

**BASIC DESIGN STUDY
ON
DEVELOPMENT OF LIBRARY AND
OTHER PHYSICAL INFRASTRUCTURES
FOR
THE INSTITUTE OF POSTGRADUATE STUDIES
IN AGRICULTURE
IN
THE PEOPLE'S REPUBLIC OF BANGLADESH**

AUGUST 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

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JICA LIBRARY



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PREFACE

In response to a request from the Government of the People's Republic of Bangladesh, the Government of Japan has decided to conduct a Basic Design Study on the Project for Development of Library and Other Physical Infrastructures for the Institute of Post-Graduate Studies in Agriculture and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Bangladesh a survey team headed by Emeritus Professor of Kyushu University, Dr. Yoshio Yamada from March 28 to April 26, 1990.

The team exchanged views with the officials concerned of the Government of Bangladesh and conducted a field survey. After the team returned to Japan, further studies were made. Then, a mission was sent to the Bangladesh in order to discuss the draft report and the present report was prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the People's Republic of Bangladesh for their close cooperation extended to the teams.

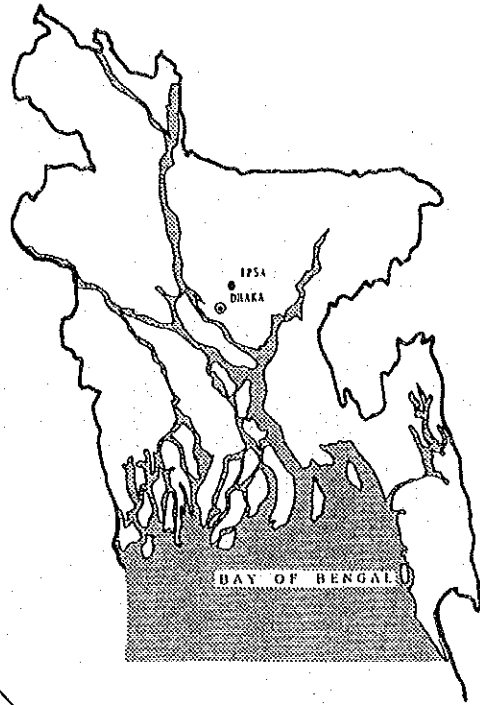
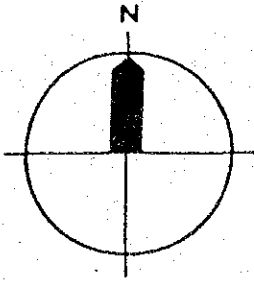
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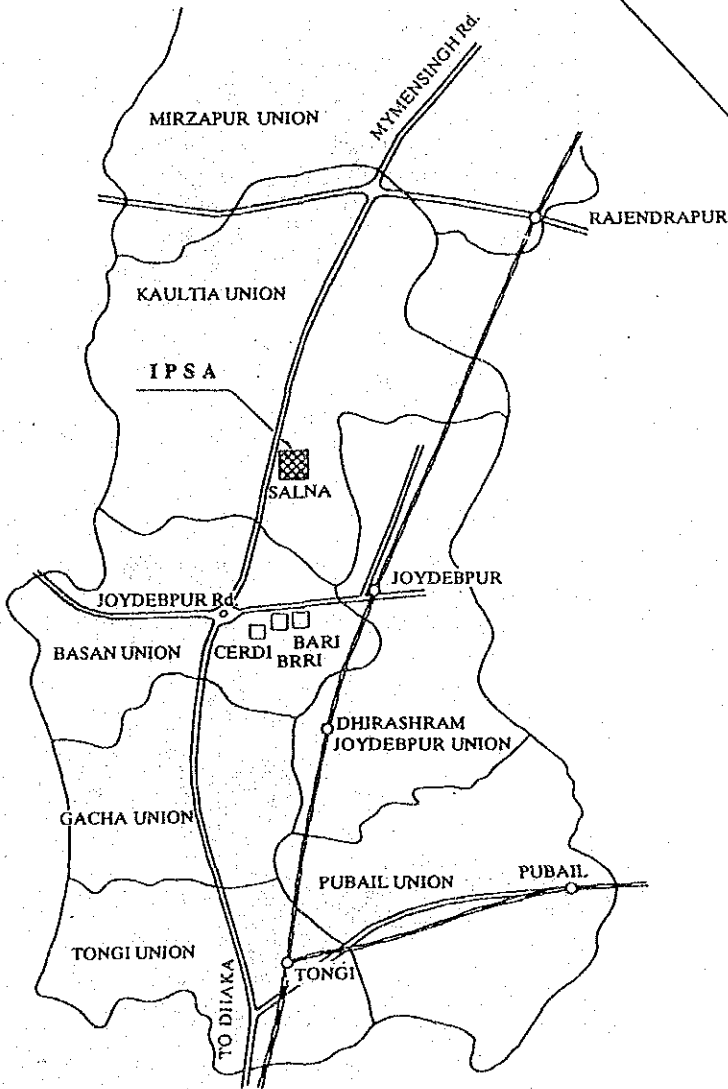
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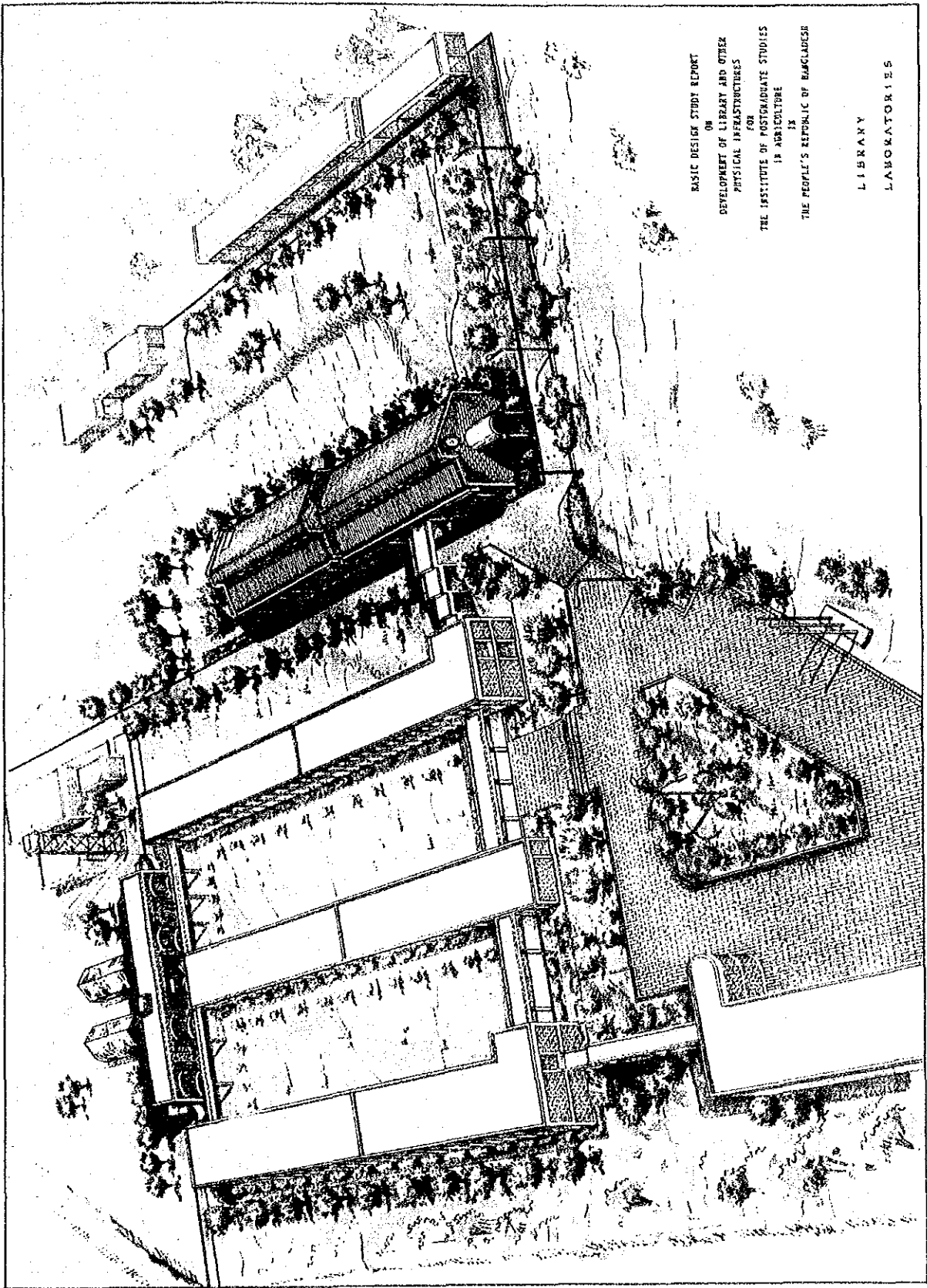
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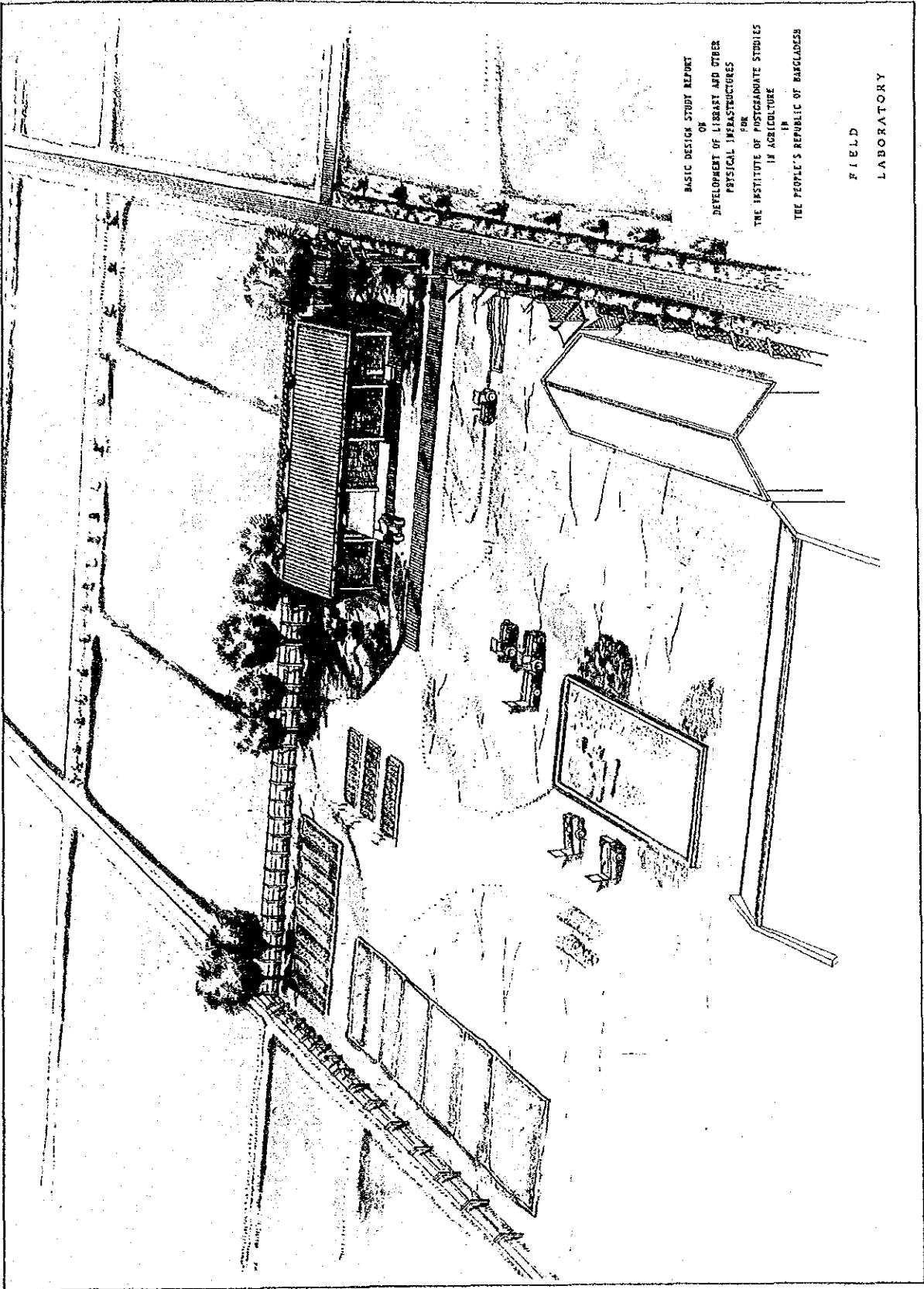
BANGLADESH



