

PD-AAG-349

9311005001502 <sup>931-1005</sup>

CLASSIFICATION  
PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol U-447

|  |   |                                      |  |                                       |
|--|---|--------------------------------------|--|---------------------------------------|
| 1. PROJECT TITLE<br>Determinants of Irrigation<br>Contract AID/ta-c-1412 |   |                                      | 2. PROJECT NUMBER<br>931-1005  | 3. MISSION/AID/W OFFICE<br>DS/AGR/RNR |
| 5. KEY PROJECT IMPLEMENTATION DATES                                      |   |                                      | 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) <u>80-55</u><br><u>9/10/80</u> |                                       |
| A. First PRO-AG or Equivalent FY <u>77</u>                               | B. Final Obligation Expected FY <u>81</u> | C. Final Input Delivery FY <u>81</u> | <input type="checkbox"/> REGULAR EVALUATION <input checked="" type="checkbox"/> SPECIAL EVALUATION   |                                       |
| 6. ESTIMATED PROJECT FUNDING   |   |                                      | 7. PERIOD COVERED BY EVALUATION  |                                       |
| A. Total \$ <u>400,000</u>   |   |                                      | From (month/yr.) <u>October 1977</u>   |                                       |
| B. U.S. \$ <u>400,000</u>  |   |                                      | To (month/yr.) <u>April 1980</u>   |                                       |
|  |   |                                      | Date of Evaluation Review <u>April 10, 1980</u>  |                                       |

J. 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. Extend the contract for 18 months.<br><br>9 month unfunded extension<br>Final 9 month extension with approximately \$50,000   | DS/AGR<br>Corey                           | 8/80                           |
| 2. Increase senior staff time on project within budget limits.   | Cornell<br>(Levine)                       | 9/80                           |
| 3. Develop detailed work plan for 18 month period, which includes:<br><br>a) Description of type of data collected<br><br>b) Methodology of data analysis explicitly laid out<br><br>c) Kinds of analytical products to be produced<br><br>d) Specification of papers to be produced | Cornell<br>(Levine)                       | 10/30                          |
| 4. Completely analyze Philippine data and then re-view data collection needs for Indonesia in light of the analysis.   | Cornell<br>(Levine)                       | 1/81                           |

|   |  |  |   |  |  |
|---|--|--|---|--|--|
| 9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS |  |  | 10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT              |  |  |
| <input type="checkbox"/> Project Paper                      | <input type="checkbox"/> Implementation Plan e.g., CPI Network | <input checked="" type="checkbox"/> Other (Specify) <u>PAF &amp; Action Memo</u> | A. <input type="checkbox"/> Continue Project Without Change |  |  |
| <input type="checkbox"/> Financial Plan                     | <input checked="" type="checkbox"/> PIO/T                      | <input type="checkbox"/> Other (Specify) _____                                   | B. <input type="checkbox"/> Change Project Design and/or    |  |  |
| <input type="checkbox"/> Logical Framework                  | <input type="checkbox"/> PIO/C                                 |  | <input type="checkbox"/> Change Implementation Plan         |  |  |
| <input type="checkbox"/> Project Agreement                  | <input type="checkbox"/> PIO/P                                 |  | C. <input type="checkbox"/> Discontinue Project             |  |  |

|  |   |   |  |  |  |
|--|---|---|--|--|--|
| 11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles) |   |   | 12. Mission/AID/W Office Director Approval |  |  |
| G.L. Corey<br>Project Manager<br>DS/AGR/RNR<br><i>G.L. Corey</i><br><i>5 Aug 80</i>                  | M. Mozynski<br>Program Officer<br>DS/AGR<br><i>MEM</i><br><i>8/5/80</i> | K. McDermott<br>Deputy Director<br>DS/AGR<br><i>[Signature]</i> | Signature <i>[Signature]</i>               |  |  |
|  |   |   | Typed Name <u>Tony Baber</u> DS/DAA/FN     |  |  |
|  |   |   | Date <u>9.12.80</u>                        |  |  |

### 13. SUMMARY

The project entitled "The Determinants of Developing Country Irrigation Problems" was initiated in October 1977 as a 3-year project. The design called for data collection in two LDCs on 2 or 3 irrigation projects. Essentially, the project is a series of case studies: i.e., data are collected on existing irrigation systems operating normally without influence from the project.

