NO DESIGN DOCUMENT

(Project summaries/abstracts developed from

PRO AGs, PIOTs, and PARs)

931100511501
931100S-C1
PD-AAF-581-C1

CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) – PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
DETERMINANTS OF IRRIGATION - CORNELL	931-1005.11	DS/AGR/TSWM

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)

☒ 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	$ 650,000	From (month/yr.) October 1977
FY 77	FY 80	FY 82	B. U.S.	$ 650,000	To (month/yr.) October 1978
					Date of Evaluation Review November 15, 1978

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. Progress report to RAC	Corey	October 1978
2. Begin project in Indonesia	USAID DS/AGR Cornell	April 1979
3. Conduct team evaluation	Corey DS/PO/PR	September 1979
4. Decision on project termination	ASIA/BUR DS/AGR	October 1979

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

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

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)

Gilbert Corey
DS/AGR/TSWM, Division Chief

12. Mission/AID/W Office Director Approval

Signature: Dean F. Peterson

Typed Name: Dean F. Peterson, DIRECTOR DS/A

Date

13. SUMMARY

This report results from a regular desk audit. The project is not on schedule due to the delayed start-up caused by the time required to gain good working relationships and agreements in the host countries. There are actually no critical problems and data collection is proceeding nicely.

14. EVALUATION METHODOLOGY

The reason for the evaluation was first to satisfy the AID documentation system and second to examine and clarify, for the record, the project status one year after the contract was signed. The evaluation method was an examination of all project records by the project manager, discussions with the contractor, and Asia Bureau representatives.

15. EXTERNAL FACTORS

The major change in project implementation plans relates to the fact that the plan was unrealistic in the first place. The project is behind schedule by approximately 10 months. This has been the result of the necessary negotiations with Missions and host country scientists prior to start-up in a country.

The contract was signed September 1977, however, the Memorandum of Understanding among Cornell, USAID/Manila, and the Philippine Government was not signed until May 1978. Therefore, the first man on assignment at post did not arrive until July 1978 or 10 months after the contract was signed.

The project calls for at least two sites in Asia. Negotiations are now underway to initiate the project in Indonesia. Here again, in order to do a proper job, time has been a key factor. The Indonesian Government and USAID/Jakarta appear extremely interested in the project and it is expected that by April 1979 a man will be stationed there.

16. INPUTS

To date there are no problems with inputs other than the fact that scheduling of them has been slower than originally planned. It is obvious that the project will need to be extended because of the delayed start up and perhaps the estimated budget will be inadequate due to this delay. However, this should not be anticipated until the project is further along and a team evaluation is made during July-August 1979.

17. OUTPUTS

Certainly progress toward output targets is not on schedule, for the reasons discussed under External Factors (above). Actually the progress is good if one considers project initiation as the date the project actually started on the ground.

18. PURPOSE

"To improve procedures for design and/or rehabilitation of irrigation systems incorporating explicit considerations of the interactions of critical socio-economic factors with the physical factors."

The progress toward EOPS has been minimal becuase of the late start; however, the EOPS conditions are still a good description of what will exist when the purpose is achieved. The data collection methodology has been developed and information collection is in progress.

19. GOAL/SUBGOAL

"To improve water use efficiency in irrigated agriculture and thereby increase production per unit of water".

It is far too early to evaluate the reasonableness of the goal. This will only be possible after the methodology and procedures have been developed at one or two sites and are tested at a third site.

20. BENEFICIARIES

No project data are yet available to quantify beneficiaries or type of benefits. However, during discussions with the Missions and Governments in the Philippines and Indonesia it is obvious that the expectation of the project output being beneficial to the Governments is high. The project is viewed as being able to provide answers on how to make irrigation systems operate so that there is an equitable distribution of water with system benefits accruing to all users.

The Mission in Sri Lanka is very much interested in having the project select that country as the third project site. However, this decision will have to await the results of the team evaluation and the decision regarding whether or not the project length is 5 years or terminates in three.

21. UNPLANNED EFFECTS

Not pertinent at this time.

22. LESSONS LEARNED

The assumption that projects can immediately begin with signing of a contract is invalid. This is especially true where the work is to be done in an LDC. The RAC when approving the project in October 1976 asked that an 18-month review be held with special attention given to research methodology. Apparently the RAC assumes that projects begin shortly after their approval because they called for a report on the 18-month review in October 1978. Of course, with data collection beginning only in July 1978 it would have made no sense to have an 18-month review with only one month's data available.

The lesson learned is that, for evaluation purposes, the project initiation date should not be the date the contract is signed but rather the date in which work actually begins. This undoubtedly creates problems within the AID documentation process but is is a fact that should not be ignored if project output is considered important.

A possible solution would be for projects to make all LDC/ Mission arrangements prior to project approval, however, this has many disadvantages and probably is unworkable especially if the contractor is not known prior to the competitive bidding process.

23. SPECIAL COMMENTS OR REMARKS

Not pertinent at this time.

THE DETERMINANTS OF DEVELOPING COUNTRY IRRIGATION PROJECT PROBLEMS: A MULTIFACTOR ANALYSIS FOR IMPROVED SYSTEMS OPERATION AND PERFORMANCE

Submitted to

United States Agency for International Development
Office of Agriculture
Technical Assistance Bureau

by

Cornell University

September 1976

TABLE OF CONTENTS

1. SUMMARY

Title	:	The Determinants of Developing Country Irrigation Project Problems: A Multifactor Analysis for Improved System Operation and Performance
Duration	:	October 1976 - September 1979
Estimated Cost	:	$278,700
Principal Investigators	:	M.L. Barnett, Department of Rural Sociology, Cornell University E.W. Coward, Department of Rural Sociology, Cornell University G. Levine, Department of Agricultural Engineering, Cornell University L.E. Small, Department of Agricultural Economics and Marketing, Rutgers University

Narrative Summary:

Expanded irrigation has been identified as a major factor in the development of the LDC's, as evidenced in the UN Indicative World Plan. Its critical role relative to the world hunger problems was stressed in the PSAC report on the World Food Supply and more recently at the World Food Conference. USAID, alone, has over 100 million dollars of current water-related projects, many of them irrigation oriented. Notwithstanding a long history of irrigation, increasing understanding of the basic engineering and agricultural sciences, and massive investments, many modern irrigation projects encounter major problems. Some of the problems relate to the physical components of the systems, but the most serious occur in management and utilization. These are especially serious where the systems are supposed to meet small-holder needs.

The problems encountered have been serious enough on many projects that they have altered the course of future governmental policies, certainly in the area of investment and frequently to the detriment of small holders.