LOCATION MAP



BASIC DESIGN STUDY REPORT
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LIBRARY
LABORATORIES



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FIELD
LABORATORY

List of Abbreviations

Organizations:

MOA	Ministry of Agriculture
MP	Ministry of Planning
BARI	Bangladesh Agricultural Research Institute
BRRRI	Bangladesh Rice Research Institute
BJRI	Bangladesh Jute Research Institute
BTRI	Bangladesh Tea Research Institute
BINA	Bangladesh Institute of Nuclear Agriculture
BARC	Bangladesh Agricultural Research Council
CERDI	Central Extension Resources Development Institute
BADC	Bangladesh Agricultural Development Corporation
BAU	Bangladesh Agricultural University
BAI	Bangladesh Agricultural Institute
BCAS	Bangladesh College of Agricultural Sciences
HDKC	Haji Denesh Krishi College
IPSA	Institute of Postgraduate Studies in Agriculture
PKC	Potuaakali Krishi College
USAID	United States Agency for International Development

Branches and Committees:

ERD	External Resource Department
PC	Planning Commission

Official titles:

DG	Director General (official title for the directors of BARI, BIRRI, BJRI)
Sec.	Secretary
Add.Sec.	Additional Secretary
Jot.Sec.	Joint Secretary
Dep.Sec.	Deputy Secretary
PSO	Principal Scientific Officer
SSO	Senior Scientific Officer
SO	Scientific Officer
Prof.	Professor
Assoc.Prof.	Associate Professor
Asst.Prof.	Assistant Professor
Res.	
Associate	Research Associate

Procedures, proposals:

R/D	Records of Discussion
PPP	Preliminary Project Proforma
GAPP	Grant Assistance Project Proposal
TAPP	Technical Assistance Project Proposal

Construction-related technical terms:

BLDG.	Building
LAB.	Laboratory
WET LAB	a laboratory where water and gas are used
DRY LAB	a laboratory where water and gas are not used

Summary

Summary

The People's Republic of Bangladesh is located in a semi-tropical monsoon area on a delta of two main rivers. It has a total population of 105,300,000 people (as of 1987), with a labour force of 30,900,000. More than 60% of the work force is engaged in agriculture, which is the main industry, and country. Cereals comprise the largest part of this industry, and rice is the major crop, with 15,990,000 tons produced in 1987/88. Despite this high figure, the country has not yet achieved self-sufficiency in its main agricultural products, and in 1987/88 imported 670,000 tons of rice and 2,330,000 tons of wheat.

In its Third 5-year Plan (1985-1990), Bangladesh set 6 goals to further the promotion of agriculture: (1) Increase in the production of food cereals, (2) Expansion of employment opportunities in agriculture, (3) Improvement of the balance of payments through the promotion of agriculture, (4) Efficient land use and conservation, (5) Stabilization of agricultural output, and (6) More intense genetic research to develop high-yielding varieties.

In 1990, the last year of the Third 5-year Plan, recognition of the necessity for improved agricultural techniques and their popularization has brought home the urgent need for higher standards of agricultural education. Stress is being laid particularly on the need for the expansion of educational institutions and the training of experts in the field of agriculture.

These educational institutions include the Bangladesh Agricultural University (BAU) at Mymensingh, the Bangladesh Agricultural Institute (BAI) in Dhaka, the Potuakali Krishi College (PKC) at Damki, Haji Danesh Krishi College (HDKC) at Dinajipur and the Institute of Postgraduate Studies in Agriculture (IPSA) at Salna. There is also the Agricultural Training Institute where propagators of agricultural techniques are trained. In 1979, the Government of Bangladesh, seeking to improve and extend agricultural technology through a project laying

stress on higher agricultural education, through the transferral of the BAI to the Joydebpur region where the Bangladesh Agricultural Research Institute (BARI) and the Bangladesh Rice Research Institute (BRRI) are located, made a request to Japan for grant aid and technical cooperation. This project was later modified, and it was decided to create a new institution, the Bangladesh College of Agricultural Sciences (BCAS); which was completed in March 1983 with grant aid from Japan. At this point, the Bangladesh government revised its agricultural higher education system, changed its plans once more to the effect that this new institution would cover postgraduate studies only; at the same time it requested Japan to provide technical cooperation in all aspects of research and education with respect to this postgraduate college. The Institute of Postgraduate Studies in Agriculture (IPSA) was opened in September 1984.

The Japanese government, upon receipt of this request, exchanged records of Discussions on the subject of a 5-year project-type technical cooperation plan with Bangladesh in July 1985. The United States, which had shown interest in the Bangladesh agricultural postgraduate studies program, also decided to participate in the project. USAID, the United States Agency for International Development, became a junior partner providing technical cooperation to the new postgraduate institute. In June 1989, the fifth year of this trilateral cooperation project, a tripartite evaluation was made, with the recommendation that a new phase of the development be implemented after completion of the present project.

The carrying out of education at the postgraduate level, made the expansion of facilities (expansion of student labs, building of library, field labs, faculty quarters, etc) for specialist training in agronomy, genetics and plant breeding, horticulture, soil science, plant pathology, entomology, crop botany, data and statistics and agricultural extension an urgent task. For this reason, the GOB drew up a proposal to expand IPSA facilities, and requested grant aid from Japan.

In response to this request, the GOJ decided on a basic design study and dispatched a basic design study team from the Japan International Cooperation Agency (JICA) to Bangladesh for 30 days, from March 28 to April 26, 1990. After scrutiny of the educational standards, geographical conditions, maintenance and administration structures, and potential results of the plan, the report proposed the plan most suited to the project. The basic design study report brought together the basic design, selection of equipment and maintenance and administration plans for the facility.