Implementation delays, mainly associated with developing good international and country linkages for the research, has created the situation, whereby, the project cannot be completed in 3 years, but will require approximately 18 months more than anticipated. This is primarily because data collection in the second country did not start until 20 months after project initiation.

The evaluation, reported herein, was also delayed to a time when it appeared that the contracted scope of work would be approximately one-half complete. A three person team reviewed the project by analyzing all output to date, and by interviews with project principal investigators.

The review determined that: a) the project has excellent relations with USAIDs and host country organizations; b) the project is behind schedule for good reasons; c) it is doubtful that between country (Philippines and Indonesia) comparisons can be made because of the site specificity of the data; in fact, data from the 3 Philippine sites may be inseparable because the 3 irrigation systems have been physically combined; d) the research methodology is not yet clear and the proposed outputs may promise more than is possible, given the data base and analysis techniques; and e) that more senior staff time devoted to the project could improve output.

Data collection is now complete in the Philippines. These data should be analyzed at an early date so that any methodology improvements suggested by the analysis can be incorporated into the Indonesia data collection which will proceed for one more year.

The project purpose will be achieved if the 3-year scope of work is completed. This will require an 18 month extension. The contractor should now concentrate on the first objective, which involves descriptions of the interactions among physical, economic, and social divisions. Other outputs can be dealt with, but data limitations may make conclusions less firm than in the case of the interactions. The original project proposal called for a 2-year extension to a third country after completing the work in the first 2 countries. The review panel does not believe the project should be extended to a 3rd country. Certainly, there is no rationale for a 3rd country until the data are all collected and analyzed from the first sites. Only then, can a judgment be made regarding the value of the information.

#### 14. EVALUATION METHODOLOGY

The purpose of the evaluation was to provide DSB with objective information so a sound determination could be made as to whether or not the project should be extended to a third country.

Information reviewed and analyzed included: (a) the progress to date; (b) the appropriateness of the research methodology; (c) the suitability of the data collection methods; (d) the degree of host country cooperation; (e) the usefulness of expected results to improvement of future development projects.

A review panel, consisting of Dr. Don Plucknett, Team Leader, Dr. Douglas Caton, and Dr. Elliot Skinner, conducted the review on site at Cornell University on April 8, 9, and 10, 1980. Dr. Plucknett, Agronomist, is Chief of the Agricultural Section in the Asia Bureau, AID; Dr. Caton, Agricultural Economist, is Chief of the Agriculture Division in the Policy and Planning Bureau; and, Dr. Skinner, Professor of Anthropology, is a member of AID's Research Advisory Committee. Dr. G.L. Corey, AID/W project manager, and Susan Holloran from the Asia Bureau evaluation office attended the review meetings.

The panel had at their disposal all the documents and reports, thus far produced, on the project. These were all reviewed prior to the site visit. The site review consisted of oral reports regarding the progress in the Philippines and Indonesia and discussions with project personnel. Dr. Gil Levine, Agricultural Engineer, Dr. Walt Coward, Rural Sociologist, and Dr. Milton Barnett, Rural Sociologist all presented material to the panel and were involved in the discussions.

#### 15. EXTERNAL FACTORS

The project has very good relations with USAIDs and host country organizations. A strongly cooperative style of operation exists in both Indonesia and the Philippines. This is, in part, due to the working knowledges of the countries by Cornell project staff, as well as, their personal acquaintances with host country officials.

The establishment of cooperative agreements among the contractor, the USAIDS, and the host institutions took much longer than anticipated. This, in effect, has caused the project to be behind schedule simply because the field work did not start on schedule.

#### 16. INPUTS

The project design called for 3 senior researchers as principal investigators, with the field work being done by senior graduate students in the country. During the process of the project, two of the principal investigators have taken assignments outside the University. They have, however, not divorced themselves from the project, as one is in the Philippines, and

the other is in Indonesia, and they do devote time to the project.

The review panel noted that the lack of a clear strategy and plan for data collection and analysis could be due to insufficient input from the senior researchers. Certainly, more senior level input will be required to produce the expected products from the project. The graduate students will produce their individual reports; but to synthesize and analyze the vast amount of data with its many interactions, much more technical input will be required than has been the case so far.

#### 17. OUTPUTS

For the same reason of slow start-up, the outputs are not on schedule. The only progress has been achieved in data collection. The data from the case study in the Philippines has been collected; however, the Indonesia data collection needs at least another year.