It is the thesis of the proposed research that the causes of these failures are an inadequate recognition of the critical importance of the interactions of the socio-economic factors with the physical aspects of the systems and a lack of understanding of these interactions. To illustrate, the process of water distribution in an irrigation system is a function, inter alia, of the physical layout of the distribution channels and the management rules followed by the water authorities. These two elements, channels and rules, interact and cannot be viewed as independent elements when systems are being designed or operated. Since the ability to implement management rules, in turn, is a function of social arrangements the initial choice of distribution layout needs to be considered from an organizational perspective.

The research proposes first to describe and analyze critical interactions, such as these; second, it will attempt to identify those interactions that are critical to system success; third, the implications for policy, design and operation will be identified. It is anticipated that this increased understanding will be incorporated into a set of analytical and operational procedures designed for use by planning, design and operations organizations.

The research procedure will be based upon detailed, interdisciplinary, field analysis of existing systems with a range of physical and socio-economic conditions. The studies will be comparative within county, between county, and between public and communal systems in monsoon Asia.

2. RESEARCH PURPOSE AND EXPECTED PRODUCTS

a. There is almost universal recognition that irrigation systems are "complex interactions of physical, economic and social factors." Yet, in planning, in design, and in operation many of these interactions, even critical ones, are either ignored or only considered intuitively.

It is the purpose of this proposed research to improve current procedures for the design of new irrigation systems, for the rehabilitation of existing ones and, more generally, for system management and operation. This would be achieved through explicit consideration of the interactions of critical socio-economic factors with the physical and biological factors.

The ultimate indicator of the achievement of this purpose is improved irrigation system performance. For the purposes of evaluation of this research project a more realistic ultimate indicator would be acceptance of the revised procedures by a significant number of the organizations responsible for the design and/or operation of irrigation systems. Intermediate indication of the achievement of the project purpose would be the successful application of the revised procedures to the redesign of at least a few existing systems. Both of these indicators require a relatively long time for utilization, given the time span between design or redesign and system implementation, and between implementation and impact on project performance.

A preliminary indicator of the achievement of the stated purpose would be the utilization of the revised procedures by any of the organizations responsible for design and/or operation of irrigation systems.

b. The specific research objectives are:

1. to describe, analyze and explain the complex interactions between the physical, biological, economic and organizational dimensions

of existing irrigation systems and the relationships of these factors to overall system performance.

2. to develop analytical tools and procedures for the identification and analysis of critical system interactions of the type indicated above.

3. to identify system design and operation implications that derive from the explicit consideration of socio-economic factors and their interaction with physical and biological factors.

4. to identify the planning policy implications. These implications lie in the areas of project scale, choice of technology, degree and forms of farmer participation and equity considerations.

3. SIGNIFICANCE AND RATIONALE FOR THE RESEARCH

a. Expanded irrigation has been identified as a major factor in the development of the LDC's, as evidenced in the UN Indicative World Plan. Its critical role relative to the world hunger problem was stressed in the PSAC report on the World Food Supply and more recently at the World Food Conference. Development of new irrigation projects do cause increases in production, especially since it usually allows for cropping during a dry season where nothing was previously grown. The major works (dams, canals, reservoirs and delivery system) all represent visible achievement and therefore carry a positive political connotation. Data worldwide, however, indicate that most irrigation systems and practically all in the LDC small farmer setting operate at unbelievably low efficiencies. Not more than 20 percent of the water reaches the crop in many systems. Governments continue to build systems in this same mold with encouragement from World Bank, AID, and other major donors.

How to provide good water management from the water source to the crop root zone in the LDC setting is neither known nor documented. This project is designed to address that problem by studying the social, economic, and technical aspects of existing systems (state-of-the-art). The objective is to provide a better mechanism for design and operation of irrigation systems.

This project is targeted directly at AID's Soil and Water Strategy (presently being developed). Improved irrigation system design and operation is a key problem within that strategy. Practically all LDC governments are interested in improving their irrigation management; evidence the more than $100 million directed at water resources management in AID's 1976 budget submission. Results of this project will be extremely useful to governments in designing new and renovating old irrigation

b. The research literature abounds with studies of specific technical questions (relating to soils, plants, water, engineering concerns). There are a number of studies of project economics, and some of economic efficiency in relation to technological changes such as irrigation. Even in the social science literature there are significant numbers of studies relating to the social systems associated with irrigation, and a few that deal with specific physical components of the irrigation system itself. (See Appendix II.) But to a very large extent these studies, while considering significant aspects of the complex interrelationships of developing country irrigation, were undertaken from a single disciplinary point of view.

In a number of instances the sensitivity of the investigator to the related disciplines has permitted a broader view, with new insights.

Rarely, however, have interdisciplinary studies of irrigation project problems been undertaken with representatives of the relevant disciplines collaborating closely. Neither have these studies been undertaken with a focus on identifying policy and operational implications. As a result, understanding of interactive effects and their implications for planning, design and operational processes is woefully inadequate. This is especially true for understanding of sociological implications and their interactions with the physical aspects of the systems. These interactions are important both in terms of the anticipated operations of the systems and in terms of the anticipated consequences of project investment.

4. PLANS TO COORDINATE TO LINK RESEARCH--INCLUDING NETWORKS

Since the emphasis is on real-world systems, active cooperation of the governmental agencies responsible for irrigation is essential. Working contact already exists with the National Irrigation Administration (NIA) in the Philippines, the Muda River Development Authority and the Division of Irrigation and Drainage in Malaysia and the Royal Irrigation Department in Thailand. Contacts have been made with relevant agencies in Indonesia, though working relationships have not yet been established. Close relationships exist with staff on the Agro-Economic Survey of Indonesia.

Linkages with the academic institutions in these countries have been established through previous research activities of the proponents. In the Philippines, close relationships exist with faculty at the University of the Philippines, at Dilliman and Los Banos. Important among these is contact with Dr. Senen M. Miranda of the Department of Agricultural

Economics, an advisor to the NIA and research leader in the area of water resources with the Philippine Council of Agricultural Research. Similar relationships exist with the Institute of Philippine Culture (IPC), a social science research unit of the Ateneo de Manila and the Social Science Research Unit of the Ateneo de Naga. The IPC is collaborating with the NIA on a survey of communal systems in the Philippines with support from the Ford Foundation.

In Malaysia working relationships exist with the Agricultural University at Serdang and the Science University of Malaya in Penang. In Thailand collaboration is anticipated with Kasetsart University (both its engineering and social science departments) and several other universities including: Chulalongkorn, Thammasat, Kong Kaen and Chieng Mai.

