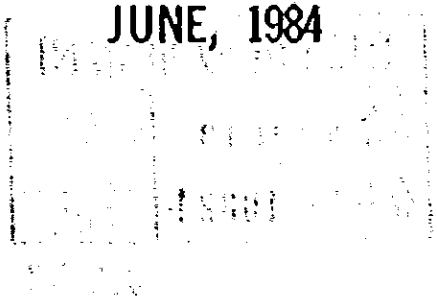
BASIC DESIGN STUDY
ON
CONSTRUCTION PROJECT
FOR
THE DEVELOPMENT
OF
THE GRADUATE PROGRAM
AT
THE FACULTY OF AGRICULTURAL ENGINEERING AND TECHNOLOGY, INSTITUT PERTANIAN BOGOR
IN
THE REPUBLIC OF INDONESIA

JUNE, 1984



JAPAN INTERNATIONAL COOPERATION AGENCY

PREFACE

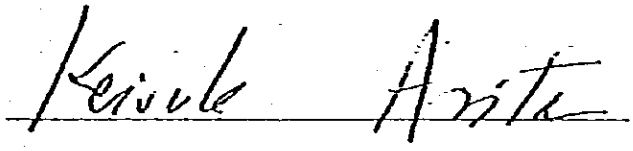
In response to the request of the Government of the Republic of Indonesia, the Government of Japan decided to conduct a Basic Design Study on the Construction Project for the Development of the Graduate Program at the Faculty of Agricultural Engineering and Technology, Institute Pertanian Bogor, and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Indonesia a study team headed by Dr. Hiroshi MORISHIMA, Professor, Faculty of Agriculture, University of Tokyo, from February 16 to March 7, 1984.

The team had discussions with the officials concerned of the Government of Indonesia and conducted a field survey in Darmaga, Bogor area. After the team returned to Japan, further studies were made and the present Report has been prepared.

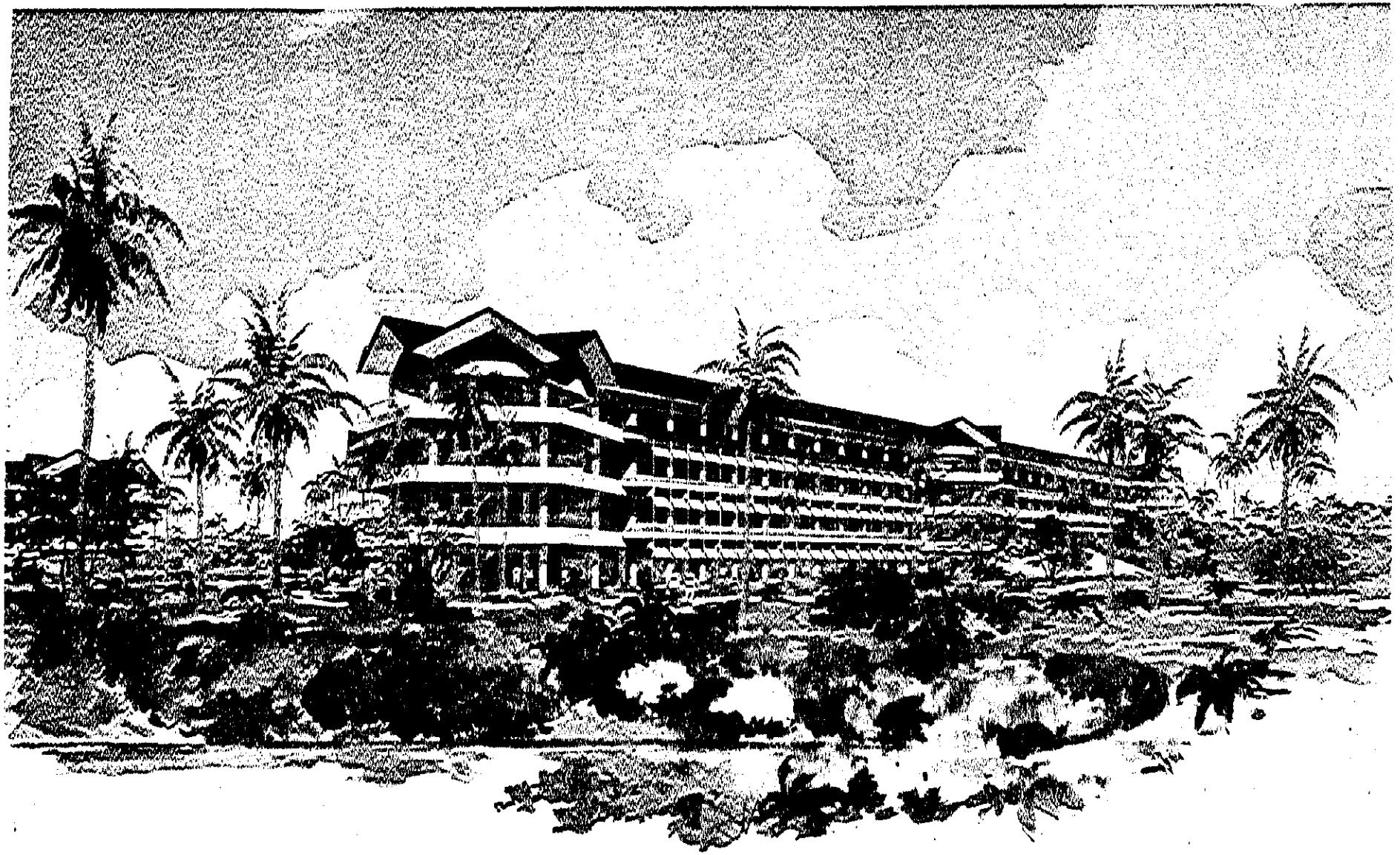
I hope that this Report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the team.

June, 1984

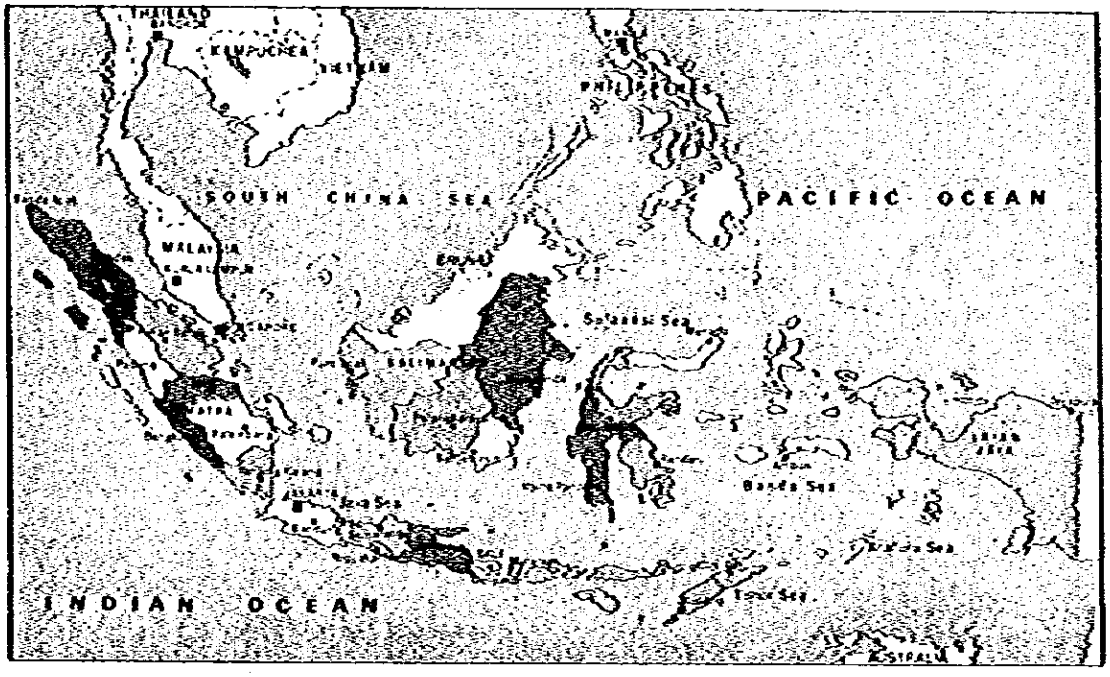


Keisuke ARITA,
President
Japan International Cooperation Agency



INSTITUT PERTANIAN BOGOR

PERSPECTIVE



MAP OF INDONESIA

PROJECT SITE

SUMMARY

SUMMARY

The Government of the Republic of Indonesia emphasizes in its new five year development plan that it intends to make maximum efforts to help alleviate the demand-supply imbalance of food by upgrading the agricultural productivity and to set up the nucleus of a national industry as a base for economic development by nurturing the agricultural industries throughout the country.

As a measure to materialize this policy, the Government of the Republic of Indonesia has been striving to upgrade the agricultural education in the country and has focused its support on the development and improvement of the Bogor Agricultural University (hereinafter referred to as Institut Pertanian Bogor or IPB) as a leading institution occupying at the most important strategic position.

In response to this policy, IPB is planning to transfer its main facilities to the Darmaga district 10 km west of Bogor and set up a master plan for the 21st-century-oriented campus planning in Darmaga (hereinafter referred to as the Master Plan) along with assistance from USAID.

Following the Master Plan, IPB has been planning to build facilities for the undergraduate program by itself. However it has become essential to start the construction project for the graduate program to materialize the graduate school development program that IPB has been enthusiastically and energetically promoting.

In the campus site, the Food Technology Development Center (hereinafter refrred to as FTDC) had already been established in 1977 as part of the Indonesian Nutrition Improvement Program supported by the World Bank and will be one of the centers of the new campus.

Japan has also extended various economic and technical assistance to the campus since 1977 mainly through the Agricultural Product Processing Pilot Plant (hereinafter referred to as AP–4) which is expected to be one of the key research and development facilities for the future academic core of the campus.

Influenced by those various incentives, the Faculty of Agricultural Engineering and Technology in IPB (hereinafter referred to as FATETA) has come to be proud of its high level research and educational performance and has been enjoying the fruitful result of continuous cooperation with Japan especially in the field of food technology.

In the meantime, IPB, together with the Netherlands and other countries, has already set up the preparatory facilities of FATETA for the time being in the site to commence its research and education activities and some basic facilities available to the undergraduate program were completed and in use in March 1984.

In other words, FATETA of IPB is actively transferring and upgrading its undergraduate program so that there might be some problems over the gradual phasing in of the academic plan without rapidly materializing the graduate school plan.

Based upon this background, the Government of the Republic of Indonesia in 1983 requested that the Government of Japan implement a grant aid program for the Construction Project for the Development of the Graduate Program at the Faculty of Agricultural Engineering and Technology at the Darmaga Campus.

In response to the above, Japanese Government has dispatched a Basic Design Study Team to Indonesia, through Japan International Cooperation Agency, headed by Professor Hiroshi Morishima, the University of Tokyo, Faculty of Agriculture, from Feb. 16th to Mar. 7th, 1984.

The objectives of the survey were to confirm the request, to study the appropriateness of the grant aid, to survey the site and related infrastructures, and also to implement the Basic Design including the planning of the facilities and its scale, and selection of equipment.

By the result of the survey, the Basic Design was implemented by the following contents and scale of the facilities.

Facilities – division head offices, academic staff rooms, research laboratories, shared laboratories, instructional laboratories, lecture rooms, graduate student rooms, technician rooms, administrative offices, meeting rooms and others.

Scale – 21,000m², four storied reinforced concrete building with appropriate equipment.

The implementing organizations extended by Indonesian counterparts for the Project are organized under the guidlines for educational administration of Ministry of Education and Culture, consisting of a steering committee led by the Rector of IPB with a working group and a technical team led by the Associate Rector II with several development sections in charge of curriculum, facilities, equipment and management.

IPB is ready for the financing of all expenses for the operation and maintenance of the facilities and equipment for the Project. Integrating all information given and received, the design of facilities and equipment were based upon the particular conditions under the hot and humid tropical climate in terms of operation and maintenance. The construction period of the Project is estimated to be 15.5 months in total.

IPB, an agro-complex university, has been expanding and upgrading for years and now stands at the summit of the hierarchical system of higher agricultural education as one of the Inter-University Centers with strong government support and one of the degree-granting universities. FATETA, the Faculty of Agricultural Engineering and Technology, is a future-oriented faculty, with high applicant ratio and high employment rate, which the Indonesian Government eagerly hopes will help raise agricultural productivity and help develop the agricultural industries. Consequently the grant aid program to the Project for the Development of the Graduate Program at the Faculty of Agricultural Engineering and Technology will surely

prove significant and be profoundly appreciated by the nation.

Furthermore, to help increase the effect of assistance for facilities and equipment, there should be reasonable continuous technical cooperation. Especially as the Project is for a higher educational institution, the technical cooperation program should be planned carefully and moreover energetically. And a Japanese implementing educational institution in charge of coordinating this cooperation, bilateral research themes and prospective researchers should be selected and recommended prudently and seriously.

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CHAPTER 4 OUTLINE OF THE PROJECT

CHAPTER 5 PROJECT EXECUTION SYSTEM

CHAPTER 6 EVALUATION OF THE PROJECT

CHAPTER 7 CONCLUSION AND RECOMMENDATION

APPENDIX

CHAPTER 1
INTRODUCTION

1 INTRODUCTION

1-1 Introduction

The Government of the Republic of Indonesia has made every effort to develop agriculture as a fundamental industry of the nation. The five year development plan, or "Repelita", emphasizes this and the importance of higher agricultural education programs.

To support this strategy, IPB was designated as one of the most important institutions in the field of higher agricultural education and has been improved and developed by means of consistent governmental support.

Taking the lead in agricultural education, IPB has set forth the philosophy of the activities of the institute for instruction, research and public services named "Tridarma" and is nominated one of the centers of an association of universities and colleges, the Inter-University Center or ICU, to help upgrade the higher educational institutions of the nation.

IPB moreover has an extremely important status as a selected institution empowered to confer academic degrees.

IPB has set up a Master Plan of the new extension project to transfer the major part of the institution to the new complex in Darmaga.

This grant aid program is expected to be a step to the materialization of the new campus plan by implementing a construction project of the facilities and equipment for the Graduate Program of the Faculty of Agricultural Engineering and Technology.

The smooth materialization of the program will make a significant contribution to the improvement of Indonesian higher agricultural education and will further strengthen relations with Japan.

1-2 Mutual Understanding

A preliminary study was carried out from Nov. 21st to 26th, 1983 and the following items were agreed on mutually.

i) The national graduate programs are to be established by 1984 to produce a considerable number of MS and PhD degree holders to cope with the shortage of researchers and specialists in the field of agriculture and agricultural education.

ii) IPB is seeking all possible assistance for the implementation of the new campus construction projects and FATETA, the Faculty of Agricultural Engineering and Technology, was considered to be developed with the assistance of the Japanese Government, because FATETA has already experienced adequate and fruitful cooperation with Japan and Japan has necessary expertise in the proposed disciplines as well as in the development of advanced qualified facilities and equipment.

iii) The executing agency for the implementation of the project is IPB, Ministry of Education and Culture.

iv) The budgetary means for the supporting infrastructures of the construction and operation of the facilities are fixed by the Government of the Republic of Indonesia.

v) The authorities concerned have understood and confirmed Japanese Grant Aid system explained by the Team, which include the principle of designation of a Japanese Consultant firm and a Japanese General Contractor for the construction of the project.

vi) The Study Team acknowledges the desire of the Indonesian Government for consideration of the triangular module concept which had been shown in IPB's Master Plan in the stage of Basic Design Study.

vii) The outline of the project is as follows;

33,560 GSM

In line with the result of the preliminary study, a basic design study team was despatched to Indonesia from Feb. 16th to Mar. 7th, 1984 and the following items were agreed mutually as elaborated in the data of this report;

i) The space allocation of the project is fixed.

ii) Ample quantity and appropriate quality of water and electricity supplied by Indonesian side are confirmed.

iii) The space and equipment requirement for each room are studied.

Buildings
Research and instructional laboratories
Classrooms and a lecture hall

Academic staff rooms
Graduate student rooms
Administration rooms
Accessory rooms

Equipment

Related equipment for the activities of the three departments, namely, the Department of Agricultural Engineering, the Department of Food Technology and Human Nutrition and the Department of Agro-industrial Technology.

Finally the outline of the project is proposed to be as follows;

21,000 GSM

The Draft Final Report Team of the Basic Design Study was sent to Indonesia to explain and refine the report from May 29th to July 5th, 1984.

Through the meetings with officials concerned, both the Japanese team and the Indonesian counterparts came to agree to the basic design.

CHAPTER 2
BACKGROUND OF THE PROJECT

2 BACKGROUND OF THE PROJECT

2-1 National Level

2-1-1 Prerequisite

There are three particular prerequisites related to the project in terms of national level background.

The First is the prerequisite from the Repelita, the Five Year Development Plan of Indonesia, in which the necessity of higher agricultural education is emphasized to solve the demand-supply – gap of researchers and specialists in the field of agriculture and agricultural education.

The Second is the prerequisite from USAID to help improve the educational circumstances of the country suffering from a shortage of educational staff and resources after the withdrawal of Dutch assistance.

The Third is the prerequisite from the Japanese cooperation having concentrated on AP-4 through long-term, continuous and various assistances.

i) Repelita

The Repelita states that agriculture is a foundation of Indonesia's economy, so the establishment of self-sufficiency, the increase of national income by export and reduction of unemployment by the development of agricultural industries are imperative for the nation.

Those policies are expected to be realized through enhancement of agricultural productivity, development of agricultural industries, improvement of product distribution system, agricultural facilities and engineering.

Among those solutions 'productivity' should be given top priority. The increase in agricultural productivity and the agro-industrial output can be achieved through the intensification and extensification program, diversification of agriculture, pre- and post-harvest handling as well as irrigation and reclamation development.

All these efforts are part of the agricultural engineering and technology which is likely to be a technology of tomorrow enhanced by sophisticated, high technology development.

ii) USAID

The contribution of USAID to the development of IPB has a long history. The first phase of the history is from 1957 to 1980 when a graduate student exchange program was established to increase number of the professors with American MS and PhD degrees.

The second phase was from 1980 to 1984 when the Master Plan was prepared by IPB with the University of Wisconsin, Perkins & Will and Sangkuriang, consultants from Chicago and Bandung, respectively.

In the meantime,the Agricultural Graduate School Development Project was implemented by IPB and the University of Wisconsin.

The third phase was from 1984 when the IRC & ESC was designed and is being constructed strictly in accordance to the Master Plan.

USAID has continuously and consistently contributed to the development of IPB and especially to the new complex in Darmaga and is expected to play a major role in the materialization of the new extension of IPB up to the 21st century.

iii) AP–4

Since 1977 Japan has tried to help upgrade the food processing technology of the nation through its economic and technical assistance to the AP–4 in the Darmaga site where not only training but also research and instruction of food processing has been carried out by the cooperation of IPB academic staff and Japanese experts.

Upgrading the research function, setting up an experiment and practical training program, training of the FATETA staff and students are evaluated to be very fruitful and effective by the Indonesian Government as stated in the Summary Report of Evaluation signed July 12, 1982 and in the project proposal.

Fourteen percent (14%) of the subjects of Agricultural Engineering Department, and 25% of Agricultural Product Processing Department, and 21% of Agro-industrial Technology are instructed in AP–4 making use of either the process lines or supporting laboratories or both.

Thus the report states that the impact of AP–4, the pilot plant and the supporting facilities, upon the Curriculum of FATETA is just in line with the national target of promoting and supporting agricultural technology of Indonesia.

2–1–2 Project Proposal

The proposed project outline set out by the Indonesian Government to the Japanese Government was originally to meet the demand from the figure in the year 2000 of IPB–FATETA just as big as the final volume of the projected space arrangement studied for the 21st century in the Master Plan with 33,550 GSM facilities.

On the other hand, the proposal described the project to be focused on the end of Repelita IV, 1988 expected to handle 12,000 IPB students, 1,650 FATETA students and 1,650 students in the Faculty of Fisheries.

Through the survey of the basic design study, such special characteristics of the project were pinpointed as long-range development project, complex project for graduate program (hereinafter referred to as GP) and undergraduate program (hereinafter referred to as UGP), and academic facilities on triangular module grid set in the Master Plan.

As a result of study on those surveys and discussions the outline of the project is basically set up on conditions that firstly the space requirement to the project meet the demand of 1990 to eliminate the unreasonable vacant ratio of facilities and unused rate of equipment.

Secondly the project should effectively focus on the GP of FATETA so as to help realize the continuous and multiple economic and technical cooperations to the institution despite the fact that this project is being limited to the provision of facilities and equipment.

Thirdly this project should be in accordance with the Master Plan as total architectural criterion, while at the same time it should be designed according to the special function of FATETA as partial criteria.

However the planning of the facilities and listing up of the equipment should be carried out carefully considering that the academic facilities plan as a hardware and the academic plan as a software of IPB–FATETA should be flexible to manage the gradually changing demand up to the year 2000 and the basically excluded UGP should be studied to find out ways of possible inclusion in the academic facilities. It is not likely to be easy to find out a way to design facilities exactly following a Master Plan when the design is scheduled to be under an economic cooperation program which has its own institutional and technological restrictions.

There are four phases for the implementation as follows.

FATETA – 1990 – GP
(Graduate Program up to 1990)

FATETA – 1990 –UGP+GP
(Undergraduate and Graduate Program up to 1990)

FATETA – 2000 – GP
(Graduate Program up to 2000)

FATETA – 2000 – UGP+GP
(Undergraduate and Graduate Program up to 2000)

Basically the scope of the project is to implement FATETA – 1990 – GP

Some expansions especially of lecture rooms can make FATETA – 1990 – UGP + GP realizable. Changing technology and engineering force FATETA – 2000 – GP to have expansions for sophisticated laboratories.

FATETA – 2000 – UGP + GP should be planned previously and carefully so as not to disturb the projected spatial arrangement already established.

2–1–3 Educational Circumstances

The institutional frame of Indonesian education is shown in Fig-2. The compulsory education is enforced only at the primary school level. Gross number of students in various educational institution is in Table 10, Chapter 6.

Generally, duration of university instruction is five year term while in IPB it is only four year term for students to get 'Ir' (Sarjana) degree as in 'Program of Instruction' cited from Academic Plan of IPB.

There are 43 national universities and 30 private universities in which more than 26 universities have the faculties of agriculture and more than 6 universities have the courses offering agricultural engineering and technology.

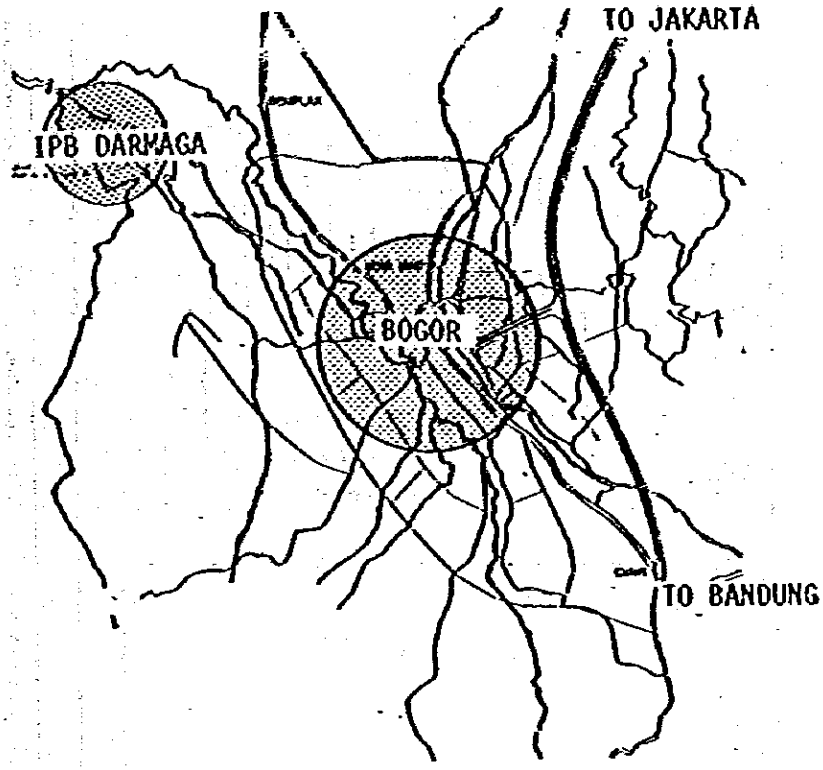
IPB has the faculty of the special field, the Agricultural Engineering and Technology (FATETA), while only Gadjah Mada University has its own Faculty of Agricultural Technology alike.

Indonesia is an agricultural country where 66% of adults work for agriculture with only 30% of GNP comes from agriculture. From the total 30% of the land is arable, yet only 11% is used as farm land. The population of Indonesia increases at the rate of 2% during Repelita and estimated to reach 262 million by the 21st century.

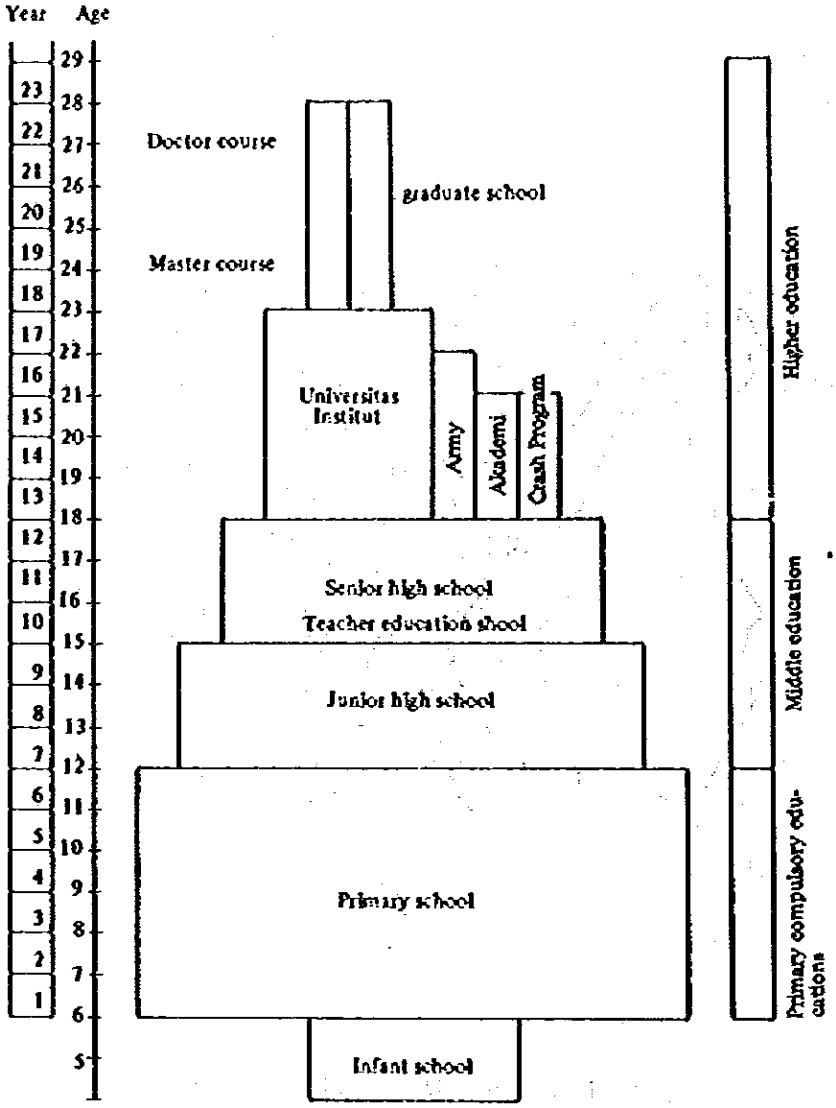
In order to restore the imbalance of food demand and supply, the Government of the Republic of Indonesia has made all effort to increase and upgrade the manpower in agricultural field. As in Table–15 and 16, the need for agricultural specialists will be five times as much as the current projected value.