The review indicated that all outputs might be difficult to achieve. There are probably several reasons for this, including site selection, data collected, and research methodology. Perhaps, also the expected output was too ambitious to expect from field data collected on case studies.

At any rate, the contract should now concentrate on the output from the first objective, which is a description and analysis of the complex interactions between the physical, biological, economic, and organizational dimensions of irrigation systems and the relationship of these to system performance.

#### 18. PURPOSE:

The project purpose is "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".

Progress toward the End of Project Status (EOPS) follows:

- a. The set of propositions regarding irrigation system interrelationships in the form of reports is not far along. One draft descriptive report on one Philippine system has been prepared. The data are complete for the Philippine work. Therefore, accelerated progress is expected.
- b. The research design procedure has been developed because it is in use in two countries. However, the procedure has not been documented and written up.
- c. The training workshops have been completed.
- d. The guidelines for reviewing planned or existing systems and the issue discussions and policy alternatives dealing with water resources vs. agricultural development, have not been started. These output conditions cannot be completed until all field data are complete.

These EOPS conditions still represent a reasonable description of what will exist at the end of the project if the project is allowed to complete the scope of work. The program is approximately 18 months behind schedule, primarily, due to the exceptionally long period of time required to initiate the programs in the field.

#### 19. GOAL/SUBGOAL

The project goal is "to improve the water use efficiency in irrigated agriculture and, thereby, increase production per unit of water".

The project is contributing to this goal, and when finished, should have contributed much more. In both the Philippines and in Indonesia, the project personal and information collected have been used by the USAIDs to improve existing development projects. The work in Indonesia will provide precisely the type of information needed for the government to improve its very large small scale irrigation development program.

Achievement of the goal will require much site specific work with every irrigation system. However, the present problem is that not enough is known about how to attack problems of inefficient use of water. Developed country solutions are usually costly in capital and energy. The output of this project will give the development community a reasonable description of how several rice irrigation systems operate and how they might be improved. Certainly, it is expected that most of the conclusions will be generalizable, at least to other rice production systems.

#### 20. BENEFICIARIES

As indicated above, the governments of Philippine and Indonesia have been direct beneficiaries of the project. They will continue to be as the data are analyzed and conclusions drawn. In the final analysis, much will be learned about equity of water use, and assuming project output is incorporated into ongoing programs, equitable distribution and use of water will become closer to reality. Overall irrigation efficiency increases expected, also creates the possibilities for increased production per unit of water, reduction in environmental and health hazards caused by excess use of water, and for expansion of a given quantity of water to serve more people.

The likelihood that the results of this project will be used in LDCs is very high. The project has already influenced programs in two countries. Its influence will be expressed through other development projects. The knowledge gained will facilitate improved design of improvement programs to reduce waste within irrigation systems.

#### 21. UNPLANNED EFFECTS

There have been no special efforts which would require changing project design other than the problem of getting started in the LDC. The delay in commencing field work has created a situation where an approximate 18 month extension is needed to complete the scope of work outlined for the 3-year

project. This probably should have been anticipated since in-country formal agreements and arrangements to carry out the work had not been developed prior to project initiation. In other words, not enough time was allowed for this very important initial stage of the project.

## 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 LDC. This project was approved in October 1976; it was contracted for in Sept. 1977; data collection began at one site in July 1978 and at the second site in July 1979.

Most of this delay is not abnormal. It was not because someone neglected his role. It merely results from the fact that where more than one institution and more than one country is involved in a project, one should expect a great deal of time to be spent in getting the program implemented. This creates problems within the AID project process, especially since AID projects are always alleged to be short term in project documents.

## 23. SPECIAL COMMENTS OR REMARKS

Attachments:

Project Evaluation Report - 16 pp.

Project Review  
April 9 - 10, 1980

Cornell University, Ithaca, New York

Project Title: THE DETERMINANTS OF DEVELOPING COUNTRY IRRIGATION PROBLEMS

5. Introduction

From the Cornell research proposal, the project proposes to:

1. describe and analyze critical interactions (of socio-economic factors with the physical aspects of the systems);
2. attempt to identify those interactions that are critical to system success, and to develop analytical tools and procedures for identification and analysis of critical system interaction;
3. identify implications for policy, design and operation.

Specific research objectives were:

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.

Underlying these objectives appeared to be a conclusion that such research could lead to diagnostic procedures (a diagnostic guide?) that would be of value in understanding determinants of irrigation system performance.