The International Rice Research Institute (IRR) is expanding its research in the water management field and close working relationships exist between the proponents and the research staff and administration at IRRI. Discussions have already been held with the Director of the Institute, Dr. N.C. Brady; with Dr. R. Barker of the Department of Agricultural Economics; and with Dr. T. Wickham of the new Department of Water Management. Close collaboration is further assured both within the Philippines and other countries of the region as IRRI's water management research expands.

In South Asia contacts have been established with staff of the Water Technology Center of the Indian Agricultural Research Institute and the Water Resources Development Center at the University of Roorkee, as well as with the Agrarian Research and Training Center in Sri Lanka.

It is anticipated that this research will be related to the activities of the regional network on irrigation research supported by the Agricultural Development Council. This network represents an important group of Asian

researchers and others concerned with the improved operation of irrigation systems.

Asian researchers represented in the network are an important source of information on irrigation research and a significant group for future research efforts on this topic. They will be used for purposes of reviewing research plans and strategies and as analyzed data becomes available as a forum for the early presentation of findings and interpretations. Their ability to discuss the findings in the context of their broad collective research experience will be of great value in the final reporting of results.

Two important U.S. groups dealing with LDC irrigation issues are the Consortium for International Development and the Food Institute of the East-West Center. Faculty associated with CID can perform useful consulting roles regarding research methodologies, the final interpretations of results and the development of policy recommendations. Their participation in the development of the final international symposium will be very helpful. The Food Institute has considerable experience with presenting research findings to system managers and operators and useful collaboration with them for the purposes of translating research findings into instructional materials is envisioned.

Colorado State University in their AID supported research project in Pakistan has carefully delineated social and technical problems associated with the on-farm aspects of that irrigation system. CSU counsel will be sought in design of the detailed work plan and their data and collection techniques reviewed carefully and used where applicable.

We visualize these linkages and cooperative activities as being important components of this research effort. In addition to the direct

value of the research itself, the combined activities will assist significantly in maintaining the fragile but important momentum that currently exists and in the development of expanded local research capability.

The linkages anticipated include host country participation in development of the research specifics (e.g., identification of specific issues, selection of study sites, etc.), active cooperative studies utilizing local graduate students and trainees along with advanced graduate students from Cornell and Rutgers, both U.S. and foreign. In most instances, the local graduate students will be supported from local resources, though some logistic support will be provided from the project.

5. PLANS TO FACILITATE UTILIZATION OF RESEARCH RESULTS

Four phases for facilitating the utilization of the results are anticipated: (a) irrigation department conferences; (b) planning and reporting workshops; (c) international symposium, and (d) other professional meetings dealing with problems of technology, food and agricultural development.

(a) Irrigation department conferences

Our past experience has shown that periodic progress reports to the irrigation agency staff, both at the system level and at the top administrative level, provide motivation to remain actively cooperative and are very effective in getting the research results utilized rapidly. Feedback from the agency staff is also very helpful in developing research directions which are most promising. Conferences are held at three levels and modes. Frequent informal meetings are held with the agency personnel directly involved in the research sites. Periodic, usually twice per year, conferences are held for a broader group of agency personnel, usually

including system superintendents and Central staff designers. These meetings would include formal reports as well as opportunity for discussion. Direct reporting to the agency administrator is planned for at least once per year.

(b) Planning and reporting workshops

Research planning workshops are projected prior to the establishment of each research effort. These will provide the opportunity for effective input into the research planning by the host country collaborators, as well as for dissemination of the results of the previous research. An updated "state-of-the-art" report will form the initial basis for each workshop, from which specific emphases will be developed.

Following the field data collection phase of each project, a symposium will be held in the host country, to review the data and the projected analysis. Subsequent to the analysis, an expanded conference to report the results is planned with participation of other agencies and groups concerned with irrigation development in the region, such as the Mekong Committee.

(c) International symposium

Toward the latter stage of the research program, an international conference is projected. This conference will be specifically aimed at the planning and design community which, in practical terms, may be the most important group in influencing the utilization of this and other research results.

(d) Other professional meetings

The importance of irrigation in world food problems and in agricultural development in general is so widely recognized that various aspects frequently are considered within these contexts. This is evident

in past AAAS meetings, at the World Food Conference, in a variety of professional society meetings, and most recently in deliberations of the International Food Policy Research Institute. The researchers involved in this project will participate in a variety of those meetings and will have the opportunity to present the findings and conclusions.

6. MANAGEMENT CONSIDERATIONS

It is proposed that this research be handled through a sole source contract. The work must be done by an interdisciplinary team and the suggested investigators have demonstrated strong abilities in this regard. The four principal investigators represent the critical disciplines associated with the problem. All have had extensive experience in irrigation related work in Asia; two have had significant additional experience in Latin America. These experiences include field research, technical assistance, teaching, and policy level advising to government agencies and/or the major foundations. The investigators have worked together previously and have established the relationships necessary for effective multidisciplinary research. Note that because of special competencies and experience working as a team, two universities are proposed. The contract would however be with one, Cornell, who would sub-contract for the services from Rutgers.

A portion of the field work should ideally be conducted in Asia where the research team has considerable experience and linkages. It is assumed

that concerned field missions will be interested and cooperative; however, before any field work or formal LDC linkages are made an inquiry will be made of all missions as to their interest in this research. Final selection of test sites will be made by the AID project managers and the contractor in consultation with Regional Bureaus only after receipt of suggestions from missions.

Great care will be taken during the preliminary stages of the project to ensure good linkages. The AID project managers will assist the contractor, in the field, with the development of formal linkages between the USAID mission, the host country institutions, and the centrally funded contract. This will be accomplished through meetings, at the test sites, with all concerned parties.

The project management in AID will be handled jointly by TA/AGR and SER/ENGR Operations-Water Resources. Budgeting, reporting, and documentation will be processed through TAB; however, the project co-manager from SER/ENGR will be a necessary signatory to all official documents.

Semi-annual meetings will be held between the contractor and the technical representatives from AID. These meetings will serve to coordinate this project with other related AID financed research projects, to check progress, to plan future work and to anticipate and remove constraints which might impede progress. In certain instances these

meetings may be held in LDCs to take advantage of mission and host country input.

Between 12 and 18 months after initiation the project will receive a rather thorough review. This review will assess the progress but more importantly it will analyze the linkages closely to determine whether the site selection was good or if it should be changed while there is sufficient time to develop reliable data elsewhere. At this point a decision will also be made as to the desirability of conducting the research in a third country.

Special Competence of the Contractor:

The four principal investigators represent the critical disciplines associated with the problem. All have had extensive experience in irrigation related work in Asia; two have had significant additional experience in Latin America. These experiences include field research, technical assistance, teaching, and policy level advising to government agencies and/or the major foundations. The investigators have worked together

previously and have established the relationships necessary for effective multi-disciplinary research. The search for the special competencies necessary for research on this type of problem was not confined to one university, and thus faculty from both Cornell University and Rutgers University are represented.

