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**A Preliminary Reconnaissance Survey
Of the Bangladesh
System of Higher Education in Agriculture
and
Agricultural Manpower Situation**

by

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Evaluation

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EXECUTIVE SUMMARY

The objective of the three week assignment (14 Sept.- 4 Oct.1983) was to conduct a preliminary reconnaissance survey to assist the USAID/Dhaka Mission in: 1) developing the Scope of Work for a major study of Bangladesh's present stock and projected demand through 1995 for agriculturally trained manpower; and 2) developing a preliminary strategy for an in-depth assessment of the present Bangladesh system of agricultural education in relation to its capacity for meeting projected demand, both qualitatively and quantitatively, and determining priority needs for assistance in agricultural education required to enable the Bangladesh system to satisfy the greatest possible proportion of that demand. This objective was modified somewhat at the request of USAID to concentrate on identification of major policy constraints and assessment of potential receptivity to reformulation of educational policy, with only secondary consideration being given to the projected agricultural manpower study.

Information was obtained through interviews with officers of relevant GOB (Government of Bangladesh) institutions and ministries, administrators and staff of Bangladesh Agricultural University (BAU) and other institutions offering university level training in agriculture, representatives of other donor agencies, and USAID staff; examination of reports and official documents; and limited inspection of available physical facilities. The Scope of Work for an assessment of the Bangladesh agricultural higher education system, developed in collaboration with the BAU Vice Chancellor, was later expanded to include determination of human resource requirements of agencies employing agricultural graduates and postgraduates.

The present Bangladesh agricultural higher education system is comprised of BAU and two smaller institutions that provide training leading to baccalaureate and/or higher degrees in agriculture, with the latter two linked academically to BAU. A fourth institution for undergraduate and postgraduate degree training is expected to admit its first students during the current academic year, and establishment of agricultural faculties are currently being considered in two other Bangladesh universities. The system is well established, and has a good base of physical and human resources already in place. There is need for improvement in academic, research and extension programs of the system, particularly in the qualitative sense, and there is need for a definitive assessment of present and future demand for agricultural graduates and postgraduates to provide a rational basis for future planning and development of the system.

Potential receptivity, both within and outside the academic community, to assessment and action required to strengthen the system appears to be generally favorable. There is general agreement that improvement is needed in the quality of training provided, and that increased emphasis must be placed on producing larger numbers of well trained advanced degree holders. The creation of the Bangladesh College of Agricultural Sciences (BCAS) provides both a valuable additional resource for imparting advanced degree training and an opportunity for significant strengthening of the system as a whole. Both BAU and BCAS have expressed the desire for assistance in developing their postgraduate programs. Both research and extension institutions of the GOB state that BAU graduates need more practical field oriented training, a criticism that BAU staff agree is justified; they are committed to improving their program in this regard if resources can be obtained for this purpose. BAU appears to have a core of staff desirous of more active involvement in research and extension. It must be recognized, however, that significant and lasting improvement in the quality of training provided by the system is a long range process.

Any comments concerning the extent or depth of commitment of administrators and staff to work toward and support changes in policies and programs of the system must be considered as highly tentative. However, there would appear to be at least a latent commitment to active support of such changes provided administrators and staff could have reasonable assurance that some positive action may result from their efforts.

A number of policy issues, the majority of which appear reasonably amenable to resolution or alleviation, can be identified that would impact in varying degrees upon a major program to strengthen the Bangladesh system of higher education for agriculture. Among these, some of the more critical would appear to be:

1. Determination of present and future job opportunities in the various agricultural disciplines.
2. Clarification of the most appropriate roles of institutions of higher learning in areas other than teaching.
3. Development and further strengthening of appropriate linkages and interrelationships between the agricultural education system and institutions engaged in research, extension and other development programs.
4. Resolution, needed at an early date, of the status of BAU.
5. Determination of the relationship between BAU and BCAS.

6. Strengthening of the BAU resource base to support more substantive research and extension activities, field oriented training for students, and development and maintenance of an adequate library.
7. Development of mechanisms to provide relevant technical materials to students.
8. Frequent closures of BAU and other universities result in extending the elapsed time required to complete a degree program. Not considered to be an overriding obstacle to marked improvement in the performance of the system with respect to quality of training provided.
9. Determination of the extent to which BAU adheres to regulations concerning student admission, student performance, staff selection procedures, academic calendar, etc.
10. Determination of need for and commitment to action over time to: improve coordination and management of advanced study programs and research; and to modify curricula and departmental or faculty alignments to meet the qualitative, quantitative, and specialization requirements of the job market as they evolve in the future.

It is tentatively concluded that: 1) although the Bangladesh agricultural higher education system is well established, it needs to be strengthened in terms of quality, relevance and sensitivity to the needs of the country; 2) any major program for strengthening higher education in agriculture should be oriented toward the system as a whole rather than to a specific institution or component thereof; 3) although any program of assistance to the system will obviously contain an element of risk, a good base of human and physical resources is already in place, the need for improvement is widely recognized, potential benefit to the people of Bangladesh would be great, and the investment required to effect major improvement should be modest.

It is recommended that:

1. USAID make a firm commitment to long term (minimum of ten years) support for strengthening and further development of the Bangladesh system of higher education for agriculture;
2. USAID assistance focus on strengthening the system as a whole;
3. Assistance provided by USAID be channeled through

some GOB entity that is concerned equally with all system functions--teaching, research, extension, training;

4. As the first step toward implementing Recommendation No. 1, USAID provide support for an in-depth assessment of policy issues, resource base, present areas of strength and weakness, and assistance needed to meet the quantitative and qualitative needs of the country for trained people to serve its agriculture and rural people;
5. The results of the above assessment be utilized in the design of a phased ten year or longer program of assistance to agricultural higher education in Bangladesh.

Abbreviations and Definitions

- Academic calendar - schedule of academic activities during an academic year, such as starting and ending dates for each term and dates of scheduled examinations.
- Advanced degree holders - persons holding a Masters or PhD degree.
- AETI - Agricultural Extension Training Institute.
- Agriculture - broadly defined to include crop and animal sciences, agricultural economics and rural social sciences, agricultural engineering and technology, fisheries, forestry, agro-industry and agro-support, rural development, and related fields.
- AID - Agency for International Development of the Government of the United States.
- Baccalaureate degree - Bachelor's (BSc) degree.
- BAI - Bangladesh Agricultural Institute.
- BARC - Bangladesh Agricultural Research Council.
- BARI - Bangladesh Agricultural Research Institute.
- BAU - Bangladesh Agricultural University.
- BCAS - Bangladesh College of Agricultural Sciences.
- BRII - Bangladesh Rice Research Institute.
- BSc - Bachelor of Science degree.
- CERDI - Central Extension Resources Development Institute.
- DANIDA - Danish International Development Agency.
- DEM - Directorate of Extension and Management, Ministry of Agriculture.
- GOB - Government of Bangladesh.

- GTI - Graduate Training Institute, BAU.
- Higher education - University-level education leading toward baccalaureate or advanced degree.
- ILO - International Labour Office, United Nations.
- MOA - Ministry of Agriculture.
- MOE - Ministry of Education.
- MS, MSc - Master of Science degree.
- PhD - Doctor of Philosophy degree.
- UGC - University Grants Commission.
- UNESCO - United Nations Educational, Scientific and Cultural Organization.
- UNICEF - United Nations Children's Fund.
- USAID - United States Agency for International Development.

**A PRELIMINARY RECONNAISSANCE SURVEY OF THE BANGLADESH
SYSTEM OF HIGHER EDUCATION IN AGRICULTURE AND
AGRICULTURAL MANPOWER SITUATION**

I. Scope of Work

The objective of the current assignment, as stated in Contract No. ASB-0249-C-00-3076-00 under which the services have been performed, was to conduct a preliminary reconnaissance survey of the Bangladesh agricultural manpower situation and system for higher education in agriculture for the purposes of assisting the USAID/Dhaka Mission in: (1) developing the Scope of Work for a major study of Bangladesh's present stock and projected demand through 1995 for agriculturally trained manpower; and (2) developing a preliminary strategy for an in-depth assessment of the present Bangladesh system of agricultural education in relation to its capacity for meeting projected demand, both qualitatively and quantitatively, and determining priority needs for assistance in agricultural education required to enable the Bangladesh system to satisfy the greatest possible proportion of that demand.

The Contract Scope of Work specified the following:

1. Familiarization with Bangladesh agriculture and its institutional structure (education, training, research, extension, etc.) for servicing its agriculture through (a) review of relevant documents (to be provided by USAID), (b) interaction with USAID and Bangladesh officials, (c) visits to the field, and (d) interviews with selected public and private agro-industry organizations.
2. Development of a detailed Scope of Work for an agricultural manpower study to determine current supply and projected demand (including both quantitative and qualitative factors) at BSc and advanced degree levels.
3. Development of a preliminary strategy for assessing the present Bangladesh agricultural education system and determining the magnitude and nature of priority needs for assistance to satisfy the projected manpower demand.

The contract specified that the Contractor's technician should, prior to departing Dhaka, prepare and submit a report to USAID which fulfilled the requirements of Items 2 and 3 above.

Upon his arrival in Dhaka, the Consultant was informed that USAID had modified the terms of reference for the assignment, and that the Consultant was to "focus largely on a preliminary strategy for assessing the effectiveness of Bangladesh's agricultural education system and related policy constraints." (Quoted from J. T. Hale letter of 7 September 1983 to people with whom appointments had been arranged for the Consultant.)

This modification in focus was clarified at a briefing with the Mission Director and staff on 14 September. The Director indicated that, although the Mission is in agreement with the need to strengthen agricultural higher education in Bangladesh, there is concern about the present feasibility of such an assistance program. He therefore requested that the Consultant concentrate on identification of major policy constraints and assessment of the potential receptivity of BAU (Bangladesh Agricultural University) and the GOB (Government of Bangladesh) to reformulation of educational policy. It was indicated that work related to the projected agricultural manpower study should receive secondary consideration.