As modified by the RAC, field research in two countries during the first three years was to have led to a planned implementation in a third country during the last two years.

### B. Conduct of the Review

The review was carried out by a three member team, consisting of Dr. Donald Plucknett, an agronomist, Chairman; Dr. Douglas Caton, economist; and Dr. Elliott Skinner, anthropologist and member of the RAC.

The team visited the Cornell University campus on April 9-10, 1980, arriving late in the afternoon on April 8. An all-day review session was held with the project principals, Professors Coward, Levine, and Barnett. The project team made their presentations in the morning and a discussion and question session filled the afternoon.

### C. Management of Project Operations

The project depends heavily upon cooperation with a wide array of host country and international institutions. Cornell enjoys excellent links and contacts with the host governments and other agencies through former students and associates, and it appears that they have exploited these fruitfully. In each country they have used the concept of a workshop to plan the program. In the Philippines IRRI, the National Irrigation Authority, SEARCA, and the Philippines Council for Agriculture and Resources Research are all cooperators. SEARCA acts as the local agent for the project, and is paid a management fee of ten percent for handling local logistical support, thus relieving USAID/Manila of that chore.

The project was signed on September 28, 1977. A memorandum of understanding among AFD, the Philippine Government and Cornell was signed in May 1978 and the field researcher began work in August, 1978. The work in Indonesia commenced in June, 1979 with the arrival of the field researcher. The workshop in Indonesia was held in April, 1979. The project is scheduled to end in September, 1980. However, field work in the Philippines will not be completed until June, 1980 and will not be completed in Indonesia until June, 1981, at least.

The project is behind schedule, mostly due to unforeseen and unavoidable problems. It is probably safe to say that the project needs about 18 months beyond its normal first phase completion date. The project requires a full year's field data in each location; in most circumstances this means that 18 months of work in the area is required to obtain the necessary full year's data. An 18 month extension would mean it would take until March, 1982 to complete the project.

#### D. Personnel and Staffing

Cornell has a strong tradition of teaching, and it integrates the teaching program into research, particularly international research. The field staff is primarily comprised of senior level (PhD) graduate students. This year Professor Small is spending a sabbatical year at IPRI, and he has participated in field studies in the Philippines. Later in 1980, Dr. Walter Coward will assume an 18 month assignment with Ford Foundation in Indonesia, and he expects to participate in some aspects of the research there.

The graduate students all require necessary language skills for the country before going out. All had participated in the course on "Peasants, Water and Development" taught jointly by Professors Levine, Coward and Barnett.

Reasons given by the staff for emphasis on using PhD students for research included: (1) can field three persons instead of one senior staff person, (2) experience gained for the student is unique, and (3) such students make significant contributions later.

#### E. Project Design

Quoting the Cornell research proposal of September 1976, the purpose of the irrigation systems research is to provide information to improve currently used procedures of new irrigation systems, for the rehabilitation of existing ones and, more generally, for system management and operation. Knowledge on the interactions of four categories of data are viewed as essential for this purpose. The "determinant" process, in the research proposal's terms, centers on identifying and quantifying the cause-effect relationships of a mix of variables in each data category with a mix in the other categories, using "case" irrigation systems as the data matrix.

In making its evaluation of project design, the project review team was asked to consider: (1) appropriateness of the research methodology, (2) soundness of data collection and analysis, (3) suitability of sites, and (4) replicability of analysis. The team's views on project design in these categories are as follows:

##### 1. Specifics of the Research Design

- The project design and the research method proposed are described in pages 15-25 of the September, 1976, Cornell University proposal.

The research design appears non-disaggregative because of apparent procedural and methodological interdependence of research objectives 1 and 2, and because of the dependence of objectives 3 and 4 on both of these objectives.

- The hypothesis underlying the research objectives is that specific variables within each of the components making up the irrigation system environment are critical for satisfactory system performance. Testing of this hypothesis is to be achieved through explicit consideration of the interactions of critical socio-economic factors with biophysical factors.

- In the Philippines, data are being collected relative to three different irrigation systems (a community irrigation system, a large government operated system, and a combination government/community run system). In Indonesia, two irrigation systems on three different sites are being studied. The study sites were selected in consultation with host country and USAID personnel. Site studies were initiated in August 1978 in the Philippines, and June 1979 in Indonesia. The analytical strategy in use is to examine the field data for each site independently. As analysis is completed on the data from individual field sites, cross-site comparisons will be undertaken.