Furthermore, the collateral funds food aid (USAID PL-480), will be used to build the residential quarters requested from the GOB.

IPSA has projected on preliminary basis approximately 34,500,000 taka for the budget of 1990/91, this last not including equipment and aid provided by Japan, and an increase of faculty and administrative staff from the current 207 approved posts (153 already recruited) to nearly 280 people. Considering the fact that the increase in teaching staff and the Japanese project-type technical cooperation are already being under taken, it is considered that there are no problems either technically or with regard to budget.

The location for the project is IPSA, which is already an operating concern; and the sites for the different buildings and facilities have been secured.

In Bangladesh, the project is under the supervision of the Ministry of Agriculture, with IPSA in charge of running the project. The actual running of the plan is carried out by the Director for Postgraduate Studies, faculty and staff members. Nine of the eleven departments have already started postgraduate level classes. In addition to the eight departments mentioned above, the data and statistics department starts courses this year.

Buildings, facilities, and equipment

NO.	Item	Surface	Content	Purpose
1.	Library	1,330 m2	Capacity: 65,000 books Stuck room Reading room Library chief's office Administration office Audio-visual room Conference room Storage Lavatories	A structure independent from the existing library will be built to cope with the increase of the number of books and documents necessary for postgraduate level studies.
2.	Laboratory building	654 m2	4 additional labs: Crop botany lab, Plant pathology lab, Agronomy lab, Agricultural extension lab, lavatories	Increased efficiency of each department by providing a single lab for each department.
3.	Equipment	-	For the library labs, and field labs.	To increase agricultural education efficiency, equipment for the departments of crop botany, plant pathology, horticulture, agricultural extension and the library will be provided.
4.	Field laboratory building	270 m2	Work area, storage (1) (2), working room, administration office, lavatories Toilet/Shower room	Increased efficiency of the field lab and the collecting of samples

The detailed design will take 4 months, and the construction (procurement) 10 months.

The early implementation of this project is advisable, taking into consideration the considerable increase of activity that it entails. Also, to make this project as fruitful as possible, it is necessary to strengthen the practical research by students in the field and in laboratories, which is not sufficient at the present time, and also to encourage activities which suit the situation in Bangladesh by using updated information including books and journals.

The direct consequences of this project, if realized, will be to increase the number of postgraduates from the current 60 to 120, to create a two-year masters program, and to upgrade the quality of postgraduate students. At the same time, progress at IPISA will have far-reaching consequences in the educational and research fields in Bangladesh and will bring positive results in the agricultural community. As a result, we can expect 1) Upgrading in the agricultural education and research spheres, 2) Higher productivity, 3) Expansion of employment, and 4) Improvement of the actual lives of the farmers.

To conclude: With more than 60% of the working population engaged in agricultural activities, the implementation of this project will be crucial to agricultural development in Bangladesh and can be expected to lead to great positive results for the economy of Bangladesh.

- * Preface
- * Location Map
- * Blueprints
- * List of Abbreviations
- * Summary

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Chapter 1 Introduction

Chapter 1 Introduction

The Government of Bangladesh made a request in May 1979 for grant aid and technical cooperation from the Government of Japan to implement a proposal to transfer the Bangladesh Agricultural Institute from Dhaka to Joydebpur approximately 40 km to the north. The GOJ agreed to the request and responded with 2 billion yen in 1981. Later, the GOB decided not to transfer the institute, but to build a new institute, the Bangladesh College of Agricultural Science, which was completed in March 1983. But in October 1983, after the completion of the initial grant aid, the obvious need for development in agricultural education and research led to a proposal for the establishment of postgraduate studies at the BCAS. The proposal was ratified by the highest authority in Bangladesh, the Martial Law Committee, in December 1983. The institution was renamed the Institute of Postgraduate Studies in Agriculture (IPSA) and a higher standard of education became necessary. Therefore, the GOB made a request to the GOJ for project-type technical cooperation. The response to this request was to start a 5-year (July 1985 to July 1990) project-type technical cooperation plan. Then the American organization USAID joined in to strengthen educational and research activities under the auspices of the Japan International Cooperation Agency (JICA).

In December 1989, the GOB made a request for grant aid to expand the facilities of the postgraduate studies institute to get the most out of the new institute and the above-mentioned technical assistance. In response to this request the GOJ decided to conduct a basic design study. The Japan International Cooperation Agency dispatched a basic design study team headed by Emeritus Professor of Kyushu University, Dr. Yoshio Yamada, to Bangladesh, from March 28 to April 26, 1990, to confirm, investigate and discuss the following subjects.

As a result of this preliminary study and of discussions with officials of the GOB, the basic design study team summed up the below-mentioned points in Minutes of Discussions which were agreed to

by both governments, and the official agreement was ratified on April 9, 1990 by Dr. S.H. Khan, Director of IPSA and Emeritus Professor of Kyushu University, Yoshio Yamada.

- 1) Confirmation of the contents of the request
- 2) Study of the existing buildings, facilities, and equipment
- 3) Study of the potential sites and infrastructure maintenance
- 4) Confirmation and discussion on the management of IPSA
- 5) Confirmation and discussion on the construction project and equipment
- 6) Confirmation and discussion on the division of responsibilities between the GOJ and the GOB
- 7) Study of related conditions

This report is a summary of the results of the above-mentioned points.

Study team members' names, the study schedule, a list of the main people involved and the minutes of discussions can be found at the end of this document.

Chapter 2 Context

Chapter 2 Context

1. Agriculture and Agricultural Education Outlook

(1) Agriculture

1) Production

Agriculture in Bangladesh centers around cereals, with 2,730,000 acres cultivated in 1987/88, of which 2,550,000 acres or approximately 93% is used for rice production. Pulses (1,820,000 acres), oil seeds (1,350,000 acres), and crops for textiles (1,310,000 acres) follow. Production of cereals is 17,120,000 tons, beans 540,000 tons, and oil seeds 450,000 tons. The production goal for 1989/90 which the GOB has set for completion of the 5-year plan is 20,700,000 tons of cereals. However, according to figures from recent years, the increase has been very small; for example, the increase from 1984/85 (16,110,000 tons) to 1987/88 (17,120,000 tons) represents only 79.9% of the goal. Thus, the difficulty in achieving the goal set for 1989/90 is obvious, and combined with population growth, self-sufficiency still seems unattainable.

2) Technological development and extension

Several institutions are already in place for the development of agricultural technology; research institutes such as the BARI, the BRRI, the Bangladesh Jute Research Institute (BJRI), Bangladesh Tea Research Institute (BTRI), Bangladesh Institute of Nuclear Agriculture (BINA), and schools of higher education such as the BAU, the BAI, the PKC, the HDKC, and the IPSA. These institutions were responsible for the development of 3 new rice varieties, 4 of wheat, and others for pulses, vegetables, oil seeds and so on. The main objectives of IPSA are to serve as a "Center of Excellence" for postgraduate education leading to M.Sc. and Ph.D. degrees in crop science.

In the area of agricultural extension, in 1982 all the related agencies were united under a common umbrella, and the Bureau of Agricultural extension under by the Ministry of Agriculture was established. At the present time, this new department comprises 12,640

members who are devoting their time to agricultural extension. Also within the framework of this project, at IPSA, there are classes concerning this subject which teach techniques for better productivity, analysis of results and other such areas related to agricultural extension. There are also application classes to provide guidance to the staff of the BAP.

(2) Agricultural education

Agricultural education in Bangladesh is a complex system comprising two parts. The first part is composed of a 12 year basic education step at the end of which the students graduate with a HSC high-school graduation degree. Then they enter the BAU or one of three colleges under BARI for 3 years at the end of which they graduate with a B.Sc. or a H.B.Sc. (see Figure-1).

The second part is the postgraduate program at BAU or IPSA where the M.Sc. and Ph. D. are awarded. But the B.Sc., M.Sc. and the Ph. D. are awarded by the BAU. This educational system is centered on the BAU in Mymensingh, with agricultural education also being carried out at 3 colleges (BAI, PKD, and the recently opened HDKC) in its sphere.

The number of graduates from each college is increasing every year, except at BAI, where the number of graduates is kept constant.

87 students enrolled at IPSA in September 1984 (students admitted in the year 1982/83), of which 39 completed their postgraduate course. The number of postgraduate programs is increasing also. In September 1986 (admittance 1984/85), the proportion of the students taking the final examination was 80% of the total of enrolled students. In 1985/86, IPSA set a fixed number of 60 graduates per year. That is the present situation.