The Consultant agreed to the requested change with the proviso that the short duration of the assignment would limit the possibility for assessing the extent to which policy constraints identified may be amenable to satisfactory resolution or to which, if not alleviated, they may impact negatively upon any future project for assistance to higher education in agriculture.

The assignment was carried out in accordance with the modified terms of reference just described.

II. Methodology

The methodology generally followed that projected in Item 1 of the Scope of Work except that it was not possible to interview selected agro-industry representatives. The BAU Vice Chancellor apparently had little advance notice of the schedule arranged for the Consultant, the University was closed for the Eid holidays during the entire period of the Consultant's visit to Mymensingh, and only the Deans and a very few faculty members were available for interviewing, factors which hampered the assessment of that institution. The names and affiliations of all persons contacted during the course of the assignment are included in Appendix A.

The following types of information and judgments were sought from those interviewed:

1. How closely actual performance at BAU and other institutions offering BSc and advanced degree training in agriculture conform to procedures and policies

stated in the BAU prospectus and other official documents with respect to:

- Standards of academic performance
- Academic calendars
- Teaching staff--numbers, qualifications, workloads
- Emphasis on practical/applied training
- Research programs, including graduate student research
- Linkages and collaboration with the national agricultural research system and specific research institutions
- Linkages and collaboration with extension training institutes and extension agencies and programs

2. The perceptions of BAU and of major employers of BAU graduates with respect to:

- Adequacy of numbers of graduates and postgraduates turned out annually in relation to job opportunities
- Overall quality of academic degree training provided by BAU and other degree-granting institutions
- Relevance of degree training provided by BAU in relation to job requirements (including balance between theory and application)
- Relevance and adequacy of specialized training given by BAU--short courses, workshops, pre-service training, etc.--for staff of research, training, extension, and other development-oriented institutions.

3. (If present system of agricultural higher education or its performance is perceived to be less than satisfactory) The basic underlying causes of present deficiencies in agricultural higher education.
4. The level at which action would be required to remove the identified basic causes of present deficiencies.
5. The extent to which there is agreement among BAU, BARC (Bangladesh Agricultural Research Council), DEM (Directorate of Extension and Management), and other relevant agencies as to the nature and causes of present deficiencies.
6. Evidence of support and, if so, how strong, to change educational policies, academic programs, resource allocations, etc., as needed to strengthen agricultural higher education to make it more relevant to Bangladesh's needs; and where such support is to be found? BAU? BARC? DEM? MOA? MOE? UGC? Others?

7. The present "climate" for effecting significant and lasting improvement in agricultural higher education in Bangladesh.

The Scope of Work for a study to assess the existing agricultural higher education system and determine possible needs for external assistance (attached as Appendix B) was developed in collaboration with the BAU Vice Chancellor, based on interviews and meetings with Deans of the Faculties, other available faculty members at BAU, and other contacts listed in Appendix A.

A preliminary Scope of Work for the agricultural manpower study was developed prior to the Consultant's arrival in Bangladesh, with assistance from a survey statistician authorized in the contract. Ultimately, this study was integrated into the overall system assessment described above and attached as Appendix B.

All information, analyses, conclusions, and recommendations included herein must be considered as tentative due to the limitations of time available for cross-checking data sources and re-interviewing key officials.

III. General Situation in Agricultural Higher Education

The present Bangladesh agricultural higher education system is comprised of three institutions that provide training leading to baccalaureate and/or higher degrees in agriculture. These institutions are linked academically in that BAU dictates the curricula to be followed by all, administers all examinations, and awards all degrees. A fourth institution (BCAS) is now being established, and is expected to admit its first students for the current academic year. Academic links between BAU and BCAS have not yet been finally determined.

A. Bangladesh Agricultural University (BAU)

East Pakistan Agricultural University, now known as Bangladesh Agricultural University or BAU, admitted its first students for the 1961-1962 academic year. From its founding through 1981, BAU had awarded a total of 4,383 Bachelors, 1,262 Masters and 4 PhD degrees. Approximately half of the Bachelors and Masters degrees have been awarded by the Faculty of Agriculture with the rest being distributed among the other five faculties, namely, Veterinary Science, Animal Husbandry, Agricultural Economics & Rural Sociology, Agricultural Engineering & Technology, and Fisheries.

At present, BAU comes under the purview of the Chancellor's

Secretariat housed in the Ministry of Education. Its development budget and approximately 95 percent of its recurrent cost budget are received through the University Grants Commission (UGC). The remainder of the recurrent cost budget comes from student fees, etc. Funds received for research are channeled largely through the Bangladesh Agricultural Research Council (BARC) or the UGC.

The Ordinance establishing BAU charged it with responsibility for teaching, research and dissemination of information related to agriculture and designated the entire country as its area of responsibility. Extension was not cited in the Ordinance as a specific responsibility.

From a brief review of the Ordinance, Statutes and Regulations of BAU, it would appear that policies and procedures for administration, management, student admissions, staff selection, staff workloads, establishment of faculties and departments, development of curricula, academic calendar, and student performance are reasonably good. The extent to which BAU adheres rigorously to such policies and procedures could not be assessed during the Consultant's brief stay at Mymensingh, although some impressions are cited below.

Teaching. BAU operates on a modified British system at present. Student performance is evaluated principally on the basis of the results of an annual examination and three periodic examinations given during the course of the academic year. The examinations are divided between theory and practical, with a weighting system for each subject covered in the examination. An examination committee is responsible for grading examination papers.

There is strong interest among BAU faculty members in converting to a full unit course system. They do not consider this to be feasible at present, however, due to the risk of teachers suffering repercussions at the hands of the students if course grades can be attributed to the teacher as an individual.

University regulations provide a standard for establishing fulltime teaching loads of staff, although it is not possible to adhere to these standards in the present situation. The present number of classes required in the curricula of the various faculties multiplied by the number of sections of each class required to accommodate the present student body results in the necessity to assign excessive teaching loads to staff members. This problem is, of course, exacerbated by the absence of staff on study leave or deputation to other institutions. The consequence is that staff time available for graduate student research supervision, staff research, and extension and related activities is seriously limited.

The student class load also appears to be somewhat excessive in terms of providing students with sufficient free time for library study, specialized field activities, etc. According to information provided by BAU, its class week is divided into 44 periods of which students are typically in class for more than 40.

From a cursory examination of the curricula of several faculties and a number of course syllabi, it would appear that present course offerings should provide a well rounded training balanced between specialization in the major field and supporting courses in other disciplines. Under the present system, however, it is apparently not possible for students in different faculties to take courses together. Therefore, a staff member in one faculty may be required to teach basic courses in his discipline in each of several other faculties. This obviously adds to the teaching load of the staff member.

Criticism was frequently encountered among the employers of BAU graduates that their training is too strongly oriented toward theory, and that they receive little applied or practical training. BAU faculty members interviewed are in agreement that this criticism is at least partially justified. Opportunity for students to gain exposure to the field is very limited due to lack of resources to permit field trips--a deficiency keenly felt by BAU staff. On the other hand, those interviewed stated that students do perform laboratory exercises themselves (in contrast to only observing demonstrations by the teacher as frequently occurs in some countries), and that students do "get their hands dirty" in the field on BAU farms. This issue merits an in-depth assessment prior to reaching conclusions as to its present seriousness or appropriate measures that should be taken to resolve the problem.

Teaching methodology is apparently also a source of frequent criticism. The most common comments in this regard were that teachers use examples from other countries rather than from Bangladesh in their lectures, and that the examination system is such that students need only to review previous examinations and memorize facts in order to score well on the examinations. Regarding the first, BAU faculty agree that the criticism was fully justified in the early years of the University, but contend that most teachers now include relevant examples from Bangladesh and the Region. Regarding the second, the impression was gained that more emphasis on problem solving and applications of theory should be included in the teaching program and on examinations. All agreed that the lack of adequate textbooks and high quality class notes, particularly in Bengali, is a serious constraint to improvement in teaching methodology and quality. They also cited the lack of teaching aids, audiovisual equipment and similar materials as a serious problem.

All of the above questions--faculty and student overload, curricula, quality of teaching and training--are interrelated. Failure to take this into consideration could well result in an action or series of actions to alleviate problems or improve quality in one area that would worsen the situation in another.

The curriculum change process is long and involved, as is the case in most universities. It was reported, however, that significant curriculum changes have been made as BAU has developed, and that such curriculum evolution as needs are identified is expected to continue. BAU staff are sensitive to criticisms such as those noted above. They feel that they sorely need more specific feedback from the employers of their graduates that spells out the nature of training that would meet their requirements, and the mix of disciplines desired. Only on this basis can BAU adjust its curricula and course syllabi to most nearly meet the needs of the employing institutions and the country now and in the future.

BAU regulations permit a first year student to repeat a failed examination twice. In the event of a failure, the student must repeat the course. If a passing mark is not achieved after the second repeat, the student is automatically dropped from the rolls of the University. Subsequent year students are permitted to repeat an examination three times before being dropped.

Only in the Faculty of Veterinary Science was it possible to obtain estimates of the percentage of students who complete their degrees in the minimum required time. The Dean of that Faculty estimated that 60-70 percent of their students complete in the minimum four academic years, that about an additional 15 percent require one additional year, and the remainder take longer. These estimates appear to be consistent with a very rough calculation from enrollment figures cited in the 1982-83 BAU Prospectus compared to approximate admissions which would indicate that around 20-25 percent of the students are in the "longer than four years" category. There was no opportunity, unfortunately, to verify either of these estimates through checking academic records. If reasonably accurate, however, this rate should not be considered to be excessive.