7. TECHNICAL REVIEW

Past research on irrigation has been highly disciplinary oriented. A considerable amount of research has been done exploring relationships between plant growth and water applications: much of it in research station settings. Similarly, significant research has been completed on the technology of irrigation. The work of social scientists on irrigation institutions and organizations has either been incidental to more focal sociological concerns or has largely ignored the significant nonsocial components of the systems.

Important new trends have occurred in the past few years. Water management research at IRRI has applied engineering and agronomic research in field settings and has combined an interest in management and organizational issues. Researchers at Colorado State University are conducting research at the turnout level in operational systems in Pakistan. Romana de los Reyes, a graduate student in Anthropology, is conducting a unique study of a communal irrigation system in the Philippines that will combine sociological analysis with data on the physical performance of the system.

Absent from the literature, at this point, are any systematic studies of the interaction of physical, biological, economic and organizational elements of irrigation based on a comprehensive program of research conducted in several field sites with comparative data. Thus, while

numerous studies in the existing literature are suggestive of critical interactions related to system performance, they do not provide an adequate basis for the enumeration of design and operations implications. What is needed is a program of research that will allow the careful identification of critical interactions and the interpretation of these findings into practical implications.

Our proposed research utilizing the combined experience of several disciplines with a focused program of research in several within- and cross-national field sites is intended to help fill this significant gap.

8. RESEARCH PROJECT DESIGN AND METHODS

Two sets of milestones can be identified for this project, one internal to each set of country studies; a second, reflecting the combination of country studies to achieve the project objectives.

Within each country the research program will have four completion points: (1) initiation of the field studies, following the pre-project planning workshop and development of cooperation specifics; (2) completion of field data collection and preliminary analyses; (3) completion of final analysis, reflected by a report document; and (4) information dissemination, characterized by final reporting meetings with agency staff and administrators.

The project milestones can be characterized by five events: (1) initiation of studies in the initial three countries; (2) completion of the country studies; (3) completion of the between-country comparisons; (4) completion of the critical workshops and preparation of the final reports; and (5) holding of the international symposium.

The anticipated time span for the total set of activities is five years. It is recognized that this proposal is for a three-year period, and therefore the full integration of the individual studies into the comparative framework, the critical workshops and the international symposium would not take place during the initial period. Completion of the two of the three country studies, and initiation of the third are anticipated within the three-year time frame.

Research Objectives

A basic hypothesis underlying the research objectives is that specific variables within each of the component dimensions making up the irrigation system environment are critical for satisfactory system performance, not only by virtue of their direct effects but also because of their interaction effects. For example, in the physical dimension the importance of the magnitude of the available water supply in determining the area that can be served by the system is clearly recognized. The customary design procedure to relate these two variables is to estimate the crop water requirements and the efficiencies in distributing and transporting the water thus arriving at a specified quantity necessary per unit area to be served. The efficiency selected presumably reflects objectives related to economic and resource use efficiency. What is not generally recognized is that the combination of social attitudes toward water distribution coupled with factors such as profitability resulting from irrigation may have a critical impact on whether those efficiencies could in fact be achieved. As a specific example, the DEZ pilot irrigation project in Iran can be considered classic. The project, designed as a modern agricultural development effort based on irrigation, with the latest in irrigation technology, was designed with

the expectation that water use efficiency would increase from the 25% found in the traditional systems to 55 or 66% with the modern improvements. Six years after the project was in operation actual water use efficiency was 11%. The modern system destroyed the role of the local villages in the water control process and failed to substitute an organizational structure that the local farmers were willing to accept.

Many more individual cases could be cited where failure to recognize critical interaction has resulted in failures to reach project objectives, partially or totally. However, there has not been rigorous research to identify these critical interactions.

Research Objective 1: To describe, analyze and explain the complex interactions between the physical, biological, economic and organizational dimensions of existing irrigation systems and the relationships of these factors to overall system performance.

a. The basic approach is to conduct multi-disciplinary field studies of operating systems in each of three countries: initially the Philippines, then in two other countries of Asia.

The complexity of the problems being addressed, the importance of understanding local situations, and the need for interaction with irrigation system personnel, require that the research be cooperative with host country research colleagues and government agencies. The research cooperation anticipated is described in the section on research linkages.

Initial focus will be on the systems in Central Luzon, either communal or NIA operated, selected with input from host country colleagues including the IPC survey of communal systems. The systems will represent some which have been judged successful in meeting the water needs of smallholders and others which have been judged unsuccessful.

The first systems to be studied are located in the Philippines wher there is strong governmental concern with many of the issues related to this proposed research and where many international agencies, including AID, are active in the irrigation development area.

There are two important dimensions of the research that set the broad parameters of the research methodology. First, the research is concerned with actions in existing irrigation systems, hence the need for field research and primary data collection in operating systems. Second, given the conceptaal emphasis on critical interactions, specific field data will be collected in each of the broad categories previously mentioned: physical, biological, economic and organizational.

Research design: Existing irrigation systems in each of the three Asian countries will be selected as field sites. In each country 3 to 5 systems will be identified for field work (the area served by one lateral of a large irrigation system might be considered a "system" for the purposes of this study). Thus, the total project would cover 9 to 15 different field sites. Observations and data collection in each field site will continue for approximately 18 months thus permitting observation of system operation through both the wet and dry seasons. In addition, by utilizing existing records and eliciting information from informants about the recent past we will attempt to add a time dimension that exceeds this 18-month observation period.

Data collection: The field data will be collected by a mix of research techniques including at least the following:

1. Physical measurements of water flow: To determine actual amounts of water being delivered at different locations within the system and at different points in time.

2. Farm surveys: to determine cropping patterns being followed, production inputs used, patterns of landholding, etc.

3. Key informant interviews: to obtain information on the formal and informal roles and rules used to operate and maintain the system, procedures for selecting leaders, modifying roles of work time, etc.

4. Participant observation: attendance at group meetings, involvement with work groups, observation of actual irrigation activities will be used to collaborate information collected through other techniques and to identify new information.

5. Sociometric techniques: to identify patterns of farmer interaction on water use and related activities such as joint land preparation or marketing activities.

6. Examination of records: when possible, the examination of records such as minutes of meetings, formal statements of rules and procedures, financial records and other information will be used as information sources.

These are standard techniques for obtaining the needed data and the investigators have had long experience with them.