Figure-1

Bangladesh educational system: number of years and schools

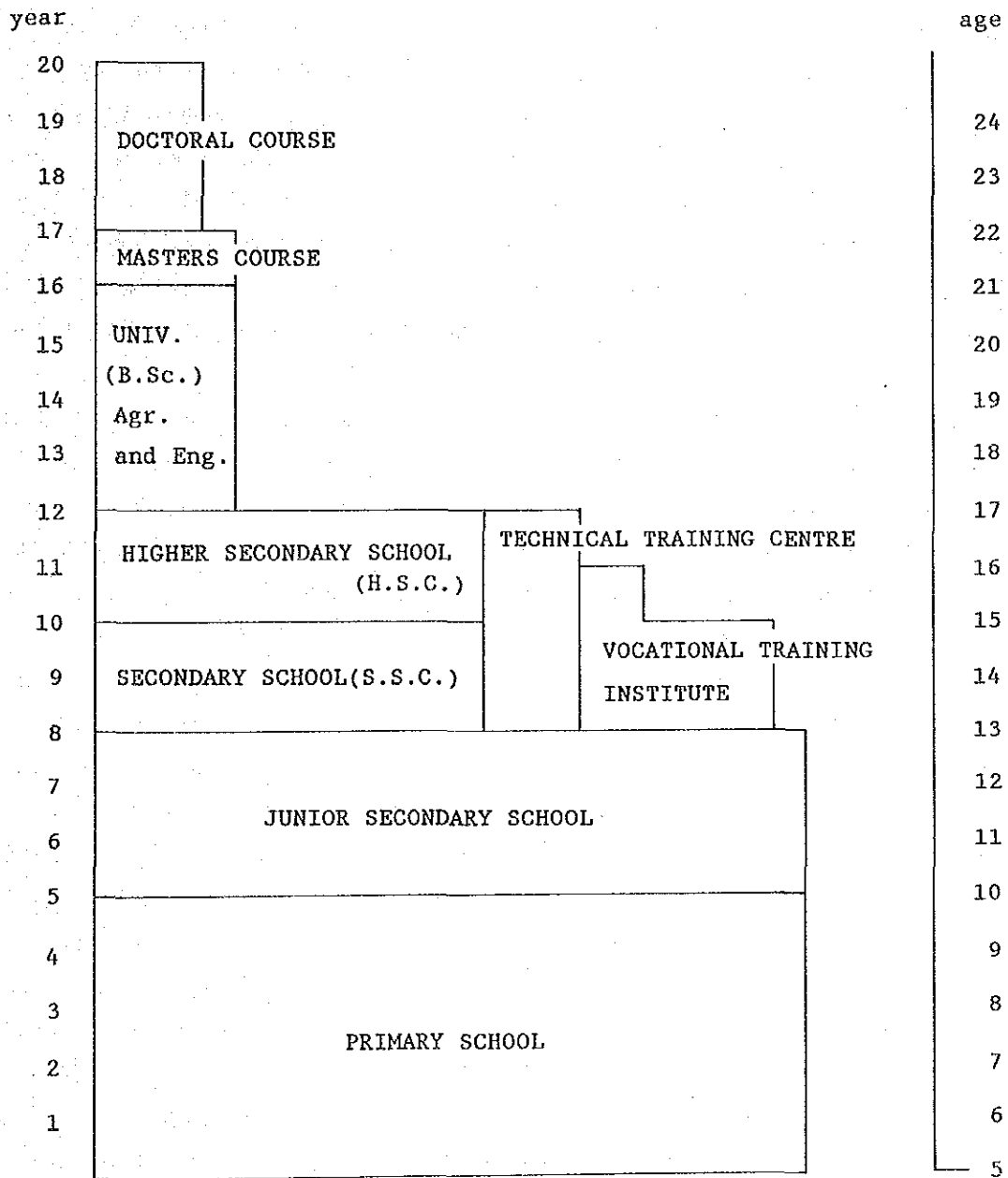


Figure - 1 EDUCATIONAL PROGRAM

(3) IPSA

1) A brief history

In an effort to improve the efficiency of the Bangladesh agricultural education system, the government made some reforms including the transfer of the BAI to the Joydebpur region where the BRRI and the BARI are located, but later changed this plan to that of the creation of BCAS and requested grant aid in 1979 from the Japanese government. The GOJ provided this aid in 1981, and the BCAS campus was completed in 1983. But the sudden increase in the number of Bachelors of Science, and the employment problems that this entailed, added to a demand for better trained agriculturalists, led to the plan to convert the BCAS into a postgraduate studies institution, renaming it the Bangladesh Institute of Postgraduate Studies in Agriculture (IPSA).

Following this change of plan, the GOB made a request to the GOJ for technical cooperation, to which the Japanese government responded with a 5-year technical cooperation project starting in 1985. This project was completed in July of 1990, and Phase II, a second 5-year technical cooperation project, was initiated. The main goal of this technical cooperation is the transfer of new technology and knowledge to educational faculty members. In addition to technical cooperation, the classrooms and laboratories which were built for the BCAS were remodeled for use as labs by the faculty members, and some of the equipment was provided in the same context. At the present moment, postgraduates' labs, classrooms, and other such buildings and facilities which were built for BCAS are being used in the same conditions.

When the postgraduate program was initiated in September 1984, there were 6 active departments (agronomy, horticulture, genetics and plant breeding, soil science, entomology and plant pathology), but 2 departments were added later (agricultural extension and crop botany). This year, the department of data and statistics was added. At the beginning, the only departments which shared laboratories were the horticulture and genetics and plant breeding departments, but when the other departments were opened, they shared those same laboratories.

This has hindered the experiments of each faculty.

Also, the library was originally renovated with a capacity for approximately 8,000 books, but the increase in the number of books has been such as to cause problems in management.

Originally IPSA was under the supervision of BARI, but in October 1988 it became an autonomous institution under the direct supervision of the Ministry of Agriculture. But the system of affiliation with BAU, which is under the supervision of the Ministry of Education, exists until the present day: the degree bestowal system, curriculum, and qualifying exams, etc., are under the supervision of BAU.

2) Staff and students

At the present time IPSA is under the supervision of the Ministry of Agriculture and until it is granted a completely independent status by the GOB it is administrated by a management committee. Initially, there were educational and research departments, an administration section, and 3 supporting sections. Of the 11 academic departments, only 8 offer a postgraduate degree at the present time.

The organization was planned for a staff of 207 but has only 110, and the faculty and executive members number only 26 of the initially planned 43. IPSA is recruiting both teaching and administrative staff for the positions which are vacant.

IPSA is preparing a new year-long curriculum and is planning to lengthen the Masters course by two years. In this case, the number of students would increase from 60 to 120. The following table shows the number of students admitted and graduates of the different departments. The proportion of the number of students examined to the number of students admitted is increasing every year, and in 1984/85 came up to 80%. From 1985/86 IPSA has admitted 60 M.Sc. students. The renovation of the equipment and facilities in preparation for the change in curriculum which would increase the number of students (60 per year x 2 = 120) is of major importance to the Institute.

Number of students admitted/examined at IPSA

SUBJECT	1982/83		1983/84		1984/85		1985/86
	NO. OF STUDENTS ADMITTED/EXAMINED		NO. OF STUDENTS ADMITTED/EXAMINED		NO. OF STUDENTS ADMITTED/EXAMINED		NO. OF STUDENTS ADMITTED
AGRONOMY	30	13	32	17	39	28	14
CROP BOTANY	2	1	.	.	4	4	4
ENTOMOLOGY	6	.	10	7	16	10	0
GENETICS AND PLANT BREEDING	14	6	8	8	21	21	9
HORTICULTURE	21	14	24	14	31	29	12
PLANT PATHOLOGY	3	2	25	19	23	16	8
SOIL SCIENCE	11	3	10	6	26	19	9
AGRICULTURAL EXTENSION	.	.	.	.	.	.	4
DATA AND STATISTICS	.	.	.	.	.	.	.
TOTAL	87	39	109	71	160	127	60

* 1) The actual admission time for 1982/83 was September 1984.

3) Utilization of existing buildings and facilities

(1) Administration building (2 floors) 1,160m²

There is a general lack of space; in addition to structural danger such as damaged electrical wires, parts of the library are included and the building does not function well.

1st floor : Director's office, Leader's office, Chief Secretariat's office, Administration office, rest rooms. Is being used as the maintenance section.

2nd floor : Library, reading room, library administration office, rest rooms. Lack of space is making the library and reading room impractical: sorting and classification are difficult. The situation is especially critical in the case of periodicals.

Lecture Hall : One floor only. Capacity for 180 people. Fans are attached to the ceiling. Some parts of the walls (wood) are damaged by mold and termites.

(2) Education building (2 sections in one 2-story building, 1 section in a single-story building, total 3 sections) 4,572m²

Due to a general lack of space, some parts are being used as storage space and preparation areas, making the whole complex difficult to use.

Faculty

section : Rooms for faculty members on both 1st and 2nd floors, computer room, maintenance officer's room, rest rooms. It is presently being used by Japanese and USAID experts.

Student

laboratories : Single-story building, 3 main labs, 1 small, preparation rooms, rest room. The preparation rooms are being used as storage areas.

Classroom

section : Faculty labs, classroom, rest rooms. Some of the classrooms of the 1st and 2nd floors have been remodeled to serve as labs for faculty members.

- (3) Section for other works: (Single-story) 375m²

Although this is not urgent, renovation is advisable for the medical facilities.

Medical room, medical administration office, equipment storage area, rest rooms.

- (4) Student dormitories: (Dorm: 2 floors, 3 sections. Dining room: single-story) 5,202m²

Needs to be reconsidered in the light of this extension program.