Classes at BAU and other Bangladesh universities are disrupted seriously by student strikes, boycotts, etc., that result in frequent closures of the institution. This is regarded as a serious problem, but one that BAU is helpless to alleviate. The Vice Chancellor and Deans are unanimous in stating that such disruptions have a demoralizing effect on both faculty members and students (they state that such closures are fomented by only a small percentage of the students, but that the rest go along). Two consequences of this situation are that teachers are forced to accelerate their lectures and practicals in order to complete the courses, and the academic year is extended.

It was reported that the actual time required to complete a scheduled academic year is typically 15-18 months, although teaching is theoretically completed in nine months. (Classes started in July of this year for the 1982-83 academic year.)

Library. One Dean described the present status of the BAU library as "chaotic". The University was closed at the time of the Consultant's visit to Mymensingh, so there was no opportunity for first hand inspection. There seems to be general consensus, however, that the library is highly inadequate in terms of both books and journals--deficiencies in recently published volumes and current journal subscriptions appear to be serious chronic problems.

Research. According to an unconfirmed figure, the present annual research budget at BAU from all sources is of the order of magnitude of about five percent that of the recurrent cost budget or about 30 lakh takas. Most research funds appear to be channeled through either BARC or the UGC. The preponderance of BAU research is graduate student thesis research. Among the constraints to staff research are the heavy teaching and graduate supervision loads, and lack of sufficient funding.

The Coordinator of the BAU Committee for Advanced Studies and Research and the Deans of the Faculties agree that the BAU research program falls far short of the innovative, relevant, ongoing research program that should typify an agricultural university and that is needed to support high quality undergraduate and postgraduate teaching and outreach (extension-type) programs. This is in spite of the fact that laboratories appear to be reasonably well equipped and that there are farms totalling about 700 acres available on campus for research and teaching purposes.

The most serious constraints to expanding both the volume and scope of research were cited as being lack of funds and present overloads on staff time. The consensus of observers having had opportunity to observe BAU over a period of time appears to be that a sufficient number of BAU faculty members, particularly younger staff, are strongly interested in developing research programs to constitute a substantive human resource base upon which the BAU research program could be expanded and strengthened in relevance and quality, provided that these constraints can be alleviated.

The BAU system for coordination and general management of research projects needs major strengthening. At present, one senior faculty member teaches in the Faculty of Agriculture and, as Coordinator of the Committee for Advanced Studies and Research, performs the functions of Graduate Dean and Director of Research. This is an impossible load, and is so recognized by the staff. Action by the Academic Council is expected in the near future

on a proposal to create two new fulltime positions to meet these needs. If finally approved and implemented, BAU would then have a mechanism for systematic review and submission of research proposals to potential funding sources, and for managing research support received by the University.

Non-degree training. The Graduate Training Institute (GTI) of the Department of Agricultural Extension & Teachers' Training in the Faculty of Agriculture is the principal BAU unit for provision of short term training. According to its report, "Syllabi of Different Training Courses," the GTI has offered some 16 courses of varying duration to extension and other development agency staff, including induction training last year for newly appointed personnel of DEM in the Ministry of Agriculture. The GTI calls upon staff from the various faculties to serve as instructors for such courses. A limited amount of such training, including farmers' training, is carried out through other channels such as the Agri-varsity Extension Project in the same department.

With BAU closed and the GTI Director and staff not available, it was not possible to assess the effectiveness of GTI training programs or the extent to which they respond to needs of the various research, extension and other development agencies. Nevertheless, the existence of this unit provides a framework within which non-degree training could become a strong and viable function of the University. It should be developed into the continuing education arm of BAU.

Extension. The principal BAU extension-type activity is the Agri-varsity Extension Project referred to above, which is functioning in some 18 villages of Kotwali Thana of Mymensingh District. This project has the two-fold objective of helping in the overall development of villages, and making the Agri-varsity teaching, research and training system more field oriented. As field staff, the Project utilizes DEM block supervisors, and provides four home development workers and four extension survey people from the project. The project director calls upon staff of the various faculties for technical expertise and assistance. The project has undertaken several research and evaluation studies that, if properly conducted, should provide information useful to both BAU staff and the DEM. As in the case of the GTI, there was no opportunity to observe this project in action.

A number of other projects supported by funds from various sources would appear to be extension oriented, and offer additional evidence of BAU interest in becoming more deeply involved in an appropriate way in extension. Also, a draft memorandum of understanding between BAU and DEM is under consideration that would give BAU responsibility for administering all extension work in Mymensingh District, utilizing DEM staff in the field and BAU staff as subject matter specialists (described more

fully in a later section).

Physical facilities. In comparison to the physical plant and other facilities available in universities in other developing countries, those at BAU are quite good. According to the Vice Chancellor, however, the facilities were designed to accommodate an annual intake of 350 students whereas the actual intake has exceeded 700 in some years and now stands at about 500.

The few laboratories and classrooms inspected by the Consultant appeared to be reasonably adequate and well equipped. The labs in Veterinary Science and Soil Science were orderly and equipment appeared to be well maintained. The research and soil testing laboratories showed evidence of current use. Although some urgently needed equipment items and spare parts were identified by the Deans, the basic facilities already exist. Supplies, particularly those that must be imported, were reported to be a serious problem. In Veterinary Science, the need for a van set up as a mobile diagnostic laboratory was cited as an urgent need to make it possible to take students to the field to examine animals--at present they gain very little experience in disease diagnosis. All BAU staff interviewed stressed the need for teaching and audiovisual aids. Another frequently mentioned need was a facility for reproducing class notes, research reports, etc. (some type of university press).

The preliminary conclusion is that lack of physical facilities is not the primary constraint to general strengthening of BAU academic, research and extension programs.

Resource base. In the absence of opportunity to review budgets and resource allocations, only a few general observations are possible. Major constraints appear to be in funds to: provide field experience to students; provide sufficient faculty positions to allow staff time for research and extension involvements; and support a comprehensive ongoing research program.

BAU has received significant external assistance from its inception. USAID assisted in the early development of the institution through a long term contract with Texas A&M University, and has continued support at a more modest level, including research grants channeled through BARC. The World Bank has also provided extensive assistance, primarily for construction of the physical plant. A partial list of other donors from which smaller increments of assistance have or are being received for research and extension projects, fellowships, travel awards, equipment, supplies, etc., includes the International Atomic Energy Commission, UNICEF, DANIDA, A/D/C, ILO, UNDP, UNESCO, and Humboldt Foundation. The Ford Foundation is presently considering support for the Bureau of Socio-Economic Research and Training, to water management, and for fellowships for women students. Preliminary discussions have been held with the Technical University of Berlin for a

small exchange/training assistance program. In all, BAU is still receiving significant support for specific projects.

B. Bangladesh Agricultural Institute (BAI)

The Bangladesh Agricultural Institute in Dhaka was founded in 1938. BAI was affiliated with Dhaka University until 1965-66 when it shifted to BAU. At present, BAU controls the BAI curriculum (the same as the BAU Faculty of Agriculture curriculum), administers examinations, and awards the degrees to BAI graduates.

The Bangladesh Agricultural Research Institute (BARI) has administrative and financial control over BAI, and controls staff appointments. (At present, most senior BAI staff hold Masters degrees, some junior staff hold only Bachelors, and there are no PhDs.)

The BAI principal stated that they experience a rather high percentage of dropouts during the first year, primarily due to acceptance of students into other faculties such as medicine or engineering. The dropout rate after the first year is negligible.

Facilities and resource base were reported to be reasonably adequate. The library has a collection of about 6,000 books and perhaps ten journals with current subscriptions, but the collection contains little in the Bengali language.

C. Bangladesh College of Agricultural Sciences (BCAS)

The Bangladesh College of Agricultural Sciences is a new institution that expects to admit its first students in December of this year or January 1984. Although originally planned to be primarily an institution for postgraduate studies, and the plan is still to work toward that objective, BCAS will start with undergraduate training.

The BCAS physical plant has been provided through Japanese assistance. Dormitory capacity is approximately 300 students, including accomodation for 75 girls. The laboratories, classrooms, and offices are modern and well-equipped, and ancillary facilities appear good. The space allocated for the library appears small for an institution that aspires to become a center of excellence for advanced degree training, however, and the present library collection is virtually nil. There are no recreational facilities at present, and staff housing was reported to be inadequate.

It is anticipated that some equipment and technical assistance will continue to be received through Japanese aid. However,

the present BCAS principal and staff expressed the opinion that additional technical assistance will be required to help develop their graduate program, and that they would like to establish a linkage with some U.S. university.

In the Project Evaluation Proforma for Establishment of BCAS, it was anticipated that "initially for the first few years, the college will be affiliated with Agricultural University at Mymensingh but will eventually ask for an independent status as University in the pattern of Indian Agricultural Research Institute (IARI)." This is apparently still an unresolved issue. It was reported that there is now some pressure to opt for independent degrees from the outset, although others feel that initially BCAS will apply for status as a Faculty of BAU, and use the BAU Agriculture curriculum. (This is not far different than opinions expressed at BAU that BCAS should become a branch campus of BAU.)

There appears to be general agreement that BCAS should ultimately become exclusively a center for advanced degree training. This would appear to have considerable logic due to the strategic location of its campus in close proximity to the major research institutions, BARI and BRRI, and its position between Dhaka and Mymensingh. CERDI (Central Extension Resources Development Institute) is also located nearby.

D. Potuakhali Krishi College

It was not possible to visit this campus, and only fragmentary information about the institution and its programs could be obtained.

Potuakhali was established only recently, and apparently does not come under the purview of either the Ministry of Education or Agriculture. It is governed by a board comprised largely of representatives of agencies that provide financial support for its operation. It is affiliated with BAU in the same manner as BAI. The future of this institution is apparently uncertain due to problems in securing sufficient funds for future operation.