The focus of data collection initially will be on specific variables related to the physical, biological, economic and organizational elements. These efforts will be designed to answer such questions as: the nature of the engineering structures of the system, the types of soils available, basic climatic conditions, available water supplies, the nature of cropping, informal water rights, patterns of communication and leadership, etc. As information is collected on each of these specialized topics and shared among the research staff, potential critical interactions will be identified. As these are identified, research procedures will be implemented to

carefully investigate these leads. For example, if information on canal size suggests that water delivery at the time of land preparation will be significantly constrained, researchers working in the economic and organizational areas will be alerted to look for specific cropping patterns, rules for planting schedules or other techniques that the system users may have derived to cope with this problem.

The identification of guiding questions, as that of the test sites themselves, will be made during the project initiation phase of each country study. Development of the specifics of cooperative effort will take place at the same time. In addition to the LDC participation during the planning phase it is anticipated that some LDC researchers from the Institute for Philippine Culture, the University of the Philippines (Los Banos) and Central Luzon State University may be actively involved with aspects of the field work and data collection in the Philippines.

The International Rice Research Institute is planning research on the identification and implementation of relatively specific practices for the improvement of system operation in the Philippines and other countries of Asia. The IRRI will participate in the planning workshops for this project and will include appropriate data collection in its own studies to provide input into the comparative phase of this research.

Data analysis: The initial analytic strategy will be to examine the field data for each field site independently. Hypotheses regarding critical interactions will be tested with a variety of statistical tools appropriate to the particular empirical measures available. These techniques may range from nonparametric tests such as chi-square through parametric tests such as partial and multiple correlation. In each case the choice of techniques will be determined by the properties of the

empirical measurements available and the conceptual thrust to identify and test interactions.

As analysis is completed on the data from individual field sites, cross-sites comparisons will be undertaken. This will allow the further testing of interactions deduced or induced from specific field sites.

b. The major activities associated with this objective are:

1. The planning workshops to be held in each country for the purpose of identifying test systems, specific study questions and details of host-country collaboration. These will be held at approximately six-month intervals and therefore will be completed in the third country about 18 months after project initiation. This activity will produce the test procedures, questionnaires and detailed research plans for each case study.

2. The Philippine country studies including the collection of field data, analysis and reporting of results will be initiated approximately 6 months after project initiation and concluded within a 21-month period. Field data will include: water use by farming units, economic (farm budget) data at the farm level, details of water management practices at the various management levels within the irrigation system, and operational details of associated farmer organizations and social structures. This activity will be complete with the compilation of the data into a report.

3. The second Asian country studies, similar to Activity 2, will be initiated 12 months after project initiation and completed in the following 21 months. The data (same as 1 above) will be collected, compiled, and recorded in same manner as first case study.

4. The third Asian country studies, similar to 1 and 2 above, will be initiated 21 months after project initiation and completed at the end of the project period. Data and compilation as 1 and 2 above.

5. Integration of country studies would be initiated only if the project is extended beyond three years. This would involve an examination of individual country studies for conclusions which can be generalized across geographic and agricultural system regions.

c. The resource requirements include:

1. Access to the overseas field sites; our contacts with irrigation agency administrators in the countries specified insure this accessibility.

2. Faculty and graduate students in the host country; we have had continuing contact with faculty colleagues in the countries specified and have been assured of cooperative efforts. The IRRI has indicated the availability of scholars and trainees from the IRRI training program.

3. Vehicles; depending upon the location of specific sites, one or two jeeps (or equivalent) plus a motorbike would be required, along with miscellaneous small equipment, e.g. rain guages, locally fabricated. No special equipment needs are anticipated.

The total estimated cost for objective is approximately $180,000.

Research Objective 2: To develop analytical tools and procedures for the identification of critical system interactions suitable for use by the professional community involved in design and operation of irrigation systems in the developing countries.

As discussed under Research Objective 1, the number of possible interactions influencing system performance is extremely large. Research

Objective 2 will build on the understanding gained through Objective 1 by systematic analysis of the interrelationships identified and their effects on system performance is anticipated that scaler rankings of importance will be an outcome.

a. The major activities associated with this objective are:

1. Development of preliminary analytical tools and procedures. Quantitative and qualitative scaling techniques will be used to develop procedures to rate variables in terms of their impact. The data from the Philippine case will be used to do this.

2. Application of preliminary procedures to a similar environment; refinement of the tools and procedures. The procedure developed in 1 above utilizing Philippine data will be applied to the irrigation system of the second Asian country. The results of this technique will then be compared to the data collected in that country. Discrepancies in critical variables resulting from the analytic procedure vs. the data collection will be evaluated and the procedure refined accordingly.

3. Application of the procedures to a broader context; refinement of the tools and procedures. The refined procedure will be evaluated for extrapolation to a wider cultural environment by testing it on the third country data.

4. Adaptation of the procedures for use by the professional irrigation community. Finalizing the procedure based on the testing procedures described in 1, 2, and 3 above.

b. The milestone events will be the preparation of the local working papers, the holding of the agency workshops and preparation of the country study final reports.

c. No special equipment or facilities are required. Personnel needs include the senior investigators, along with host-country colleagues. Approximately $50,000 is estimated for this objective.

Research Objectives 3 and 4: To identify system design and operation implications that derive from the explicit consideration of socio-economic factors and their interaction with physical and biological factors; to identify the planning policy implications.

a. Two types of activities are anticipated for these objec ives:

1. Analysis using country studies are expected to reveal a set (or sets) of variables influencing system performance. The results of this synthesis will be a general application based on commonality of critical variables.

2. Critical review and interaction with irrigation agency design and operation personnel and with policy level planners.

b. Following achievement of Objectives 1 and 2, data on selected systems in the UPRP command area will be obtained, using the developed procedures. Analysis will be for the purpose of identifying the design and operation implications. The reporting of these analyses and implications will be the indicator of phase completion. Accuracy of the identification cannot be judged until implementation of the changes under the UPRP.

c. No special resource requirements other than the investigators and associated graduate students and collaborators. It is anticipated that $40,000 will be used for this effort.

The general pattern of field data collection and preliminary analysis by the research teams followed by critical reaction from other researchers and end-product users, with final analysis and reporting has been used very successfully by researchers affiliated with the Cornell Rural Development

Committee (see, for example, the AID sponsored research on the role of local government). Three of the four principal investigators of this proposal have worked with the Rural Development Committee for a number of years.