- (5) Faculty residence: (3 floors, 1 section) 428m²

There is an urgent need for this facility to be renovated since 70% of the faculty members commute from Dhaka where transportation conditions are bad, and this is causing problems in recruiting new members, especially since there is to be an increase in the number of faculty members. Use of the present facilities by faculty members is also a problem, as some parts of the dorm are being occupied by female students.

- (6) Faculty residence: (2 floors, 2 sections) 309m²

Needs to be revised within the framework of the current project.

- (7) Farm facilities: Work and storage building for agricultural

equipment 170m², heavy equipment storage building, 240m².
There is no urgency, but gradual renovation is necessary.

(8) Additional facilities: Water pump tower, gas-powered electricity generator, electric transformer station, 3 hothouses. There is no urgency, but will need gradual renovation.

(9) Research equipment

It has been confirmed that some of the equipment is out of order and cannot be used. The equipment also has to be shared which hampers efficiency.

The existing student labs are in agronomy, soil science, genetics and plant breeding and entomology (4 departments).

Samples taken from the field labs are being processed in the student labs due to lack of space. As a result the student labs are soiled.

a) The types of equipment used in the agronomy lab are a balance, an ionmeter, a hydrometer, a PH-meter, a centrifuge, a blender, a juicer. All of this equipment is in frequent usage.

The equipment cupboards in the lab and preparation rooms contain soil testing equipment and agronomic sampling equipment.

b) In the soil science lab were: a balance, a table balance, a microscope, an autoclave, and an electric water bath. There was no soil testing equipment. The soil science lab shares the soil testing equipment with the agronomy lab.

c) The entomology lab had a balance, a microscope, and a stirrer.

d) The genetics and plant breeding lab has a small refrigerator, scales, a microtome, a microscope and an electric water bath, of which the microtome has a damaged blade and cannot be used.

2. Development Plan

(1) National economical development plan

1) Third Five-year Plan

The previous national plans had concentrated on the problems of economic restructuring, poverty, unemployment, malnutrition, and illiteracy. The Third 5-year Plan (1985-1990) reaches further and has set as its goals the eradication of poverty, increased supplies of basic goods, increase of employment opportunities and the development of human resources. The following are the main themes of this plan:

- (1) Cut down on population growth
- (2) Create jobs
- (3) Develop basic education and expert training
- (4) Develop technology for long-term structural changes
- (5) Achieve self-sufficiency in basic foods
- (6) Satisfy basic human needs
- (7) Encourage economic growth
- (8) Instill a sense of independence

This translates into an increase of the Gross Domestic Product of 5.4%, production of 20,070,000 tons of food, 70% enrollment in primary education, employment for 1,000,000 people and as the final stage of the plan, population growth of less than 1.8%.

2) Agricultural development plan

60% of the labour force is engaged in agriculture, making it the largest industry of the country and a major concern for the GOB. The following subjects are of the greatest urgency:

- (1) Increase in the production of food cereals
- (2) Expansion of employment opportunities
- (3) Improvement of the balance of payments
- (4) Land use and conservation
- (5) Stabilization of agricultural output
- (6) Intenser genetic research to develop high-yielding varieties

The major agricultural products of Bangladesh are cereals. Rice production in 1987/88 was 15,410,000 tons. Imports came up to 670,000 tons. In the same year, the production of wheat was 1,040,000 tons; 2,330,000 tons were imported. Self-sufficiency has yet to be attained in both commodities.

To overcome this problem, improvements and expansion of agricultural extension are of utmost importance. The GOB is laying stress on the expansion of educational organizations in the agricultural field and the training of experts.

(2) Context of the plan

As mentioned above, the development and expansion of global agricultural technology is a major concern for the GOB. Urgent solutions are required.

The creation of IPSA was recognized by the Martial Law Committee in December 1983 and it was opened in September 1984 under the supervision of the Bangladesh Agricultural Research Institute (BARI) of the Ministry of Agriculture; it has since become the highest educational institution for agriculture in the country.

The objective of IPSA is to raise standards of education and research in agriculture.

- (1) To serve as the highest institution for postgraduate education, leading to Masters and Ph.D. degrees in all disciplines of agricultural sciences and some social sciences.
- (2) To conduct research to support and complement the applied agricultural research system in Bangladesh.
- (3) To provide facilities, information, and programs to support agricultural expansion and guidance activities for present research staff and non-personnel.

To achieve these goals within IPSA, the GOB has drawn up a project to improve and expand the facilities of IPSA, and has requested grant aid from the GOJ. The IPSA development project is a step toward the achievement of the above-mentioned goals.

3. Request: Background and Content

(1) Background

The Government of Bangladesh, seeking to increase and stabilize agricultural production, decided to reform the agricultural education system to provide better training for experts. In this context, a request was made for grant aid from Japan to build a new institution, the Bangladesh College of Agricultural Sciences (BCAS), which was completed in March 1983.

Before BCAS became functional, the Bangladesh government made some reforms in its agricultural higher education system, and took the step of converting this new institution to postgraduate studies, renaming it the Institute of Postgraduate Studies in Agriculture (IPSA). At the present time, the Institute is in a cooperative phase involving both Japan and USAID in a project-type technical cooperation plan, since May 1985. To further the goal of improving the standard of education at the postgraduate level, the agronomy, horticulture, genetics and plant breeding, soil science, entomology, plant pathology, crop botany, agricultural extension and data and statistics departments are in urgent need of renovation or enlargement, as with the library, where the increase of documents necessary for postgraduate studies such as technical books, documentation and other information provided by USAID have brought about an urgent need for additional construction.

(2) Contents

The basic design study team has discussed and confirmed details with the GOB after survey at the project site. The following table shows the contents of the request.

Item	GOB request	Confirmation by study team
Project name	Extension project of the Bangladesh Institute for Postgraduate Studies in Agriculture (IPSA)	Extension project of the Bangladesh Institute for Postgraduate Studies in Agriculture (IPSA)
Executing organizations	Bangladesh Institute for Postgraduate Studies in Agriculture (IPSA)	Bangladesh Institute for Postgraduate Studies in Agriculture (IPSA)
Construction site	Within IPSA at Salna, Kaultia Union, Joydebpur Upazila, Joydebpur Sub-division	Within IPSA at Salna, Kaultia Union, Joydebpur Upazila, Joydebpur Sub-division
1. Library	Capacity: 65,000 books	Capacity: 65,000 books, 1,330 m ²
2. Laboratory building	4 additional labs (for 4 departments)	4 additional labs (for 4 departments), 654 m ²
3. Equipment	Whatever is necessary for the above-mentioned facilities. Maintenance of the equipment	Whatever is necessary for the above-mentioned facilities. Maintenance of the equipment
4. Field laboratory building	Building for one unit	270 m ²
5. Dormitories	Faculty staff dorm Visiting faculty dorm Community center, guest house.	Collateral funds from food aid USAID (PL-480) will be used to build the faculty dorms. Therefore, this will not be included in the present project.
6. Farming facilities	Farming facilities	Will not be included in the present project

Chapter 3 Details of Project

Chapter 3 Details of Project

1. Objectives

The purpose of this project is the development of agricultural postgraduate studies by creating a nucleus of agricultural education in Bangladesh. IPISA is the sole postgraduate institution devoted to agriculture in Bangladesh. By developing it, a general upgrading of the standard of education and technology in Bangladesh can be expected.

The goals of this project can be summed up as follows:

(1) Upgrading of agricultural technology

Upgrading of agricultural technology and developing crop varieties best suited to the local natural conditions will be brought about by a general upgrading of the educational and research structures in Bangladesh. Extension of such technology will have direct beneficial consequences on agricultural productivity.

(2) Improvement of agricultural conditions

To promote better usage of land and productivity by improving soil and agricultural conditions through analysis and research.

(3) Compilation of agricultural information

The gathering and analysis of information from all over the country into a single organization will contribute to a general improvement of agricultural technology.

(4) Improvement of agricultural extension

A general improvement in agricultural extension is necessary in the rural areas for better productivity. The staff of the DAE will receive guidance on this point.

(5) Improvement and stabilization of the lives of the farmers

The aim is to stabilize production and thus improve the lives

of the farmers by upgrading agricultural extension and selecting new crop varieties.

(6) Research and development

Research and development in agriculture encompass a large range of subjects, including basics such as soil science and natural science. High quality research and development will bring about the best solution for Bangladesh.

2. Analysis of the Request

(1) Justification of the project

The main points of the request received from the GOB were: 1. Construction of the library building, 2. Expansion of the student laboratories, 3. Equipment for educational and research purposes, 4. Construction of the field laboratories building, 5. Construction of the residential quarters, and 6. Establishment of farming facilities. The following is a summary of the justifications of these requests from the GOB side.

1) Construction of the library building

The construction of the library building is of absolute necessity because of the lack of space in the existing library, since a postgraduate level library must have all the latest information, documentation, journals and books. Also, the floor does not have sufficient strength to support expansion.

2) Expansion of the lab facilities

In the present situation, nine departments are forced to share the same lab facilities due to lack of space. This situation is very impractical, especially for the implementation of this new curriculum which would adopt a course system. Four new labs need to be built to afford each department its own lab (Plus a lecture-room for the dept. of data and statistics). The lab facilities need to be built urgently.