On the basis of this consideration, FATETA staff should be kept as much as five times the present condition to keep up with the demand explosion. In line with this context, expectation for IPB to help resolve the national problems has been growing up forcing IPB to take appropriate measures to expand its capacity and ability.

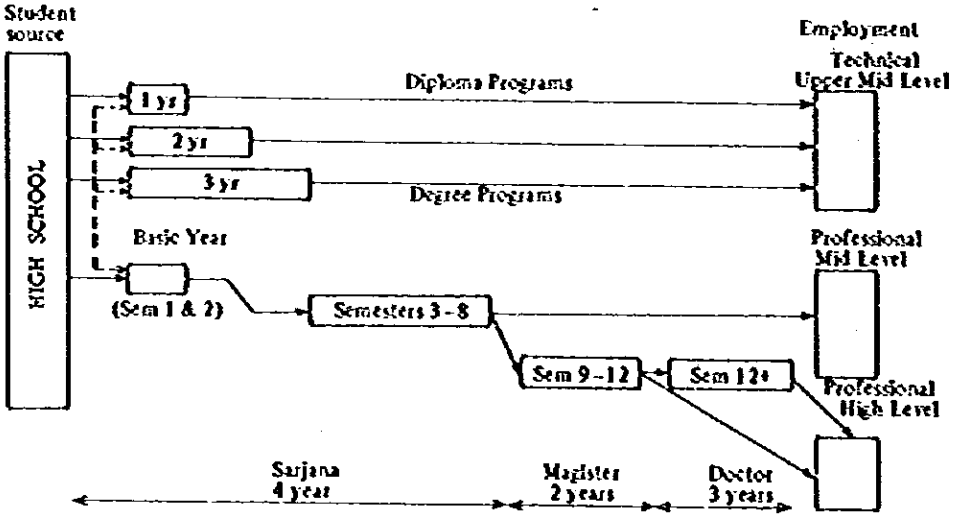
	Total Projections of Students	Students in Agricultural Department
Alandas (Padam)	3,526	739
Bogor (Bogor)	6,000	6,000
Blawja (East Jawa)	9,326	1,587
Gadjah Mada (Yogyakarta)	17,274	582
Jonbia (East Jawa)	6,651	684
Sliwja (Polerba)	–	435



Fig–1 Location of Darmaga Campus (D–8)



Fig–2 Educational Institution in Indonesia (D–8)



Fig–3 Program of Instruction

2–2 Project Level

2–2–1 Outline of IPB

i) History

As a background to the project in its project level, IPB's history should be mentioned in brief.

IPB has a long history from the establishment by the Dutch of vocational schools for Agriculture, Forestry and Veterinary Medicine in Bogor. In 1940 the two first schools joined to form an institute of higher agricultural education as the Faculty of Agriculture. During the War, it was closed and reopened in 1946 along with new Faculty of Veterinary Studies.

In 1950 IPB became a part of the University of Indonesia and in 1954 the Faculty of Veterinary Studies was divided to two majors, Veterinary Medicine and of Animal Husbandry. From 1954 to 1957 the University suffered a serious shortage of academic staff due to the withdrawal of Dutch assistance.

Indonesia asked the United States to help overcome the difficulties and a cooperative relationship which was established between the University of Kentucky and the University of Indonesia, an affiliation which actually started at the end of 1957.

The shortage of higher agricultural education graduates become evident and all possible effort was extended to solve the problem. After energetic studies and enthusiastic efforts a new higher Indonesian educational system was created, combining the European and the American systems.

Thus in the new system, a philosophy called 'Tridarma' for instruction, research and public services was established as the basis of the system.

In 1960, the Faculty of Agriculture consisted of three fields of study, Agricultural Economics, Agricultural and Natural Science, and Forestry. In 1962 the Faculty of Veterinary Medicine and Animal Husbandry incorporated a new field of study, Fisheries.

In 1963 IPB was recognized as independent and approved institution comprising agro-complex faculties by a Letter of Decision from the Ministry of Education and Culture, authorized by the President.

In 1964 the Faculty of Agricultural Mechanization and Products Technology was established. The Faculty of (1) Agriculture, (2) Veterinary Medicine, (3) Animal Husbandry, (4) Fisheries, (5) Forestry and (6) Agricultural Mechanization and Products Technology composed the line-up of the revamped institute.

In 1969 MUCIA, the Mid-West Universities Consortium for International Activities, and Indonesian Ministry of Education and Culture agreed to a cooperative program to cover the period from 1970 to 1980 for institution building activities through staff training

and curriculum revisions which was to strengthen all six IPB faculties.

In 1980 a regulation, PP05–1980 was issued to improve Indonesian higher education through helping realize uniformity of universities. PP05–1980 encourages IPB to reorganize the institution to have two more faculties, one for the Graduate Program and the other for Diploma. The Faculty of Mathematics and Natural Science was included in the line-up at the same time. Accordingly the number of IPB faculties is now nine.

The development of the IPB necessitated the cooperation of national and such international institutions as from Japan, the Netherlands, France and the United States. The cooperative relation with the United States has been strong particularly through the connection with the University of Wisconsin over the IPB/UW Graduate School Program and the establishment of the Darmaga Campus Master Plan.

ii) Faculties

As in i) there are nine faculties including GP and Diploma. In a sense there are seven faculties related to the undergraduate program of IPB.

1. Faculty of Agriculture

   Agronomy
   Soil Science
   Plant Pests and Diseases
   Community Nutrition and Family Resources
   Agri-business
   Agricultural Extension

2. Faculty of Veterinary Medicine

   Veterinary Medicine

   a. Science course
   b. Professional stream
   c. Doctor of Veterinary Medicine

3. Faculty of Fisheries

   Water Resource Management
   Aquaculture
   Fishing Methods

4. Faculty of Animal Science

5. Faculty of Forestry

   Forestry

   a. Forest Management
   b. Forest Utilization
   c. Forest Conservation and Wildlife Management

6. Faculty of Agricultural Engineering and Technology
   Agricultural Engineering
   Agro-industrial Technology
   Food Technology and Human Nutrition

7. Faculty of Mathematics and Natural Sciences.
   Statistics and Computation
   Agro-meteorology
   Biology
   Chemistry

The gradual projections for the number of IPB students and academic staff from 1980 to 2000 are listed in Table–1. The number of each faculty's students in year 2000 is broken down in Table–2.

Table–1 Projected Number of IPB Students and Academic Staff from 1980 to 200 (D–2)

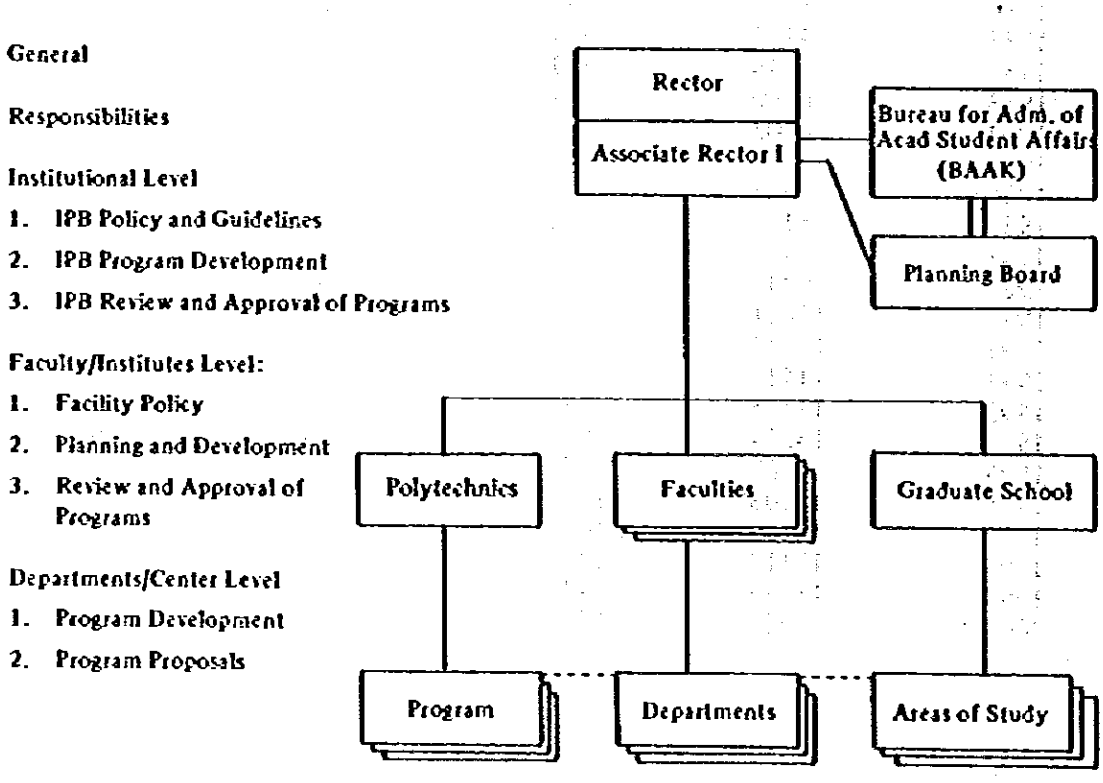
Year	Number of student	FTE Teaching Staff	Replacement & New Staff	Number of Departments
1980	5000	333	31	21
1981	5360	357	33	21
1982	5746	383	35	21
1983	6160	411	38	21
1984	6603	440	40	21
1985	7078	472	43	21
1986	7588	506	46	21
1987	8134	542	50	22
1988	8720	581	53	23
1989	9348	623	57	25
1990	10021	668	61	26
1991	10743	716	66	28
1992	11516	768	71	30
1993	12345	823	77	33
1994	13234	882	81	35
1995	14187	946	87	38
1996	15208	1014	93	40
1997	16304	1087	100	43
1998	17417	1165	107	46
1999	18736	1244	115	50
2000	20085	1339	123	53

Table–2 Broken Down Number of IPB Students in Each Faculty (D–2)

Faculty	No. Students by Program Objective				Total
	S_1	S_2	S_3	S_0	
Agriculture	4950	450	200	600	6200
Veterinary Medicine	1320	100	70	150	1640
Fisheries	1980	50	30	250	2285
Animal Science	1980	100	50	250	2355
Forestry	2310	100	50	300	2760
Agricultural Technology	2310	100	50	300	2760
Mathematics Engineering & Natural Science	1650	50	50	200	1950
Total	16500	950	500	2050	20000

iii) Organization

The organization of instruction administration is shown in Fig–4. As noted in i) the Graduate School is independent from the disciplinary faculties as one faculty. The Diploma Training Program is the responsibility of the polytechnic faculty as shown in Fig–4.



Fig–4 Instruction Administration (D–2)

The organization of research administration is shown in Fig--5. Under each faculty departments are operated respectively and independently while being supported by centers and experimental stations. Under Associate Rector I, a head for the research institute is established to control all research activities in IPB.

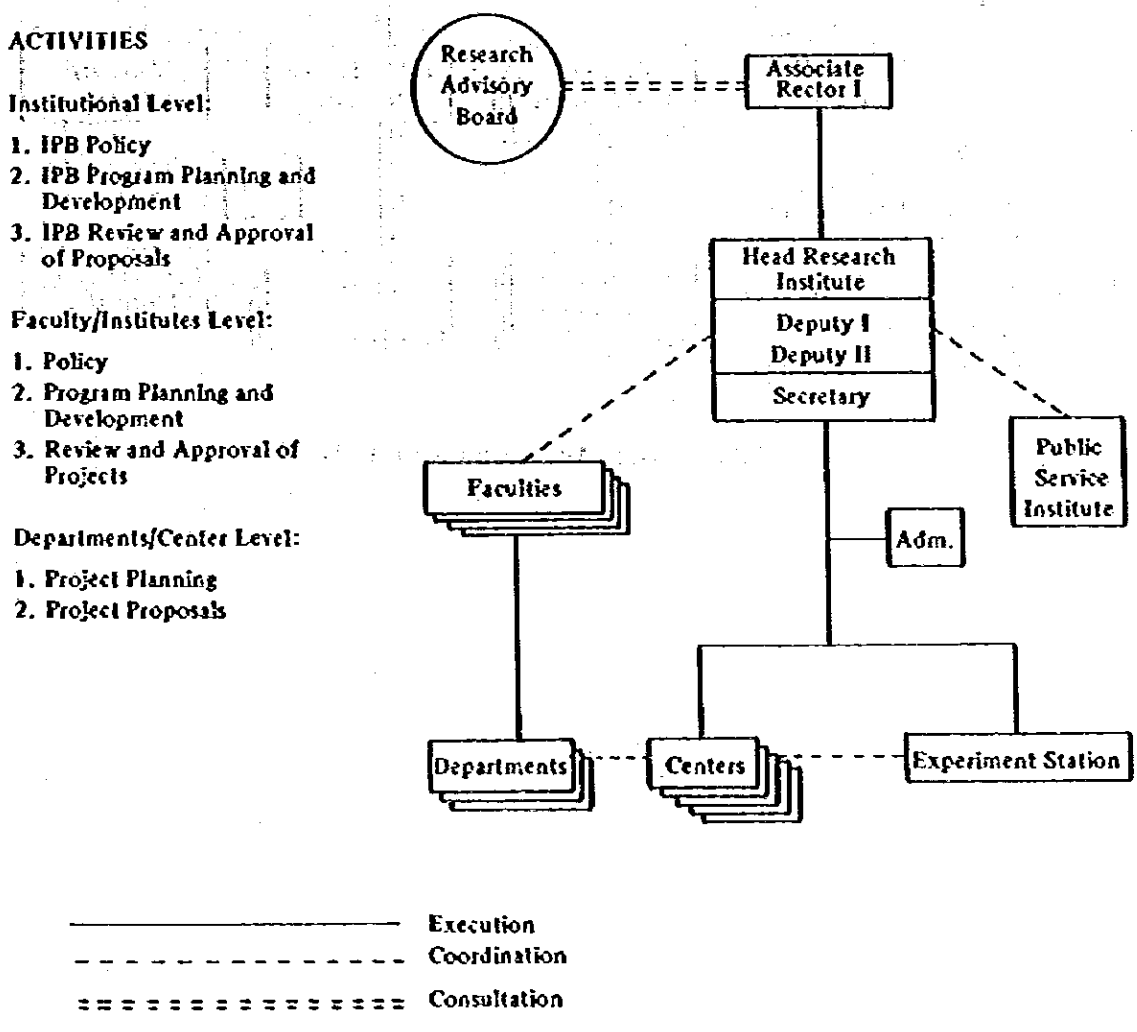


Fig--5 Research Administration (D--2)

The organization of public service administration is in Public Service Institute in IPB. The execution of public services is to be carried out through Centers and Communication Media Units.

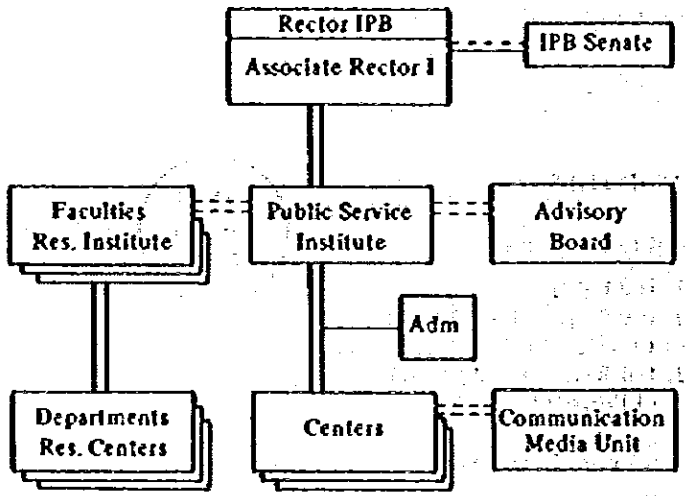
But as shown in Fig–6 each faculty or each department will manage the services through the consultation with the Public Service Institute.

ACTIVITIES

I. Institutional Level:
   1. IPB Policy
   2. IPB Planning and Department
   3. IPB Review and Approval of Program Proposals

II. Faculty/Institutes Level:
   1. Policy
   2. Planning and Development
   3. Review and Approval of Projects

III. Departments/Center Level:
   1. Project Planning
   2. Project Proposals



Fig–6 Public Service Administration (D–2)

The organization of program management in IPB is shown in Fig–7. Centers belong to the Institute and curriculum are to be set up at Faculty/University level.

RESPONSIBILITIES

Institution (IPB) Level

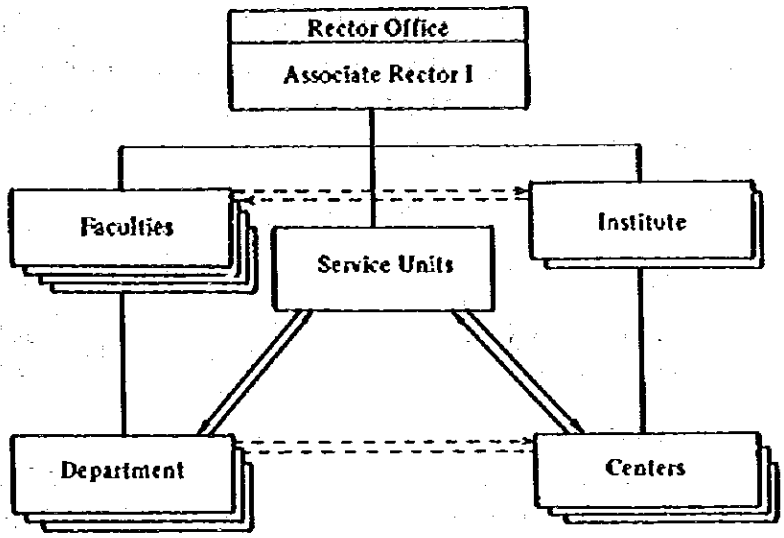
1. Program* Approval
2. Program Monitoring & Evaluation

Faculty/Institutes Level:

1. Project ** Approval
2. Project Monitoring and Evaluation

Departments/Center Level:

1. Project Execution
2. Project Reporting



* Program of Instruction, research and public services
** Projects includes curricula.

Fig–7 IPB Program Management (D–2)

2–2–2 Outline of Darmaga Campus

The site is 10km west of Bogor municipality surrounded by rural villages with various plantations and farms. To cope with the rapidly increasing educational, research and social activities, IPB planned to set up a new complex in the site.

A Master Plan was drawn up by IPB with the University of Wisconsin, Perkins & Will, a consultant from Chicago, and Sangkuriang, a consultant from Bandung, financed by the Government of Indonesia and USAID. Various facilities have been built, some of which will form part of the future complex.

The existing facilities are as follows;

AP–4	
Agriculture Product	806 m²
Processing Pilot Plant	O
FTDC	
Food Technology	2,540 m²
Development Center	O
APL	
Aerial Photo	754 m²
Laboratories	O
FATETA–UGP	
Basic Instructionals	1,480 m²
for DAE, DFT & DIT	X
FORESTRY	
Faculty of	4,730 m²
Forestry	O
HOUSING	764 m²
Staff housing	X
SPORTS HALL	
Sports and Assembly	1,854 m²
Hall	O
DORMITORY	502 m²
Dormitories	X

O: Facilities, to form part of the new complex

X: Facilities, that will not form part of the new complex

2–2–3 Outline of FATETA

The concept of the Faculty of Agricultural Engineering and Technology, herein called FATETA, is a little bit different from that of Japan including that of Agro-chemistry and/or Food Technology.

There are three departments with different objectives respectively;

(1) the objective of the Department of Agricultural Engineering (hereinafter refferd to as DAE) is mechnization and industrialization of agriculture.

(2) the objective of the Department of Food Technology and Human Nutrition (hereinafter refferd to as DFT) is the industrialization of food processing and utilization.

(3) the objective of the Department of Agro-industrial Technology (hereinafter refferd to as DIT) is the industrialization of agricultural products.

The students permitted to enter FATETA are well selected from many fields through high level examinations, and the present enrolled number of 800 being broken down to 745 for UGP and 55 for GP.

By 1990 the number of student enrollment will be 1800 including 150 for GP. By the year 2000 that will be 2000 with 200 for GP. The graduates from the faculty are welcomed by various governmental and private institutions as shown in Table–3.

Private enterprises are expected to increase their employment of the graduates.

Table–3 Graduate's Employment from FATETA.

Employment	Total	Percentage
1. Higher Education	80	11
2. Research and Development	92	13
3. Government Enterprise	102	14
4. Industry	120	16
5. Private Enterprise	35	5
6. Others	300	41
Total	729	100

2–2–4 Local Surroundings

Bogor is 65 km south of Jakarta along the way to Bandung. As the city, Bogor is located in the center of Agricultural district in West Java from where 27% of IPB undergraduate students are studying.

There are already some establishments for national research and development centers to help make it easy for the specialists in IPB to carry out interdisciplinary and cooperative research and development projects effectively and efficiently.

i) Ministry of Agriculture

1. CRFC (Central Research Institute for Food Crops)
2. Animal Research Center
3. Plant Pest and Disease Research Center
4. Agro-economic Research Center
5. Scientific Library

ii) Ministry of Forestry

1. Wildlife Research Center
2. Forest Research Center

iii) LIPI (National Institute of Sciences)

1. Biological Research Center
2. Botanical Garden
3. Zoological Museum

iv) Ministry of Health

1. Nutrition Research Center

As local surroundings, the climate of Bogor is quite fit to the university establishment. Green leaves, breeze of unpolluted air, pure streams and quiet country sceneries are the idealistic environment for educational and research activities. All are the characteristics of Bogor. Because of its elevation, 200m higher than Jakarta, the weather in Bogor is 2 degrees lower than that of the Capital.

Blessed with those environmental condition, the site of Darmaga is to be a pleasant place for educational activities and therefore is appropriately prepared to be the 21st-century-type educational and research complex conducive to realizing the national strategy to bring about a productive agricultural structure in Indonesia.

CHAPTER 3
SITE CONDITIONS

3. SITE CONDITIONS

3-1 Proposed Construction Site

The proposed site, Darmaga Campus, IPB, is situated 10 km west of the center of Bogor City, a city with a population of about 300,000.

The site can be reached from Bogor within 30 minutes by various forms of transportation. The proposed site is inclined from north to south, but under the Master Plan it will be graded by the Indonesian side.

The final land survey and soil investigation are now being carried out by the Indonesian side and shall be completed and the relevant data shall be handed over to the Japanese side by early June.

The condition of the approach road to the site is good and access road to FATETA will be prepared by Indonesian side prior to the completion of the construction.

3–2 Infrastructure

3–2–1 Electric Power Supply

i) Power Distribution Line

PLN (State Electricity Enterprise) 6kV power distribution line is installed and supplying power to existing facilities on the compus site. At present, there is no 6kV power distribution line neer the projected site. As for the project, 20kV or 6kV distribution line shall be newly installed inside the campus and to supply power to the proposed facilities.

ii) Supply Voltage

Power supply voltage to the existing facilities is 220 V/127 V which is dropped down from the aforementioned 6 kV power distribution line. As for the project, power supply voltage shall be 380 V/220 V (Indonesian standard voltage) which is dropped down from the 20 kV and 6 kV power distribution line.

iii) Voltage Fluctuation and Power Failure

From the survey of existing facilities, there are many experimental and research equipments which have their own automatic voltage regulator, and the voltage fluctuation can be thought to be over + 10% to – 10%. Power failures occur frequently, and durations are not constant.

This exerts a bad influence on the experimental and research activities. When power supply for the Project is led from the newly installed 20kV distribution line, it is expected that the condition above will be alleviated, but not completely solved so as not to have a bad influence on the experiment and research activities.

Consequently, to meet the requirements of the experimental and research activiites, automatic voltage regulator shall be required for some equipment.

iv) Application of Power Receiving

1) Permanent Power Supply

The actual necessary period to receive permanent power is at least 8 months, 2 months for preparing application documents and 6 months for receiving power after the application.

All these applications shall be done by the Indonesian side. As for the Japanese side, early submission of necessary drawings, and close cooperation with the Indonesian side will be necessary.

2) Temporary Power Supply

The period to receive temporary power for construction is same as of permanent power.

3–2–2 Telephone System

There is now a telephone line available for the Darmaga Campus.

The Information Resources Center, now under construction, is scheduled to install an electronic PABX.

At present, there is no communication system such as interphone, etc. among the facilities of Darmaga Campus. This causes inefficiency in the activities. In the Project, such a communication system must be considered to enhance the efficiency of the activities.

3–2–3 Water Supply System

i) Water Source

At present, water is taken from a river north of the site and supplied to the existing facilities. For the Project, water shall be taken from a river south of the site, and after the treatment, it shall be pumped up to an elevated tank and supplied to the facilities by gravity.

ii) Water Quality

It is not suitable for drinking. It must be boiled to use as drinking water.

iii) Water Capacity

Capacity of intake water from the river is;
Rainy season 2.7 m^3/sec.
Dry season 1.0 m^3/sec.

3–2–4 Drainage System

i) Soil and waste water are treated by permeation system after leading into the septic tank.

ii) Drainage from the laboratory is neutralized, then led to the same septic tank of soil and waste water.

iii) Storm water can be discharged to the lake south of the site.

3–2–5 Gas Installation

LPG are used. Supply system is the separate supply system with LPG cylinder (45 kg and 13 kg cylinders are available).

3–2–6 Incinerator Installation

Existing incinerator is not working because of imperfect combustion. For the Project, forced combustion type incinerator should be installed considering the present situation and pollution.

3–2–7 Others

At present, rat damage occurs in Darmaga Campus. Some countermeasures such as piping or ducting should be considered for installation of electric wires and cables.