E. Plans for additional Faculties of Agriculture

Plans are under consideration by the Gob for the establishment of agricultural faculties in the universities at Rajshahi and Chittagong. If established, they will have linkages with BAU in such forms as exchanging staff to serve as external examiners, representation on Academic Councils, etc. However, BAU would have no academic control as such over these new faculties, and

would not award the degrees to their graduates. A proposal to form an agricultural faculty at Dhaka University has apparently been kept in abeyance.

F. Advanced degree training in agriculture

BAU at Mymensingh is the country's principal institution for advanced degree training in agriculture, having awarded 1,262 Masters and 4 PhD degrees from its inception through 1981, as reported earlier. It was reported that about 100 students had done their Masters programs at BAI; it is assumed, however, that those awarded since BAI's affiliation with BAU would be included in the BAU total. BCAS is expected to concentrate on advanced degree training with a maximum of 100 MS plus PhD candidates admitted annually; but that is still in the future.

There is widespread recognition that Bangladesh cannot continue to send people abroad for training at the same rate as in the past. Pressure is increasing to provide more advanced degree training in-country to ensure that it will be relevant to Bangladesh agriculture and its needs. There also appears to be general agreement about the need to upgrade existing advanced degree programs, particularly the research component. In short, advanced degree programs in agriculture need both qualitative and quantitative strengthening.

G. Capacity of system to turn out baccalaureate degree holders

Based on reported admission figures, the potential annual output of BSc graduates by the present system should be approximately as follows:

BAU	500
BAI	100
BCAS	60
Potuakhali	50
Total	<u>710</u>

The actual number graduating will, of course, depend upon the number admitted by each institution each year, the dropout rate, and the number of students that take longer than four years to complete their BSc degree programs. Thus, a more realistic estimate of graduates that can be expected to complete annually would probably be in the range of plus or minus 500.

H. Graduate employment situation

The current job situation with respect to agricultural graduates is not at all clear. According to the Proforma for the BCAS project evaluation cited earlier, at least 500 graduates are required per year as estimated in the second five year plan. Another source estimated a need for 1000 graduates per year. BAI reported that its graduates are securing employment without difficulty. Yet, BAU has decreased its annual intake from more than 700 to about 500 due to problems encountered by its graduates in securing employment.

A 1981 employment survey of BAU graduates revealed that about 18.5 percent were unemployed at the time of the survey in contrast to just over 8 percent unemployed in 1970. The rate of unemployment was highest in the Faculty of Fisheries (73.7%), followed by 36.7 percent in Animal Husbandry and 23.5 percent in Agricultural Economics. None from Veterinary Science were unemployed at the time of the survey, and only 4.3 and 2.6 percent from Agriculture and Agricultural Engineering, respectively.

Results of the above study would appear to indicate that a major cause of unemployment among BAU graduates is an imbalance in the proportions of students in the various faculties. Other possible factors could conceivably include reluctance of graduates to accept employment in less developed areas or reluctance to seek jobs in the private sector. Regardless of the causes, rational planning and development of the system of agricultural higher education will be possible only if the human resource requirements--both numbers and mix of disciplines--now and in the future can be determined with a reasonable degree of accuracy.

I. Linkages of institutions of higher learning with research

BAU has direct linkages with BARC in that the Vice Chancellor is a member of the Council and the Coordinator of the BAU Committee for Advanced Studies and Research is a member of the BARC executive council (according to President's Order No. 32 of 1973 relating to BARC). Through a sabbatical system recently established under the USAID-supported Agricultural Research Project, it is possible for BAU staff members to spend a period of time working in a research institute. Support for approved research projects at BAU is being provided through BARC. BAU participates in some national research projects such as the BARC-sponsored cropping systems project. Thus, the basic elements for strong and viable linkages between BAU and the national research system already exist to at least a degree.

Although it is not unanimous, there seems to be a general

feeling at BAU that they would like to participate more fully in the national research system, including a higher degree of collaboration with research institutes (BAU presently has a memorandum of understanding with BIRRI for collaboration and exchange but, according to the Vice Chancellor, it is not active at present). BAU staff generally gave the impression that they would welcome more research support from BARC, but feel that relations between BAU and BARC should be limited to matters related specifically to research.

The question of linkages between research and the other existing agricultural degree institutions does not arise to a significant degree as they are primarily teaching institutions. It is expected that the linkages between BCAS and research will be quite direct with BARI exercising administrative and budgetary control over this new institution.

J. Linkages of institutions of higher learning with extension

Several of the linkages with BAU have already been cited. If the draft memorandum of understanding between BAU and DEM should be approved and implemented, the University would assume direct responsibility for development, administration, and backstopping support of all extension programs in all or a large part of Mymensingh District, with staff and resources of DEM allocated for that district coming under the purview of BAU. The present BAU Agri-University Extension project represents a first step in that direction.

Other opportunities for developing viable linkages can also be envisioned. For example, the DEM Director of Training expressed interest in a program of staff exchange between extension subject matter specialists and BAU staff. CERDI and the BAU GTI have much in common and could complement and reinforce each other's programs through close collaboration and sharing of resources. The Agricultural Extension Training Institutes (AETIs) which provide pre-service training to local extension workers could benefit from collaboration with BAU and, in return, BAU would gain the benefit of closer contact with the field.

A system of internships for final year students at BAU has been proposed as a vehicle for providing its students with the practical experience they now lack. This proposal has not been implemented due to lack of resources. Its implementation would benefit both extension and research institutions through providing graduates better equipped to meet their particular requirements.

There appears to be support in both BAU and DEM for developing more productive linkages and relationships.

IV. Situational Analysis

The description of the Bangladesh agricultural higher education system presented in the foregoing section provides the basis for consideration of the "climate" for and commitment to system improvement, discussion of certain policy issues, and arriving at some tentative conclusions.

A. "Climate" and commitment

The present "climate" or receptivity for taking significant steps to strengthen the system for higher education in agriculture appears to be reasonably favorable. Critical factors contributing to this conclusion include:

1. There is widespread recognition that increased emphasis must be placed on producing advanced degree holders in-country.
2. Both employers of agricultural graduates and BAU, the largest source of agricultural graduates, agree that improvement is needed in the quality of training provided, particularly in the area of practical field oriented experience.
3. The creation of BCAS provides a significant new resource for advanced degree training. It is strategically located with respect to two major research institutions and CERDI, and is relatively convenient to Mymensingh. Integration of this institution into the higher education system would have far reaching impact of the effectiveness of the system as a whole.
4. Implementation of the earlier plan to affiliate BCAS with BAU in the early years, or the proposal that BCAS become a Faculty of BAU, would contribute to the development of both institutions. It could also be a unifying force through exchange of staff, collaboration in developing adequate libraries (a serious need for both), and through the increased substantive contact between BAU and the research community and system. It would also be consistent with opinions expressed at BAU that BCAS should become a branch campus for postgraduate training.
5. There is an expressed desire at both BAU and BCAS for assistance in developing their postgraduate programs.

6. DEM has recently been reorganized with new leadership, and new concepts are being considered for extension in the future. Implementation of future programs and approaches will require changes in undergraduate and pre- and in-service training, and substantive inputs from disciplines not well represented in extension at present such as production economists and rural sociologists. Much of this must start in the higher education system.
7. The proposed increase in staff complements at the AETIs, and the possible lengthening of their course to three years, would not only increase the immediate demand for agricultural graduates, but also place greater demands on the extension staff training system. Development of linkages and collaborative effort between CERDI and the BAU GMI would appear to be more viable possibilities as this materializes.
8. Both BAU and DEM are desirous of strengthening their linkages and relationships through various mechanisms including, possibly, staff exchange programs. Such mechanisms would help to overcome the difficulties presently experienced by the educational institutions in providing field experience to their students.
9. BAU has proposed an internship in the field for final year students, but has been unable to implement such a program due to lack of resources. To do so would require support from potential employing institutions. Both research and extension people expressed the opinion that some such arrangement would be both desirable and potentially feasible.
10. According to observers of BAU, many BAU staff members have a strong interest in and desire to conduct substantive research. This group is reported to be of sufficient size to provide a critical mass for development of a viable and relevant BAU research program.

Any comments concerning the extent or depth of commitment of administrators and staff to work toward and support changes in policies and programs of the system must be considered as highly tentative. Based on very fragmentary evidence, there would appear to be at least a latent commitment to active support of such changes provided institutional administrators and staff could have reasonable assurance that some positive action may result from their efforts. A somewhat disturbing complacency was sensed in some, and an attitude of hopelessness in others. Nevertheless, it is tentatively believed that the core of presently and potentially committed people is large enough to develop the leadership necessary for any comprehensive assessment of

needs and constraints, and for exerting pressure for significant changes for which need may be revealed by such an assessment.

Although the climate appears favorable, it must be recognized that significant and lasting improvement in the agricultural higher education system and its relationships with research, extension, other development programs, and the agro-industry and support sector requires time. Attempts to move and change too rapidly would almost inevitably result in disruptions in the system that could well set back rather than contribute to progress in this regard. Furthermore, there are some basic policy issues that must be resolved if major improvement in the system is to be achieved.

B. Policy issues

A number of policy issues can be identified that would impact in varying degrees upon any major program to strengthen the Bangladesh system of higher education in agriculture. Included among such issues are:

1. Planning, development and conduct of programs of the institutions granting agricultural degrees are presently done largely on an ad hoc basis without clear knowledge as to the extent and nature of employment opportunities or the types of graduates and advanced degree holders needed by potential employers.

Future planning and development of higher education institutions and their programs should be based on realistic estimates of: 1) present and future job opportunities for graduates and advanced degree holders in the various disciplines of agriculture; and 2) the content and nature of training required to meet the needs of potential employers.