9. OVERALL COST ESTIMATES

Total Project Cost: $278,700

Fiscal Year Estimates

	FY 77	FY 78	FY 79
Salaries and Wages			
Principal Investigators	$15000	$12000	$12000
Research Assistants	20000	30000	30000
Field Research Costs	10000	15000	15000
Travel and Maintenance	12900	14000	13000
Equipment and Supplies	9000	6000	6000
Other Direct Costs	5000	5000	5000
Indirect Costs (36.8% of salaries and wages)	12880	15460	15460
TOTAL	$84780	$97460	$96460

Cost Estimates by Objectives

The interrelationships of the objectives and the sequencing of the in-country studies make it difficult to break down by fiscal year detail the cost estimates for the objectives. The overall estimates by objectives are approximately:

Objective 1: $180,000

2: 50,000

3: 15,000

4: 35,000

The first year emphasis will be entirely toward Objective 1; approximately 60% of the second year and 40% of the third will be for this same objective. The emphasis during the second year will shift to Objective 2, with approximately 25% of the costs allocated to this; this same percentage is anticipated for the third year.

Objectives 3 and 4 will represent about 15% of the second year budget and 35% of the third year budget.

10. WORK PLAN

a. Objective 1: To describe, analyze and explain the complex interactions between the physical, biological, economic and organizational dimensions of existing irrigation systems and the relationships of these factors to overall system performance.

Completion of the first of the three sets of country studies is anticipated by the end of the second year; completion of the second set is scheduled for mid-year three. Completion of the third set is anticipated early in year four. (It is recognized that this is a three-year project and the decision to proceed with the third country set will be dependent upon review of the research progress in year one.

1. Activities

a. Planning workshops. In view of the major element of host-country cooperative effort required for this research, provision for host-country input at the planning stage is required. Prior to each set of country studies, a planning workshop will be held, to identify specific sub-objectives, details of field work, etc.

b. Field data collection and preliminary analysis (Philippines). Following the first planning workshop the field studies will take place.

Intensive data collection will take place at a number of communal systems in the Philippines. Analysis of system specific interactions will take place.

c. Field data collection and preliminary analysis (second Asian country). Same as for activity b; selection of appropriate country to be based upon consultations with AID.

d. Field data collection and preliminary analysis (third Asian country). Same as for activity b; selection of appropriate country to be based upon consultations with AID.

e. Integration of country studies.

2. Inputs

Principal investigators, primarily for activity a and during initial and final stages of activities b, c, and d.

Graduate students, U.S. and host-country, primarily in activities b, c, and d, though active in activity a. The budget estimates have been identified in detail by Fiscal Year (section 9) with overall estimates by objective. For the first two years, for Objective 1, the estimated total cost of $145,000.

3. Objectively verifiable progress and completion indicators

Activity A. Planning conference reports
Initiation of field studies

Activity B. Philippine country report and associated publications

Activity C. Second Asian country report and associated publications

Activity D. Third Asian country report and associated publications

Activity E. International symposium and report.

b. Objective 2: to develop analytical tools and procedures for the identification of critical system interactions. The achievement of Objective 1 for the first two Asian countries will permit the development of appropriate procedures.

This should be completed within the third year. Application to the third Asian case, and subsequent modification would take place in the fourth year.

1. Activities

a. Development of procedures for Philippine environment. Initial identification of critical variables and an identification procedure. Following this development, a workshop with host-country researchers and agency representatives will be held to evaluate and refine the procedures.

b. Application and refinement of procedures. The procedures developed on the basis of the Philippine studies will be applied to the second Asian country; these will be modified to include the inputs from the second set of studies. A local critical workshop will be held for agency reaction.

c. Application and refinement of procedures for third Asian country. Similar to Activity b; expected completion latter part of fourth year.

d. Development of generalized procedures. A pattern similar to b and c though with the broader perspective, culminating in a general critical workshop and international symposium in the fifth year.

2. Inputs

Primarily principal investigator and host-country colleagues and agency personnel. Costs are primarily related to travel and partial salaries.

3. Objectively verifiable progress and completion indicators

Activity A. Formal procedure document

Activity B. Revised procedure document for Asian context

Activity C. Revised procedure document

Activity D. Generalized procedure document symposium report.

c. Objective 3: To identify system design and operation implications that derive from explicit consideration of socio-economic factors and their interaction with physical and biologic factors. Most of the activity to achieve this objective will take place in the third, and subsequent years. Completion is anticipated for the firth year, culminating in the presentations and discussions at the international symposium. The country specific implications will be comlleted approximately six months after completion of Objective 1 in each country.

1. Activities

a. The analysis of results developed under Objective 1, as well as that obtained in studies by others.

b. Interaction with agency staff and administration. Formal reporting will be made through agency conferences. Emphasis will be upon local country implications. More general implications will be considered at the international symposium.

2. Inputs

Primarily principal investigators, host-country colleagues and agency personnel for the in-country activities. Budget items primarily related to travel and meetings.

3. Objectively verifiable progress and completion indicators

Reports of agency conferences, and associated documents.

d. Objective 4: To identify planning policy implications. This objective will receive only preliminary emphasis during the first two years of the project. Significant work will start in year three, with most emphasis during year four and five.

1. Activities

a. Analysis of results to date, and identification of policy implications.

b. Critical review and reporting. Policy implications will be explored with individuals active in irrigation planning, in a workshop format. Refinement of the implications statements. The final statements will be explored at the international symposium.

2. Inputs

Primarily principal investigators, host-country colleagues, and planning personnel. Budget items primarily related to travel and meetings.