- The anticipated time span for the total set of activities was scheduled for five years in the project proposal to permit time for integration of the individual sites and country studies into the proposed comparative framework. Completion of two country studies was anticipated within the initial three-year time frame. Each country study has four completion points: (1) site selective and study initiative, (2) completion of field data collection, (3) analysis and reporting, and (4) information dissemination.

- On analysis, the project proposal indicates that the researchers will "test" hypotheses on critical interactions by a variety of statistical tools, including parametric and non-parametric techniques. It is believed that it will be necessary to develop non-conventional analysis methods and procedures for the identification of the critical socio-physical system interactions. The anticipation is that scaler rankings of importance will be an outcome.

- In the Philippines, the project manager is Mark Svendsen (Agricultural Engineering) assisted by Ed Lopez, a local hire. They are assisted by Leslie Small, Project Economist, on leave with the Rice Research Institute. Svendsen and Lopez prepared an "interim" descriptive report on one of their study sites in November 1979 entitled: "The Talaksan Pump Irrigation Project." The project manager in Indonesia is John Duwel (Rural Sociology) assisted by Ramschaud Oad (Agricultural Engineering). The project leaders, Drs. Coward, Barnett and Levine, oversee the Country by field visits. The completion of the data gathering phase in the Philippines is scheduled for May 1980 and in Indonesia the scheduled data collection completion date is June 1981. Data analysis for the Philippines data will begin this summer, although part of the data will be analyzed in Mr. Svendsen's dissertation. Drs. Levine, Coward and Barnett will direct the overall data analysis process.

## 2. Observations on the Research Design

In an evaluation of a project, the first question always is whether the project objectives are consistent with the project's purposes. The second, and equally important question is whether the research design is consistent with the objectives. Of over-riding importance is the value or relevancy of the project's purposes comparative to available options. That

the project is set up to identify (and to quantify) the determinants of developing country irrigation problems would seem to require that the research design must systematically encompass the system dimensions of the farming operation, and a number of other factors. These could include: the range and nature of the interactions between the socio-economic and the biophysical environments, estimates of magnitudes and direction flows of decision and input-output functionals and the upper-lower bounds of constraint factors.

- Since it is impossible to meet the agricultural requirements of heavily populated areas without irrigation, this project addresses a very important question. Over time, to insure against famine, reasonably successful irrigation systems have evolved. However, the project contends that even better systems can emerge by studying the social and economic aspects of existing systems, and measuring the impact of the variables on decisions about a systems operation. The project proposal, in this regard, contends that the "mark of social scientists on irrigation institutions and organization has either been incidental to more local sociological concerns or has largely ignored the significant nonsocial components of the systems." This statement does not appear to reflect awareness of the full range of economic evaluation and social structure documentation of available LDC irrigation system studies, e.g., Colorado State University's work in Pakistan, for example.

- A complete definition of a socio-economic methodology tied to a decision model and analysis as guidance on data gathering and its analysis does not, as yet, appear as an integral of the research design. Also, answers were not clear as to what extent constraint analysis has been built into farm irrigation system components of the project to what extent

it should be built in; to what extent constraints external to the project, such as national policy, will be considered; and to what extent available knowledge and proven methods of analysis applicable to the project data gathering and analysis processes have been assessed. That is, the review materials provided and oral explanations during the review were not explicit on these points.

- The research is concerned with two basic phenomena: a finite land and water agricultural production system, and the parameters and dimensions of an interaction sphere of influence on this system composed of socio-economic variables. This interaction sphere also contains the real worth of farmer decisions. A further expectation is that the production system is either in static state, or transition (stage) state. Either state may be in economic or socio-economic equilibrium or disequilibrium. These states are influenced by "sets" of economic and technical variables, and reflect social and political structuring as they impinge upon and condition the decision process. The internalized relationships of the decision realm are non-linear, e.g., they are mutually interdependent.

- A concern of the research is irrigation efficiency, presumably technical-economic; however, the underlying objective function of the research must necessarily be net farm income as indexed by land and labor use intensity. In this decision set, the irrigation-farm production system, to be a system and not a collection of sub-systems, must be homogenous as to make-up and decision process, e.g., not contain competitive elements, else the system will not yield a finite solution as the system is caused to serve competing ends.