Positive action to alleviate this issue is feasible, and should receive high priority.

2. The most appropriate roles of institutions of higher learning in areas other than teaching have not been clearly established, and are often perceived quite differently by the various agricultural institutions.

Roles of the higher education institutions in research, extension, training, rural development, policy development, and national planning should be clearly defined and accepted by the educational institutions, user institutions and Government.

Resolution of this high priority issue would require joint and concerted action by the elements identified above.

3. A number of linkages and interrelationships between the institutions of higher learning in agriculture and institutions engaged in research, extension, development, etc., already exist on paper, and some are partially functional. At present, however, such linkages are far from adequate, due in part to the lack of common understanding of the roles of the educational institution (see Issue 2 above).

Appropriate linkages and interrelationships should be identified and developed between the educational system and institutions engaged in research, extension, development, etc., that will enable all to fulfill their respective roles most effectively.

Resolution of this issue will also require joint and concerted action by all institutions involved. It will require time, and steps should be taken to avoid premature actions; but it is of high priority, and should be undertaken immediately.

4. The present uncertainty regarding the status of BAU (remain as at present or be transferred to the Ministry of Agriculture) will hamper effective action related to Issues 2 and 3 above, so long as it is allowed to continue.

The issue should be resolved promptly. It is possible that prompt implementation of whichever decision is made may be of greater importance than the actual decision.

5. The unresolved issue as to the relationship of the new BCAS to BAU inevitably leads to rumours and tensions. Its appropriate resolution will have an impact upon the development of higher education in agriculture for years to come.

It is urgent that the place of BCAS in the agricultural higher education system be established soon, in a manner that ensures the effective integration of this new institution into the total system.

6. Resources currently allocated to BAU appear to be inadequate: to provide the number of staff required; to mount significant research and extension programs; to permit needed field training for students; to upgrade and develop the library.

High priority should be given to alleviation of this situation through a variety of mechanisms such as joint participation of BAU with research and extension institutions in appropriate programs, as well as through seeking additional appropriations.

This is a difficult issue not readily amenable to solution, taking into consideration the limited resources available in the country. Nevertheless, it should receive continued attention and the resource base should be broadened as rapidly as possible.

7. At present, all students in agricultural degree programs suffer from lack of textbooks and relevant reference materials, particularly works available in Bengali.

This issue could be alleviated significantly through providing some suitable incentive to competent teachers and scientists for developing comprehensive class notes and similar teaching and reference materials, and providing the system with the means for reproducing such materials in quantity at low cost.

8. Frequent closures of BAU and BAI due to student strikes, boycotts, etc., have a demoralizing influence on both students and staff, and result in extending the elapsed time required to complete a degree program (it is reported that at least five years are presently required to complete the four year baccalaureate degree program).

Although serious, this issue is not readily amenable to solution, certainly not internally within a university. It is considered feasible to make major progress in developing and strengthening the agricultural higher education system even with this constraint, however, and the need is of such great importance that appropriate action should not be held up pending alleviation of the closure situation.

9. Although the statutes and regulations governing the University appear to be reasonably good, it is reported that they are not always rigorously followed. If this should be the case, it becomes an issue that merits attention and possible action.

This question should be closely examined. If relaxation of regulations that impact significantly on programs of the institution is identified, necessary action should be taken to tighten up the system. Discretion should be used in this regard, however, as a reasonable degree of flexibility is essential for dealing with existing and new circumstances and situations.

10. The present situation for coordination of research and advanced study programs at BAU is inadequate. A recent study of employment of BAU graduates would appear to indicate an imbalance among numbers of students pursuing the various fields of specialization. There appear to be possibilities for more efficient use of resources through some reorganization of the various curricula and, perhaps, some realignment among faculties and departments. Taken together, these factors have implications regarding the structure and organization of the University and its academic program.

The currently experienced inadequacy of research and advanced study program coordination and management could be quickly alleviated through appointment of a qualified fulltime staff member to handle each of these functions. The other issues are much less clearcut and require in-depth assessment prior to any action.

Major realignments in curricula, departments, or faculties is a long term process of evolution that must proceed deliberately with involvement of all staff and administrators if it is to be successful and non-disruptive.

C. Conclusions

Conclusions reached during the short term of this consultancy must be considered as tentative, based on inadequate information and interaction. Within these limitations, it is concluded that:

1. The Bangladesh system of higher education for agriculture is well established and has made significant progress since its establishment;
2. The need now exists to strengthen the system to improve the quality of higher education in agriculture, and to make it more relevant and sensitive to the needs of the country;
3. Any major program for strengthening higher education in agriculture should be oriented toward strengthening of the entire system, rather than being focused on individual institutions or components within the system;
4. Planning and implementation of a successful program for significantly strengthening the agricultural higher education system as indicated in Conclusion 2 will require strong leadership, willingness to innovate,

and commitment to action; and, will involve an element of risk (as does virtually every worthwhile program). However, a good base of human and physical resources is already in place, the need for improvement is widely recognized, potential benefit to the people of Bangladesh would be great, and the investment required to effect major improvement should be modest.

V. Recommendations

It is recommended that:

1. USAID make a firm commitment to long term (10 years at the minimum) support of the strengthening and further development of the Bangladesh agricultural higher education system;
2. USAID assistance focus on strengthening the system as a whole;
3. Assistance provided by USAID be channeled through some GOB entity that is concerned equally with all system functions--teaching, research, extension, training;
4. As the first step toward implementing Rec. no. 1, USAID provide support for an in-depth assessment of policy issues, resource base, present areas of strength and weakness, and assistance needed to enable the system to meet the quantitative and qualitative needs of the country for trained people to serve its agriculture and rural people (one part of the assessment should focus on the system and its linkages and relationships with institutions engaged in research, extension, and other development programs and with the agro-industry and support sector; the other part, carried out concurrently, should focus on human resource requirements in terms of job opportunities, the nature of training required, and relative demand for people trained in the various disciplines of and related to agriculture. A draft Scope of Work for the entire study is attached as Appendix B);
5. The results of the above assessment be utilized in the design of a phased ten year or longer program of assistance to agricultural higher education in Bangladesh.

APPENDIX A

Persons Contacted During Assignment

APPENDIX A

Persons Contacted During Assignment

USAID

J. Norris, Director
W. Joslin, Deputy Director
S. French, Food & Agriculture Officer
J. Hale, Food & Agriculture
B. Wennergren, Food & Agriculture
W. Boehm, Program Officer
H. Plunkett, Program Office
Md. L. Rahman, Food & Agriculture
H. Murray-Rust, Food & Agriculture
R. Montgomery, Food & Agriculture

Ministry of Agriculture

A. M. Anisuzzaman, Secretary

Bangladesh Agricultural Research Council

Kazi M. Badrudozza, Director-General
M. A. Mannan, Member Director, Soils & Irrigation
Ekramul Ahsan, Member Director, Econ. & Social Sciences
Kamal Uddin Ahmed, Member Director, Crops & Forestry
Abdur Rahim, Member Director, Nutrition
Q. M. Emdadul Haque, S.S.O., Animal Husbandry

Directorate of Extension & Management (MOA)

S. A. Mahmud, Director General
A. K. M. Mansur, Director, Training
M. P. Singh, FAO Team Leader, Agricultural Training
Project II (World Bank-funded)

World Bank

John Hall, Agriculture
John Bowlin, Education

Agricultural Development Council (A/D/C)

Gerard Gill, Associate

International Agricultural Development Service (IADS)

David Daugherty, Chief of Party, Agric. Research Project
(?) Green, Agricultural Economist
(?) Kaul, Crop Scientist
(?) Gisselquist, Water Management Specialist

Banladesh Agricultural University (BAU)

A. K. M. Aminul Haque, Vice Chancellor
M. Ashraf Ali, Dean, Faculty of Agric. Econ. & Rural
Sociology, and Chm. Bureau of Socio-economic
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Md. Abul Hasnath, Dean, Faculty of Animal Husbandry
Md. Z. H. Bhuiya, Dean, Faculty of Agriculture
Manik Lal Dewan, Dean, Faculty of Veterinary Science
Shah M. Farouk, Dean, Faculty of Agric. Engineering
and Technology
M. Aminul Islam, Dean, Faculty of Fisheries
M. Ashraf Ali Khan, Coordinator, Committee for Advanced
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M. R. Biswas, Professor, Dept. of Irrigation & Water
Management
A. M. A. Karim, Director, Agri-varsity Extension Project
S. M. Bulbul, Assoc. Professor of Poultry
Afizuddin Miah, Head, Dept. of Anatomy & Histology
M. Ismail Hossain, Assoc. Professor of Anatomy & Histology
Abdur Razzaque, Asst. Prof. of Bengali, and ex-Public
Relations Officer
M. Shamsul Huq, Assoc. Prof. of Soil Science
(Name not obtained), MSc student in soil microbiology

Colorado State/Cornell Water Management Team

Ramchand Oad, Team Leader, Irrigation Engineer, CSU
Duane Johnson, Agronomist, CSU
Michael Walter, Agricultural Engineer, Cornell
Florence McCarthy, Sociologist, Cornell

Technical University of Berlin

Knud Caesar, Professor of Crop Science

Banladesh College of Agricultural Sciences

Amjad Hussain, Principal
Abbul Hamid, Assoc. Professor, Agronomy
Mohammad Ali, Asst. Professor, Crop Botany
Mohammad A. Quadir, Asst. Professor, Horticulture

Central Extension Resources Development Institute (CERDI)

Md. Mokarram Hossain, Asst. Director (Administration)
Nanda Lal Das, Training Officer

Agricultural Extension Training Institute (Tejgaon)