3-3 Climatic Environment (Darmaga District)

The climatic environment in Darmaga is as in Table-4.

Table-4 Climatic Data in Darmaga (D-12)

Item \ Month		1	2	3	4	5	6	7	8	9	10	11	12
Temperature °C	Mean	25.0	25.0	25.7	25.5	25.7	25.4	24.9	25.2	25.5	25.8	25.8	25.1
	Maximum	29.3	30.0	30.5	31.2	31.5	31.1	31.2	31.4	31.9	32.3	31.2	29.8
	Minimum	22.0	22.1	22.3	22.2	21.8	21.3	20.1	20.7	21.1	21.4	22.2	21.7
Humidity (%)		88	88	88	87	85	83	81	81	82	82	85	88
Rate of Sunshine (%)		31	42	39	60	61	70	80	81	72	74	52	42
Precipitation (mm)		541	293	334	354	227	223	261	161	464	390	373	327

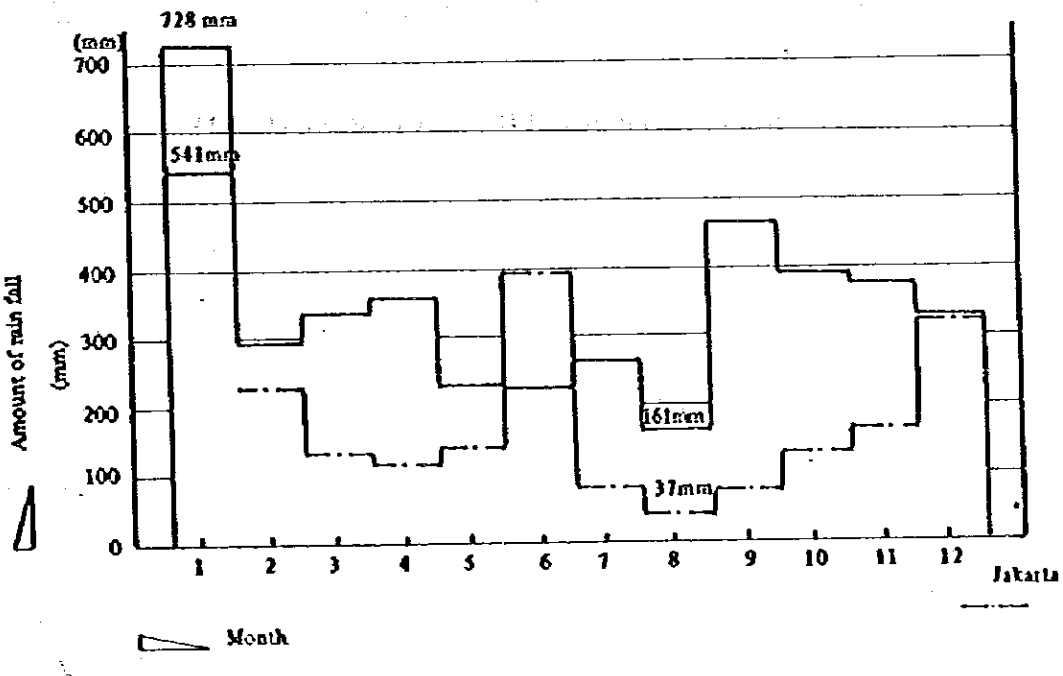
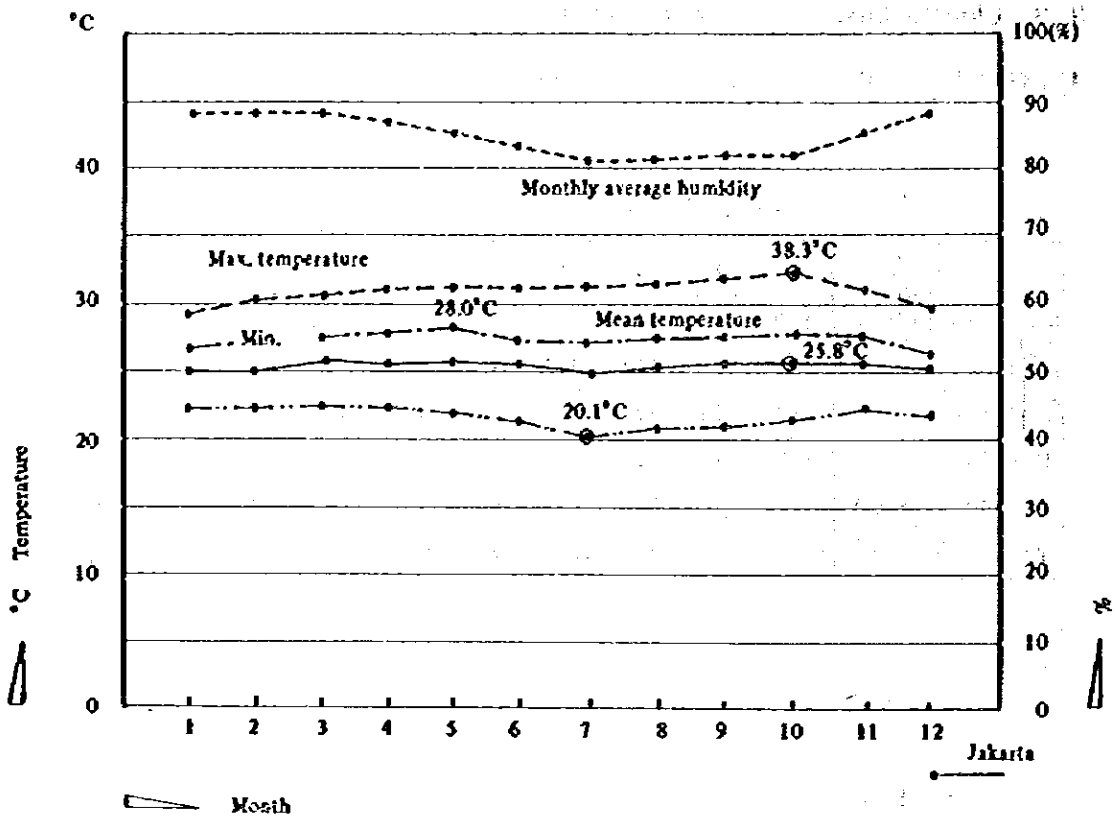


Fig-8 Monthly Average Amount of Rainfall in Bogor (D-11)



Fig–9 Temperature and Humidty of Bogor (D–11)

CHAPTER 4
OUTLINE OF THE PROJECT

4. OUTLINE OF THE PROJECT

4-1 Objective

4-1-1 FATETA Development Project

i) Objectives

The objectives of this project are to contribute to the new Indonesian policy outlined in Repelita IV to help upgrade the agricultural engineering and technology to lesson the demand-supply-gap of food through increasing the productivity in the field by strengthening the educational, research and social service programs of higher agricultural education bodies.

As the top institution, having been designated as one of the core of 12 inter-university centers and selected as a degree granting institution, IPB is expected to play a major role in this national development strategy.

FATETA is certain to be one of the most progressive and creative faculties in IPB. And now various projects are planned to form a gigantic complex in Darmaga financed by Indonesia, the United States, the Netherlands, and other countries.

The 21st century oriented picture of the complex was painted by IPB together with the University of Wisconsin supported by a U.S. and an Indonesian consultant. This construction project will form the main part of its academic core in the huge urban complex facilities so as to develop the graduate program at the Faculty of Agricultural Engineering and Technology, IPB, Bogor.

The student enrollment should be increased; the academic staff projections should be enriched; the research programs should be varied and upgraded; the instructional program should be improved and developed; and the social service programs should be carried out effectively.

All those targets should be in line with the Academic Plan IPB has already established and all the activities are expected to be realized in a frame as in the Master Plan IPB has designed and followed up so far.

All the conditions should work positively to the grant aid program not to pose difficulties or constraints on it but to pave way toward significant and effective contribution of it to FATETA, IPB and Indonesia.

ii) Management Plan

The projections for the academic staff can be calculated by studying the academic plan.

In particular, the projections for the educational staff are made on the basis of the curriculum and projection of students.

Here is a table from IPB's Academic Plan (P-115).

Table–5 Projected Staff in 2000 IPB (D–2)

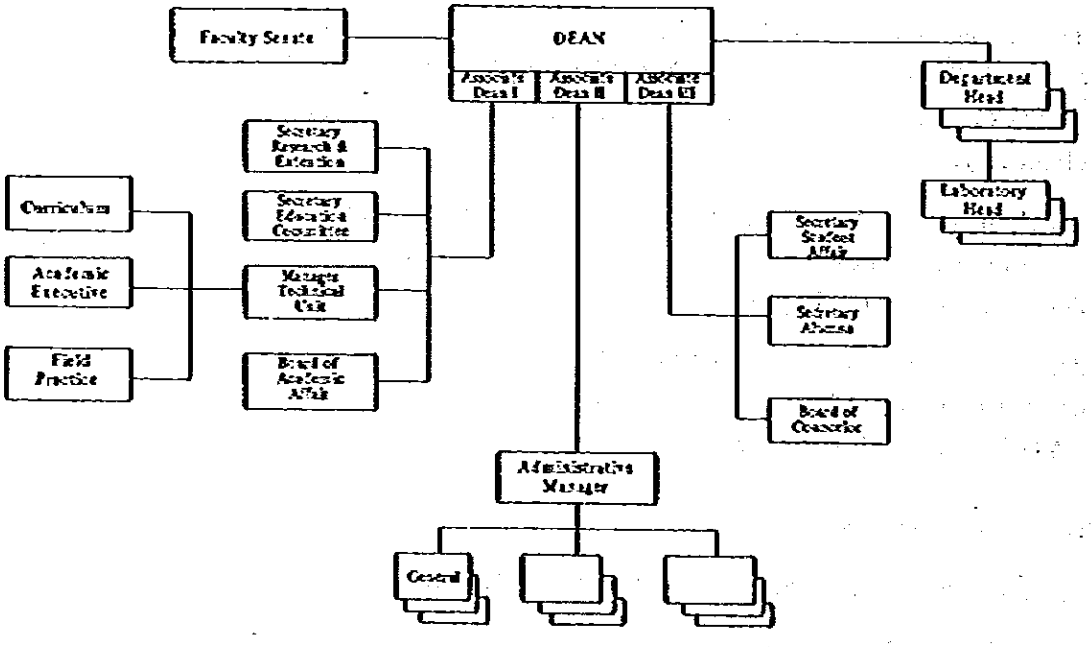
Projected Staff Requirements
For All IPB Programs the year 2000

Program of Instruction	FTE Staff Required for:				Total
	Instruction	Research	Pub. Serv.	Adm.	
S_0	100	15	15	18	148
S_2 and S_3	120	171	86	51	428
S_1	888	190	190	318	1,586
Total	1,108	376	291	387	2,162

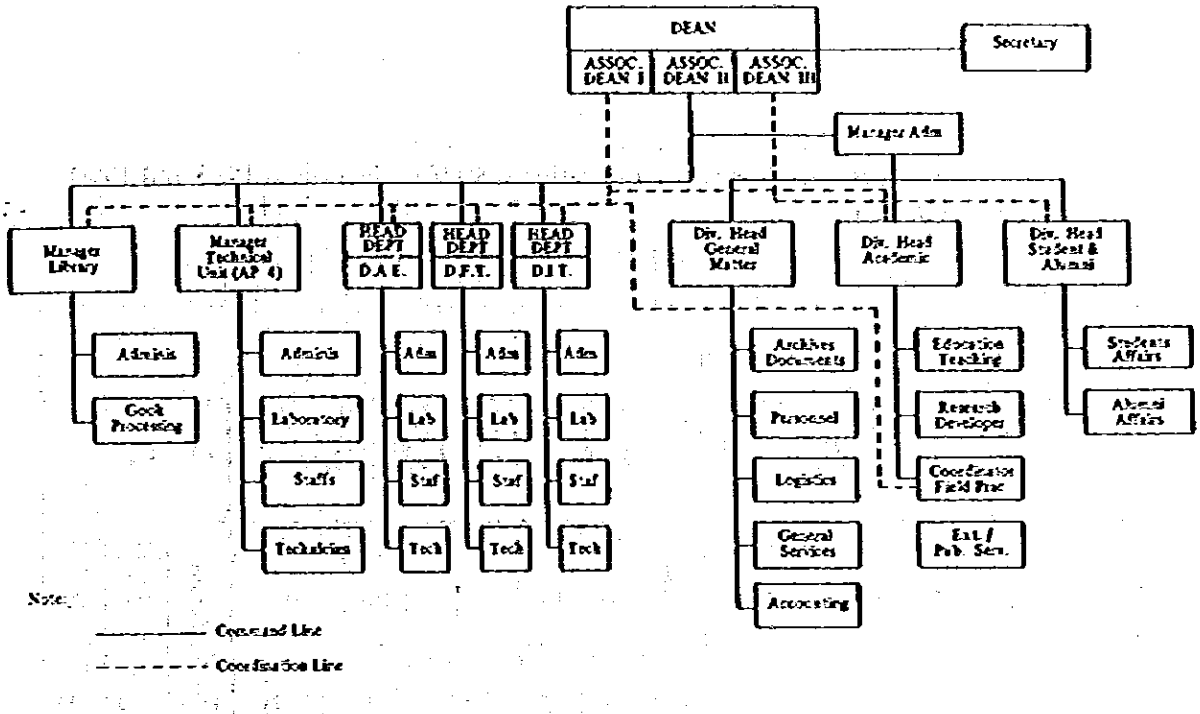
The projected administrative staff requirement for all IPB programs by the year 2000 is 387. The 1990 project achievement rate is estimated to be 50% of year 2000 and FATETA share in IPB is 14% so that FATETA 1990 share to IPB 2000 is computed to be 7%. From this calculation, the administrative staff shall be projected to be 28.

IPB requests for the time being 40 administrative staff for FATETA Faculty, 10 for each department and 7 executive rooms all including secretarial and service assistants.

Fig–10 and 11 show the Administrative chart of FATETA which explains the size of the request.



Fig–10 Administrative Flow of FATETA



Fig–11 Administrative Organization of FATETA

iii) Academic Plan

Table–6–1 shows the student enrollment and projected aducational staff calculated from the data of the Preliminary Study and Basic Design Study.

It can be seen that the equality of each department is being gradually realized. Roughly more than twice the projections are going to be by 1990.

Table–6–2 shows the academic plan by the year 2000 of FATETA in which the projections are likely to be again doubled from year 1990.

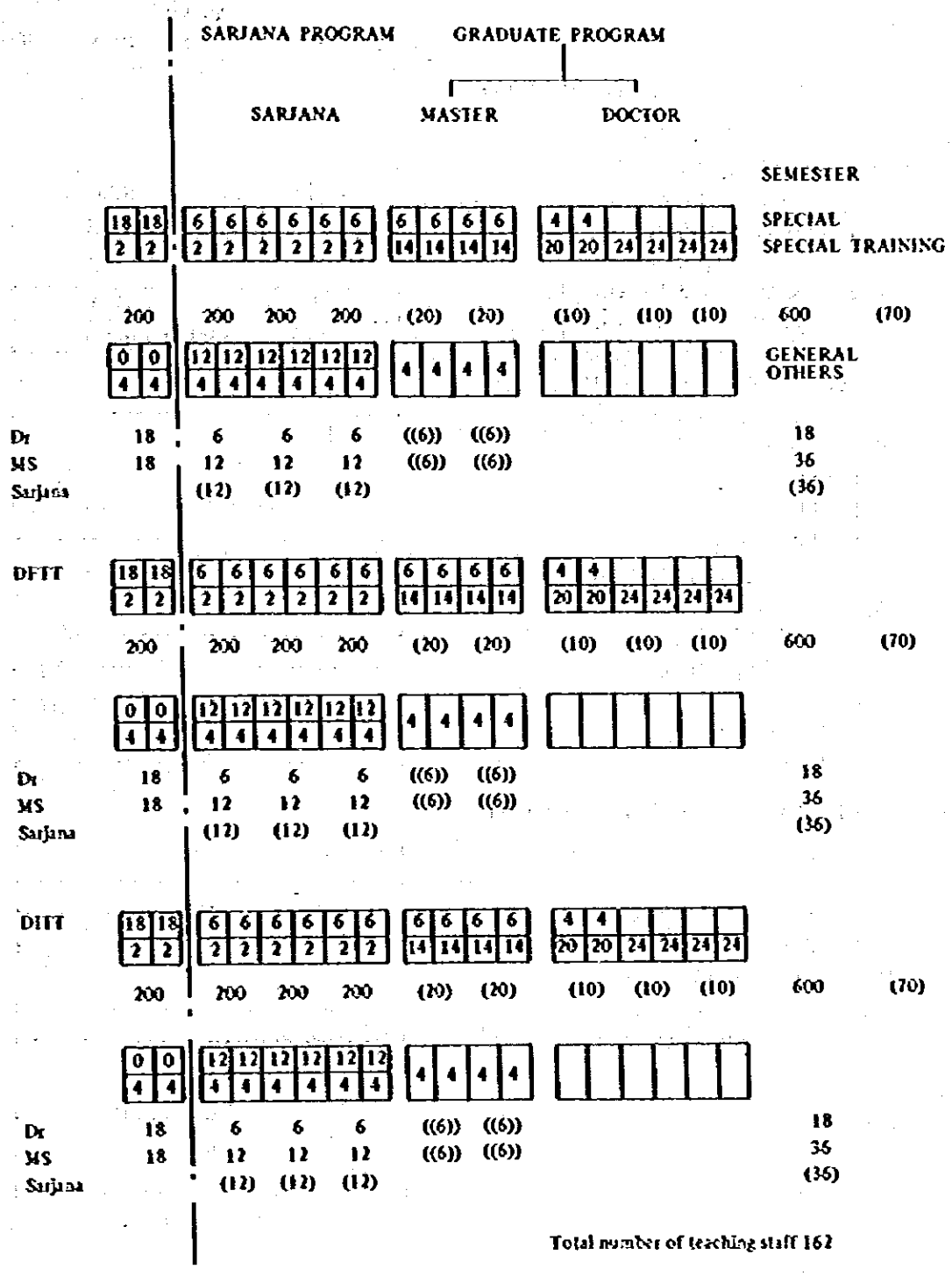
The major assumptions used as the basis for Table–6–1 and 6–2 are from the Academic Plan by IPB while some recommendations are set out to be the basis for some alteration to the original projection such as the equality among the departments, the composition of subjects, and the number of academic staff.

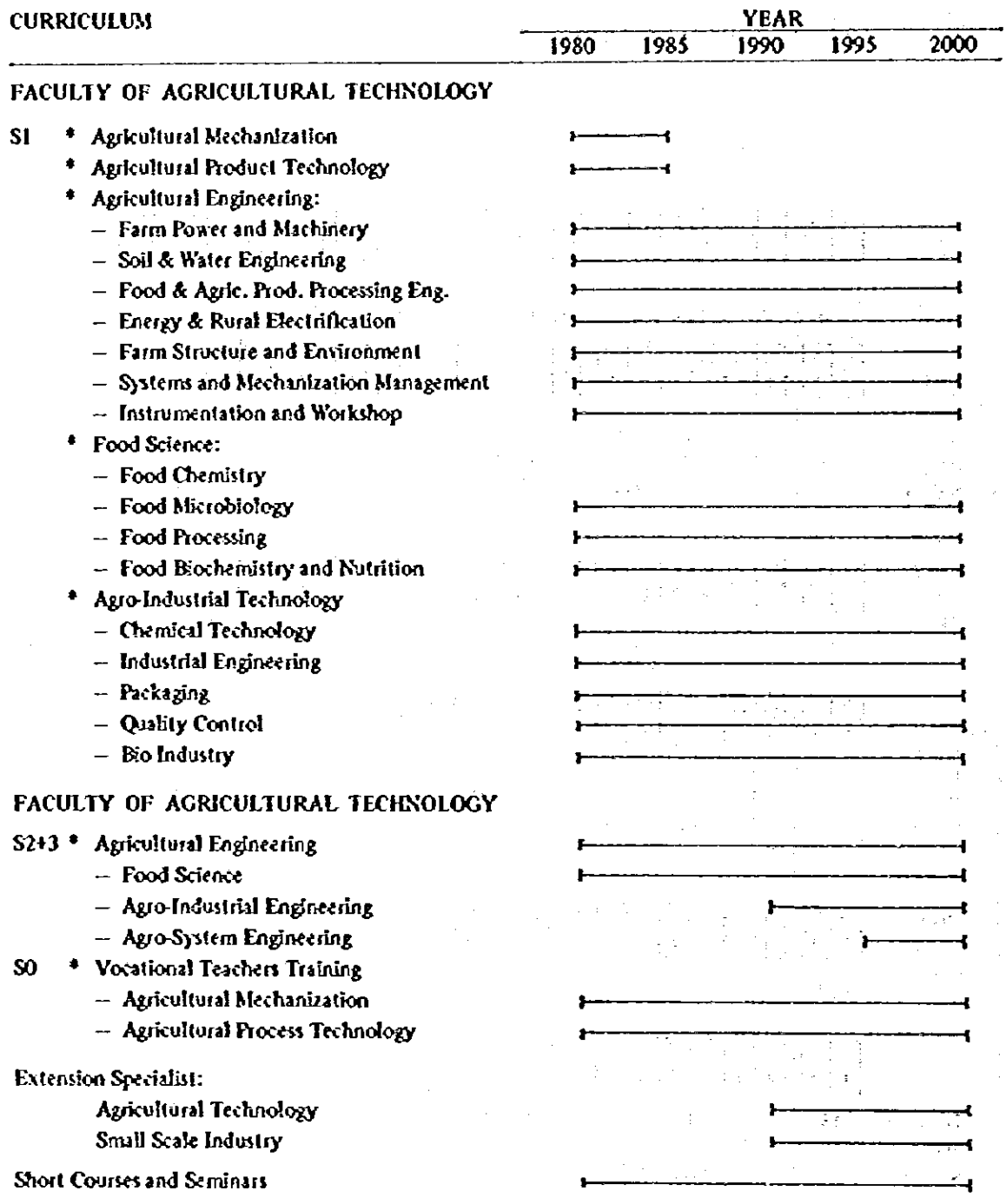
The entire plan is subject to study and refinement as shown in Fig–12.

Table–6–1 Student Enrollment and Educational Staff Projection in 1983 and 1990 (D–12)

	1983 (84)						1990					
	Student Enrollment			Staff			Student Enrollment			Staff		
		Graduate			Graduate			Graduate			Graduate	
DAE Department of Agricultural Engineering	Sarjana	MS	Dr	Sarjana	MS	Dr	Sarjana	MS	Dr	Sarjana	MS	Ds
	261	14	14	(19)	10 T=16	6	625	21	21	(30)	30 T=45	15
DFT Department of Food Technology & Human Nutrition	210	12	12	(10)	9 T=19	10	525	18	18	(25)	25 T=45	20
DIT Department of Agro Industrial Technology	177	0	0	(18)	5 T=8	3	500	15	15	(25)	25 T=40	15
				Σ T= 43						Σ T=130		

Table–6–2 Academic Plan of FATETA 2000 GP+UGP





Fig–12 Curriculum to be Studied and Refined up to 21st Century (D–12)

Table–6–1 and 6–2 list the design conditions, e.g.;

Research Units (academic divisions) are projected to be 16,

Number of Students in FATETA–1990–UGP

	S1–2	S1–3	S1–4
DAE	156	156	156
DFT	131	131	131
DIT	131	131	131
Total	418	418	418
Grand Total		1,254	

S1 : Undergraduate program
S1–1 : is in IPB out of FATETA

Number of Students in FATETA–1990–GP

	S2–1	S2–2	S3–1	S3–2	S3–3
DAE	11	11	7	7	7
DFT	9	9	6	6	6
DIT	7	7	5	5	5
Total	27	27	18	18	18
Grand Total			108		

S2 : Master program
S3 : Doctor program

Number of Academic Staff in FATETA–1990–GP

	Service Staff	Assistant Staff	Heads & Associate
DAE	30	30	15
DFT	25	25	20
DIT	25	25	15
Total	80	80	50
Grand Total	210		

------- Teaching staff 130

4-1-2 Obligations of Indonesian Side

Obligations of Indonesian side should be fulfilled as basically agreed in line with the procedure of the grant aid program.

As was repeatedly mentioned, the characteristics of the Project is, we should think of, in the specialty as a part of parallely proceeding internationally multiplied projects in a single huge complex, the removal to and expansion in the Darmaga Campus.

Table-7 outlines the routine budget and Table-8 is the development budget for 1984/1985 which can hardly be broken down to the respective projects such as IRC & ESC, Faculty of Agriculture, FATETA and others.

In this study mission the obligation of Indonesian side is again confirmed as in the attachment to the Minutes of Discussions at Feb. 25th, 1984 an ample quantity and appropriate quality of water and power are requrested to help bring about the stability of the educational and experimental conditions of laboratories.