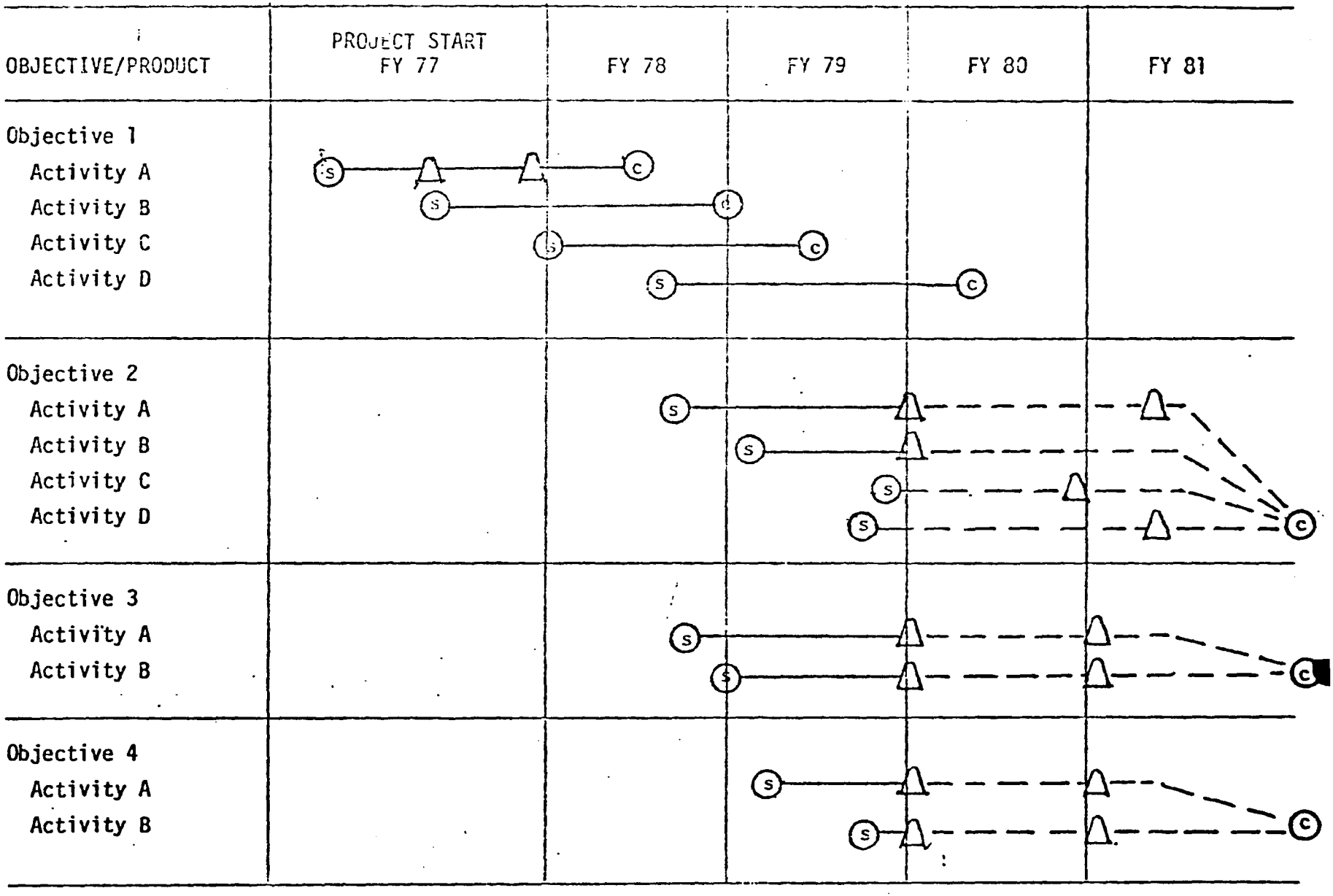
3. Objectively verifiable progress and completion indicators

Report of policy implications. Professional and/or scientific journal articles.

11. INITIAL ENVIRONMENTAL EXAMINATION

The activities of this project fall into the area described in environmental procedure regulations, paragraph 216.2(c) "Analyses, studies, academic or investigative research, workshops and meetings." These classes of activities will not normally require the filing of an Environmental Impact Statement or the preparation of an Environmental Assessment. It is possible

that an output of the project will be a set of procedures and guidelines which when used would require such an assessment. However, the project itself only proposes development of procedures. Under these guidelines, this activity clearly qualifies for a Negative determination at the time when a threshold decision is determined.


OBJECTIVE/PRODUCT
PROJECT START
FY 77
FY 78
FY 79
FY 80
FY 81
Objective 1
Activity A
Activity B
Activity C
Activity D
Objective 2
Activity A
Activity B
Activity C
Activity D
Objective 3
Activity A
Activity B
Objective 4
Activity A
Activity B

Summary	Objectively Verifiable Indicators	Important Assumptions
A.1. Goal To improve the water use efficiency in irrigated agriculture and thereby increase production per unit of water.	A.2. Measurement of Goal Achievement 1. Increased acreages per unit of irrigation water, 2. Decreased waterlogging and salinity problems, 3. Increased production per irrigation system.	A.3. (as related to goal) 1. LDC's will actively attempt to improve irrigation system design. 2. Irrigated agriculture will continue to be essential to food production especially in highly populated areas of the developing world.
B.1. Purpose To improve procedures for design and/or rehabilitation of irrigation systems incorporating explicit consideration of the interactions of critical socio-economic factors with the physical factors.	B.2. End of Project Status Preliminary - Utilization of revised procedures by an organization responsible for design and/or operation of irrigation systems. Intermediate - Successful application of revised procedures in at least a few existing systems. Ultimate - Successful utilization of the revised procedure by a significant number of LDC design and operational organizations.	B.3. (as related to purpose) 1. Sufficient concern will exist in at least some design - operation agencies that there would be a willingness to try revised procedures. 2. The procedures would be such that available or reasonably attainable LDC skills would be required for utilization.
C.1. Outputs 1. Description, analysis, and explanation of complex interactions between physical, biological, economic and organizational dimensions of existing irrigation systems. 2. Analytical tools and procedures for the identification and analysis of critical system interactions. 3. Set of design parameters derived explicitly from the socio-economic dimension. 4. Identification of elements which relate to planning policies.	C.2. Output Indicators 1. A set of propositions regarding interrelationships based on quantitative and qualitative data in form of written reports and workshop proceedings. 2. A research design procedure including measurement techniques. 3. Training workshops complete 4. A set of guidelines to be used by designees and project operators in reviewing the state of planned or existing systems. 5. An issues discussion and policy alternatives dealing with water resources and/or agricultural development as derived from the study.	C.3. (as related to outputs) 1. Appropriate numbers of field sites can be identified and made accessible for detailed study. 2. Selected sites will represent a range of conditions appropriate for study objectives.
D.1. Inputs 1. Qualified contractor personnel with backstopping facility. 2. AID control funding and project guidance. 3. Participating personnel from LDC's and USAIDs in workshops to plan specific research strategies, data collection and analysis, and follow-up seminars to extend results.	D.2. Budget/Schedule Budget/Schedule See detailed budget.	D.3. (as related to inputs) 1. Highly qualified contractor principal investigators will remain available. 2. LDC's will have personnel and resources to support this activity.

PERSONNEL

Four faculty members, representing critical disciplines in the study of irrigation systems are identified as primary participants in the proposed research. Each has officially designated international components to his University responsibilities, ranging from 25% to 100%. All have had extensive experience in irrigation related work in Asia, including field research, teaching, and policy level advising to government agencies and/or the major foundations.

The primary faculty are:

Milton L. Barnett, Dept. of Rural Sociology, Cornell University

E. Walter Coward, Jr., Dept. of Rural Sociology, Cornell University

Gilbert Levine, Dept. of Agricultural Engineering, Cornell University

Leslie E. Small, Dept. of Agricultural Economics and Marketing, Rutgers University

These primary faculty, along with the host-country collaborators, will provide the core group planning the work, directing the graduate student participants, analyzing and reporting on the research.