3) Acquisition of research equipment

New equipment is needed to replace damaged equipment and for the expanded lab facilities. Equipment for the library will become also necessary to gain full benefit from the new library.

4) Construction of facilities for field research

These facilities are needed to classify and prepare samples

obtained in the field.

In agricultural research, the analysis and preparation of samples obtained in the field and of soil samples are of utmost importance. In the present situation, this is being done in the student labs where there have been contamination problems. Because of this, it is necessary to build labs near the fields.

5) Construction of staff quarters

70% of the faculty and administration staff are commuting from Dhaka, but there have been difficulties due to the bad transportation system. It is becoming more and more of a problem to secure staff members for the Institute. The construction of new residential quarters would alleviate the commuting difficulties of the staff and would secure the continued presence of these people at the Institute, and is of the utmost urgency.

With regard to these requests from the GOB, the study team, after examination of the sites for construction, interviews of the people involved and technical evaluation, has come to the following conclusions regarding the urgency of the requests:

1) Construction of the library

The construction of a new library was deemed necessary due to structural weakness of the present library floor which is a source of danger, and lack of space for the amount of documentation involved in postgraduate studies. A library is of utmost importance to the success of this project. The number of books and journals which are to be acquired through USAID (refer to Chapter 3, 3.(2) Procedures) and IPSA is projected to amount to 24,000 by the year 1995, and to stabilize around 65,000 by the year 2000. Therefore the new library should have the capacity to hold 65,000 books and journals, reading rooms with 83 seats, and study rooms for 60 people.

2) Expansion and renovation of student labs

There are now only 4 labs for the 8 presently active departments, which is a major cause of the markedly low efficiency. The addition of 4 more labs is of the utmost urgency.

3) Equipment

Equipment should be provided for the library, the research labs, and the field research labs, in conjunction with the overall expansion of IPSA.

4) Construction of field laboratory facilities

Field laboratory studies have not been conducted in a very efficient manner due to the lack of facilities. The construction of field research facilities is necessary for preparation and classification of samples obtained in the field, since this is one of the most important areas in agricultural research.

The GOB considers the overall improvement and expansion of agricultural technology to be of the utmost importance and urgency to develop agriculture as a whole within the framework of its Third 5-year Plan.

This development project will bring great direct benefits to a country which has 60% of its labour force engaged in agricultural activities, the expansion of educational and research facilities at IPSA providing better training of experts for the research and extension agencies, which would increase productivity. This would result in a definite improvement of the quality of life of the farmers. The study team have come to the conclusion that the urgency is real and that grant aid from the GOJ justified.

(2) Scrutiny of the implementation plan

The actual implementation of this project is under the supervision of the Ministry of Agriculture, and will be conducted by IPSA, as is

mentioned in Chapter 3, 3.(2) Procedures, and Chapter 3, 3.(5) Maintenance and conservation plan, the basic lines of these operations being the same as at the present moment. With regard to the increase of maintenance costs, the budget for the project, not including equipment and facilities, is approximately 34,500,000 taka (1990/1991) and it is considered that there is no problem on this project.

The Director of IPSA is responsible for the actual administration, finances and academic details. He will be assisted by the Associate Director, Supervisors and Associate Supervisors. There are at present 26 faculty and executive members, and 110 staff members, to which 24 faculty members and 47 staff members will be added later on (Please refer to 3. (1) Agencies and administration). It is considered that this increase in staff will be sufficient for the increased activity planned.

The budget for infrastructures (such as drains) which will become necessary with the addition of new facilities such as the library, the labs, and field labs, has already been estimated. Therefore this presents no difficulty.

The administration of IPSA in the past has also been taken into account and it is considered there will be no problems in future administration.

(3) Relationship with other grants aid programs

The project-type technical cooperation plan was implemented in July 1985 through the Japan International Cooperation Agency (JICA) and lasted for the following five years. USAID started its participation in this project in April 1986, and today this plan includes tripartite cooperation between the U.S., Bangladesh and Japan.

In June 1989, an evaluation team involving the three countries made an evaluation of Phase I of the project, and recommended the continuation of the project in Phase II. Following the minutes of discussions of June 1990, the GOJ decided on the implementation from this July of Phase II of the project-type technical cooperation project which would last for 5 more years.

Phase II of the technical cooperation project will consist of the dispatch of a team leader, a coordinator, experts in each field, long-term and short-term experts under the auspices of JICA; and the dispatch of long-term and short-term experts under the auspices of USAID. The GOJ will provide the equipment and equipment related items. The U.S. will provide periodicals and documents.

In addition to this, with regard to the request initially made to the GOJ for cooperation in the establishment of residential quarters, collateral funds (PL-480) from the USAID (food aid) will be utilized for the construction of these quarters; this is basically agreed upon by both the U.S. and Bangladesh governments.

(4) Work allotment

The following is the conclusion the study team came to on the demarcation of responsibilities between the GOJ and the GOB, after deliberation over the urgency of the request and the compatibility with the Japanese grant aid system.

Item	Government of Japan	Government of Bangladesh	Remarks
Library	○		including library equipment
Laboratory building	○		
Laboratory equipment	○		
Field laboratory building	○		
Electricity		○	where necessary
Electric generators		○	where necessary
Water		○	existing facilities will be used
Sewerage	○	○	the field lab building will continue using existing facilities
Gas		○	
Telephone		○	
Construction site		○	

The facilities and equipment involved in the project were defined as laid out in detail in Chapter 3, 2 (1), "Justification of the project" resulting from study of the content of the request made by the GOB.

Responsibility for the additional infrastructure which will become necessary after expansion of the existing facilities was allotted to the GOB for reasons related to the existing infrastructure at IPSA. It was also confirmed that the staff quarters which were part of the request will be built with collateral funds from USAID food aid (PL-480).

3. Project Contents

(1) Agencies and administration

The organization in charge of this project on the Bangladesh side is the Ministry of Agriculture, and the actual implementation will be done by IPSA.

IPSA was originally under the administration of BARI, the Ministry of Agriculture, but in October 1988 became an independent research and educational institute under the umbrella of the Ministry of Agriculture.

The Director of IPSA is responsible for the actual administration, finances and academic details of the project. He will be assisted by the Associate Director, Supervisors, Associate Supervisors and by each department director. As can be seen in chart 2, the administrative structure of IPSA is divided into three sub-divisions: education, administration and auxiliary affairs.

The breakdown of the number of faculty staff at the center of IPSA allows for 8 professors, 14 associate professors and 15 assistant professors a total of 37. There are now 6 associate professors, 14 assistant professors and 1 tutor, making a total of 21.

Additionally, one professor from Kyushu University (JICA technical cooperation), and one professor from Oregon State University (USAID) are on full-time duty at IPSA and fill in for the IPSA faculty team central members. There are more than 50 temporary members at IPSA from BARI and BRRI who provide guidance on theses, research and education.

The facilities which would be established through this project will be administered within the present administration framework of IPSA; the library and field labs will be administered by the auxiliary affairs department, and the labs by the research and education department, since they will be used by the respective science departments. Parts of the equipment storage areas will be administered in common.

There are no problems expected regarding the administration since this will be conducted along previous lines of maintenance and administration, with a budget of 3,450,000 taka.

The repartition of the staff will be as follows.

	Present	Number present	Increase	Number projected
Director	1	1	0	1
Additional Director	0	1	0	1
Supervisor	2	2	0	2
Associate Supervisor	2	2	0	2
Professors	21	37	7	44