Table-7 Routine Budget for 1984/1985, IPB (D-12)

ROUTINE BUDGET FY 1984/85 FOR IPB

1.	Personnel salaries	Rp 4,000,000,000
2.	Operational expenses	Rp 110,000,000
	2.1 Electricity	
	2.2 Gas	
	2.3 Water	
	2.4 Telephone	
	2.5 Others	
3.	Administration expenses	Rp 80,000,000
4.	Consumables	Rp 120,000,000
5.	Building Maintenance expenses	Rp 2,000/m²/year=110,000,000
6.	Others	
		Rp 4,420,000,000

INCOME BUDGET FY 1984/85

1.	Annual budget	a. Development	Rp 6,420,500,000
		b. Routine	Rp 4,420,000,000
2.	Tuition		Rp 195,000,000
3.	Others		Rp 500,000,000
			Rp 11,535,500,000

Table--8 Development Budget of 1984/1985, IPB (D-12)

DEVELOPMENT BUDGET 1984/1985 FOR IPB

1.	Total budget FY 1984/1985	Rp	6,420,500,000
1.1	Physical Facilities		
1.1.1	IRC and ESC construction (counterpart)	Rp	2,200,000,000
1.1.2	One loft (3 stories) and node of building at Agricultural Faculty site (Phase 2)		100,000,000
1.1.3	Water Treatment plant control building Water basin and clear well building		275,000,000
1.1.4	Ring road and parking lot (+15,000 m²)		225,000,000
1.1.5	Water Tower and auxiliary building		200,000,000
1.1.6	Sawmill laboratory for Forestry Faculty		15,000,000
1.1.7	Fisheries lab for Faculty of Fisheries		18,200,000
1.1.8	Temporary offices for Dept. Indus. Tech. FATETA Incl. electrical and water utilities		30,000,000
1.1.9	Green house, graduate school		45,000,000
1.1.10	Sewage system, drainage system and roads for 25 houses		20,000,000
1.1.11	Development of Jonggol Exp. Station		500,000,000
1.1.12	Temporary Classrooms of Bogor Campus (Phase 2)		25,200,000
1.1.13	Completion of Animal Nutrition/Fields lab of Animal Science		20,000,000
1.1.14	Renovation of classrooms/Lab at Agriculture Veterinary Medicine, Agricultural Science and Public Service		45,000,000
1.1.15	Renovation of Remiote Sensing lab at Soil Science building		7,500,000
1.1.16	Semi permanent classrooms at Darmage		20,700,000
	Total	Rp	3,755,600,000

4-1-3 Scope of Project

The scope of the Project assigned to Japan is to grant the provision of the facilities and equipment for the construction project for the Development of the Graduate Program at the Faculty of Agricultural Engineering and Technology, IPB in the Republic of Indonesia.

i) Facilities

The facilities will compose a building for FATETA located as shown in Fig-13. The four storied triangular shaped reinforced concrete building will consist of the facilities such as research, shared and instructional laboratories, lecturerooms and a multi hall, academic staff rooms graduate student rooms, administrative staff rooms and ancillary rooms.

ii) Equipment

The equipment will consist of educational and experimental equipment for 16 research laboratories, 12 shared laboratories and 6 instructional laboratories. The categories of activities in those laboratories are as follows;

Research activities:

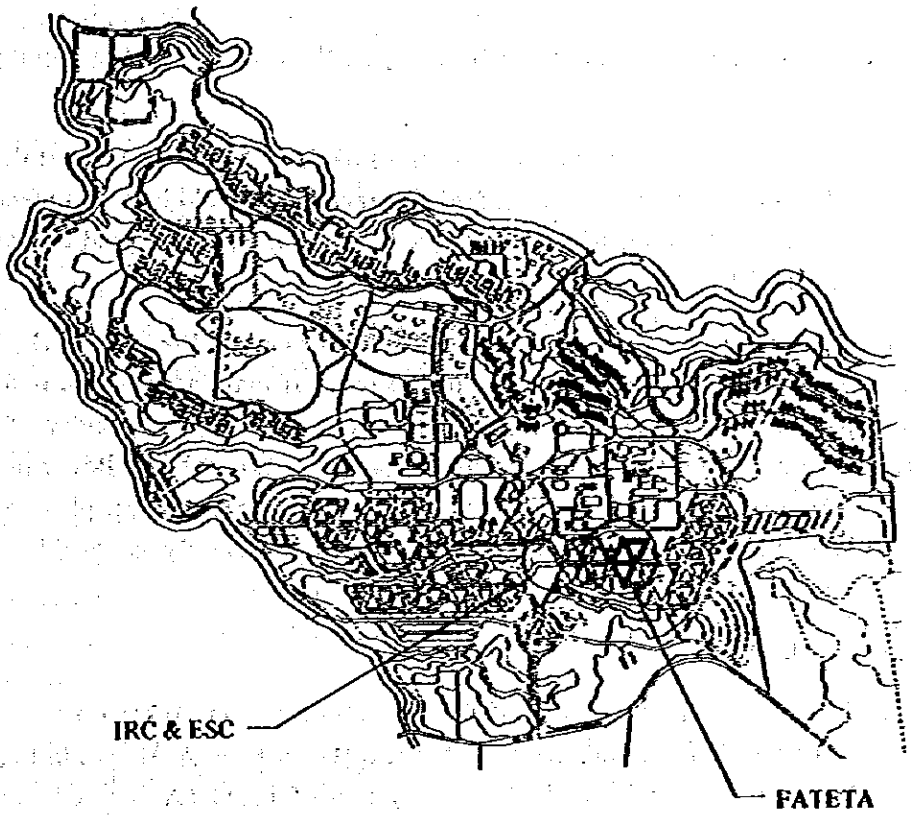
Experiment for research activities in each academic division. The name of the unit is from the special research subject carried out by the leader of the unit.

Shared activities:

Experiment shared by all units for research and instruction. Over-cost, over-sophistication, over-space-request, over-frequent-use of equipment shall be restored by setting up of the system.

Instructional activities:

There are two instructional laboratories in each department. These laboratories are mainly used for instructional purpose.



Fig–13 Site Allocation

4-2 Design Policy

4-2-1 Design Condition

The conditions about spatial requirement are based upon the activities of the approaching 1990 on one hand.

On the other hand, the gradual change of the conditions likely to be brought about through the activities from 1990 to 2000 should be studied and measures should be recommended if any to cope with the expanding quantity and enhancing quality of educational and experimental activities in FATETA.

The condition for the construction period is expected from the end of 1984 to March, 1986, the end of fiscal 1985/1986 year. The condition to the scope is that the program is for the Construction Project for the Development of the Graduate Program at the Faculty of Agricultural Engineering and Technology, IPB in Darmaga Campus 12km west of Bogor through a grant aid program extended by the Government of Japan. The condition over planning and design is from the Master Plan IPB has set up and is following up as severely as possible.

4-2-2 Total Design Criteria

IPB notifies of its intention that all planning of the projects being undertaken on the site be designed as strictly as possible in accordance with the IPB Master Plan. As shown in Fig-13, the allocation and triangular modular grid planning system of FATETA is fixed prior to this basic design allowing only Minor alteration because of FATETA's being a major part of the academic core and plant cluster in the Campus.

The first floor of the academic core should be designed to have a pedestrian walkway, a 'Malt', as a covered open space through which students can go anywhere they want without getting wet even in heavily raining days. Cross-points of the triangular module grid are called 'Nodes' to install mechanical and electrical service circulation piping and vertical transportation means such as stair casses, lifts and so on.

4-2-3 Partial Design Criteria

There should be partial architectural criteria which allow the partial facilities in the Master Plan to be designed pragmatically in compliance with the actual respective requirements of each faculty, department and academic division.

i) Form

The form of FATETA should match the total criteria as strictly as possible.

ii) Technology

The project is part of an internationally multiplied major project which will be supported

by various foreign economic and technical assistance under various terms and teams with various original technology.

It is, we believe, a technology transfer which will have a positive impact on the building construction industry of Indonesia.

iii) Urban Scale

With 20,000 students, and 2,000 academic and administrative staff, the campus will most likey grow to be a 'city' by the beginning of the 21st century. Changing functions through the changing socio-economic system and technology will result in changes in these educational and research facilities and equipment accordingly. A 'city' should be flexible if it is to cope with future changes.

iv) Design Standard

The Master Plan functions as official codes and standards as it is accepted and approved by the local authorities and the Government of Indonesia. So it should be followed as a total criterion while there should be partial architectural criteria to help set up more functional and practical design for facilities having different objectives and conditions respectively.

For example, IRC & ESC is fully air-conditioned as a center while FATETA is not air-conditioned as a faculty. Thus there should be respective design standards for each category of architecture.

v) Architectural Expression

IRC & ESC is one of several center facilities which are likely to be built around the core of the academic clusters. Those centers have some special characteristic like public facilities in the heart of a city while FATETA is a faculty, it means, a school, and a research complex, is to give some other architectural impression.

vi) Restriction

Institutional restrictions may influence to some degree in design of the project due to its procedures, duration and to the nationality of the consultant and general contractor.

vii) Model

FATETA is to be the first faculty designed strictly in accordance with the Master Plan so as to be a model of design and planning for the facilities being planned successively in the site.

4-2-4 Space Requirement

The final space requirement of FATETA-2000-UGP+GP is 22,373 NSM as in the Program Summary in the Master Plan (P-9). The space requirement for all facilities in the Darmaga Campus is 346,674 NSM, 57% of which is for the academic clusters.

The academic clusters are broken down into the Plant cluster, Animal cluster, Service cluster, Socio-economic cluster and Animal health cluster. The Plant cluster consists of the Faculty of Agriculture, FATETA and Forestry.

FATETA is 11% of academic clusters and this project achievement ratio is roughly 50% of its final stage so that 3.0% (57% x 11% x 50%) of this gigantic complex is shared by this grant aid project.

i) FATETA-1990-GP

The projection for academic staff is, as in 4-1-1, iii), 130 for 1990-GP excluding 80 service staff. There are designed 16 academic division head offices, 3 academic staff rooms, 16 research laboratories, 3 technicians' rooms and 7 executives' rooms as follows;

	No. of R.	Service staff	Ass. staff	head associates
Academic div. head office	16	16	16	16
Academic staff office	3		53	27
Research laboratories	16	64		
Technicians' rooms	3	15	15	
Executives' office	7			7
Sub Total	45	95	84	50
Total			229	

------Teaching staff 134 (Capacity)

The capacity for teaching staff, 134, is bigger than requested, 130, and total allowable number of academic staff, 229, is bigger than that requested, 210.
The projections for administrative staff are as follows;

	No. of R.	No. of Staff	T.No. of Staff
Faculty office	1	35 (5)	35 (5)
Meeting room	1	((24))	
Faculty Head Office	1	1 (2)	1 (2)
Sub Head Offices	3	1 (1)	2 (3)
Department Office	3	7 (3)	21 (9)
Meeting rooms	3	((24))	
Department Head Offices	3	1 (1)	3 (3)
Total			63 (22)

( ) Service assistant

(( )) Come from other rooms

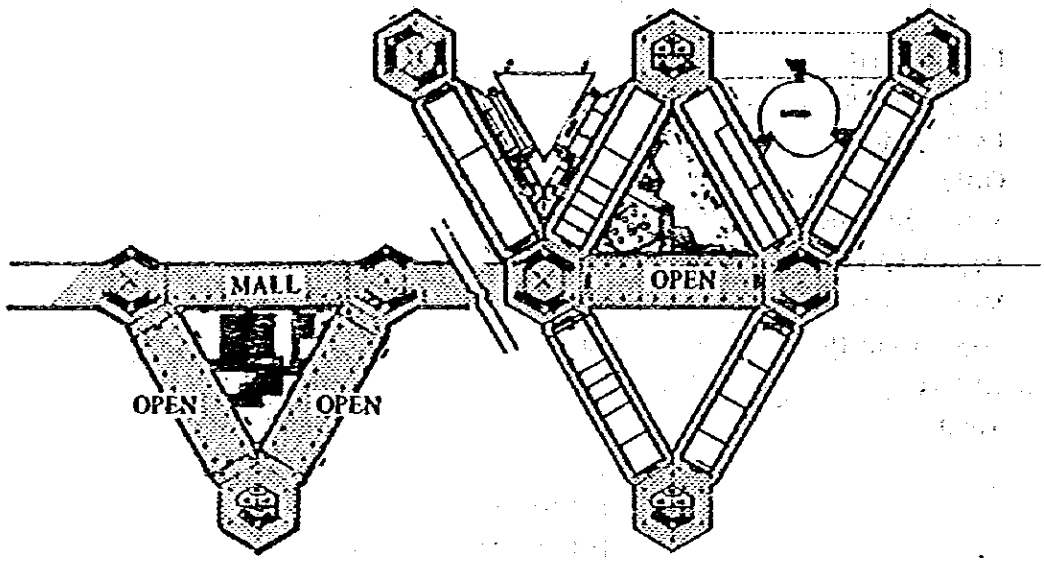
The space requirement of students firstly come from PATETA 1990 GP. 108 students are projected in 4–1–1, iii) and 3 classrooms and 3 graduates students' rooms are designed as follows;

	No. of R.	No. of Students	T. No. of Students
Student's rooms	3	40	120
Classrooms	3	60	180
Multi-hall	1	240	240

The space requirement of shared facilities is derived from shared experimental activities and equipment in research and instruction.

The number of research laboratories is based on the number of academic divisions.

The space requirement of instructional laboratories is based upon the total unit hours for the instructions on basic experiments. As a total, space required to this phase is 21,000 GSM.



1st FLOOR PLAN 2nd FLOOR PLAN

Fig–14 FATETA–1990–GP (D–12)

ii) FATETA–1990–UGP+GP

If additional space is unavailable, the curriculum of FATETA–1990–UGP should be in three shifts;

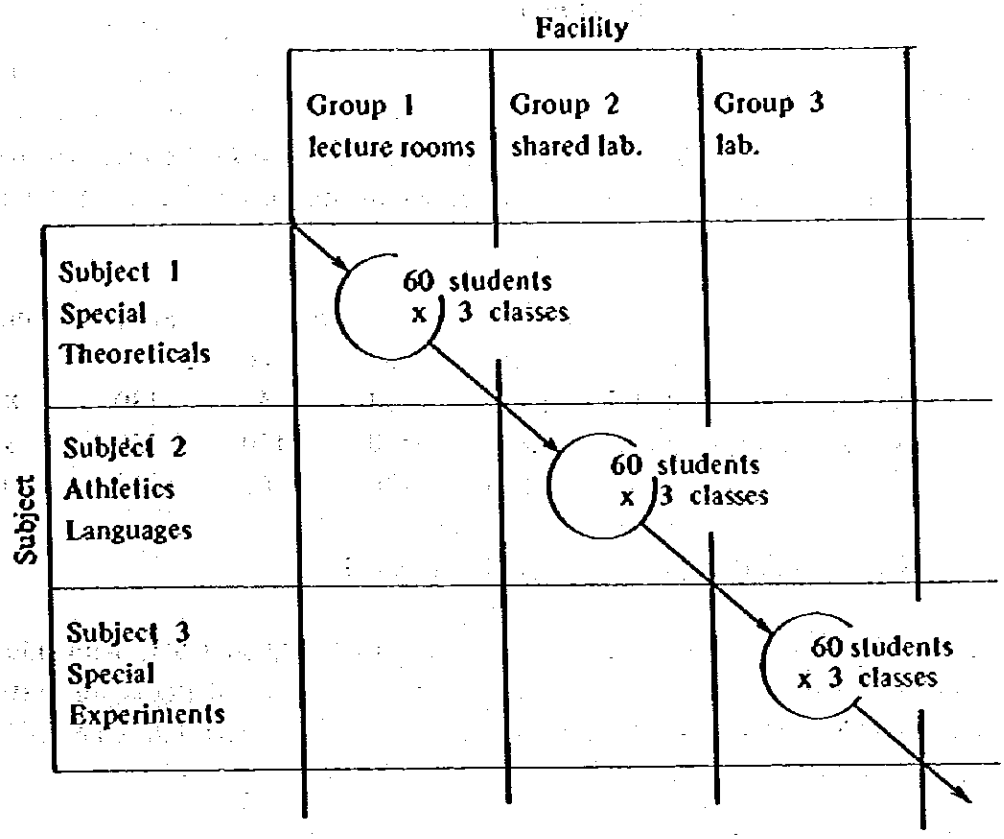
1/3 of students shall be in lecture facilities (classrooms, student's rooms and a multi-hall):

1/3 of students shall be in laboratories (research and instructional laboratories):

1/3 of students shall be in other spaces (fields, shared laboratories, athletic facilities and others).

If students' groups go around along the flow shown in Table–9 the facilities can manage the spatial requirement of FATETA–1990 UGP+GP through the triple shift arrangement.

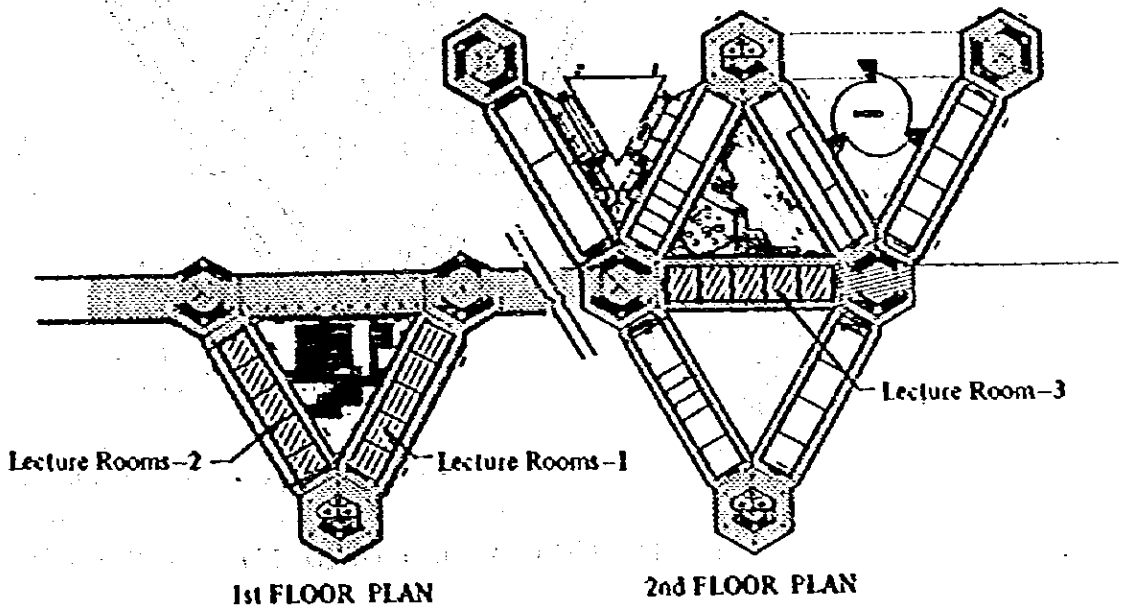
Table–9 Modules (D–12)



If 15 additional classrooms are designed in this GP as in Fig–15 the curriculum will be approximately in two shifts;

1/2 of students can be in lecture facilities.

1/2 of students can be in other facilities.



Fig–15 FATETA–1990 UGP + GP (D–12)

Thus it is better for FATETA–1990–UGP + GP to have 15 additional classrooms as illustrated in Fig–15. GSM will be 23,000.

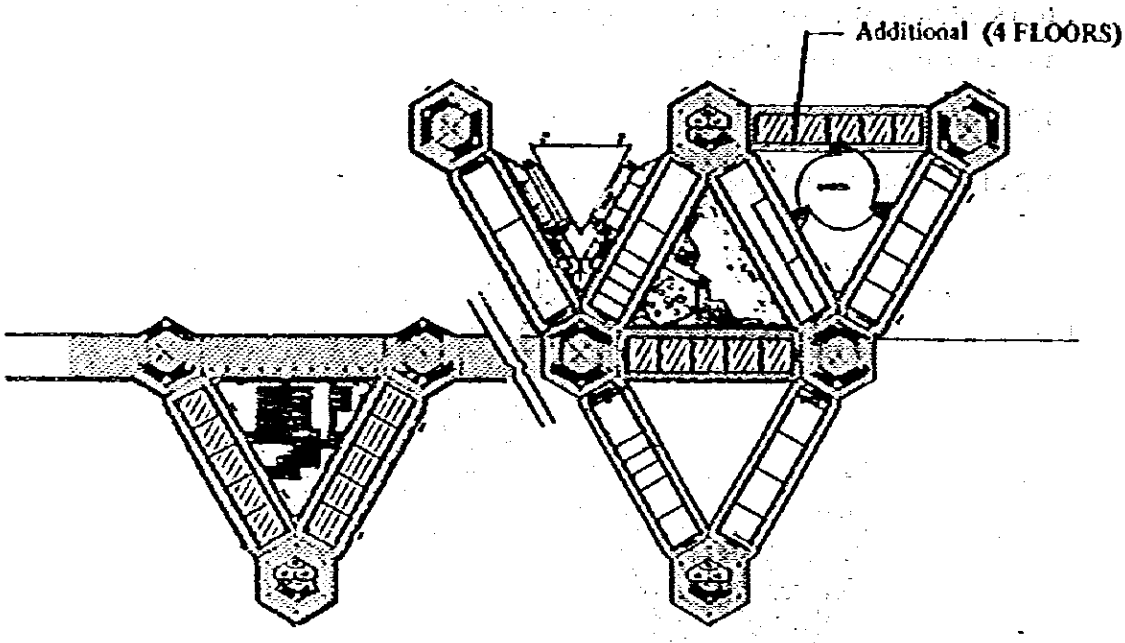
iii) FATETA–2000–GP

As in the Master Plan the setting up of 16 laboratories is the final target of curriculum development in FATETA while the projections of students are calculated to be as follows;

		UGP		GP		Staff	Admin
		S1'	S1	S2	S3		
A	FATETA–1990	413	1,237	54	54	130	85
B	FATETA–2000	600	1,800	180	120	270	85
B–A		287	563	126	66	140	0

* S1' – is at First year common education in IPB.

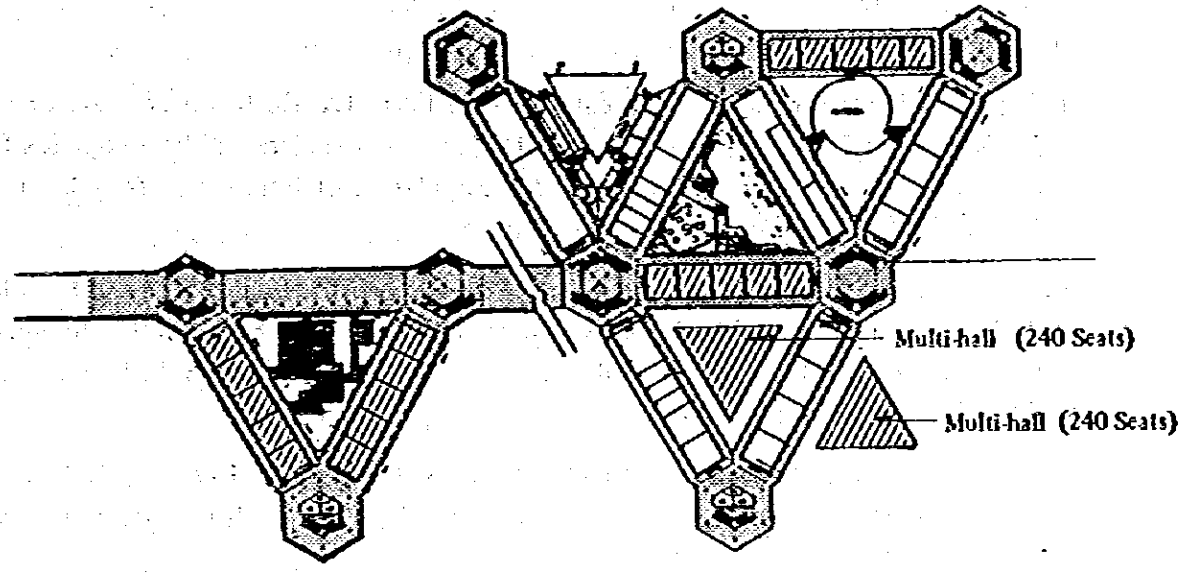
So there should be some additionals calculated to be 2,000 GSM. With 450 NSM academic staff's rooms for 140 staff, 300 NSM student's room for 192 graduate students with three 160 NSM special laboratories and with 770 for others, FATETA–2000–GP needs 25,000 GSM.



Fig–16 FATETA–2000–GP (D–12)

iv) FATETA–2000–UGP+GP

Two 240 NSM multi-halls for additional 563 students described in iii) can satisfy FATETA–2000UGP+GP's space demand. There will be 30 class units including three units in each multi-hall so as to teach simultaneously 1800 students not less than demanded. Consequently no double shift nor triple shift will be adopted in the curriculum in FATETA–2000UGP+GP.



Fig–17 FATETA–2000UGP+GP (D–12)

As a result of those four studies so far and through the preliminary planning of alternative space arrangements, four stages can be presented with total space requirement as follows;

FATETA–1990–GP	21,000 GSM
FATETA–1990–UGP+GP	23,000 GSM
FATETA–2000–GP	25,000 GSM
FATETA–2000–UGP+GP	27,000 GSM

As for this project, the model FATETA–1990–GP should be the base and other models show how flexibly this model will be able to cope with the changing conditions up to the 21st century.

4-3 Basic Design

4-3-1 Design Methodology

The basic design and surveying work related to this project is the development of the propositions concerning the planning of a graduate school, a national, specialized agricultural research and educational institution, the IPB. After studying several alternatives this report offers one basic design.

Furthermore, the circumstances surrounding this project are very unique, as this plan encompasses plans for the removal and expansion of the well established IPB under a sole master plan.

i) Campus Structure

This project is for the facilities and equipment of FATETA which will be move to and expanded in the 250ha Darmaga Campus. This campus structure will be a complex for the creation, dissemination, processing and accumulation of information for education and research of agriculture.

Situated in a large site, this project is similar to the construction of a city in both incredibly large space and unimaginably long time. The Master Plan based on the aforementioned major architectural criterial calls for these structures to be established homogeneously within a fixed triangular grid.

In contrast to this, the basic design calls for partial architectural criteria fit to each structure. To get over the discrepancy of two contradictory methods is expected to pave way to the creation of good design.

ii) Dynamic curriculum system

There are two theories of campus planning and design. The one, the static unit space system, is based on the past examples of space demand. The other, the dynamic curriculum system, assesses the scale and location of facilities by taking into account and analyzing the dynamism within a campus. This method analyzes space demand by studying the flow of information, the flow of educational materials, and the flow of people through education, research and social activities.

In the static method the accuracy of statistics is to be discussed endlessly only to lead to prior-used models. In the dynamic method facilities are able to be developed to correspond with the academic plan and curriculum now being created.

Thus, it may well be called a future-oriented method. Of the design conditions, we are able to increase accuracy through discussions and, as a result, will be able to set them up mutually understandable.

iii) Open flow and closed flow

The dynamics of flow of people concerns how people stay in a functionally defined space and how they move through functionally undefined space connecting the defined spaces. Both are connected by transportation, informational and environmental system. In this analysis, the general framework of activities of students and academic staff in each academic year should be studied.

This is follwed by semester circulations, depending upon course, major and topic selection. Next is the weekly circulations, unit module arrangements on time tables. This plan uses 4-unit modules a day for 6 days, or 24-unit modules per week. One unit comprises 100 minutes plus 20 minutes break. Eventhough the precise time of module units can be freely changed, this 24 unit/6days system allows a dynamic curricular system to be carried out easily. The overall dynamics become extremely simple when modular progress is diveded into 3 facilities, and 3 subjects, as in Table-9.

Actually many small flows appear which can be dealt with as the minor circuits of the larger circulation. Next is daily circulation. The purpose of the campus structuring is to help materialize a more effective daily circulation.

Such circulation can be divided into two types. Open flow and closed flow, both exhibit various different qualities respectively. Open flow is such flow as of GP students who are in laboratories and research rooms during the day without moving around. This is a so called disconnected circulation, and thus there is very little relation with other facilities.

Closed flow is such flow as of UGP students, the connected circulation of students moving between various lecture rooms and teaching laboratories. In this case, the space arrangement is extremely important. This case will be referred to as primary circulation.

In either case, the circulation of academic staff corresponds to this primary flow and becomes secondary circulation. Here, because of the nature of the circulation, the flow is to be closed flow.

A rough space demand study based on circulation and stationing is given in 4-2-4. As the accuracy of the academic plan and curriculum is increased, more accurate the estimation will be.

iv) Open cluster

It is possible to estimate space demand by the method cited above, and there is no major discrepancy between this and the numerical values or details of the master plan. The problem lies in how to deal with the hardware, the space arrangement structures.