Shafiuddin Bhuiya, Principal
M. Mahbubur Rahman, Instructor, Agronomy I
Mobin Uddin Ahmed, Instructor, Coop. & Agric. Marketing
Mrs. Mahfuza Khatun, Instructor, Horticulture
Miss Ruba Nazneen, Instructor, Agronomy II
Alauddin Ahmed, Instructor, Agric. Extension
Mrs. Jinat Jahan, Instructor, Plant Protection
A. K. M. Lut Ful Kapor, Instructor, Farm Machinery
Md. Fazle Sobhan Faruque, Instr. An. Hus. & Fisheries

Danish International Development Agency (DANIDA)

Daniel Pedersen
Peter Jul Larsen

Bangladesh Agricultural Institute (BAI)

Mosharraf Hossain, Principal
A. K. M. Shamsuddin, Professor, Crop Botany

University Grants Commission (UGC)

Muhammad Abdul Bari, Chairman
Kazi Abdul Latif, Member

Ford Foundation

Anthony Bottrall

APPENDIX B

S C O P E O F W O R K

for

Assessment of Bangladesh system for higher education in agriculture and its needs for assistance; its relationship with and relevance to existing agricultural research, training, and extension institutions; and the degree to which the system can satisfy present and projected human resource requirements of such institutions

APPENDIX B

SCOPE OF WORK

for

Assessment of Bangladesh system for higher education in agriculture and its needs for assistance; its relationship with and relevance to existing agricultural research, training, and extension institutions; and the degree to which the system can satisfy present and projected human resource requirements of such institutions

I. Background and Justification

Agricultural production dominates the Bangladesh Gross Domestic Product (GDP), still accounting for nearly half in 1982, although the percentage has declined as the rest of the economy has grown more rapidly. Also, agriculture is the most important employer of labor in the country's economy, with more than three fourths of the total labor force engaged in this sector; and more than 85 percent of the population live in rural areas.

Rice is by far the most important crop in Bangladesh. Other principal crops include jute, potatoes, oilseeds, sugarcane, and pulses; and wheat is of increasing importance. The potential for development of water resources is high. Within this general structure, there is significant potential for increasing the production of the principal crops and, although perhaps on a more limited scale, of various specialty crops and livestock enterprises particularly well adapted to adoption by the smallest farmers. The performance of agriculture since 1973 has been relatively good by historical standards, but is still inadequate to meet the demand generated by burgeoning population growth and modest increases in real per capita GDP.

Although there is considerable variation among geographic districts, and the average farm size is reported to be about 3.5 acres, a relatively high proportion of rural families own little or no land. Of the estimated 8.5 million rural households, it is reported that about 15 percent own no land at all, and about 35 percent own only their homesteads and 0.5 acres or less of cultivable land.

The effective output of research, extension and other development programs to help Bangladesh farmers increase their agricultural production must be accelerated even to maintain the present

level of production in relation to demand. Furthermore, the combination of small farm size and high proportion of rural families with little or no land has serious implications for the planning and development of research, extension and other development programs and, consequently, for the types and content of higher education in agricultural fields required to serve the needs of agriculture and the rural people.

The agricultural scientists, extensionists, planners, administrators, and managers required to meet the twin challenges identified above through generation, testing, and dissemination of the necessary improved technology and provision of essential agro-support services must be produced by the country's agricultural education system. Therefore, the development and continuing improvement of a system that provides high quality relevant education, and that has the capacity to produce trained manpower in the quantities and areas of specialization required must be awarded high priority in the country's overall development planning and allocation of resources.

Bangladesh Agricultural University (BAU), then known as the East Pakistan Agricultural University, admitted its first students in 1961-62. From its founding through 1981, BAU had awarded a total of 4,383 Bachelors, 1,262 Masters and 4 PhD degrees. The Faculty of Agriculture accounted for approximately half of both the Bachelors and Masters degrees with the rest distributed among the other five Faculties, namely, Veterinary Science, Animal Husbandry, Agricultural Economics & Rural Sociology, Agricultural Engineering & Technology, and Fisheries.

Two other institutions in the country presently offer degree level training in agriculture--Bangladesh Agricultural Institute at Tejgaon (Dhaka) and Potuakhali Krishi College at Dumki (Potuakhali). Both are affiliated with BAU in the sense that they must follow the BAU curriculum, and that BAU administers the examinations and awards the degrees to their students. Administratively, Bangladesh Agricultural Institute comes under the purview of BARI. Potuakhali is governed by a board representing several Bangladesh institutions from which it receives funding. A third degree-granting institution, the Bangladesh College of Agricultural Sciences at Joydebpur (Salna), is presently being established, and expects to admit its first students for the coming academic year.

BAU has received significant external assistance from its inception. USAID assisted in the early development of the institution through a long term contract with Texas A&M University, and has continued support at a more modest level, including research grants channeled through BARC. The World Bank has also provided extensive assistance, primarily for construction (an auditorium and gymnasium presently under construction are also being funded through the Bank). A partial list of other donor agencies from which smaller scale

assistance of various types has or is being received would include the International Atomic Energy Commission, UNICEF, DANIDA, A/D/C, ILO, UNDP, UNESCO, and Humboldt Foundation.

Qualitative aspects of undergraduate and postgraduate training imparted by the agricultural degree-granting institutions and their affiliates need to be upgraded. Areas of critical need for strengthening the system include: staff development (both advanced degree training and professional improvement), library development, research and extension program development, development of printing and reprographic capabilities, and equipment for teaching and research. Also, some important policy issues need to be resolved to permit the orderly and successful strengthening of the system as a whole.

Present and anticipated human resource requirements and demands of institutions and organizations employing agricultural graduates and advanced degree holders have not been well identified in terms of total numbers, mix of disciplines, or training content. Such information is urgently needed for rational planning and development of university programs and facilities.

II. Purpose

The purpose of the proposed study will be to:

- A. Assess the current and potential capability of the Bangladesh higher education system for agriculture to respond to the country's current and projected needs for trained agricultural personnel, including the system's relevance to and relations with agricultural research, training and extension institutions and programs (see Abbreviations and Definitions section for definitions of "higher education" and "agriculture");
- B. Identify and quantify types of assistance that will be required and policy constraints that must be alleviated to enable the agricultural higher education system to provide relevant high quality education and training to produce and reinforce the higher level agricultural manpower needed for research, training, extension and other development institutions, and the agro-based industries and support sector;
- C. Assess the numbers and areas of specialization of agricultural graduates and advanced degree holders needed to match job opportunities in employing institutions at present and in the foreseeable future.

III. Description of the Study

An interdisciplinary team of experts, described in Sections IV and V, will be made available in Bangladesh by USAID to collaborate with a counterpart Bangladesh team designated by the GOB to accomplish the following:

- A. Assess the adequacy and relevance of the present agricultural higher education system in relation to:
 1. Educational policies and their impact on possibilities for strengthening the system;
 2. Organizational and functional structure;
 3. System of terms and examinations (as contrasted to unit course system);
 4. Administration and management (including the BAU farms);
 5. Admission policies, requirements and procedures;
 6. Faculty and staff;
 7. Undergraduate and postgraduate curricula;
 8. Degree requirements and degrees granted;
 9. Student evaluation (grading) system;
 10. Teaching methodology & relevance to Bangladesh agriculture;
 11. Course syllabi in relation to the country's current as well as anticipated needs;
 12. Library collection, organization, management, operation, and acquisition process;
 13. Research program: relevance, quality, quantity, funding procedures, coordination, reporting;
 14. Non-degree training programs;
 15. Extension/outreach programs;
 16. Physical facilities, equipment, teaching aids and materials;
 17. Resource base;
 18. Number of graduates and advanced degree holders produced in relation to current and projected demand, by field;

19. Linkages and relationships with research, training, extension and other development institutions, and with agro-based industries and support sector.

- B. Identify and prioritize policy constraints that must be removed or significantly alleviated to permit substantive progress in strengthening the agricultural higher education system. Such constraints to include, but not be restricted to:
1. Employment policies in the agricultural sector, including realistic projections of the kinds and quantities of agricultural graduates required by the various agencies;
 2. Development of appropriate and viable relationships between the educational institutions and research, extension, development and agro-industry and support institutions and agencies.
- C. Assess the potential capacity of the existing agricultural higher education system to expand (if necessary) and further develop to meet Bangladesh's higher level agricultural manpower needs, provided the constraints identified under Item B above can be alleviated.
- D. Assess the human resource situation in the agricultural sector of Bangladesh to determine the present supply and projected effective demand for agricultural graduates and advanced degree holders in relation to:
1. Total magnitude of demand, broken down by type of employing institution, level of attainment (BS, MS, PhD), and area of specialization;
 2. Content and quality of training provided at present in relation to institutional needs, and recommended changes to meet future needs.
- E. Identify, justify, and quantify the types of external assistance required to strengthen the agricultural higher education system in areas for which need is revealed in the assessment of the present system. Such assistance to be organized into the following categories:

Staff development
Technical assistance
Library development
Commodities (teaching aids, equipment, etc.)
Physical facilities
Other

- F. Identify, justify, and quantify additional GOB inputs required to permit external assistance to be utilized effectively.
- G. Identify areas appropriate for development by the educational institutions as centers of excellence for education and research, and as a lead center for extension activities.
- H. Develop an implementation schedule for actions and inputs required to strengthen the Bangladesh agricultural higher education system (including both GOB and external assistance actions and inputs).

The study team will work in two groups. The larger group, headquartered at Mymensingh, will be responsible for assessment of the system of agricultural higher education, policy issues, assistance needs, and recommendations related thereto. It will give most intensive attention to BAU, the largest and most comprehensive institution of higher learning in agriculture in the country, but will devote sufficient attention to the other institutions to fulfill the requirements of the scope of work as stated above. The smaller group, consisting of a manpower specialist and survey statistician headquartered in Dhaka, will be primarily responsible for Item III.D as described above. Both types of activities will proceed concurrently under the overall coordination of the U.S. team leader and his Bangladesh counterpart.