Supporting the core group of faculty will be a Cornell faculty advisory panel representing a broader range of disciplines, who will be available for consultation and specific input as problems are encountered for which individual expertise is desired. Faculty in this group include:

Dr. W. Brutsaert, Professor of Civil and Environmental Engineering (Hydrology)

Dr. H. Capener, Professor of Rural Sociology (Development Sociology)

Dr. M. Drosdoff, Professor of Agronomy (Tropical Soils)

Dr. Milton Esman, John S. Knight Professor of Government (Institutional Development)

Dr. Howard Conklin, Professor of Agricultural Economics (Resource Economics)

Dr. D.P. Loucks, Professor of Civil and Environmental Engineering (Environmental Systems)

Dr. David Thurston, Professor of Plant Pathology (Tropical Plant Pathology)

Dr. Norman Uphoff, Assistant Professor of Government (Local Government)

Dr. William Whyte, Professor of Industrial and Labor Relations (Development Sociology)

In addition to the faculty members, research assistants will be utilized as an integral part of the research effort. These will include advanced level graduate assistants from Cornell and both advanced and junior level graduate assistants from the host country cooperating institutions. These will be coordinated to provide multi-disciplinary teams for each system study.

(04) RAC Meeting May 24-25 1976 (Final)

The Determinants of Developing Country Irrigation Project Problems: A Multifactor Analysis for Improved System Operation and Performance - Cornell University

Dr. Thorbecke, Cornell University, absented himself from the meeting to avoid any possible conflict of interest.

Dr. Peterson, Chairman of the Subcommittee composed of Dr. Heady, Dr. M. Peterson, and Mr. Wittnebert reviewed the project as follows. As background Dr. D. Peterson pointed out that Asia, with more than half of the world's population, has only about 20% of the arable land resources which is 80 to 90% utilized. Much of this comes under the influence of the tropical monsoon with distinct wet and dry seasons. They must, through irrigation, insure against drought to avoid famine. Reasonably successful indigenous irrigation systems have evolved. However, the large, externally designed systems have a rather poor record of achievement. There are many reasons beyond the physical characteristics of the systems for this poor performance. Since there is no way to meet the agricultural requirements of these heavily populated areas without increased irrigation, this proposal addresses a very important matter.

This project proposes to deal with the socio-economic factors and their interactions with the physical characteristics at the project level. The research objectives are to 1) describe, analyze, and explain the complex interactions among these components; 2) develop analytical tools for identifying critical systems interactions; 3) identify system

design and operation implications; and 4) identify planning policy implications.

A planning workshop including host country participation will insure a workable methodology. Following this analytical stage further planning with host countries will refine the procedures. The investigators appear well qualified, and there is also an impressive list of consultants representing important disciplines.

The stated goal is to increase water use efficiency, but this may, or may not be fully congruent with more basic goals, e.g., improving the income of individual farmers. Significant questions are: to what extent will constraints external to the projects, such as national policy, be considered and how far can one move into these? Will the Asian Development Bank and the Agricultural Development Council be involved in these considerations?

The Subcommittee is generally favorable to the project, but believes it could be improved. Suggestions for discussion include confining the project to monsoon Asia, clarifying the socio-economic methodology, and including political science expertise on the team.

Mr. Wittnebert said the consumer oriented objectives of the project were very good and that the efforts of staff and contractor were apparent in the quality of the proposal.

Although he was quite favorable to the project Dr. Heady suggested that a more complete definition of the socio-economic methodology should be given as there are many reasons for inefficient water distribution and use. The heavy use of research assistants should be re-evaluated, and perhaps more social science emphasis given in the leadership.

Dr. M. Peterson pointed out that one can manipulate the variables and data input to provide whatever conclusion desirable on irrigation economics. He referenced an earlier example in the western U.S. to illustrate traps to be avoided.

Dr. Montgomery said that in the socio-economic methodology it is important to get the political analyst to attach social content analysis to decision analysis. He indicated his belief that the Cornell political science consultants mentioned in the proposal are qualified to work on that problem if they are given access to that phase of the study.

Dr. Adams expressed his reservation whether this task could be done within the estimated budget. He also expressed concern that host countries often want the money but do not want projects evaluated. Therefore, he believed this would be a high risk activity with little chance for success.

Dr. Swanson expressed concern that examples of the quoted critical indicators were not given and that there was no performance indicator which dealt with equity distribution. He asked if third country testing would be included. Dr. Ehrenreich endorsed the systems approach and thought this expertise could be successfully incorporated into such an analysis. Dr. Smuckler pointed out that Cornell has political scientists who have worked in this area, and he would encourage their involvement if the project moves forward.

Dr. D. Peterson acknowledged that the budget is modest, but since this is pioneering work it may be best to begin modestly. It is necessary to develop a critical mass.

Dr. Corey, TA/AGR, pointed out that a significant point of the project is that it will look at systems as they exist, and there is not to be any juggling of inputs. He emphasized that this will be the first project of it's kind in the world and will be a systems rather than a bottle-neck approach. He expressed agreement with the comments on methodology. A significant key to success of the effort is involvement of local people because foreigners cannot successfully go in and get the necessary data - this is why the workshops are necessary. Validity of the project rests upon reliability of the data. Restriction to the Asian monsoon area is desirable. Too often irrigation systems merely dispose of water. Not enough attention is given to getting the water from the delivery system to the crop. This project will look into the reasons for this inadequacy. The project aims to see if certain interventions do carry over to other systems. The investigators believe it will take time more than money to do this task. Commenting on the involvement of research assistants he said these would be top level advanced graduate students and employed wisely in the Cornell tradition. Before the project would be implemented he said top consideration would be given to host country locations. He reported the Asia Bureau is favorable to the proposal.

Dr. D. Peterson asked if there should be more clarification of methodology prior to approval and how a delay until October would affect the project plan. Dr. Hesser, TA/AGR, indicated it would be possible to sharpen the methodology with greater political science involvement and re-evaluation of the budget for review in October without disrupting

the planning horizon. The consensus of the subcommittee was that Dr. Hesser's suggestion be adopted.

Motion: That AID staff consider suggestions of the RAC and present a revised proposal at the October (RAC) meeting.

Vote: Carried with 10 aye and 5 nay votes.

The Chairman made clear that the negative votes should be interpreted as a desire to approve the project without further referral, therefore the project goes forth with a strong affirmation for acceptance with the suggested considerations. Dr. D. Peterson said he wanted to emphasize the concensus of the subcommittee for this project and to compliment AID staff on its development. Dr. Long complimented the RAC on their review and action on the project.