The point of campus planning is to decide which facilities to centralize and which facilities to decentralize, and to assign to these facilities, allocations on a time axis and on a space axis. Being an enormous complex structure it inevitably becomes a multicore structure.

Between the various facilities there are plazas linearly connected as functionally undefined spaces or the open clusters. The new campus structures of Tsukuba University, Toyohashi and Nagaoka Institute of Technology, and Kanoya University of Athletics are based on this open cluster concept.

v) Software and hardwate systems

Campus planning proceeds according to software system conditions and hardwate system conditions. The software system is "TRIDARMA" or the educational, research and public services supported by the administrative organization. The software system includes the curriculum program and the management program. The hardware system consists of educational, research and administrative facilities and equipment.

Educational and research facilities are referred to as the academic core and there is a flow of information from lecture, to research, to experiment, and to research and development. The nature of the spaces differs, however, according to the quantity of created or disseminated information, and this has a great influence on the spatial structure of the facilities.

Research and development areas resemble a production facility and actually constitute pilot plants. Student and faculty housing and recreational facilities are arranged in relation to these main living facilities.

If one considers the campus as a city, these are the superstructures. However, the concept of a modern campus requires that information, environmental and transportational facilities and equipment be dealt with as an infrastructure necessary to effectively set up the superstructure.

vi) Loft, Node, Mall and Court

The focus of the discussion so far has been on the space arrangement but we have not yet discussed the space characteristics or the form of the spaces. In a sense, space arrangement or requirement can come to be acceptable.

The IPB Master Plan is based on a triangular grid with 60 degree intersections which makes it necessary to pay closer attention to space allocations than with a rectangular grid. The lofts are boxes, groups of spaces of the main educational and research facilities (Academic core) in fixed boxes as unit structures. Node refers to the points of intersections formed by the boxes coming from 6 directions. The unit distance of the nodes is approximately 70m.

The courtyards formed by the lofts are equilateral triangles of 55m per side. The Malls are open air spaces on the first floor of the lofts and they correspond to the open clusters mentioned in iv).

In spite of the simple arrangement of open space, high quality functionally undefined spaces were created by considering the relation of the courts and the various open space,

and through their geometric effect. The aforementioned campus planning method is the basic policy for the actual planning and surveying of this project.

General requisites noted so far are taken as basic assumptions for this report while special requisites are specifically cited from elements developed by Indonesia, the United States and Japan for this project and fully studied for successful economic cooperation by realizing this plan.

The master plan is strictly a part of the special requisite as framework for this plan. This plan offers partial criteria while simultaneously accepting the overall criteria considering the facts cited below.

(1) This project is for only one part of the Darmaga Campus, not for the entire Campus.

(2) The IRC & ESC are already being built strictly according to the master plan.

(3) The master plan itself is a quite reasonable proposal as overall criteria.

4-3-2 Details of Facility

i) Administrative facilities

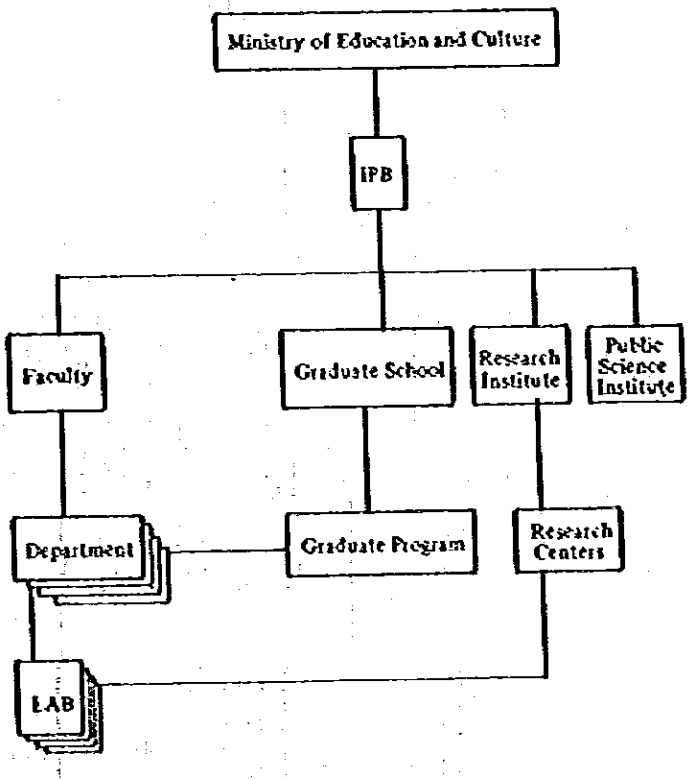


Fig-18 Diagram of Administrative Organization (D-10)

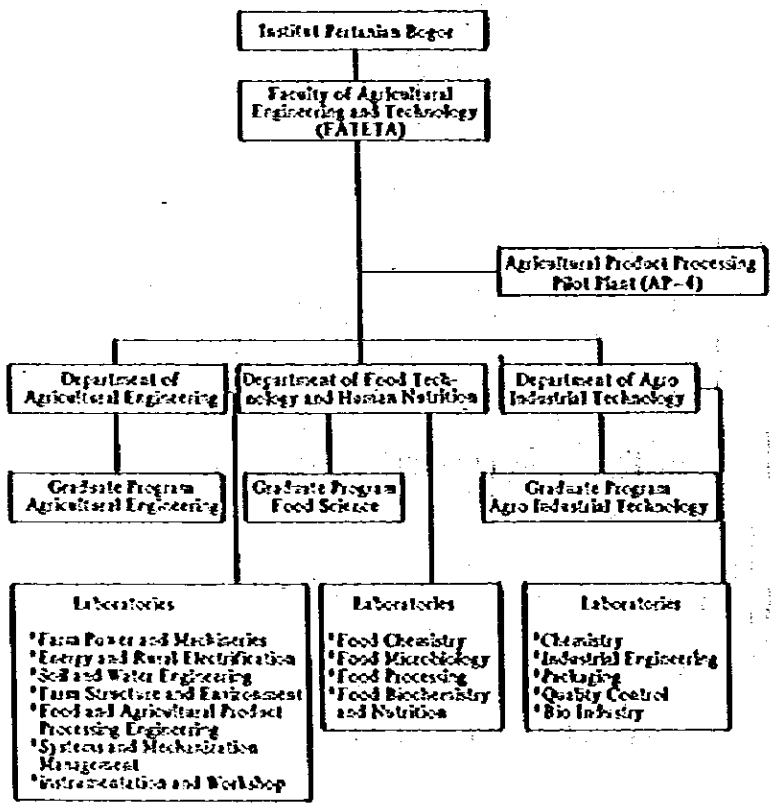
The administrative organization of IPB shown in Fig–18 deals with the graduate school as a faculty, but shows each laboratory as belonging to the appropriate department. Although each department belongs to a faculty, the laboratories belong to a main laboratory complex, in a so called two level structure. Fig–11 is the administrative organization of FATETA.

The dean of FATETA is shown as administrative head, and each department head and laboratory head is shown in his respective general position.

Fig–13 shows the flow of information within FATETA. Fig–4 shows the connections between the facilities and graduate school, but the position of the graduate school are the same as those of one faculty. Management is shown not by indicating the department but by showing the research activities.

Although this proposal deals with plans to expand a graduate school, it should be clear from the above discussion that the major facilities of the graduate school are the laboratories of the various departments.

It is neccessary to have the offices of the dean and three associate-deans, the faculty administrative office, meeting rooms, etc. The offices of each department chairman, the department administrative office, meeting rooms, etc. should be on the upper floor. Fig–19 shows the 3 departments and 16 laboratories which comprise the FATETA department structure.



Fig–19 FATETA Department Structure

ii) Educational facilities

The facilities for graduate students are the educational facilities. The relations between FATETA 1990 UGP + GP, and FATETA–2000 UGP + GP are as shown in 4–2–4.

In general, the lecture rooms of the various graduate departments can be subdivided into seminar rooms with movable partitions. Graduate student rooms are located in each department. In the case of jointly used for graduate and undergraduate, these rooms must be able to convert into lecture rooms.

A large lecture room, multi hall is being planned for FATETA graduate students, but this, too, will be used as joint graduate/undergraduate facilities with great frequency. There are also technicians rooms, but these, too, can in a sense be used as multi-functional faculty offices. The general classroom use for the FATETA 1990 GP + UGP is as shown in Fig–15. These classrooms should be hopefully on the first floor.

Since they are used by students from many faculties as well as by students from outside the university, they must be easily accessible. It is expected that future faculties will be built according to this space structure.

iii) Academic division office

As shown in Fig–19, FATETA consists of 16 academic divisions. Each of these has an academic division office. 7 to 9 students and 12 to 13 research personnel shall be assigned to each research room, and such large numbers will make it difficult to manage the space demand.

It is expected that the number of laboratory personnel will decrease as the improvement of the educational research system, the development of information management system and equipment system progress, and as a result of the increased effectiveness or productivity of FATETA's own educational research systems.

In each department an academic staff room to accommodate 30 people will be built. These rooms may also be used as offices so as to meet the changes of research division in the future.

iv) Research laboratories

Each academic division has its own research laboratory.

Department of Agricultural Engineering

(1) Farm power & machinery laboratory.
(2) Soil & water engineering laboratory.
(3) Agricultural energy & rural electrification laboratory.
(4) Agricultural farm structure & environment laboratory.

(5) Food & agricultural processing engineering laboratory.
(6) System & agricultural mechanization management laboratory.
(7) Instrumentation & workshop laboratory.

Department of Food Technology and Human Nutrition

(1) Food chemistry laboratory.
(2) Food microbiology laboratory.
(3) Food processing laboratory.
(4) Food biochemistry & nutrition laboratory.

Department of Agro-Industrial Technology

(1) Agro-industrial engineering laboratory.
(2) Agro-chemical technology laboratory.
(3) Quality control laboratory.
(4) Packaging laboratory.
(5) Biotechnology laboratory.

iv) Shared laboratories

Shared laboratories are central facilities, which can be freely used by any department or research group. It is possible to increase the effectiveness of facilities and equipment, and make research activities less exclusive through such facilities.

(1) Precision machine room (DAE, DFT, DIT)
(2) Soil mechanics & soil physics room (DAE)
(3) Material testing room (DAE)
(4) Hydraulic & Hydromechanic room (DAE)
(5) Computer room (DAE, DFT, DIT)
(6) Drawing room (DAE, DFT, DIT)
(7) Heat & Mass Transfer room (DAE)
(8) Workshop (DAE, DFT, DIT)
(9) Balance room (DAE, DFT, DIT)
(10) Surveying & Mapping room (DAE, DFT, DIT)
(11) Water distilling apparatus room (DAE, DFT, DIT)
(12) Darkroom (DAE, DFT, DIT)

vi) Instructional laboratory

Each department is provided with two large-scale laboratories for use by 50 to 60 students. Details are given below;

Department of Agricultural Engineering

(1) First Instructional laboratory for DAE.
(2) Second Instructional laboratory for DAE.

Department of Food Technology and Human Nutrition

(1) First Instructional laboratory for DFT
(2) Second Instructional laboratory for DFT

Department of Agro-Industrial Technology

(1) First Instructional laboratory for DIT.
(2) Second Instructional laboratory for DIT.

vii) Ancillary facilities

The ancillary facilities necessary for the environmental, information and transportation infrastructures are listed below.

Environmental facilities

(1) Electricity requires a power receiving room
(2) In addition, a generator and its room are necessary for power source during emergencies.
(3) Sections requiring gas will be supplied from an LPG gas cylinder room. Areas requiring hot water can use instant water heaters which run on LPG. Steam can be produced in the desired areas using electric or gas suppliance. Refrigeration and/or heating cabinets can be run within the appropriate facilities on electric power.

Information facilities

(1) There is a computer room but there is no provision for on-line linkage of computers in the entire campus.
(2) There is an internal phone system but it does not yet have external circuits.
(3) There are facilities for intra-faculty broadcasting but there is no connection to the entire campus.
(4) There is a fire warning system but it is only for each individual faculty.
(5) There are clock but they are battery operated.

Transportation facilities.

(1) There is a freight lift.
(2) There are emergency lamps at each evacuation pathway.

Infrastructure

The concept of FATETA's infrastructure is based on the principles below.

(1) simplicity (unintegrated)
(2) disjunction (decentralized)
(3) division (unamalgamated)

4-3-3 Site Planning

i) Plant cluster

Fig-20 and Fig-21 are concept diagrams of the master plan structure. FATETA is located within the science and technology cluster-plant and the comparative area sizes are:

Faculty of Agriculture		Faculty of Forestry		FATETA
2	:	1	:	1

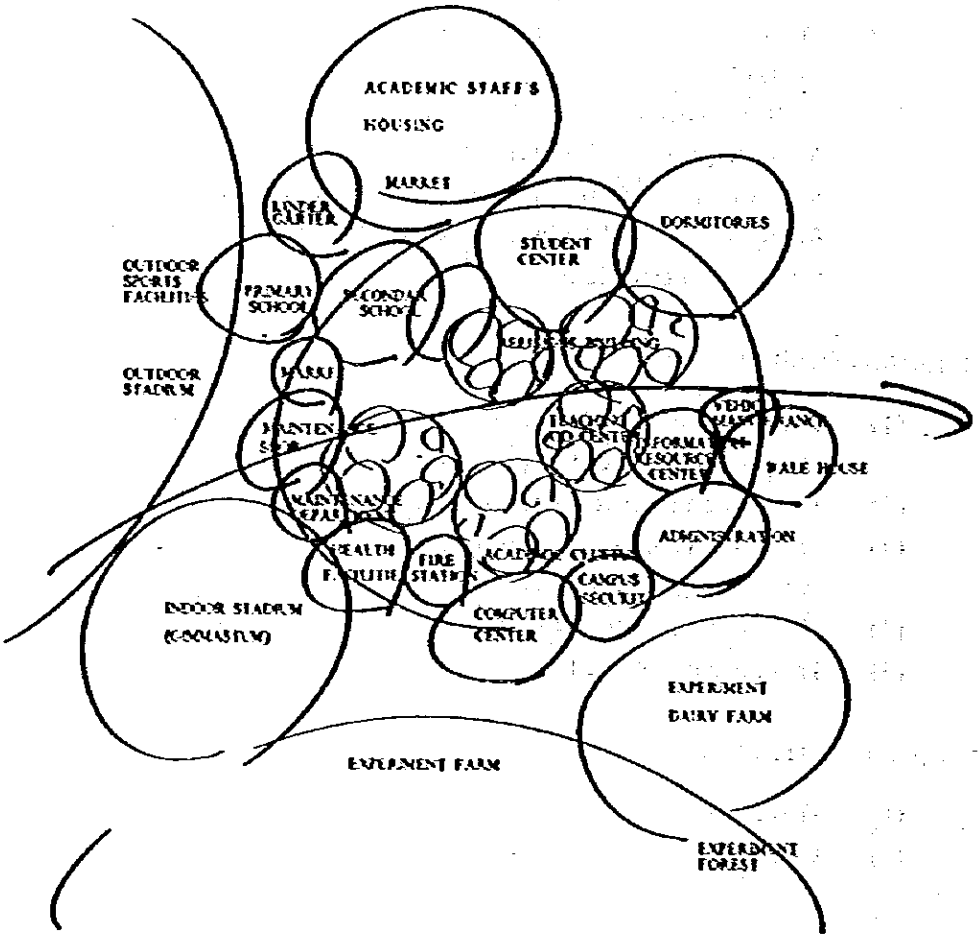
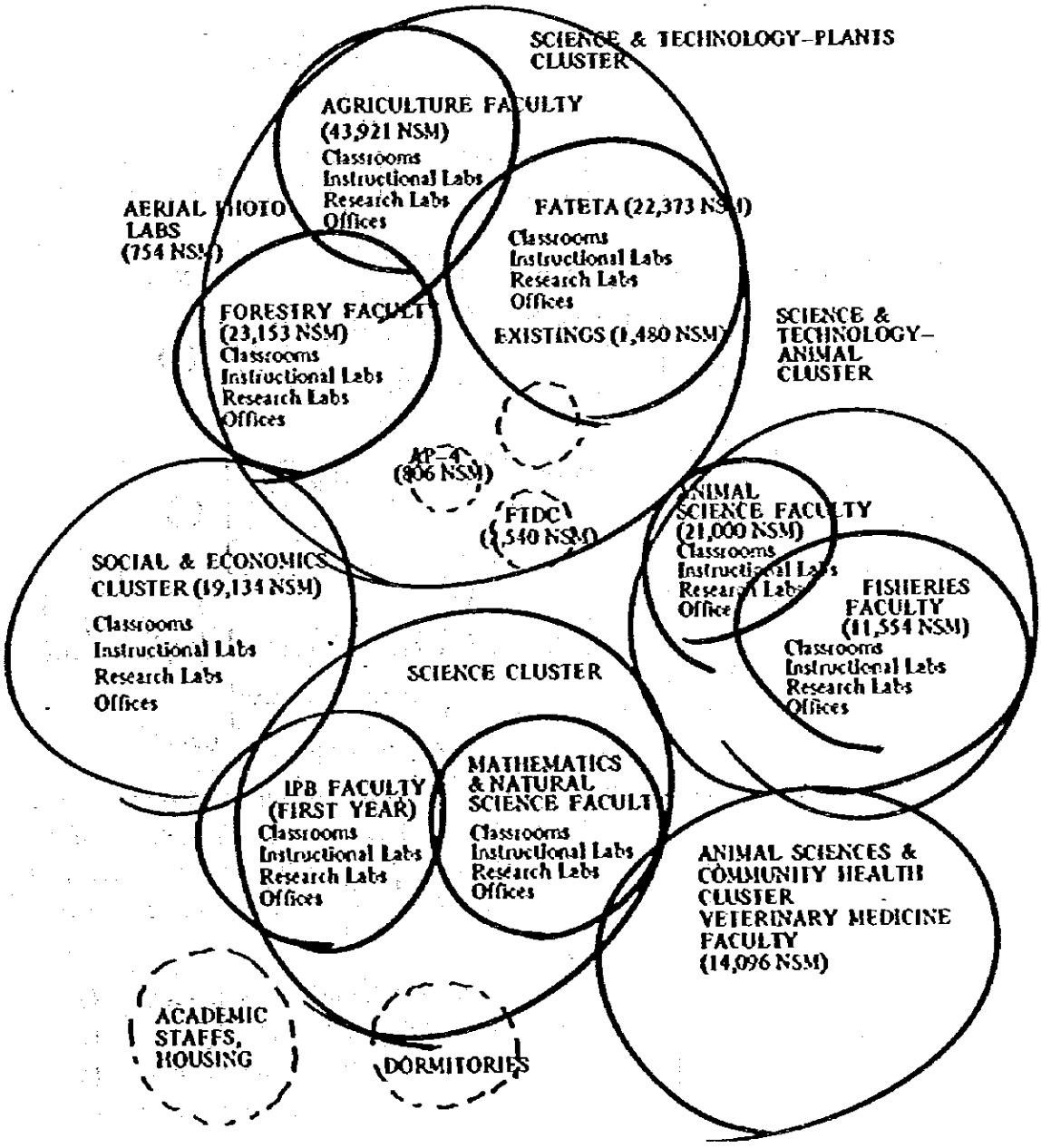


Fig-20 Concept Diagram of Campus Structure (D-12)

The science and technology plant cluster planned to be located on the east side of the academic core are shown in Fig--17. FATETA is located at the center of this cluster.

There are 32 lofts on the east side of FATETA, and these provide more than enough space for the Faculty of Agriculture and Faculty of Forestry. It is necessary to place the auditorium, language center, computer center and other such facilities on the west side of FATETA near the so called campus core.



Fig–21 Concept Diagram of Academic Cluster (D–12)

ii) IRC & ESC

In the campus core to the west of FATETA an Information Resource Center and Environmental Studies Center will be built with USAID financial assistance. The general concept is for a complex facility consisting of one center. The ESC (Environmental Studies Center), and one modern library, the IRC. The space arrangement is as shown in Fig-22. The area is approximately 13,700 NSM (net square meters).

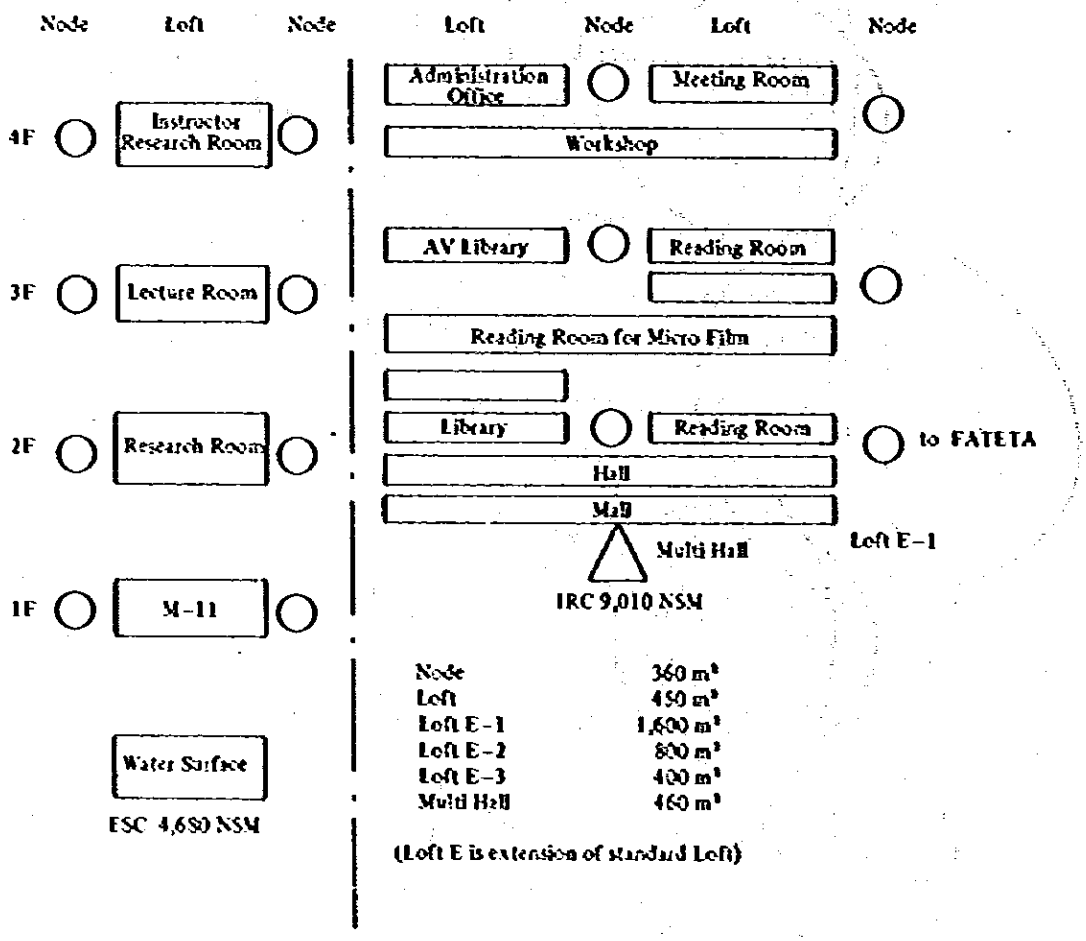
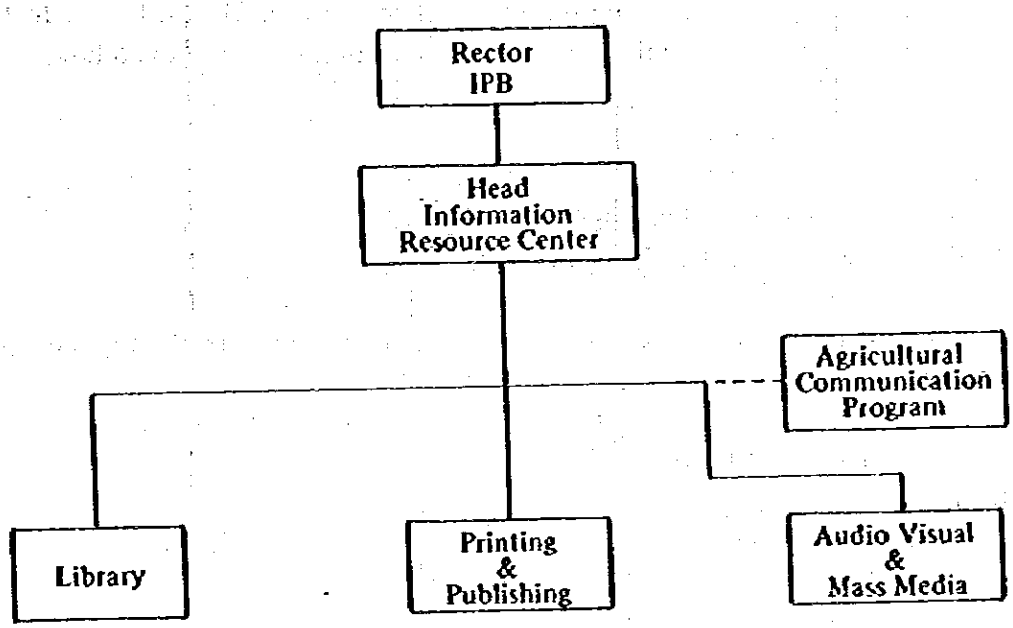


Fig-22 IRC & ESC Space Structure

The IRC evolved from the concept of a library, but, as shown in Fig–23, it is of great importance to the entire education and research plan. Its functions are expected to be as below.

1) Reading and lending of library materials.
2) Production, accumulation and publication of materials.
3) Production, accumulation and publication of audio visual data.
4) Production, accumulation and publication of microfilm.
5) Supply of all informational resources to all faculty.
6) Development of a computer data system.

IPB Information Resources Administration



Fig–23 Position of IRC within the IPB

The library is a central facility. The ESC is a faculty facility to the extent shown in Fig–22. It can also be considered to be a part of the Social and Economic cluster. Originally, however, central facilities were to be centralized around a so called campus core, and as in the academic plan (D–2, P–84). The following are considered to be part of the central core.

1) Research & Development Center
2) Environmental Research Center (ERC)
3) Food Technology Development Center (FTDC)
4) Tropical Animal & Plant Research Center

The following are dealt with as items for further consideration.

5) Agricultural Power Resources Research Center
6) Agricultural Engineering Technology Research Center
7) Remote Sensing Research Center

iii) Space arrangement

The internal allocation of the plant cluster is according to the above cited major architectural criteria of the Master Plan, and FATETA is located centrally, as shown in Fig–13. The internal space arrangement of FATETA was repeatedly discussed even in the course of this survey.