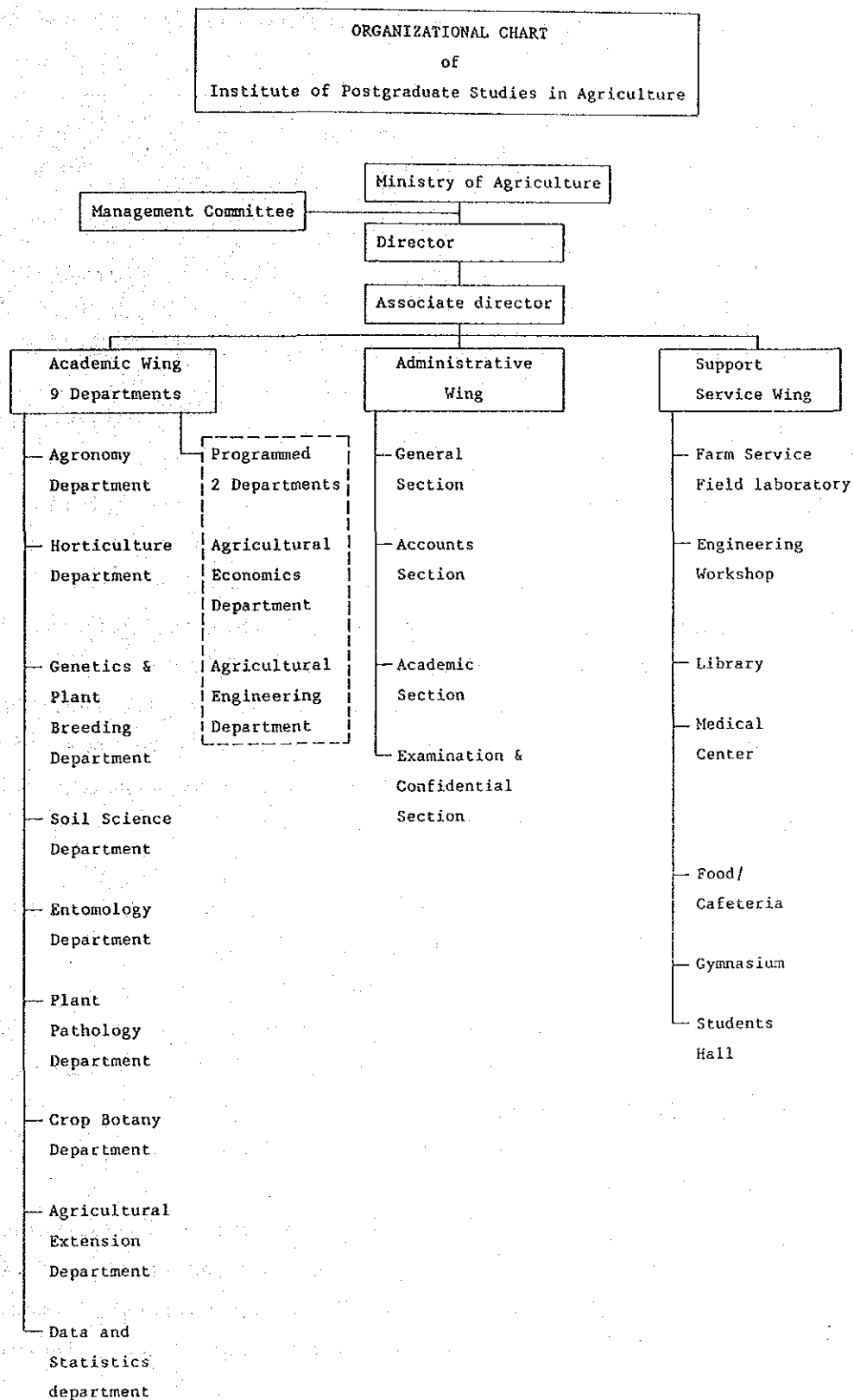
subtotal	26	43	7	50
administrative staff	110	110	47	157

total	136	153	54	207

At the present time, there is a set frame for 43 faculty members, but with the expansion project, that number will be increased to 50 (see above, subtotal:projected maximum)

Fig-2. following shows the structure.

Figure-2 Organizational Chart of IPSA structures



(2) Procedures

1) Library

The following is the plan for expansion of the library

YEAR	BOOKS	JOURNALS	TOTAL
1989/90	5,082	127 CATEGORIES (2,300)	7,382
1994/95	ABOUT 15,000	ABOUT 600 CATEGORIES (9,000)	ABOUT 24,000
1999/2000	ABOUT 50,000	ABOUT 1,000 CATEGORIES (15,000)	ABOUT 65,000

The budget allotted to the library at IPSA for acquisitions is 300,000 to 500,000 taka per year; 1,000 to 2,000 documents are being acquired each year. If the journals provided by USAID are taken into account, the existing library has already reached the limit of its capacity. IPSA is planning to increase the number of books and journals to approximately 24,000 in 1994/94 and to 65,000 in the year 1990/2000. The "Developing Library Service for the IPSA" (Oregon State University, December 1985) reports the need for 65,000 at IPSA as a postgraduate studies institute.

The holding capacity of the new library included in this project should be about 65,000 books and other documents.

Seminar rooms, audio-visual rooms, conversation rooms and reading rooms with 60 seats will be planned in accordance with the number of students and faculty members.

2) Laboratory building

In order to meet the needs of the nine departments now operating, four new labs will be built to respond to the needs of the Horticulture, Plant Pathology, Crop Botany and Agricultural Extension departments. The department of Data and Statistics will use a lecture-

room. They will be designed in accordance to the new curriculum; the agricultural extension lab will be designed like a conference room, and the labs for the other departments will be provided with water, gas and electricity.

3) Field lab

This will be used for the preparation and classification of the huge amounts of plant and soil samples obtained in the field.

The field lab building will be apart from the other facilities to avoid contamination of sensitive specimens and precision instruments, and also to increase the efficiency of experiments.

(3) Location and situation

1) Location

* location : 30 km north on the national road from Dhaka, 650 m to the right.

* regional

dependence : Salna, Kaultia Union, Joydebpur Upazila, Joydebpur Sub-division

* construction

site : The area presently administrated by IPSA is of 80 ha including farming areas (60 ha national property, 20 ha private property). Buildings occupy 5.5 ha and fields for research occupy 15.5 ha.

The site for this project includes 1,200 m² for the library, and 400 m² for the student labs. For reasons of practicality with the existing facilities, a location across the road from the education building was chosen for the site of the library, and a location adjoining the education building was chosen as the site for the student labs. These sites are on flat terrain and will not present any difficulty regarding flooding during the rainy season as long as adjacent gutters are made. The field lab

will be in the same area as the present research field. All the new construction will be on sites as yet unused, and will not cause problems with existing structures.

* geological

features : The area has moderately undulating hills located on an old alluvial tableland. The site gently slopes eastward (average degree of incline 1/200). Between each table there are small valleys, the result of erosion, and in the rainy season water flows into the Chilai River.

* land

utilization: The land controlled by IPSA is an area of 20 ha centered around the institute buildings. This area is surrounded by a makeshift fence.

* land

quality : At the construction site test holes were dug at 3 points (1.5m in depth). The ground surface consists of a layer of silt with clay and below this is an elastic layer of silt.

* land

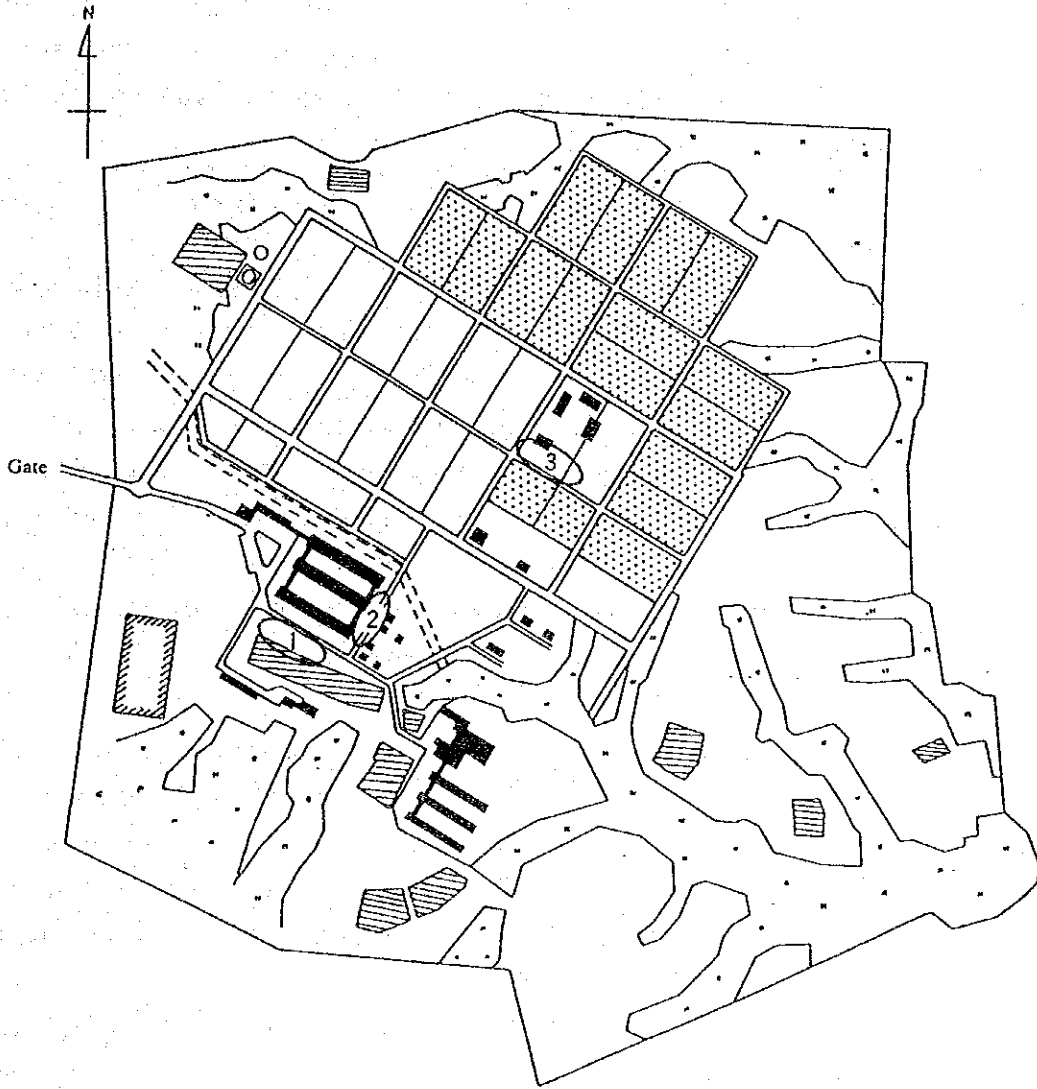
durability : As a result of the boring work conducted at two points in the construction area, it was found that the land durability ranges from 10t/m² to 20t/m² in average. The level of subterranean water was 1.4m to 1.5m in the dry season.