Both groups will develop detailed work plans and reporting formats upon arrival in Bangladesh in consultation with their Bangladesh counterparts and USAID. The human resource requirements group will, in general, follow the guidelines for questionnaire development and data organization shown in Appendices B.1 and B.2.

IV. Resource Requirements

Successful completion of the study described above will require inputs from both the GOB and USAID. The estimated requirements for each are as follows:

A. GOB

1. Team of experts to function as counterparts to USAID team in assessment of higher education system:
 - a. Counterpart team leader--a senior member of the BAU faculty designated by the Vice Chancellor to work fulltime on the study throughout its duration.
 - b. Coordinator of Committee for Advanced Studies and Research (CASR), BAU--parttime as required.

- c. A representative of each Faculty of BAU--parttime as required.
 - d. An extension specialist, BAU--parttime as required.
 - e. One representative of each of the following institutions--parttime as required:
 - Bangladesh Agricultural Institute
 - Potuakhali Krishi College
 - Bangladesh College of Agricultural Sciences
 - Bangladesh Agricultural Research Council
 - Directorate of Extension and Management
 - Ministry of Education
 - Planning Commission
2. Counterpart to manpower specialist in assessment of human resource requirements for agricultural research, extension, training, and other development institutions --fulltime for the duration of the study.
 3. Support staff--fulltime for the duration of the study:
 - a. Typist-clerk
 - b. Staff Assistant (to arrange appointments, secure documents, assemble data, etc.)
 4. Support budget for Bangladesh team members, for travel, subsistence, supplies, etc.

B. USAID

1. Interdisciplinary technical assistance team	
	<u>W. Mos.</u>
a. Agricultural university administration and management specialist (Team Leader)	3.75
b. Agricultural experiment station administrator	1.50
c. Agricultural extension program specialist or extension administrator	1.50
d. Plant scientist	1.25
e. Agricultural economist	1.25
f. Agricultural engineer	1.25
g. Animal scientist	1.00
h. Veterinary scientist	1.00
i. Fisheries scientist	1.00
j. Rural sociologist	1.00
k. Library specialist	0.75
l. Manpower specialist	3.00
m. Survey statistician	2.00
n. Questionnaire format specialist (in U.S.)	0.10
o. Project manager	3.00
	<u>23.35</u>
	TOTAL

2. Support budget for travel, subsistence, local goods and services, report reproduction, communications, etc., with local personnel services as follows:
 - a. Staff assistant (2, for duration of study)
 - b. Secretarial (2, for 90 and 78 w.days, resp.)
 - c. Computer operators/coders (2, for 36 days ea.)
 - d. Interviewers (8, for 36 days ea.)
3. Home office support costs and overhead, assuming USAID will contract with a U.S. institution(s) to provide the required personnel and services.

V. Terms of Reference for Study Team Members

All team members (Bangladesh and U.S.) will be expected to participate as an interdisciplinary team to address the tasks identified in Section III. More specific responsibilities of the team members will be as follows:

A. Bangladesh members

Counterpart team leader

The counterpart team leader will work fulltime with the U.S. team leader in planning and supervising the study, interacting with other team members and with relevant Bangladesh institutions, and preparing the final study report. He will concentrate specifically on policy issues and other matters related to the overall organization, administration, management, and functioning of the agricultural higher education system.

Coordinator, CASR, BAU

The Coordinator CASR will serve as counterpart to the U.S. agricultural experiment station administrator in assessing the research programs of the institutions of higher education in agriculture with respect to their relevance, quality, quantity, funding procedures, coordination, and reporting; in identifying policy constraints impacting upon such research; in determining organizational changes and external assistance needed to strengthen such research programs; and in determining the most appropriate linkages and relationships with the BARC and directly with research institutions.

BAU Faculty representatives

The representative of each Faculty at BAU will work as counterpart to the U.S. team member(s) related to his Faculty in the areas identified in Section III that are applicable to his Faculty. This will include consideration of the

other institutions of higher learning in agriculture as well as BAU.

BAU extension specialist

The BAU extension specialist will serve as counterpart to the U.S. extension specialist in assessing extension with respect to the same factors as those identified above for research, including determination of the most appropriate linkages and relationships with DEM and other institutions and agencies having extension and development activities and programs that impact directly upon rural people.

Representatives of other institutions

Representatives of institutions other than BAU will participate in an initial planning meeting and such periodic meetings of the entire team as deemed to be appropriate during the course of the study; will collaborate in portions of the study relevant to their institutions; will review and comment both orally and in writing on the draft study report; and will participate in de-briefing sessions with USAID and other institutions as appropriate.

Counterpart to manpower specialist

This counterpart will collaborate with the manpower specialist and survey statistician in the planning and conduct of the study, with specific responsibility for making contacts with Bangladesh institutions and organizations to obtain necessary permission to interview and gain access to official documents, and arranging interview schedules.

B. U. S. members

Agricultural university administration and management specialist (team leader)

The team leader will be responsible for coordination in Bangladesh of all team activities; for arranging, in collaboration with his counterpart, team meetings and contacts with all relevant institutions; for keeping USAID and GOB informed of the progress of the study; and for preparation of the final study report. In addition, he will concentrate, in collaboration with his counterpart, on policy issues and other matters related to the overall organization, administration, management, and functioning of the higher education system for agriculture, and on linkages and relationships between that system and research, extension, and other development institutions, and the agro-industry and support sector.

Agricultural experiment station administrator

The agricultural experiment station administrator will have responsibilities as described for the CASR Coordinator who is designated as his counterpart.

Agricultural extension programming specialist/administrator

The agricultural extension specialist will have responsibilities as described for the BAU extension specialist who is designated as his counterpart. He will concentrate most closely on the Department of Agricultural Extension and Teachers Training and the Graduate Training Institute at BAU. He will also examine the total Bangladesh agricultural extension system, particularly DEM, in relation to determining the most appropriate role of the educational institutions with respect to extension, and the most appropriate linkages and relationships to facilitate fulfilling that role.

Plant scientist, agric. economist, agric. engineer, animal scientist, veterinary scientist, fisheries scientist, rural sociologist

Each of the above will be responsible for the areas identified in Section III that are applicable to the Faculty(ies) with which he will be associated. The rural sociologist will also collaborate closely with the extension specialist. All will examine the curricula of the six faculties taken as a whole with respect to possible duplications, weaknesses in supporting courses, and opportunities for combining or modifying courses to best meet the needs of the students in each Faculty. In research, they will focus on the present situation and opportunities for improvement in interdisciplinary research, in addition to considering graduate student and staff research within that Faculty.

Library specialist

The library specialist will assess the library and make recommendations related thereto as indicated in Section III.A.11.

Manpower specialist

The manpower specialist, in collaboration with his counterpart, will be responsible for overall planning, conduct, coordination, and supervision of the human resource requirements portion of the study, for keeping the "systems" portion of the team fully informed of progress and feeding preliminary data to them as it becomes available, and for preparation of the human resource requirement portion of the report.

Survey statistician

The survey statistician will be responsible for design of the instrument used for collection of data, establishing statistical methods to be used for data analysis, determining coding and data transfer procedures, preparing tabular formats for reporting of results, assisting in training local staff to be utilized in the study, and assisting in final interpretation of the data and preparation of the human resource requirement portion of the report.

Questionnaire format specialist

This specialist will assist the manpower specialist and survey statistician, prior to their departure from the U.S., in developing a questionnaire format that is easily amenable to microcomputer analysis and that facilitates summarization and interpretation of results.

Project manager

The project manager will be responsible for identifying and submitting nominations to USAID of qualified candidates for the U.S. team; for handling logistic and other support functions necessary for getting the team to Bangladesh and their support while in Bangladesh; for providing the services specified in the contract within the limitations of resources and time allocated; and for reproduction and delivery of the final study reports as specified in the contract. In addition, he will spend approximately three weeks in Bangladesh at the outset of the study to assist in its planning and organization, and to collaborate with the team and relevant institutions in a preliminary identification of the specific issues and policy matters that should be addressed by the team. He will return to Bangladesh for approximately two weeks at the end of the study to assist in preparation of the study reports and to participate in review and de-briefing sessions.

VI. Reporting Requirements

Each team member will submit a written report of his findings and recommendations to the team leader prior to departure from Bangladesh, in addition to reporting orally to the full Bangladesh/U.S. team, USAID and others as appropriate.

The manpower specialist, in collaboration with his counterpart, will prepare a report of the human resource requirements portion of the study that adequately addresses the issues identified in Item III.D. An advanced draft of that report will be distributed to USAID, all institutions represented on the full team, and such others as the GOB or USAID may designate, not later than two weeks prior to his departure from Bangladesh. Comments and suggestions of the reviewing agencies will be received at appropriate de-briefing session, and the final editing and preparation for reproduction will be completed before the departure of the manpower specialist.

The team leader, in collaboration with his counterpart, will prepare a report of the complete study, of which the human resource requirements report will be a part, that adequately addresses all of the tasks specified in Section III, including detailed recommendations for follow on action. An advanced draft of

that report will be distributed to USAID, all institutions represented on the team, and such others as the GOB or USAID may designate, not later than one week prior to the departure from Bangladesh of the team leader and project manager. Comments and suggestions of the reviewing agencies will be received at appropriate de-briefing sessions. The final study report will be delivered to USAID for distribution not later than one month after completion of the study, in the number of copies specified in the contract.