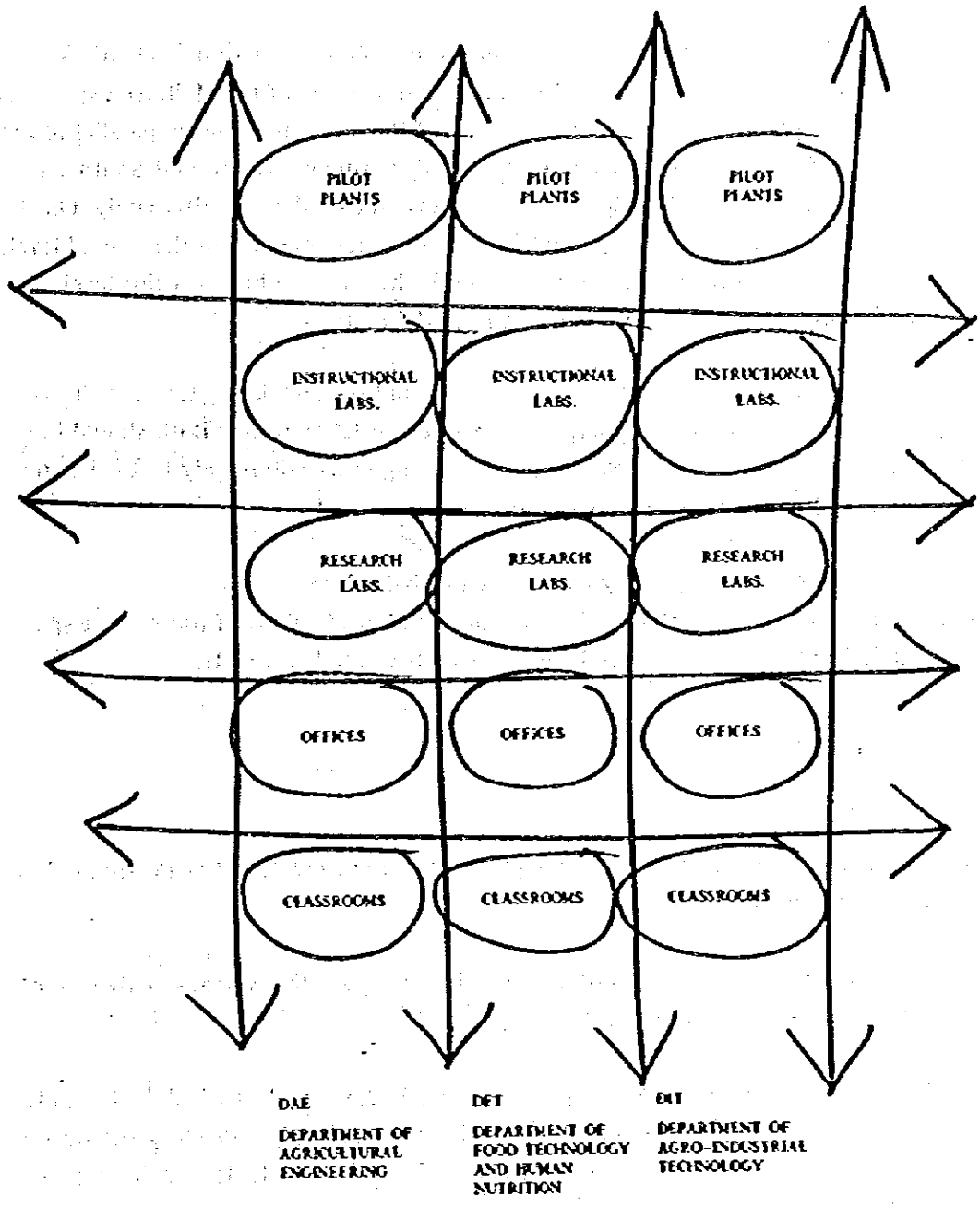
The issue was whether the functional space axis and research space axis matrix shown in Fig–24 are designed according to block zoning or level zoning. Block zoning is the major new campus zoning method in Japan, and level zoning is rarely used now. In block zoning, facilities are grouped as the buildings according to the functions as follows;

Office + Classroom tower
Research + Laboratory tower
Instructional Laboratory Building
R D Plant (Research & Development Plant)

In level zoning, the functions are grouped as the floors according to the types of spaces as follows;

Pedestrian + Special laboratory floor.
Instructional laboratory floor.
Research Laboratory floor.
Student floor.
Academic staff floor.

In this case the entire academic core takes a homogeneous quality, and a certain degree of flexibility is achieved. After so many discussions and examinations of alternatives a decision was made in favor of level zoning.



Fig–24 Space Structure

Actual planning is according to the subject heading listed below.

1) First floor section (mainly for instructional activities)

This section is on level 2. The mall, a type of pedestrian space forms the central part. To the South there should be as much open space as possible with a view of the lake. These open spaces, moreover, serve as additional space available for future facility expansion.

2) Second floor section (mainly for administrative and instructional activities)

This section is on level 3 to be ground level for north side of the Mall. An expansion of the lofts is planned for the Eastern section of the line which runs in parallel to the North side of the mall. The nodes placed on lines running North and South a unit apart from the mall, are designed as open nodes and closed nodes alternately. On the second floor, lofts are used for special laboratories which must be on the ground level, and administration offices. In addition, a multi hall will be built on this level. The south side lofts are designed to be student related facilities.

3) Third floor section (mainly for instructional and research laboratory activities)

The third floor consists of instructional and research laboratories. Both should be as close as possible to the ground level. The remaining space will mainly be used as free spaces for graduate and research assistants.

4) Fourth floor section (mainly for research activities)

The fourth floor consists of shared laboratories and academic staff rooms. The space will largely be used for research and study activities of academic staff.

4-3-4 Architectural Design

i) Basic concept

1) The academic plan and the master plan based upon the Repelita IV are used as major architectural criteria.

2) The partial architectural criteria are based upon the various activities of FATETA, as defined in the academic plan.

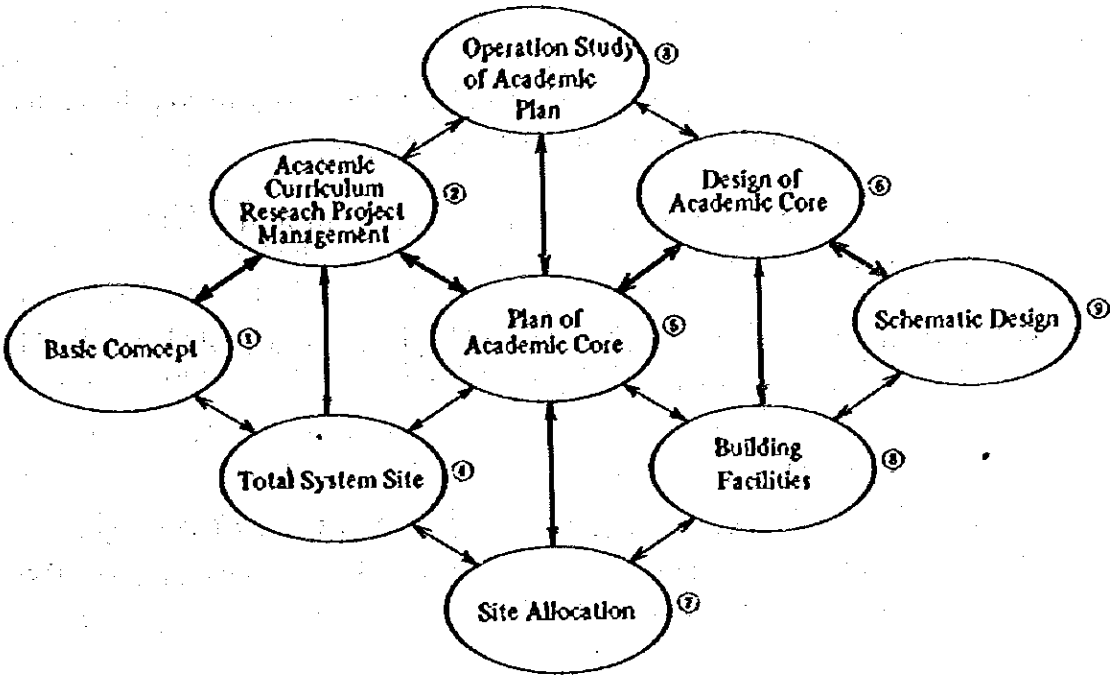
3) Fig-25 shows the steps of campus planning, 1, 2,3, and 4 of which had already been studied by IPB. As for this partial campus planning all steps should be studied to come to good design including 1, 2, 3, and 4. The main steps of studies should follow the thick line.

ii) Academic Plan

1) This project is based upon the Academic Plan of IPB.

2) It is an extremely long-term plan which targets the year 2000 and, as such it is creative and innovative, but subject to further study in terms of FATETA.
cal aspect of GATETA.

3) This IPB Academic Plan is a base of the project proposal and the minutes of the preliminary study.



Fig–25 Design Flow

iii) Operational Studies

1) The academic plan requires that the followings be combined in a yearly program:

Instructional plan-curriculum
Research plan-project
Management plan-operation

2) The phases are based on the study of spatial requirement but will actually be fixed gradually by following yearly changing conditions.

iv) Total System

1) The Darmaga campus site system is based on the concept shown in Fig–20 and Fig–21.

2) The plan has not yet been studied about the total information system, total environmental system, and total transportation system which should be basis of the total integrated system of an educational complex.

3) A homogeneous space allows flexibility, but it has a tendency to become institute-oriented rather than subject-oriented.

v) Plan of Academic Core

1) In order to solve the problems cited in iv) it is necessary to consider centralization and decentralization of functional spaces.

2) First, there should be proposed a 'core concept' to increase effectiveness of activities of a campus.

3) Next, there should be proposed the concept of shared facilities, to increase efficiency of facilities and equipment.

vi) Design of academic core

1) The architectural expression of "academic core" is based on the major architectural criterion of the master plan. There should be, however, pragmatical criteria from cost analysis and detail design.

2) The use of Japanese materials may be a base of partial criteria.

3) Utilization of Japanese earthquake resistant construction techniques shall be a base of partial criteria.

vii) Site allocation

1) It is necessary to study the plant cluster total design based on Fig–13.
2) The main approach is from the south of the campus, but this must be examined according to the yearly program.

viii) Building Equipment

1) In the actual design process the buildings equipment is to be made failproof and failsafe by using the principles of separation, decentralization and division.

2) However, in an extremely long-range plan one cannot always use the principles. There is a need to constantly explore the possibilities for integration, centralization and unification.

ix) Schematic Design

1) The basic design drawing appended to this report is based on the design method flow as in this section.

4-3-5 Structural Design

Indonesia is located on the Eurasian earthquake belt and many earthquake have been recorded there in the past. Consequently, appropriate countermeasures should be taken at the time of structural planning. As the Project is part of the overall campus master plan which was prepared by the Indonesian side, the master plan shall be reviewed and future expansion shall be considered.

For this reason, the building structure shall be of rigid frame structure with reinforced concrete. The soil investigation of the site is now under way by the Indonesian side and shall be completed and the data of which will be handed over to the Japanese side by early June. For the time being, the foundation method of the Project shall be determined on the basis of the soil survey data of adjacent site, and shall be adjusted afterwards.

According to the above data, tufaceous clay with N value of 4-5 exists down to 8.0M depth from the existing ground surface, followed by rather stiff clay down to 10.0M. Beneath it, there is a 10.0M thick well compacted fine sand layer with N value of more than 60.

Since the building is a 4-storied reinforced concrete structure, pile foundation will be sufficient. The supporting layer shall be well compacted fine sand layer having N value of more than 60.

To allow for expansion or contraction of the concrete due to thermal fluctuation of the building and differential settlement of ground, expansion joint should be considered at a distance of 60M or less along the lengthwise direction of the building.

The external force and working load on the buildings are set as follows;

i) Seismic force

Zone coefficient	0.05
Building coefficient	1.0
Important factor	1.5

ii) Live Load

Conformity with the Japanese Building Standard and Indonesian Building Standard

iii) Foundation

Pile foundation (Earthdrill method)

iv) Supporting Layer

Well compacted fine sand layer with N value of more than 60.

Structural materials

i) Concrete

Fc=225kg/cm² (compressive strength at 28 days)

ii) Reinforcing bar

SD 35 (over 19mm dia.)
SD 30 (under 16mm dia.)

iii) Structural steel

SS41

4-3-6 Electrical Design

i) Power supply and distribution system

1) High voltage power

High voltage power (20kV and 6kV) work including transforming system are to be done by Indonesian side.

2) Low voltage power

Transformer, main distribution board of secondary side, and cable work up to the sub-distribution board of the building shall be done by Indonesian side.

The scope of work of the project shall be all the works from sub-distribution board to each load.

Electric source;
3-phase, 4 wire 380V/220V, 50Hz

3) Generator system

Generator shall be provided through the contract to serve as emergency power source for the emergency facilities, and experimental and research equipment which have bad influence on the experiment and research activities due to power failure. They are as follows:

Power for;

fire hydrant pump
some experimental and research equipment
security lighting fixtures

Capacity of generator for above load, after considering the demand factor, is approx. 150kVA. One set of above generator with auto/manual starter and auto/manual switch shall be provided.

4) Outline of power supply system is as follows.

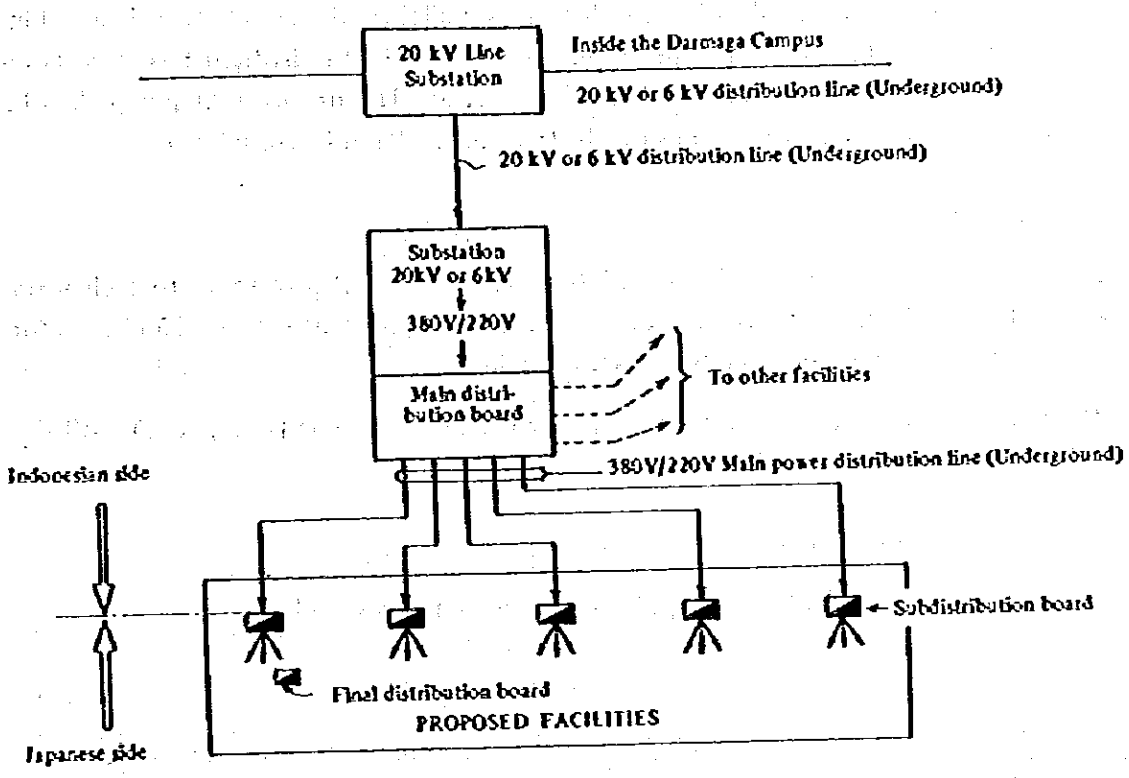


Fig-26 Power Supply System (D-12)

ii) Lighting system

Fluorescent lamp shall be mainly use as light source for lighting fixtures. Illumination level of main rooms shall be as follows.

Name of Room	Average illumination level
Administration Room	300 lx
Instruction & Research Lab.	300 lx
Class Room	300 lx
Professor's Room	300 lx
Corridor & storage	50 lx

Lighting fixtures shall be of surface mounting or pipe pendant type. Rustproof type fixtures shall be considered at rooms where special chemicals are used.

iii) Socket outlet system

The socket outlet shall be of 4-pin type (2 pins for earthing). Socket outlets for room air conditioners shall be prepared at places where room air conditioners are to be installed.

iv) Fire alarm system

Manual fire alarm system shall be provided in the building. The push button, bell and indicator lamp for fire alarm shall be installed on top of the fire hydrant box, and its receiver shall be installed at the administration section. The fire hydrant pump shall be started automatically by fire alarm singnals. Detector shall not be considered.

v) Telephone system

Pipings for telephone shall be installed from telephone exchange room to each main room. The Maximum capacity of telephone exchange equipment shall be 10 circuits for central office line and 100 circuits for extension line.

The telephone system shall be used solely for the extension line (interphone) until the installation of central office line.

vi) Public address system

Public address system shall be equipped for general contact and calling.

vii) Lightning protection system

Lightning protection system shall be installed in conformity with the Indonesian Standards.

4-3-7 Air Conditioning and Ventilation Design

i) Air conditioning system

Rooms where required shall be air-conditioned, employing air cooling type air conditioner, considering the local climate, easy maintenance and economical operation. Power source and sleeve hole shall be prepared in academic staff rooms for future installation of window type cooler by Indonesian side.

ii) Ventilation system

The mechanical ventilation system shall be considered for rooms such as toilets and laboratories which require forced ventilation. Rustproof ventilation fan and duct shall be considered for exhaust system of laboratories which contain corrosive ingredients. Ceiling fans shall be installed in academic staff rooms, administration rooms, meeting rooms, etc.

4-3-8 Plumbing and Sanitary Design

i) Water supply system

Water shall be diverted from the main pipe beyond the elevated tank to be installed by the Indonesian side, and supplied to necessary places by gravity. The diameter of diversion pipe shall be smaller than the main pipe. Water suuply system to the projected buildings is indicated as follows.

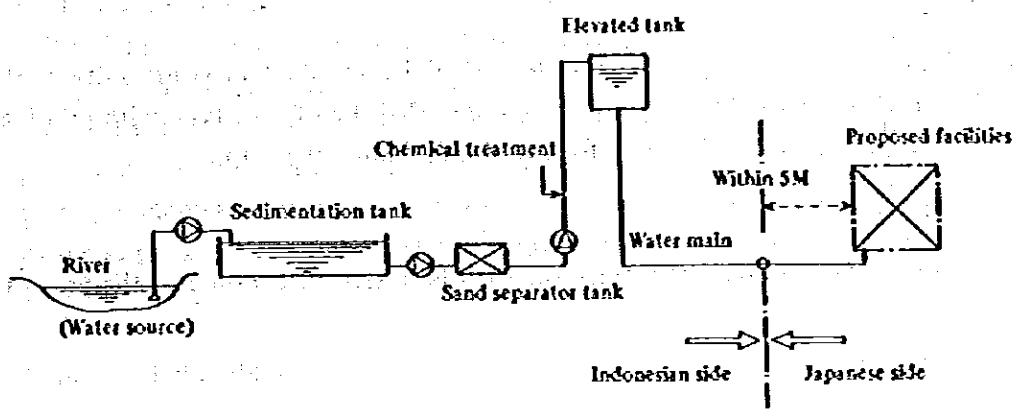


Fig-27 Water Supply System (D-12)

ii) Drainage System

Drainage from buildings shall be separated into 4 systems: soil water, waste water, laboratory drain water and storm water. Soil and waste water processed through the septic tank are to be penetrated into the ground through the slotted pipes within the site. Laboratory drain water which contain acid and alkali shall be processed as same as soil and waste water after neutralized by the neutralization tank. Chemicals and heavy metals shall be disposed by proper way after treated separately and collected in a container. Storm water shall be discharged to the lake south of the site.

Storm water discharge system is as follows.

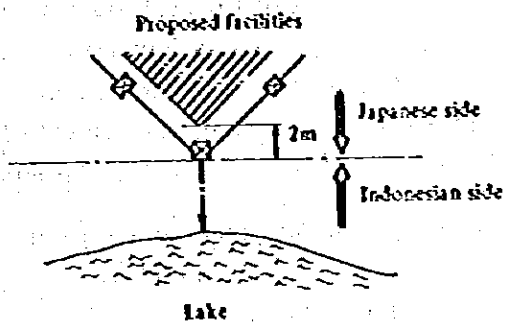


Fig-28 Storm Water Discharge System (D-12)

iii) Sanitary Fixtures

Sanitary fixtures shall be installed to meet the local customs.

iv) Gas supply system

Propane gas (LPG) shall be installed outside the building in cylinders and supplied to necessary places such as laboratories, pantry, etc.

v) Fire extinguishing system

Interior and exterior fire extinguishing system shall be installed in conformity with Japanese Fire Fighting Law. Fire extinguishing pump shall be of unit type with priming tank and control panel, and used as both for exterior and interior pump.

vi) Incinerator system

Forced combustion type smokeless incinerator shall be installed, considering the present situation.

vii) Hot Water Supply

Water heaters which run on electric shall be provided to the pantries, and instant water heaters which run on LPG shall be provided to the chemical laboratories.

4–3–9 Equipment Design

i) Background of equipment and apparatus schedule

Careful consideration is to be given in selecting equipment and apparatus of the basic design for FATETA, IPB, Republic of Indonesia.

In general, the educational system of the departments of Agricultural Engineering, Food Technology and Agro-industrial Techmology in South-East Asian countries follows the curricula of their counterparts in Europe and the U.S.A..

On the other hand, the main stream of the same departments in Japan is from agricultural civil engineering. This is due to the fact that the substratum arrangement of farm land and agricultural irrigation, etc. have played a very important role in rice-field agriculture in the process of development of agriculture in Japan. It appears, however, that in the conventional curricula of IPB for the substratum arrangement of farm land, irrigation engineering and agricultural structures has been lower than the actual needs.

Request was made on the supply of equipment and apparatus for sixteen laboratories of three departments, Agricultural Engineering, Food Technology & Nutrition, and Agro-industrial Technology of FATETA, IPB. The detailed information of the request shows that fewer requests are made on equipment and apparatus under the category of facilities, measurements, and instruments in the educational system of agricultural engineering de-

partments ordinary in Japan.

The Republic of Indonesia is now placing on its policy to increase production of agricultural products through irrigation engineering, water engineering, substratum arrangement of farm land, etc. to establish the basic studies and educational system of agricultural engineering and technology.

ii) Schedule by department

FATETA in IPB consists of sixteen laboratories attached to three departments, Agricultural Engineering, Food Technology & Human Nutrition, and Agro-industrial Technology, as stated above. In establishing the schedule by departments, priority has been given to the equipment and apparatus necessary for the basic pursuit of agricultural engineering as well as for the common use of the three departments. A premise is made that the equipment and apparatus which may be compatible to the AP-4 should be left over as far as possible. The most suitable configuration of these shared laboratories will be as follows.

* Shared Laboratory Room

1. Precision machine room
2. Soil mechanics & soil physics room
3. Material testing room
4. Hydraulic & hydromechanic room
5. Computer room
6. Drawing room
7. Thermal process engineering room
8. Workshop room
9. Surveying & mapping room
10. Balance room
11. Water distilling apparatus room
12. Dark room

The computer room is so installed as to allow students to obtain sufficient training.

* Instructional laboratories

Two instruction laboratories will be provided for each department according to the number of students. The rooms are so designed as to accommodate basic equipment as a priority, such as experiment tables, basins, drafts, and chambers to meet the basic requirements of the equipment and apparatus necessary for experiments and practice of students.

* Department of Agricultural Engineering

1. Farm power & machinery laboratory
2. Soil & water engineering laboratory
3. Agricultural energy & rural electrification laboratory
4. Agricultural farm structure & environment laboratory
5. Food & agricultural processing engineering laboratory
6. System & mechanization management laboratory
7. Instrumentation & workshop

* Department of Food Technology & Human nutrition.

1. Food chemistry laboratory
2. Food microbiology laboratory
3. Food processing laboratory
4. Food biochemistry & nutrition laboratory

In selecting the apparatus of the laboratory of this Department, emphasis has been placed on the basic apparatus such as experiment tables, basins, drafts, chambers, and cabinets.

* Department of Agro-industrial Technology

1. Agro-industrial technology laboratory
2. Agro-chemical technology laboratory
3. Quality control laboratory
4. Packing laboratory
5. Biotechnology laboratory

In selecting the apparatus of the Department of Agro-Industrial, emphasis has been placed on the measuring equipment.

The sixteen laboratories and common laboratories for the three departments are as listed above. We found it most difficult to select the equipment and apparatus because they differ with different themes of laboratories and the capability of researchers. For this reason, we had to evenly allocate the budget for each laboratory. However, we were forced to make some differentiation by placing emphasis on measurement and instruments for some laboratories.

iii) Problems in the supply of equipment and apparatus

Today, a variety of experiment equipment and apparatus are used by research and test laboratories in each engineering field and most of them have been imported from Europe, the U.S.A., and Japan. In particular, few precision machines are made in Indonesia.

About 7 years ago, AP-4 (Agricultural Product Processing Pilot Plant Project) and CRIFC (Central Research Institute for Food Crops) were established for research in

Indonesia through the economic assistance of the Japanese Government. All equipment and apparatus used by these organizations were supplied by Japan. This indicated that equipment and apparatus can successfully and sufficiently be supplied by Japan. In addition, some equipment and apparatus such as precision machines and computers require training before use, and establishment of maintenance and control system as well as aftercare with careful consideration.

It is a matter of course that consumables necessary for utilization in experiments such as glassware and chemicals should be supplied smoothly. The expenses necessary for consumables and maintenance control should be basically borne by IPB, Indonesia. However, such expenses may cause difficulty in some studies. The future policy for this problem should be determined, depending upon the recognition of importance to achieve the object of studies, through close mutual agreement between Indonesia and Japan. There should be scrutinizing of conditions before the selection of computer system and consoles such as connecting conditions to the total computer system of the Darmaga Campus if any, or the the partial super minicomputer system within FATETA if possible and the infrastructural conditions from the development stage of the campus.

Based upon those studies there proposed 12 units of 8-bit-type micro-computer for instructional use and 2 unit of 16-bit-type micro-computer in a shared facility, the Computer Room, 3 unit of 16-bit-type micro-computer in the research rooms, 2 in DAE and 1 in DIT.

The specification of those computers shall be in accordance with those consideration as follows:

Maintainability in the site shall be considered. Adaptability to the ability of local operators shall be considered. Availability of local agencies to take care shall be considered.