* floods

: There are several small valleys around the area into which water could pour in case of flooding. During the record flooding of 1988, the area was not inundated thanks to those valleys.

IPSA construction site

1. Library site
2. Laboratories site
3. Field laboratories site



S 1/8,000

2) Infrastructure maintenance situation

* condition of the roads

IPSA is located about 700 m to off an asphalted road, 30 km north from Dhaka. The road inside the complex is brick around the main gate and asphalted or bare everywhere else. Of the facilities to be established through this project, the library will face the asphalted part, the student labs will face the brick part, and the field lab will face the non-treated bare part of the road.

* infrastructure situation

Electricity, water, and natural gas will have to be installed. There is now 11 KV of high intensity electricity at IPSA and this is connected to the buildings in units of 380/220V by transformers of 500 KVA. This can be used for the project. But electricity supply is irregular, with blackouts and fluctuations in intensity and frequency. An initiative from IPSA to provide reliable electricity is necessary. Telephones have already been installed on campus. The well presently in use has a sufficient supply of water.

Sewage is processed through a septic tank and infiltrated into the ground, but the terrain being of clay and the pipes being in low ground, the underground water level is high. The water cannot be absorbed by the terrain and comes up to the surface, presenting a problem. This problem should be dealt with by improvements in the sewage system, and will be handled by IPSA.

There is enough natural gas already connected to the complex, so there is no need for additional work on this subject.

(4) Facilities and equipment

After examination of the request made by the GOB, the following facilities and equipment are deemed necessary.

1) Facilities

(1) Library :

The following facilities will be needed for the storage and display of postgraduate level educational books and documents, including audio-visual facilities and study facilities.

Item	Surface in m2	Content
Library	1,330	Book storage room, reading room, library chief's office, administration office, audio-visual room, conference room, storage, lavatories, equipment

(2) Student laboratory :

The following facilities will be needed to cope with the new courses.

Item	Surface in m2	Content
Laboratory building	654	Applied Botany, Plant Pathology, Agronomy, and Production Technology Departments and their respective labs, lavatories, equipment

(3) Field laboratory :

Facilities for preparation and processing of field samples will be needed.

Item	Surface in m2	Content
Field laboratory building	270	Work space, storage (1), work room (2), administration office, lavatories, equipment

2) Equipment

(1) Equipment utilized for reading, study, storage and audio-visual activities

(Card cabinet, display props, office supplies, audio-visual instruments)

(2) Equipment utilized in the labs

(horticultural equipment, plant pathology equipment, crop botany equipment, agricultural extension equipment)

(3) Field labs: equipment to process samples

(seed storage, thresher and sorter, etc.)

(5) Maintenance and conservation plan

1) Maintenance plan

The actual administration will be conducted on previous lines as mentioned in 3. (1) Agencies and administration.

IPSA has the ability for competent maintenance of a library containing equipment, centering around its three present librarians some of whom have studied library maintenance in the U.S.

The new equipment in the student labs will be the same as the equipment presently used in the labs; at present, each department is responsible for the maintenance of its own equipment, and equipment used by several labs is stored together. This is the present situation regarding the maintenance of equipment and can be continued unchanged.

2) Maintenance costs

To present a clear estimate of the costs entailed after implementation of this project, it is necessary to take into account the maintenance costs of the new facilities and equipment. The budget for this was of approximately 1,500,000 taka in 1989/90. The budget for 1990/91 is 3,450,000 taka, not including equipment and facilities. The breakdown of this figure is 1,304,000 taka for labour costs, and 9,000,000 taka for utilities and miscellaneous expenses. The increase in maintenance costs after implementation of this project are thus taken into account. Moreover, the Ministry of Agriculture and the External Assistance Branch of the Ministry of Finance have discussed the budget and agreed to the increase in costs for research equipment and faculty salaries. There are no difficulties in this regard.

The 9,000,000 taka allotted to maintenance and other expenses for 1990/91 represent a significant increase over the previous year and is sufficient to cover the additional costs incurred through the implementation of this project.

The additional maintenance costs are as follows:

(1) Electricity costs

These calculations are based on the assumption that the library and field labs will be open even when the school is closed, and that only the student labs will closed.

a) costs

* library

ITEMS	ELECTRICAL LOAD OF FACILITIES	USAGE	ACTUAL ELECTRICAL LOAD
OUTLETS FOR LIGHTS	26.1kw	70%	18.2kw
POWER (AIR-CONDITIONING, VENTILATION)	13.8kw	50%	6.9kw
EQUIPMENT	5.0kw	20%	1.0kw
TOTAL	44.9kw		26.1kw

* student labs

ITEMS	ELECTRICAL LOAD OF FACILITIES	USAGE	ACTUAL ELECTRICAL LOAD
OUTLETS FOR LIGHTS	13.0kw	50%	6.5kw
POWER (REFRIGERATOR)	2.0kw	50%	1.0kw
EQUIPMENT	20.0kw	30%	6.0kw
TOTAL	42.0kw		13.5kw

Only the refrigerator and incubators will be operated while the school is closed.

Costs entailed while the school is closed: (refrigerator and incubator expenses) $5\text{kw} \times (\text{demand rate}) 30\% = 1.5\text{kw}$

* field labs

ITEMS	ELECTRICAL LOAD OF FACILITIES	USAGE	ACTUAL ELECTRICAL LOAD
OUTLETS FOR LIGHTS	3.2kw	70%	2.2kw
POWER (AIR-CONDITIONING, VENTILATION)	2.0kw	50%	1.0kw
EQUIPMENT	3.0kw	30%	0.9kw
TOTAL	8.2kw		4.1kw

b) charges

The school will be open for 8 hours/day
for 9 months/year

ITEMS	CALCULATION	COST/YEAR
DURING SEMESTER	$(26.1+13.5+4.1) \times 8\text{H} \times 30\text{D} \times 9\text{M} \times 1.45\text{TK}$	136.868 TK
OUT OF SEMESTER	$(26.1+1.5+4.1) \times 8\text{H} \times 30\text{D} \times 3\text{M} \times 1.45\text{TK}$	33.094 TK
TOTAL		169.962 TK

H:hours D:days M:months TK:taka

(2) Water costs

Since water from the well will be used, the only expense is electricity for water pumping. This is included in the electricity costs.

(3) Gas costs

The involves only gas used in experiments: the amount varies according to the school curriculum, but in any case is very small, and for this reason, we have not included the cost here.

(4) Running costs for the new facilities

Electricity only 169,962 taka/year

3) Upkeep and checks of facilities and equipment

The utilization of local materials and techniques for the construction of this project presents no problems. Upkeep of the equipment should be conducted according to a strict system of controls.

- * The equipment for the library is mainly composed of cabinets and can be satisfactorily managed by the library staff.
- * The audio-visual equipment will be selected items bought on the local market from makers with agencies in Bangladesh
- * The student labs research equipment will selected on the same lines as the existing equipment; the current management should be satisfactory.

The upkeep and maintenance of the other equipment is under consideration by IPSA, one possibility being storage of all the equipment in one area, and should not present any problems.

4. Technical Cooperation

As stated in Chapter 1, Introduction, the contents of the project-type technical cooperation plan implemented in July 1985 at IPSA are the following:

- (1) Dispatch of long-term and short-term experts
- (2) Research guidance in 6 departments
- (3) Training for faculty staff
- (4) Transfer of equipment usage technology
- (5) Evaluation of IPSA management
- (6) Evaluation and guidance on the student examinations, curriculum, research
- (7) Training programs
- (8) Consultation evaluation of technical cooperation plan application

Based on these points, the project was implemented within the framework of GOB-GOJ cooperation. In 1986, USAID entered this project in the capacity of a junior partner to Japan's technical cooperation. The contents of the cooperation from USAID are as follows:

- (1) Curriculum development
- (2) Dispatch of long-term and short-term experts
- (3) Documents, journals
- (4) Training programs

In June 1989 an evaluation was made by Japan, the U.S. and Bangladesh on the results of the project, through a trilateral evaluation team. Their conclusion was that although there had been some problems with the project, the overall result was successful due to the efforts by each country, and they recommended a 5-year Phase II to strengthen education and research at the postgraduate level by providing technical cooperation.

At the present time there are 2 Japanese long-term experts (a leader and a controlling officer), approximately 10 short-term specialists per year, and one long-term American expert, who provide guidance to the professors and students at IPSA. Phase II has already been implemented in July 1990 on the following lines:

- (1) The cooperation plan will extend over 5 years, from 1990 to 1995.
- (2) Long-term experts including a team leader, a coordinator and experts in each field, as well as short-term experts as the necessity arises, will be sent through the JICA program. Within the framework of the USAID program, several long-term and, whenever necessary, several short-term experts will be sent.
- (3) Equipment from Japan and periodicals and other documents from the U.S.A. will be provided.

If this present project is realized through grant aid from Japan, it will support even more concrete and precise education and research and will complement the technical cooperation.