIS, Bangalore during August 1983.

All major items of equipment to be purchased from the U.S. have been identified. The procurement procedures have been set up at Houston to make purchases for and on behalf of IIS. Equipment worth $16,000 have been received at IIS and indents for equipment worth $70,000 are being processed at Houston.

Problems and Constraints

None.

4. Sub-Project Title	Collaborative Institutions
Identification and development of collaborative research projects to be supported under the TRP project. The field of enquiry was primarily but not limited to that of energy from biomass	National Academy of Sciences (NAS), Contract No. ASB-0465 -C-00-1019-00

Date Approved	Agreement Signed	Amount	Duration	Amount Disbursed	GOI Contribution
12/31/80	03/13/81 05/12/82 Am # 2	$101,738	thru 06/30/82	$71,802	None

Summary Description:

NAS contract was signed on March 13, 1981 for $225,000 for identification and development of energy related projects for funding under TRP. Since the subprojects under TRP were already identified and approved prior to the completion of NAS services, it was decided to amend the contract (i) to revise the scope of work to include services for the planning of an energy conservation workshop proposed to be held under the Alternative Energy Project, (ii) to reduce the level of funding and (iii) to extend the termination date from January 30, 1982 to June 30, 1982. Accordingly, the contract was amended on May 12, 1982 revising the scope of work and reducing funding from $225,000 to $101,738.

Current Status:

Under the revised scope of work Dr. Dennis Wood and Dr. Charles Holt visited India during May 3 - 17, 1982 to have a preliminary survey of Steel, Aluminium, Industrial boilers and Industrial furnaces industries and to discuss modalities with the Association of Indian Engineering Industry (AIEI), the proposed Indian institution to implement the energy conservation component of the Alternative Energy Project.

Based on this visit NAS prepared a draft proposal for carrying out energy efficiency subproject in cooperation with AIEI. The draft proposal and brief report of NAS representatives visit was sent to CASE for review and comments in October 1982. Thus the work under NAS contract has been completed.

We reviewed NAS expenditure vouchers under AID contract and found that NAS had charged salaries and wages and fixed percentage of overheads regularly to the AID contract whereas only two visits of NAS

consultants were actually performed through February 1982. We asked NAS to review the expenses charged to the AID contract. Consequently, NAS refunded $19,392.93 inadvertantly charged to AID contract. The total expenditure incurred under NAS contract thru June 30, 1982 is $71,801.16 (excluding the cost of tickets in connection with May 1982 travel of Drs. Wood and Holt). NAS is awaiting billing for these tickets from AID/W. These tickets are estimated to cost $7,202.

5. Sub-Project Title	Collaborative Institutions
Development of Micro and Low Head Hybrid Hydro Electric Systems	Water Resources Development Training Center (WRDTC) University of Roorkee (Roorkee)/ Colorado State University (CSU)

Date Approved	Agreement Signed	Amount	Duration	Amount Disbursed	GOI Contribution
10/05/81	01/22/82	$150,000	3 years	$148,580	Rs.1,070,000

Summary Description:

The project is to develop economically viable and technically feasible system for energy production, energy storage and delivery and energy appliance in integration with low head micro hydel system for meeting overall energy requirements of a village. The system consists of two components: (a) Micro Hydel System consisting of (i) a low head - 400 kw hydro plant on small canal fall at Kakroi and (ii) a medium head hydro plant in hilly areas; and (b) hybrid system for integrated energy production, storage and commodity production. The major focus of the project is on demonstration aspects with emphasis on (a) controller development and (b) comparing available system and demonstration of most applicable hybrid system.

Background:

USAID financed the first year's requirements $150,000 of the three years research project estimated to cost $429,000 out of Technologies for the Rural Poor Project. The financing for the remaining two years' requirements was proposed to be provided from the Alternative Energy Project.

The project was originally planned to be implemented by CSU and Roorkee. However, in October 1982 Prof. Joel B. DuBow, the U.S. Principal Investigator left CSU and accepted a position with Boston University (Boston). Therefore, it was decided to (i) transfer the project from CSU to Boston, (ii) terminate the contract between CSU and Roorkee w.e.f. December 31, 1982 and (iii) negotiate a fresh contract between Roorkee and Boston to complete the remaining work under the project.

Current Status:

The hybrid system identification and initial design of the controller system has been completed as first stage of the project during Roorkee's one year collaboration with CSU. CSU has incurred an

expenditure of $166,764.55 during one year period of the collaboration. The CSU/Roorkee agreement is being amended to provide for the additional funds ($16,764.55) and to terminate the services as of December 31, 1982. The remaining work under the project will be completed by Roorkee in collaboration with Boston. Boston has already started the research work under the project effective January 1,1983. AA/ASIA has approved the waiver of competition to enable Roorkee to negotiate with Boston to complete the scope of work orginally contracted for with CSU. A host country contract for $300,000 between Roorkee and Boston is expected to be executed shortly. This contract will be funded from the Alternative Energy Project. Prof. O.D. Thapar, the Indian Principal investigator is planning a visit to Boston in early July 1983 to (i) execute contract, (ii) discuss collaborative research, (iii) provide information on controller development and (iv) finalize program milestone and equipment procurement. The project is expected to be completed in December 1984 as originally scheduled.

Problems and Constraints:

None.