EQUIPMENT LIST

SHARED LABORATORY

1. Precision machine room

Liquid chromato graph	1
Gradient evaluation unit	1
Refractive index detector	1
Fluorescent detector	1
Column oven	1
Sample injector	1
Sample filter	10
SGE Microliter syringes	2
Data processor chromatopac	1
Empty column	1
Column filling device for 2.1 mm I.D.	1
Column end	1
Packing materials	1 lot
Thermal chart paper for chromatopac	
Coulter counter	
UV Spectrophotometer	1
Freeze dryer	1

2. Soil mechanics & soil physics room

One-axial unconfined compression tester	1
Tri-axial compression tester	1
Soil sampler	1
Oven	2
Soil sieve	1
Pressure membrane apparatus	1
Soil hardness tester	1
Soil compaction case	1

3. Material testing room

Common compression tester (25ton)	1
Common tension tester	1
Concrete testing equipment	1
Metal testing equipment	1
Wood moisture meter	1

4. Hydraulic & hydromechamic room

Open channel hydraulic laboratory set	1
Pitot tube	5
Reynold number apparatus	1
Airflow demonstration apparatus	1
Fluid friction apparatus	1
Permeability test set	1

5. Computer room

8 bit computer machine	12
16 bit computer machine	2

6. Drawing room

Drawing bench	60

7. Heat & mass transfer room

Shell and tube	2
Cold storage (10 degree)	1
Temperature measurement unit	2
Heat and mass transfer (cooling tower)	1

8. Workshop room

Lathe	1
Drilling machine	1
Milling machine	1
Band saw	1
Circular saw	1
Power hack saw	1
Tool	1

9. Surveying & mapping room

Transit (mini transit)	6
Dumpy level	6
Automatic level	6
Tilting level	6
Digital transit compas	2
Compas (bruton type)	6
Abney hand level	6
Range finder	6

Digital curvemeter	6
Planimeter (electronic digital)	6
Prism alidade	6
Plane tables	6
Tripod for plane table	6
Staffs (aluminum) 5m 5sets, 3m 5sets	6
Poles (metal) 25mm x 3m, 25mm x 4m	6
Pin poles 6mm x 50cm	50

10. Balance room

Analytical balance (200g, 0.1mmg)	5
Top loading balance (5kg/6kg, 50mmg)	2
Top loading balance (10kg/11kg, 50mmg)	2

11. Water distilling apparatus room

Auto still	2

12. Dark room

Dark room set	1lot

INSTRUCTIONAL ROOM

1. DAE Instructional Lab. 1

Engine research and test bed	1 lot
Solarimeter	1
Pen recorder	1
Universal test machine	1
Strain, stemgth for concrete	1
Strain and shear strength for metal	1
Comprehensive vibrator	1

2. DAE Instructional Lab. 2

Dynamic straingage meter (multi channel)	1
Sound level meter	1
Strobo	1
Video recorder and display	1
Air compressor	1
Precision E.R. (dial gauge)	1
Hand truck	1
Hand lifter 250 kg	1
Magnetic base	

3. DFT Instrucional Lab. 1

Electric furnace	1
Vacuum oven	1
Dissolved oxygen meter	1
Peristaltic pump	1
Abbe refractometer	1
Quick evaporator	1
Table top shaker	1
Constant temperature bath	1
Ultrasonic cleaner	1
Complete set of TLC unit	1
Constant temperature water bath	1
Laboratory freezer dryer (8 liters) with vacuum pumps	1
Hot plate stirrer	4
Complete membrane filtration apparatus with accessories	1
Visco meter	1
Bench	6
Fume hoods	2
Sink	1

4. DFT Instructional Lab. 2

Culture bottles (three size)	50
Dilution bottles 1000	10 pcs
Pipets	25
Petri dishes	50
Sterilizable filter unit	1
Culture tubes with caps, 144 pcs/pk	10 pk
Others	
Water activity measurement apparatus	1 lot
Constant temperature refrigerator	
Precision thermometer	
Vacuum pump	
Thermocouple and connector	
Milivolt recorder	
Vernier calipers	1
Micrometer calipers	5
Freezer	1
Refrigerator	1
Constant temperature water bath	1
Desiccators	10
Heating mantles	3
Humidity chamber	1
PH meter	1
Vacuum dryer oven	1
Set of specific gravity hydrometer (different degree of specific gravity)	1
Hygrometer	1
Humidity-temperature recorder	5
Thermister temperature controller	1
Standard laboratory press	1
Circulating pumps	3
Benches	6
Fume hoods	2
Sink	1

5. DIT Instructional Lab. 1

Paper tensile strength tester	1
Taber type abrasion tester	1
Thickness micrometer	2
Benches	4
Fume hoods	1

Sinks	1
Autoclave	2
PH meter	1
Anaerobic jar	2
Mini fermentor	1
Thin layer chromatograph	5
Gel electrophoresis chamber	1
Homosenizer	1
Test tube supports	12
Petri dish rack	120
Desicator	2
Aseptic box	2
Rotary test tube washer	2
Drying cabinet	2

6. DIT Instructional Lab. 2

Transistor circuit trainer	1
Sequential controller	2
Thyristor trainers	1
Magnetic circuit trainers	1
Electric centrifuge	1
Karl Fischer moisture meter	1
Mini jar fermentor	1
Flame photometer	1
Paper electrophoresis apparatus	1
Vacuum drying oven	1
Electric drying oven	1
Benches	2
Sinks	1
Lami pack	1
Can seamer	1

DEPARTMENT OF AGRICULTURAL ENGINEERING

1. Farm power & machinery laboratory

12–soil sieve set	1
Dynamic straingage meter (multi channel)	1
Walking type ergometer	1
Gas meter, Oxigen analyser	1
Respiration gas meter	1
Hand type barometer	1
Pulse meter	1
Blood sensimeter	1

2. Soil & water engineering laboratory

Current meter (0.5 – 1. 8m/s)	5
Current meter (0.03 – 0.7 m/s)	5
Ground water level recorder	2
Tidal gauge	2
Rainfall intensity recording system	1
Water flow measuring apparatus	1
Soil moisture meter	5
(depth of 10, 20, 30, 40, 60 and 80 cm)	

3. Energy & rural electrification laboratory

Vacuum flask calorimeter	1
16 bit computer machine	1
Infrared thermometer	1
AC Voltmeter	1

4. Agricultural farm structural & environment

Flow measurement	1
Hot wire anemometer	1

5. Food & agri-processing engineering laboratory

Portable frozen and cold room	1
Recording thermometer (12 point senser)	
–40deg(C) – 0deg(C)	1
0deg(C) – 100deg(C)	1
0deg(C) – 200deg(C)	1

Recording thermometer (6 point senser) 0deg(C) -- 60deg(C), 20% – 90%	1

6. System & agri-mechanization management laboratory

Computer (16 bits)	1 lot

7. Instrumentation & workshop laboratory

Hole saw 3 kinds	1
Drill point gauge	1
Universal level protractor	1
Bench drilling machine	1
Precision surface plate	1
Handy brinnel hardness tester	1
Hand Vibrograph	1
Angle gauge	1
Geard roll forming machine	1
Circular shear	1
Hack saw machine	1
Surface gauge	1
Electric floor grinder	1
Air impact wrench	1
Arc welder	1
Electric spot welding machine	1

DEPARTMENT OF FOOD TECHNOLOGY & HUMAN NUTRITION

1. Food chemistry laboratory

Benches	2
Fume hoods	1
Sink	1
Cabinet for chemical storage	4
PH meter	1
Fat extraction apparatus	1
Crude fiber condenser (for 6 units)	1
Fraction collector	1
Polyacrylamide gel electrophoresis unit	1
Complete with destaining unit	

2. Food microbiology laboratory

Benches	2
Fume hoods	1
Sink	1
Cabinet for chemical storage	4
Mini jar fermentor	1
Low temperature incubator	1
Medium to high temperature incubator	1
Deep freezer	1
Autoclave	1
Incubator water bath shaking	1
PH meter	1
Anaerobic jar unit	1

3. Food processing laboratory

Benches	2
Fume hoods	1
Sink	1
Cabinets for chemical storage	4
Jelly strength tester	1
Fruit hardness tester	1
Vacuum can tester	1

4. Food biochemistry & nutrition laboratory

Benchs	2
Fume hood	1

Sink	1
Cabinets for chemical storage	4
PH meter	1
Fraction collector	1
Peristaltic pump	1
Freezer	1
Rat cages, and racks, 30 cages/rack	1
Rat metabolic cages	4
Rat scale	1
Operating sets	2
Biological refrigerator	1

DEPARTMENT AGRO–INDUSTRIAL ENGINEERING

1. Agro-industrial engineering laboratory

16 bit computer machine	1
Power supply circuit trainers	2

2. Agro-chemical technology laboratory

Vacuum evaporator	2
Abbe refractometer (for high refractive index)	2
Benches	2
Sink	1
Fume hood	1

3. Quality control laboratory

Densitometer	1
Hammer crusher	1
Nenken type adiabatic bom calorimeter	1
Rotary drying oven	1
Water pollution test kit	1
Water quality test kit	1
Portable dissolved oxygen meter	1
BOD automatic monitor	1
Bench	1
Sink	1

4. Packaging laboratory

Conditioner chamber	1
Vacuum packer	1
Bench	1
Sink	1

5. Biotechnology laboratory

Bench	1
Sink	1
Fruit hardness tester	1
Vacuum can tester	1

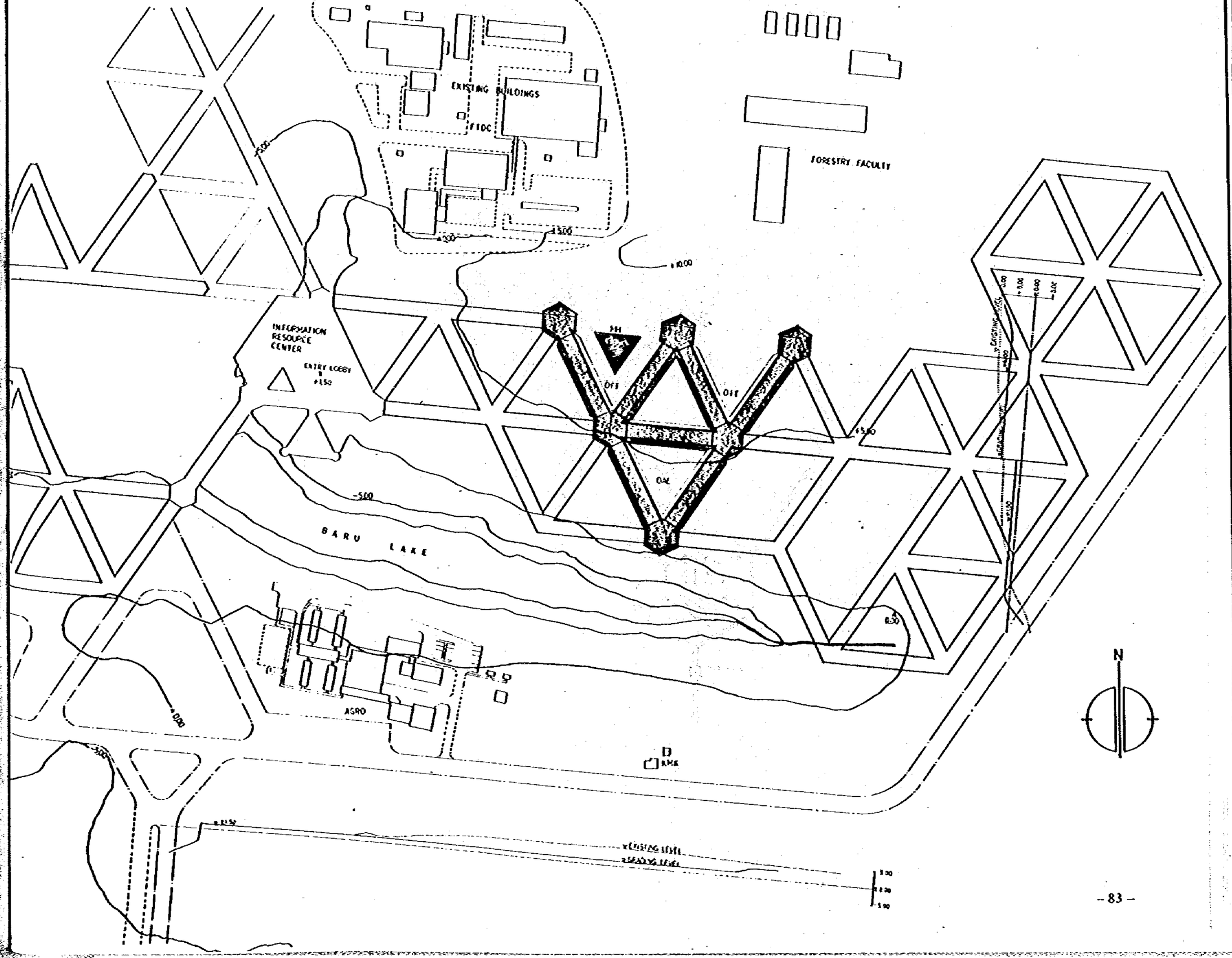
4-3-10 Basic Design Drawings

i) List of Drawings

0	SITE PLAN
1	1ST FLOOR PLAN
2	2ND FLOOR PLAN
3	3RD FLOOR PLAN
4	4TH FLOOR PLAN
5	ROOF PLAN
6	SECTION
7	ELEVATION-1
8	ELEVATION-2
9	SECTIONAL DETAIL
10	FINISH SCHEDULE
11	FINISH SET
12	DETAIL-1
13	DETAIL-2
14	SCHEDULE OF AREA

INSTITUT PERTANIAN BOGOR

Indonesia



AD : ADMINISTRATION
- .OFFICE
- .MEETING
- .PROVATE HEAD
- .DEPT HEAD
- .DEANS
- .COPY
- .OFFICE FOR DEPT

PO : PROFESSORS OFFICE
AS : ACADEMIC STAFF ROOM
GS : GRADUATED STUDENT ROOM
TS : TECHNICIANS ROOM
LA : SHARED LABORATORIES
IL : INSTRUCTIONAL LABORATORIES
RL : RESEARCH LABORATORIES
AU : AUDITORIUM
CR : CANTEEN
- SNACK
- FOOD

DAE: DEPARTMENT OF AGRICULTURAL ENGINEERING
DIT: DEPARTMENT OF INDUSTRIAL TECHNOLOGY
DFS: DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY

SITE PLAN

SCALE
1 : 2000

0

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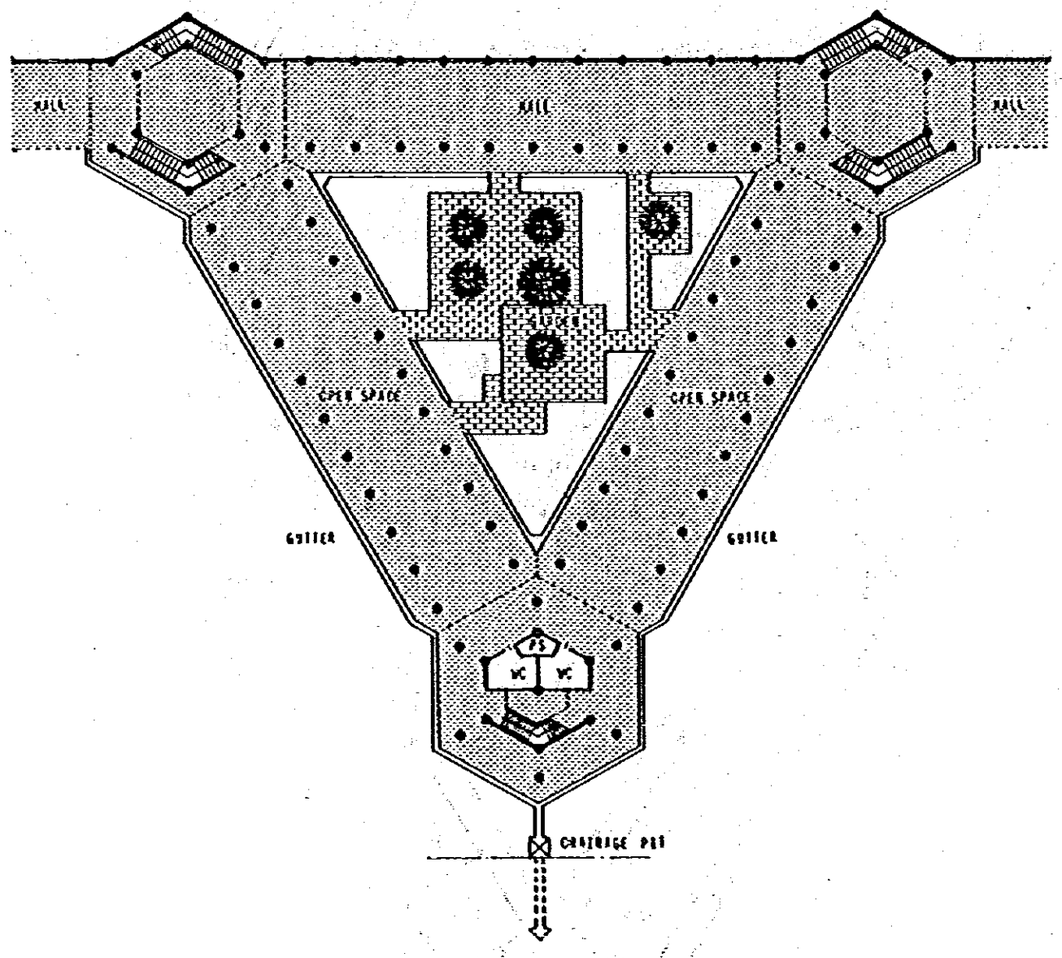
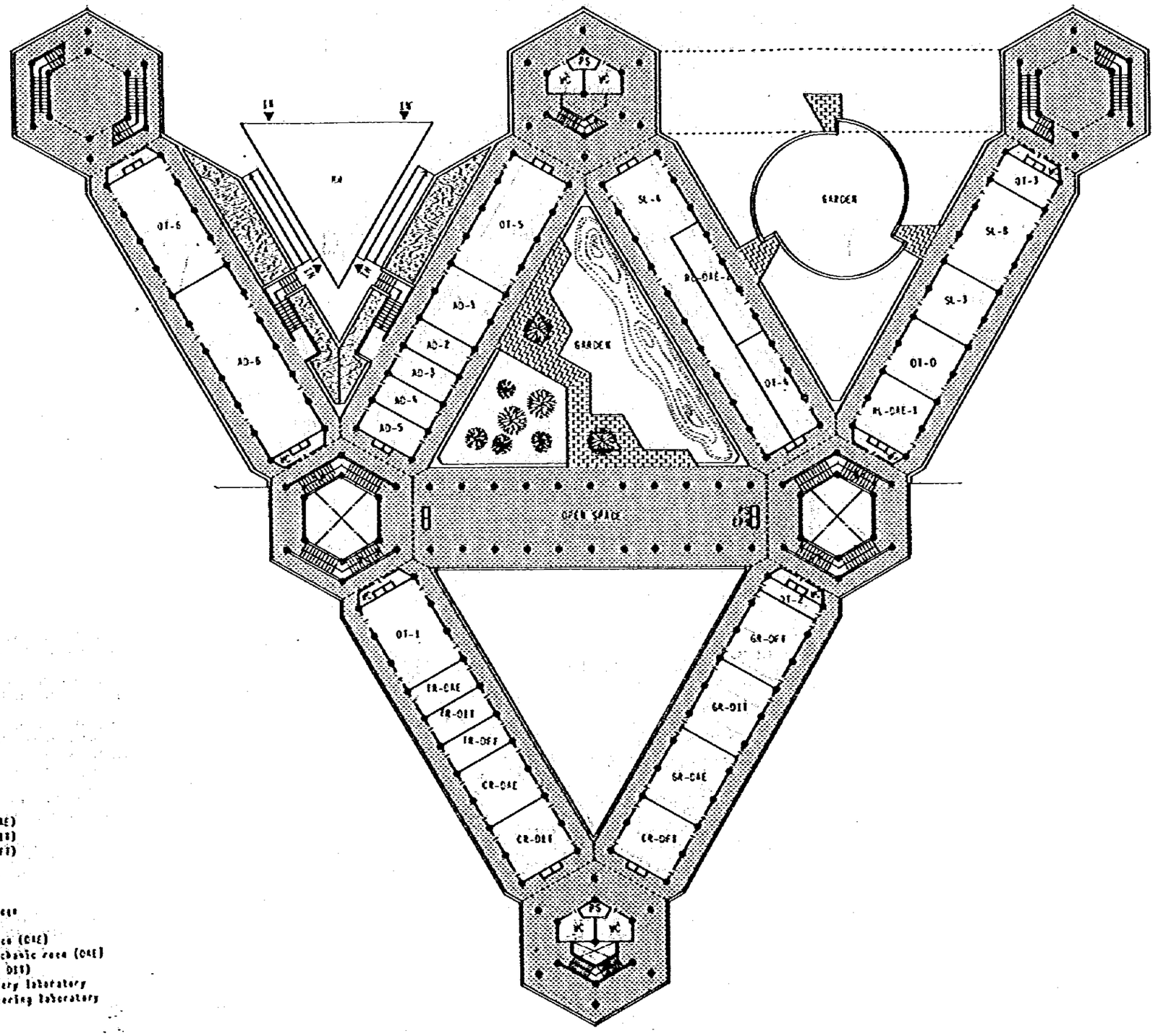


1ST FLOOR

1 5 10 20M

1



AD-1 Faculty head
AD-2 Faculty sub head (CAE)
AD-3 Faculty sub head (DEE)
AD-4 Faculty sub head (DFF)
AD-5 Meeting
AD-6 Faculty office
CR Classroom
GR Graduated student room
ER Technicians room
SL-3 Material testing room (CAE)
SL-4 Hydraulic & hydroschanic room (CAE)
SL-5 Workshop (CAE, DFF, DEE)
RL-CAE-1 Farm power & machinery laboratory
RL-CAE-2 Soil & water engineering laboratory
RA Multi hall
OT Others

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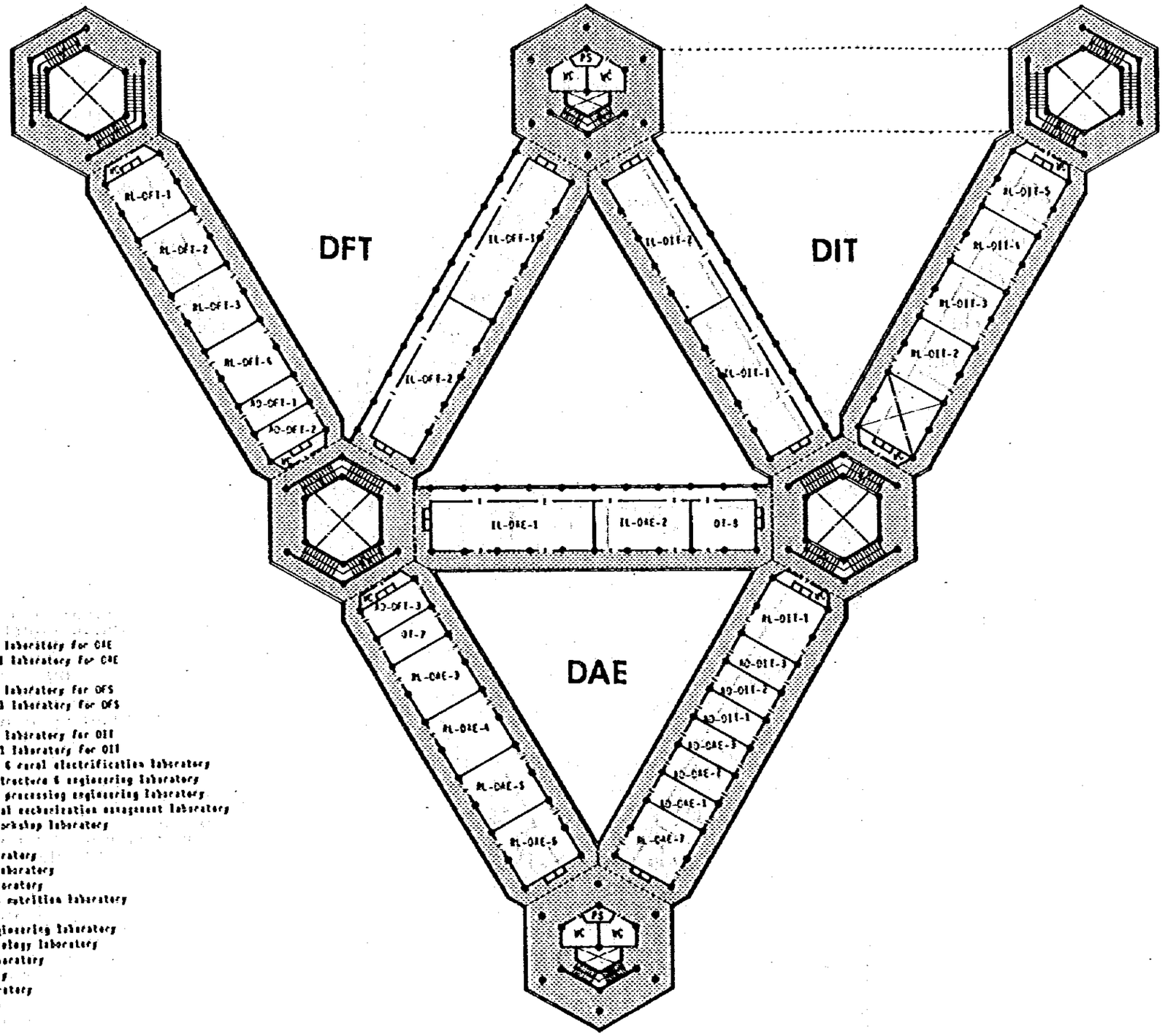
2ND FLOOR

1 5 10 20M

2



IL-DAE-1 First Instructional laboratory for DAE
IL-DAE-2 Second Instructional laboratory for DAE

IL-DFT-1 First Instructional laboratory for DFS
IL-DFT-2 Second Instructional laboratory for DFS

IL-DIT-1 First Instructional laboratory for DIT
IL-DIT-2 Second Instructional laboratory for DIT
RL-DAE-3 Agricultural energy & rural electrification laboratory
RL-DAE-4 Agricultural farm structure & engineering laboratory
RL-DAE-5 Food & agricultural processing engineering laboratory
RL-DAE-6 System & agricultural mechanization management laboratory
RL-DAE-7 Instrumentation & workshop laboratory

RL-DFT-1 Food chemistry laboratory
RL-DFT-2 Food microbiology laboratory
RL-DFT-3 Food processing laboratory
RL-DFT-4 Food biochemistry & nutrition laboratory