- System defects are conditions, as are the absolute values of all variables and constants. Efficiency indications are derivatives of the functionals, whether components (sub-sets) or elements (factors) of components. It follows that the determinants of irrigation project problems are the limiting factor variables or constraints, taken in order of magnitude. These establish the functional maximums. Minimums are set by the most limiting conditions or variables. Thus, use of mini-max concepts are, necessarily, elements of the research design. Within this range, systems operate only at the level of capacity of the most limiting factor(s).

For the most part, the technical (and to a somewhat lesser extent the biological) aspects of irrigated farming systems can be readily measured. No clear-cut indicators or measurement methodologies exist for social data. Yet, deep rooted traditions with regard to land usage can have as much, or more, influence on agricultural productivity as land ownership or the economics of land and labor. Studies made on the effects of social influence (custom) and achievement valuing provide sufficient evidence to suggest that "tradition" may be as responsible for the striking differences encountered among developing societies in the actual utilization of land and labor for agricultural purposes as any other determinant. It is presumed that this is the sort of cause-effect phenomena which was in mind when the research proposal stated that "explicit consideration (would be given) the interactions of critical socioeconomic factors with the physical and biological factors." One presumes the research proposal had in mind:

(1) that the manner of approach or methodological definition of research procedure provides the opportunity for explicit consideration of concerns,

(2) that what is critical depends upon the objective function of the research (e.g., what is being measured), and

(3) that the interaction is not with the biophysical directly, but rather that both the biophysical and the socioeconomic spheres of influence act upon the decision realm of the decision-maker.

- Therefore, an assumption of the research could well and reasonably have been that social structure, institutions and/or custom have the primary, if not the single motivating influence, upon farm organization, size of holding, pattern of practices, investment and the extent of labor participation in agriculture. The research hypothesis would thus be that mere substitution of "new" for the old does not necessarily induce radical change in the quality or quantity of production or increase the efficiency of irrigation or cultivation, e.g., habit patterns are difficult things to change. Thus, anyone dealing with traditional mind sets and attempting to affect change is required to simultaneously deal with the risk and uncertainty elements of decision-making.

- Consequently, the expectation of the social side of this research would be that it will systematically ascertain farmers' perception of irrigation and the reasons and preferences with regard to land use and allocation of labor as well as on-farm management irrigation water. Unfortunately, no reading on this type of conceptualization of the development setting or of decision-making was obtained from the materials provided or from the review discussion.

- Hence, nothing can be said at this review point on exactly how the conversion of the socio-economic and/or biophysical data being assembled will identify the determinates of irrigation decision-use problems, other than that the analysis and conclusion of the research will

primarily be based upon case study data - three cases in the Philippines and five cases in Indonesia. However, the "cases" will probably not provide variance data on the same irrigation systems, trend data, or difference (comparative) data of other systems or socio-economic structures, all of which seem important. Moreover, the data gathering does not seem to have been formulated so as to perceptively or readily explain behavior or decision patterns or at least this seems the case; nor does it seem that the input-output relationships being observed are of sufficient uniformity or stability (certainty) to offer reliable prediction possibilities for other systems.

F. Progress

- The project is six to nine months or more behind schedule, and results of field research are not yet complete nor analyzed. For that reason, the statements listed below may not be entirely fair to the research team and to the project. Nonetheless, the review team wishes to make the following observations:

- o With respect to the foregoing, review of the RAC minutes on the projects's approval indicates a shared concern. The RAC questioned the reality of whether the research results can be applied as a function of political difficulties. The RAC specifically evidenced concern with the lack of a quantifiable model; a concern, as evidenced above, which remains. The RAC was also concerned about the research methodology and the need for more social science emphasis. Again, the review team also has this concern because a research methodology is not explicitly in evidence, because of the importance of

the social science variables, and because of the heavy field research dependence upon graduate students.

- o The Review Team rated progress and excellence on the four project objectives on a scale of 0-10 (0 = poor and 10 = excellent).
  1. Analyze and explain interactions - less than 5
  2. Development of Analytical Tools - indeterminate
  3. Explicit Consideration of Socio-economic Factors - less than 5
  4. Planning Policy Implications - indeterminate
- o The project is difficult to understand and to analyze. The written materials presented were not helpful, and the methods are obscure and shadowy. Apparently there is no written or established protocol for the field data collection. Matters such as what measurements are made, when and how often were not clear. Also, criteria for site selection were not clear. This would appear to be a serious weakness, especially since the field staff is made up of graduate students. Isolation of key variables (determinants) is the major objective of this research program, yet the lack of specificity in research methodology appears to weaken opportunity to isolate such variables.
- o The analytical aspects of the project cause concern. Apparently there was no pre-conceived plan of analysis. A catalog of analyses to be undertaken would have been helpful.