6. Sub-Project Title: Comprehensive Studies on Prevention of Nutritional Blindness

Collaborative Institutions: National Institute of Nutrition/National Eye Institute

Date Approved	Agreement Signed	Amount	Duration	Amount Disbursed	GOI Contribution
10/19/81	04/28/82	$313,560	3 years	$287,645	Rs.1,059,200

Summary Description:

The National Institute of Nutrition (NIN), Hyderabad and National Eye Institute (NEI), U.S.A. proposed to conduct a series of studies that will help to determine the adequacy of Vitamin A distribution in correcting Vitamin A deficiency and preventing nutritional blindness and also risk factors that may interfere with the effectiveness of India's Vitamin A distribution program in preventing blindness, a major public health problem in India. AID is financing the costs of imported equipment and exchange of scientific visits under the project.

Current Status

All major equipment required to be imported from the U.S. has been procured and installed at NIN. Two NIN scientists Dr. N. Raghuramulu and Dr. Mrs. P. Bhaskaram visited U.S.A. during August 31 to October 8. 1982 under the project. The purpose of Dr. Raghuramulu's visit was to discuss latest developments in the field of collagen and retinoids with special reference to the methodology in separation and estimation. The main aim of Dr. Bhaskaram's visit was to exchange ideas and technology with respect to immunological methods to be used in the project protocols. These visits were very useful and will help in carrying out the project work successfully. The laboratory work of the project was started in October 1982. Dr. (Ms.) Barbara underwood of NEI visited NIN during October 31 to November 25, 1982 to initiate studies an assessment of vitamin A nutriture by the relative dose response procedure in undernourished Indian children. Dr. Karl Kupfer, Director NEI visited NIN on January 8 and 9, 1983 and a meeting of project investigators was held on January 9, to review the progress of the project. The project's progress is satisfactory.

Problems and Constraints:

None.

7. Sub-Project Title	Collaborative Institutions
Field Evaluation of Serological Tests of Malaria	National Institute of Communicable Diseases/ Centers for Disease Control

Date Approved	Agreement Signed	Amount	Duration	Amount Disbursed	GOI Contribution
10/10/81	1/	$51,000	2 years	-	Rs.1,121,300

Summary Description:

The National Institute of Communicable Diseases (NICD), Delhi and the Centers Disease Control (CDC), Atlanta to conduct field research in the form of sero-epidemiological studies in support of an operational malaria control program. The aim of the project is to introduce, improve and evaluate antigen production and sero-epidemiologic techniques for use in surveillance and assessment of malaria in India. AID is financing the cost of imported equipment, study tours and a training workshop at NICD.

Current Status:

In accordance with the letter of understanding dated march 4, 1982 regarding implementation of the project, NICD has furnished USAID detailed specifications of the equipment required to be imported from the U.S. alongwith CDC's concurrence. USAID action on procurement is pending because of disagreement between CDC and NICD relating to training needs of the NICD scientists. NICD is insisting on short term training involving production of monoclonal antibodies with the help of hybridoma techniques to refine the existing serological tests for its scientists at CDC. CDC has expressed inability to absorb bench trainees in malaria serology in Malaria Branch labs because of major commitments to develop malaria vaccine and has suggested its two weeks laboratory course in serological dagnostic techniques for NICD scientists. Furthermore, CDC advised that it had already committed a significant amount of staff time and resources, for training purposes by its staff over the last four years under the No Cost

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1/ In view of already existing No Cost Agreement #01-333-C dated September 20, 1978 between CDC and ICMR, the parent organization of NICD, no new sub project agreement or PASA executed with CDC for the above sub project.

Agreement, to assure that serological techniques established at NICD are adequate to support the field component of the proposed study. Regarding proposed training workshop at NICD, CDC has agreed to provide a scientist to assist in the presentation of certain topics. However, CDC prefers that the workshop be held prior to October 1, 1983. We asked NICD to advise whether with the proposed cooperation from CDC, NICD will be able to complete the project and achieve the objectives of the project or not. NICD has advised that CDC's proposed two weeks laboratory course did not meet specific training requirements. NICD has identified four specific techniques for training of its scientists. NICD has also expressed its inability to hold the training workshop prior to October 1, 1983 because of administrative problems. We have asked CDC to reconsider NICD's request and advise.

Problems and Constraints:

Satisfactory resolution of training issue ASAP in view of December 31, 1984 PACD for the overall TRP project.

Attachment 'B'
to PES # 83-4

USAID/NEW DELHI

EVALUATION COST DATA

1. No. and Title of Project/Activity: 386-0465, Technologies for the Rural Poor

2. Purpose of Evaluation: Progress Review

3. Mission Staff Person Days involved in Evaluation (estimated):

   - Professional Staff 32 Person Days
   - Support Staff 8 Person Days

4. AID/W Direct-Hire or IPA TDY support funded by Mission: None

	Name	Period of TDY (Person-Days)	Dollar Cost (Travel, Per Diem etc.)	*Source of Funds
a.				
b.				
c.				
d.				

5. Contractor Support, if any: None

Name of Contractor@	Contract No.	Amount of Contract	*Source of Funds

* Whether PDS, Mission O.E., Project Budget or Central/Regional Bureau funds.

@ IQC, RSSA, PASA, PSC's, Institutional Contract, Cooperative Agreement, etc.