VII. Implementation Schedule

Activities related to tasks specified in Section III will proceed concurrently, since team member schedules will be staggered as indicated below to minimize the strain on staff and resources of BAU and other institutions collaborating in the study. The general implementation schedule for the "systems" portion of the study will be as follows:

Mos. after team
leader arrival
in Bangladesh

Activity

- | | |
|------|---|
| 0.50 | Completion of detailed work plan and schedule. |
| 1.25 | Submission of written/oral reports of animal, veterinary, and fisheries scientists. |
| 1.75 | Submission of written/oral reports of plant scientist, agric. economist, agric. engineer, and library specialist. |
| 2.25 | Submission of written/oral report of rural sociologist; completion of investigations related to tasks A through F in Section III. |
| 2.50 | Completion of preliminary implementation schedule for follow on project (if such is recommended). |
| 2.75 | Completion and reproduction of complete study report draft. |
| 3.25 | Completion of all team field assignments. |
| 4.25 | Delivery of final study report to USAID in number of copies specified in contract. |

Schedule of U.S. team members in Bangladesh

Assignment	Month 1	Month 2	Month 3	Month 4	Month 5
Project mgr	xxxxxx(---in U.S.-----)xx			xxx(-in U.S.-)	
Team leader	xxxxxxxxx	xxxxxxxxx	xxxxxxxxx	xxx	
Animal sci.	xxxxxxx	xx			
Fisheries	xxxxxxx	xx			
Veterinary	xxxxxxx	xx			
Plant sci.	xxxxx	xxxxxxxx			
Agric. econ.	xxxxx	xxxxxxxx			
Agric. engr.	xxxxx	xxxxxxxx			
Library		xxxxxxxx			
Rural soc.		xxxxx	xxxx		
Expt. Sta.		xxxx	xxxxxxxxxxx		
Extension		xxxx	xxxxxxxxxxx		

Note: U.S. time at end of project for team leader and project manager is primarily for final editing and reproduction of study report.

The implementation schedule of the human resource requirements portion of the study will be approximately as follows:

	Weeks of activity											
	1	2	3	4	5	6	7	8	9	10	11	12
Study design	xxx	xxx										
Compile data	xxx	xxx										
Survey des.		xxx	xxx									
Field prep.		xx	xxx	xxx								
Data coll.				xxx	xxx	xxx	xxx	xxx	xxx			
Data proc.						xxx	xxx	xxx	xxx	xx		
Final output										xx	xxx	xxx

Team members in Bangladesh

Manpower	xxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxx	xxxxxxxxxxxxxxxxx
Statist.	xxxxxxxxxxxxxxxxx		xxxxxxxxxxxxxxxxx

VIII. Illustrative Budget for USAID-funded Inputs

1. Personnel	\$145,000
2. Travel & Transportation	74,000
3. Other Direct Costs	42,000
4. Contingencies (10%)	26,000
5. Indirect Costs	101,000
	<hr/>
TOTAL	\$388,000

Appendix B.1

General Outline of Anticipated Interview Schedule

- A. Identification block
 - 1. Reporting unit name
 - 2. Identification number (from master list)
 - 3. Geographic location
 - 4. Address
 - 5. Respondent name and title, telephone number
- B. Interview status
 - 1. Completion/callback code
 - 2. Interview date, time, duration
 - 3. Name and signature of interviewer
- C. Present supply and projected demand for high level agricultural manpower: statistical data supplied by an informed respondent for his specific organization or administrative unit.
 - 1. Present supply of high level agricultural manpower: the recording of this information for each reporting unit will involve filling out a series of data matrices to account for all types and statuses of employees and to probe the respondent's memory. Since the same format is used for each of the four following variables, the matrix is only presented once below. The variables are:
 - a. Total number of authorized positions, by educational attainment and specialization.
 - b. Number currently reporting for work, by educational attainment and specialization.
 - c. Number on leave of absence or secondment, by educational attainment and specialization.
 - d. Number of vacant positions, by educational requirements and specialization.

Specialization	BS	MS	PhD	TOTAL
Agronomy				
Ag. Economics				
Etc.				
<hr/>				
TOTAL				

Note: Theoretically, matrix b + c + d = a.

2. Present unsatisfied demand for high level agricultural manpower: each reporting unit will identify by educational requirements and specialization any positions for which satisfactory candidates are not available. This matrix does not necessarily repeat 1(d), since a position may be unfilled for various reasons other than unsatisfied demand. (The matrix will appear as in (1) above.)
 3. Projected demand for high level agricultural manpower: Anticipated manpower needs for each reporting unit will be recorded in matrices which detail the educational requisites and agricultural specialization of the human resource requirements. Government organizations and universities often have five-year manpower projections generated for national planning purposes. In other organizations and enterprises the interviewer will assist in making simple projections on the basis of anticipated expansion of sales, services, production, or other output. The recording matrix, similar in appearance to that shown for (1) above, is repeated for each year of the projection period.
- D. "Soft" data or subjective information collected from the respondent on manpower quality, relevance, and other related topics.
1. Quality and relevance of academic preparation
 - a. At each level of education
 - b. Within each specialization
 - c. Particular institutions in Bangladesh
 - d. Education abroad

2. Inter-organizational relationships
 - a. Ministry of Agriculture (internal)
 - b. University and Government
 - c. Public and private sector
3. Labor attrition
 - a. Emigration or "brain drain"
 - b. To private sector
 - c. To non-agricultural sector
4. Salary structures
 - a. Salary differentials by educational attainment
 - b. Salary differentials by public vs private sector
 - c. Salary differentials by local vs. foreign employment
 - d. Career

Appendix B.2

**Illustrative table formats for reporting
human resource requirement assessment results**

4. Projected demand for new MS level agricultural postgraduates, 1984-

Field of specialization	Number/year					TOTAL	Average
	1984	1985	1986	1987	etc.		
<u>New positions</u>							
Agronomy							
Agricultural economics							
etc.							
Subtotal							
<u>Replacements for existing positions</u>							
Agronomy							
Agricultural economics							
etc.							
Subtotal							
<u>To go on study leave</u>							
Agronomy							
Agricultural economics							
etc.							
Subtotal							
<u>TOTAL projected demand</u>							
Agronomy							
Agricultural economics							
etc.							
TOTAL							
<u>To return from study leave</u>							
Agronomy							
Agricultural economics							
etc.							
Subtotal							
<u>NET projected demand</u>							
Agronomy							
Agricultural economics							
etc.							
TOTAL NET							

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5. Projected demand for new PhD level agricultural postgraduates, 1984-1988.

Field of specialization	Number/year					TOTAL	Average
	1984	1985	1986	1987	etc.		
<u>New positions</u>							
Agronomy							
Agricultural economics							
etc.							
Subtotal							
<u>Replacements for existing positions</u>							
Agronomy							
Agricultural economics							
etc.							
Subtotal							
<u>To go on study leave</u>							
Agronomy							
Agricultural economics							
etc.							
Subtotal							
<u>TOTAL projected demand</u>							
Agronomy							
Agricultural economics							
etc.							
TOTAL							
<u>To return from study leave</u>							
Agronomy							
Agricultural economics							
etc.							
Subtotal							
<u>NET projected demand</u>							
Agronomy							
Agricultural economics							
etc.							
TOTAL NET							

6. Projected supply of new BS level agricultural graduates, 1984-1988.

Source	Number/year					TOTAL	Average
	1984	1985	1986	1987	etc.		
Bangladesh Agric. University							
etc.							
etc.							
Foreign universities							
TOTAL							

7. Projected supply of new MS level agricultural graduates, 1984-1988.

Source	Number/year					TOTAL	Average
	1984	1985	1986	1987	etc.		
Bangladesh Agric. University							
etc.							
etc.							
Foreign universities							
TOTAL							

8. Projected supply of new PhD level agricultural graduates, 1984-1988.

Source	Number/year					TOTAL	Average
	1984	1985	1986	1987	etc.		
Bangladesh Agric. University							
etc.							
etc.							
Foreign universities							
TOTAL							

9. Present supply vs. present demand for high level agriculturally trained manpower in Bangladesh, 1984.

Highest degree	Specialization	Present supply	Present demand	DIFFERENCE
BS	General agriculture			
MS	Agronomy Agricultural economics etc.			
PhD	Agronomy Agricultural economics etc.			
TOTAL				

10. Projected supply vs. projected demand for high level agriculturally trained manpower in Bangladesh, 1985.

Highest degree	Specialization	Projected supply	Projected demand	DIFFERENCE
BS	General agriculture			
MS	Agronomy Agricultural economics etc.			
PhD	Agronomy Agricultural economics etc.			
TOTAL				

11. Projected supply vs. projected demand for high level agriculturally trained manpower in Bangladesh, 1986.

Highest degree	Specialization	Projected supply	Projected demand	DIFFERENCE
BS	General agriculture			
MS	Agronomy Agricultural economics etc.			
PhD	Agronomy Agricultural economics etc.			
TOTAL				

12. Projected supply vs. projected demand for high level agriculturally trained manpower in Bangladesh, 1987.

Highest degree	Specialization	Projected supply	Projected demand	DIFFERENCE
BS	General agriculture			
MS	Agronomy Agricultural economics etc.			
PhD	Agronomy Agricultural economics etc.			
TOTAL				

13. Projected supply vs. projected demand for high level agriculturally trained manpower in Bangladesh, 1988.

Highest degree	Specialization	Projected supply	Projected demand	DIFFERENCE
BS	General agriculture			
MS	Agronomy Agricultural economics etc.			
PhD	Agronomy Agricultural economics etc.			
<hr/>				
TOTAL				
<hr/>				

(Series to continue through period for which projections are made.)

14. Enrollment requirements for satisfying present and projected demand for high level agriculturally trained manpower in Bangladesh.

	No. of students to enter training					
	1984	1985	1986	1987	etc.	Average
Secondary school graduates to study for BS						
BS holders to study for MS						
MS holders to study for PhD						

APPENDIX C

References Utilized

APPENDIX C

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