- o The research approach in Indonesia appears to differ distinctively from that used in the Philippines; this may make interpretation difficult.
- o The outputs of the project are not clear at present. Some possible outputs appear to be (1) planning knowledge, (2) design knowledge, (3) a diagnostic guide (?), (4) support to field missions, (5) training (especially in Indonesia, and (6) guidance materials for international agencies such as IBRD.

#### G. Conclusions

1. The project apparently has very good relations with USAIDs and host country organizations. Project personnel in the field have gained necessary language competence. A strongly cooperative style of operation exists in both Indonesia and the Philippines.

2. A disturbing aspect of the Philippine situation is that all the three systems under study have become part of a larger irrigation system. Therefore, it is questionable whether the data can be disaggregated so that conclusions can be provided for each of the irrigation systems. Secondly, the systems have expanded in scale, that is to say, it will be difficult to determine how the decisions made concerning each of the systems could be identified, given the overall control by the government. Thirdly, the question of location specificity is of concern. This assurance may invalidate cross-cultural comparisons. A possibility is to use simulation techniques to get at some of the variables. On this point, the researchers concluded that "there is no presumption that we can get at all the factors, but that diagnostic features can be identified." This is a retreat from the germs of the project, and what was agreed upon.

3. Between country comparisons are also questionable. While in Indonesia the research is looking at the same three types of groups as in the Philippines to the end of generating comparable data, but here again location specificity is a problem. In contrast to the relative homogeneity of the Philippine population, the Indonesian population is ethnically more complex and stratified. Another problem here may be the absence of data generated from fixed schedules owing to the sensitivity of locals to be formally interviewed. The issue of expansion in scale might also be troublesome since many of the farmers are also involved in the production of foodstuffs other than rice, and are engaged in non-farm occupations. Apparently the growth of markets has influenced the occupational profile, and this undoubtedly will have an effect on the socio-economic factors involved in decision making with respect to the irrigation system. Dr. Barnett is convinced that he knows what the rules are and that deviations from the rules or norms would provide valuable insights.

There are a number of issues which must be dealt with if this project is to be of policy-making value to USAID (and to other developers) and contribute to a better understanding of irrigation systems in general:

(1) There is a need for a paper specifying the major hypotheses concerning total ecosystems in which irrigation is one of the subsystems. For example, is there a relationship between the variable of size, and the other variables? Under what circumstances does one variable (i.e. environmental, biota, or socio-economic) become the independent one, and the others the dependent ones? (Non-linearity of the relationships).

(2) An attempt must be made to generate a diagnostic guide that would be helpful to people looking at irrigation systems. For example, must they collect data on flow of water, time of flow of water, crops grown, single or multi-cropping, fertilizer use, patterns of authority (whether formal or informal), ritual and rational factors, etc.

(3) Although the generation of data for simulation models might be difficult at this time, are there patterns in irrigation systems which the human brain (that yet unbeatable computer) has identified as "hunches" that could be useful? These should be provided if possible.

(4) There should be some attempt to demonstrate what methodology was used and with what success. What did the fieldworkers do, and how did they do it?

(5) There should be some attempt at providing policy-guidelines which, when used with the necessary caveats, could be a step in the right direction.

#### H. Recommendations

Given the fact that the project is behind schedule, for good and unavoidable reasons, and that field data must be gathered if the project is to achieve even part of its objectives, the Review Team recommends an 18 month extension. To assure Agency receipt of what are very important and critically informative findings which it needs on socio-economic and biophysical factor interactions as they bear on decision making, and to assure maximum validity and program planning usefulness of the findings the Review Team recommends extending the project under the following conditions:

1. that the research be confined to fulfilling the data and analysis requirement of objective 1 of the research proposal;  
and
2. that a methodology be explicitly laid out which will identify the universe represented, the data being and to be assembled, the analysis procedure and techniques to be used, and the kinds of analytical products to be produced, together with the predictive and generalizable properties of the anticipated products.

The Review Team does not recommend continuation of the project to its full term, in particular the extension to a third country.