RL-DIT-1 Agro-industrial engineering laboratory
RL-DIT-2 Agro-chemical technology laboratory
RL-DIT-3 Quality control laboratory
RL-DIT-4 Packaging laboratory
RL-DIT-5 Biotechnology laboratory

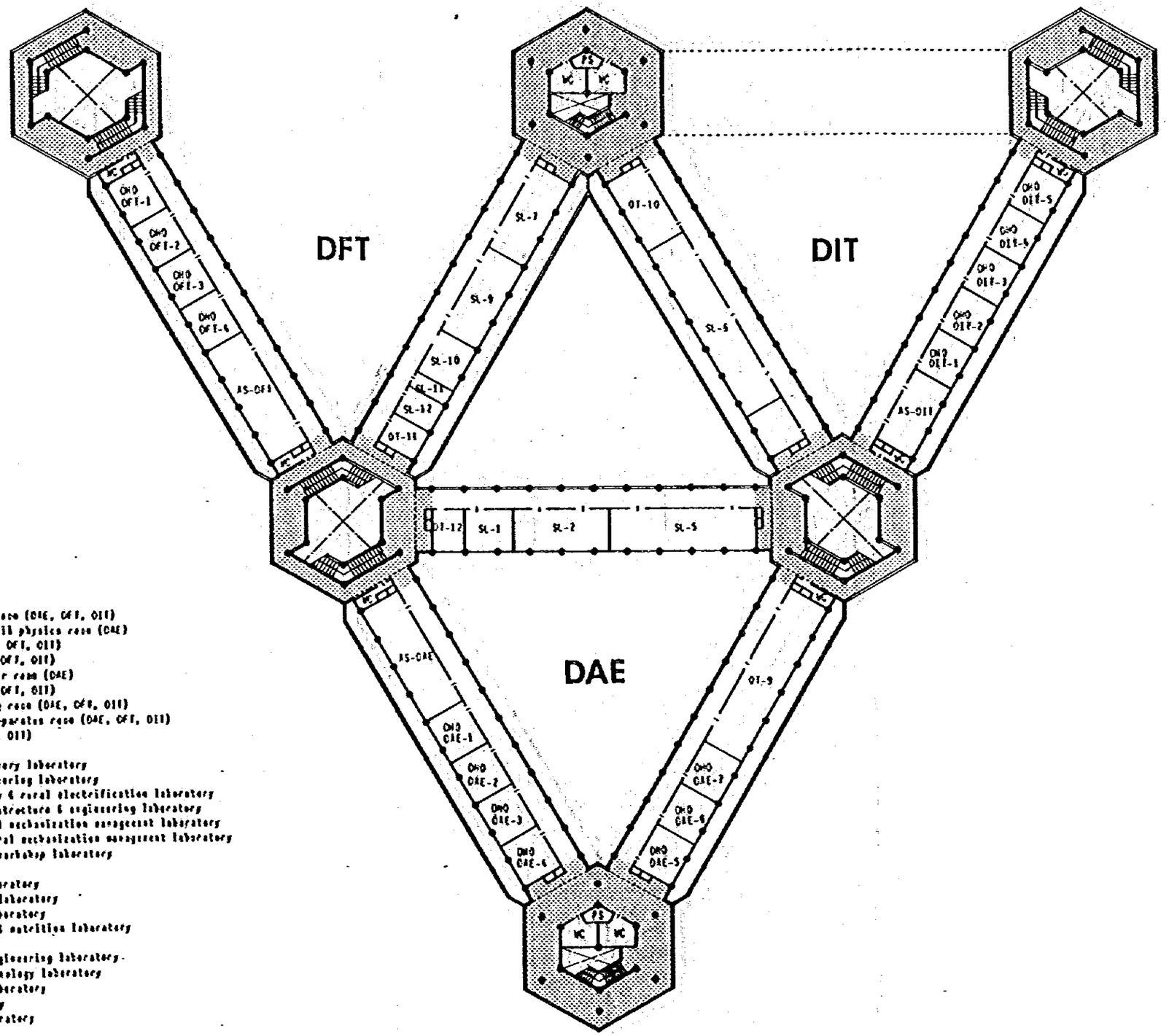
AD-1 Department head
AD-2 Department office
AD-3 Meeting
DI Others

INSTITUT PERTANIAN BOGOR
Indonesia

3RD FLOOR

1 5 10 20M

3



SL-1 Precision machine room (DAE, DFT, DIT)
SL-2 Soil mechanics & soil physics room (DAE)
SL-5 Computer room (DAE, DFT, DIT)
SL-6 Drawing room (DAE, DFT, DIT)
SL-7 Heat & Mass transfer room (DAE)
SL-9 Balance room (DAE, DFT, DIT)
SL-10 Surveying & Mapping room (DAE, DFT, DIT)
SL-11 Water distilling apparatus room (DAE, DFT, DIT)
SL-12 Darkroom (DAE, DFT, DIT)

OHD-DAE-1 Farm power & machinery laboratory
OHD-DAE-2 Soil & water engineering laboratory
OHD-DAE-3 Agricultural energy & rural electrification laboratory
OHD-DAE-4 Agricultural farm structure & engineering laboratory
OHD-DAE-5 Food & agricultural mechanization management laboratory
OHD-DAE-6 System & agricultural mechanization management laboratory
OHD-DAE-7 Instrumentation & workshop laboratory

OHD-DFT-1 Food chemistry laboratory
OHD-DFT-2 Food microbiology laboratory
OHD-DFT-3 Food processing laboratory
OHD-DFT-4 Food biochemistry & nutrition laboratory

OHD-DIT-1 Agro-industrial engineering laboratory
OHD-DIT-2 Agro-chemical technology laboratory
OHD-DIT-3 Quality control laboratory
OHD-DIT-4 Packaging laboratory
OHD-DIT-5 Biotechnology laboratory

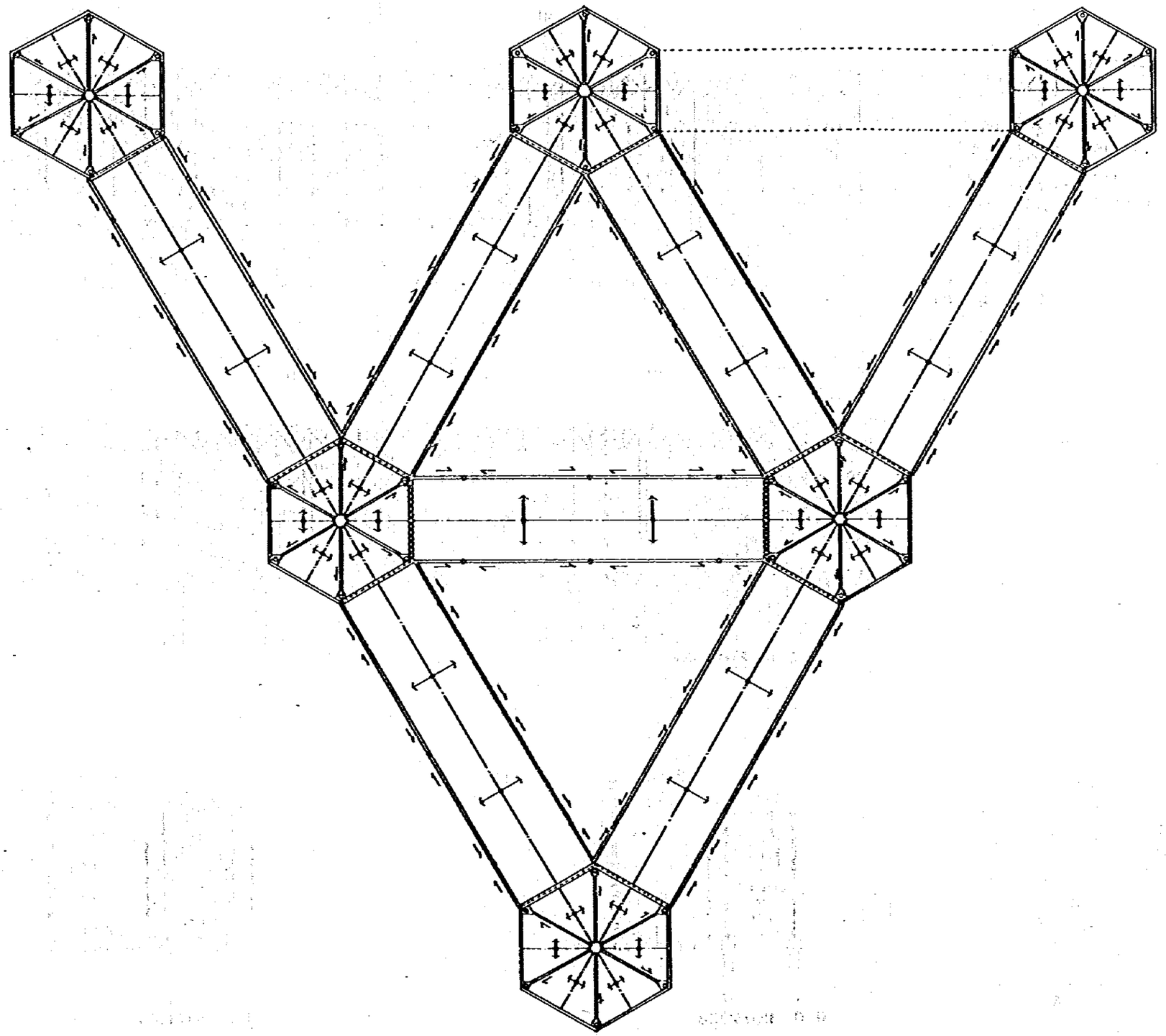
AS Academic staff
OT Others

INSTITUT PERTANIAN BOGOR
Indonesia

4TH FLOOR

1 5 10 20M

4

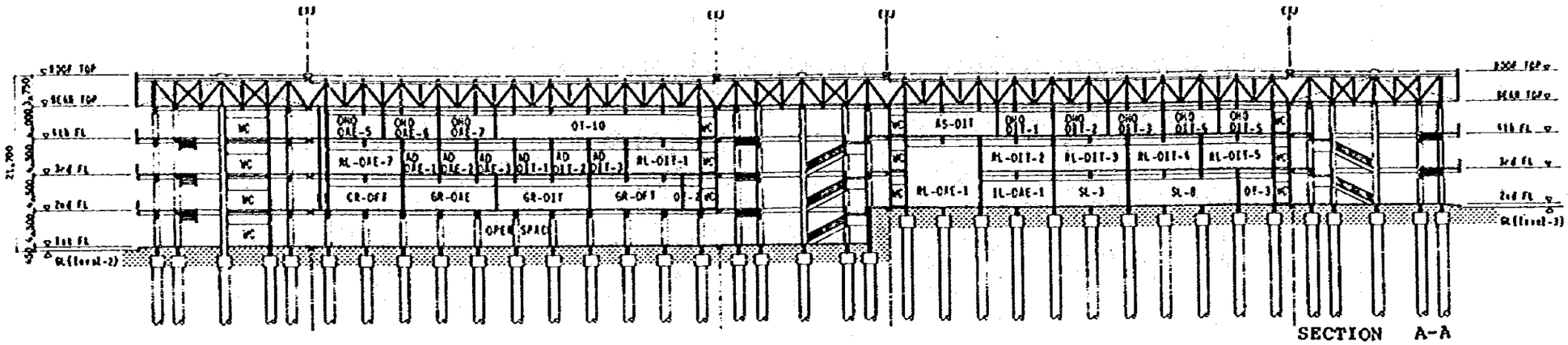


INSTITUT
PERTANIAN
BOGOR
Indonesia

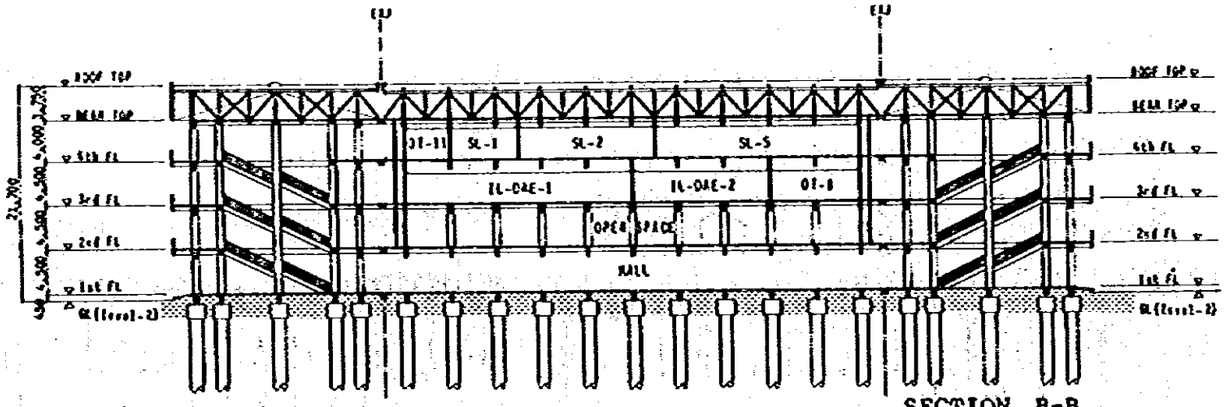
ROOF PLAN

1 5 10 20M

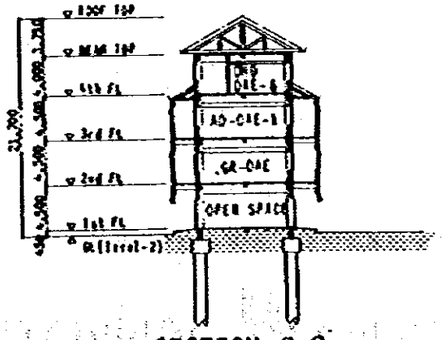
5



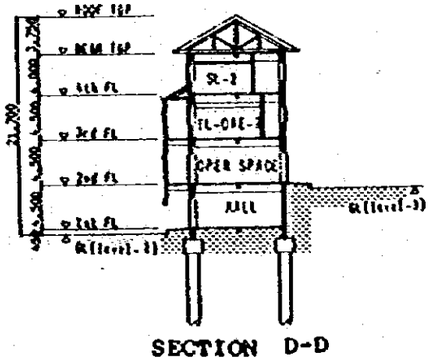
SECTION A-A



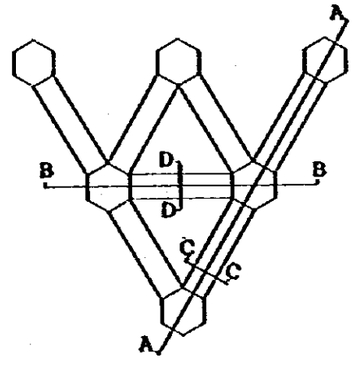
SECTION B-B



SECTION C-C



SECTION D-D



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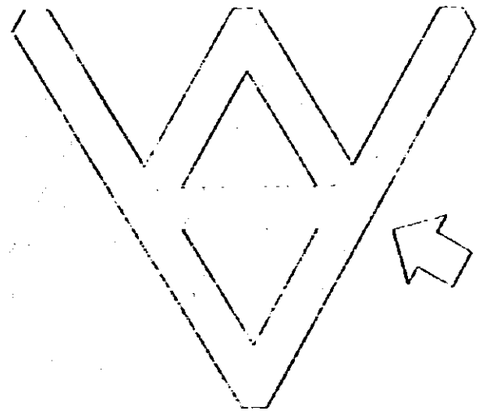
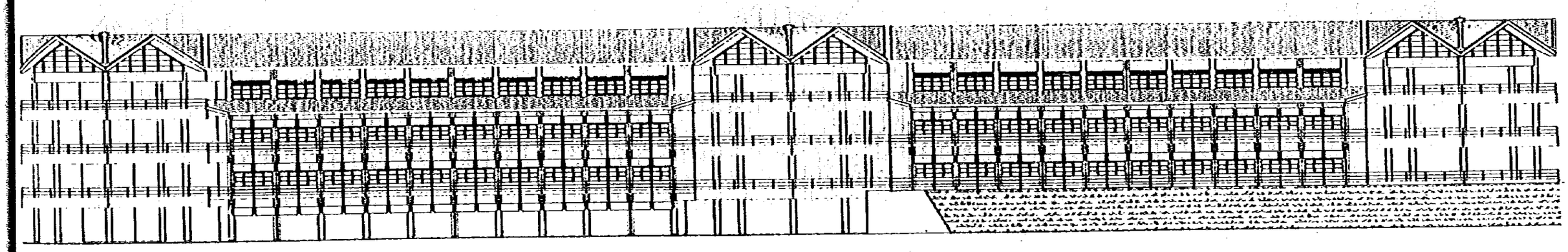
SECTION

1 5 10 20 M

6





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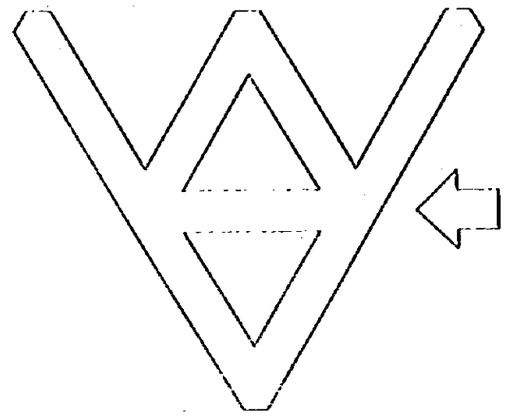
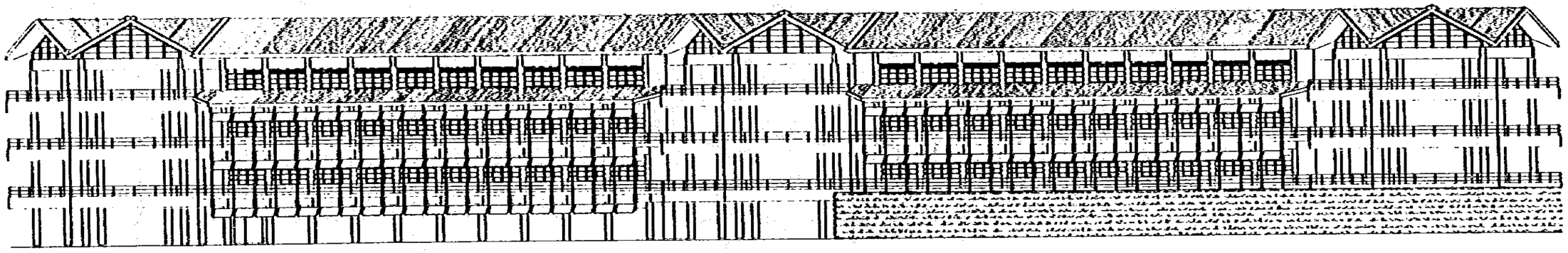
ELEVATION

– 90 –

1 5 10M

7





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ELEVATION

1 5 10M

8

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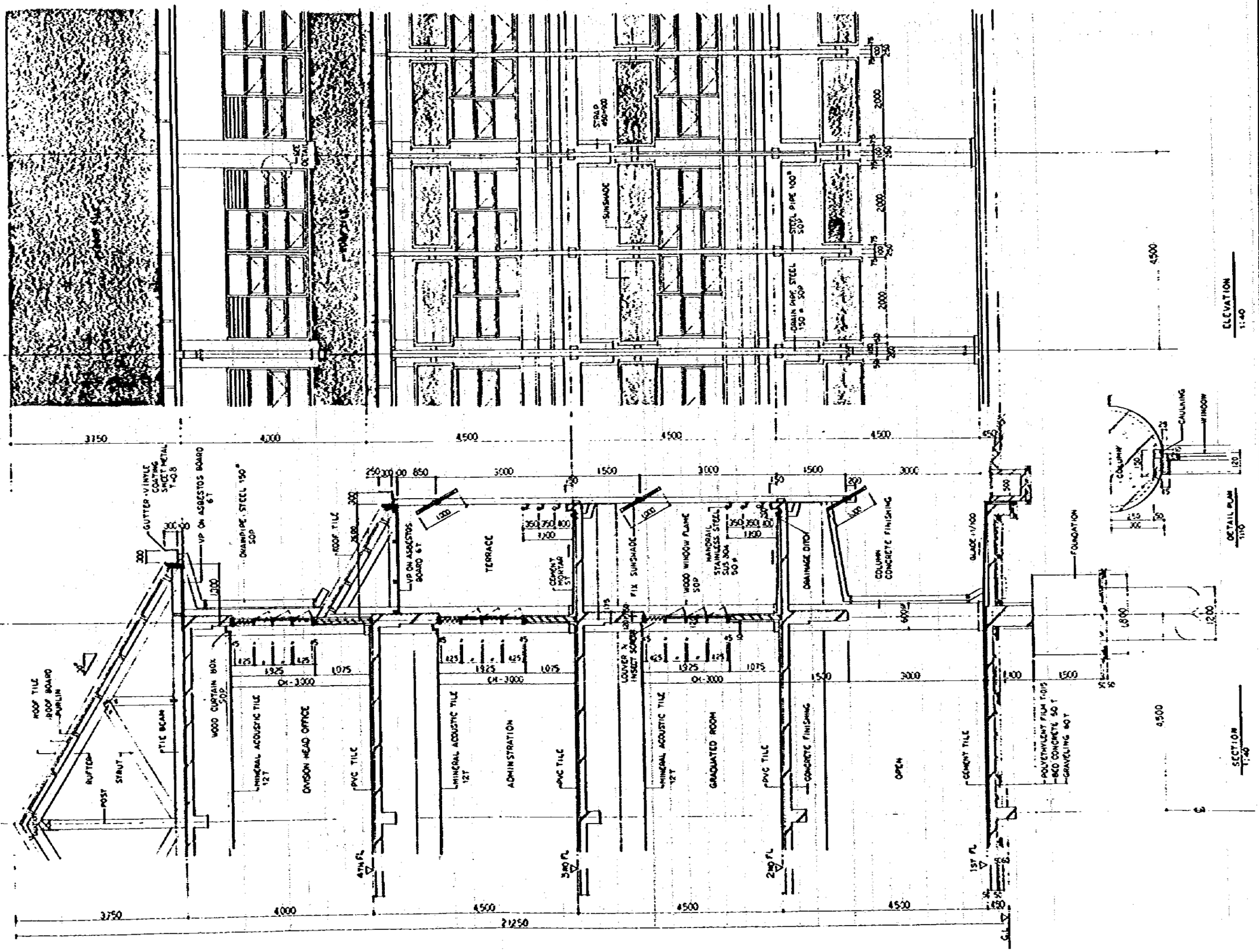
Indonesia



SECTIONAL DETAIL

SCALE 1 : 80

9

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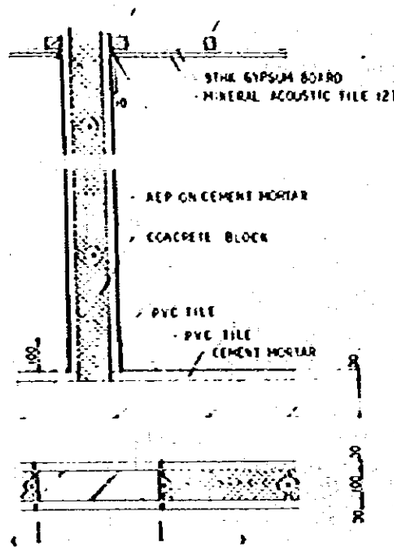
FINISH SCHEDULE

SCALE
NOT TO SCALE

10

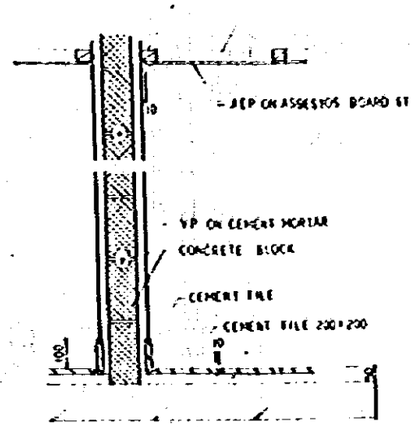
INTERIOR FINISHES				ELEMENT / FINISH NO	FLOOR F-1 PVC TILE	FLOOR F-2 CEMENT TILE	FLOOR F-3 CERAMIC MOSAIC TILE	FLOOR F-4 CARPET ON CEMENT MORTAR	FLOOR F-5 CEMENT MORTAR ST	FLOOR REMARKS	BASEBOARD B-1 PVC TILE	BASEBOARD B-2 CEMENT MORTAR ST	BASEBOARD B-3 CERAMIC TILE 100×100 ON CEMENT MORTAR	BASEBOARD B-4 CL ON HARD WOOD	BASEBOARD B-5 CEMENT TILE	BASEBOARD REMARKS	WALL W-1 AEP ON CEMENT MORTAR	WALL W-2 VP MORTAR ST ON BLOCK 150T	WALL W-3 VP ON CEMENT MORTAR ST	WALL W-4 VINYL WALL SHEET	WALL W-5 CONCRETE FINISHING	WALL W-6 AEP ON CEMENT MORTAR ST	WALL REMARKS	CEILING C-1 MINERAL ACOUSTIC TILE 12T	CEILING C-2 AEP ON ASBESTOS BOARD 6T	CEILING C-3 VP ON ASBESTOS BOARD 6T	CEILING C-4 MINERAL ACOUSTIC TILE 19T	CEILING C-5 CL ON PLYWOOD 6T (Plain and perforated)	CEILING C-6 AEP ON CEMENT MORTAR ST	CEILING C-7 CONCRETE FINISHING	CEILING C-8 AEP ON CONCRETE FINISHING	CEILING REMARKS: CEILING HIGHT	GENERAL REMARKS
BUILDING NAME	FLOOR LEVEL	ROOM NO	ROOM NAME	FINISH SET NO																													
	1ST		ADMINISTRATION 1-5	FS-1	O						O					H=100	O							O								3000	
	1ST		SHARED LABORATORIES 1-3	FS-2		O						O				H=100		O							O							3000	
	1ST		RESEARCH LABS 1	"		O						O				H=100		O							O							3000	
	1ST		INSTRUCTIONAL LABS 1	"		O						O				H=100		O							O							3000	
	1ST		OTHERS 1-3		O	O					O	O				H=100	O	O						O	O							3000	
	1ST		OPEN SPACE			O															O									O			
	1ST		HALL	FS-3		O									O	H=100					O										O		
	2ND		SHARED LABS 4-13	FS-2		O						O				H=100		O							O							3000	
	2ND		INSTRUCTIONAL LABS 2-11	"		O						O				H=100		O							O							3000	
	2ND		CLASS ROOM 1-3	FS-1	O						O					H=100	O							O								3000	
	2ND		GRADUATED STUDENT ROOM 1-3	"	O						O					H=100	O							O								3000	
	2ND		TECHNICIANS ROOM 1-3	"	O						O					H=100	O							O								3000	
	2ND		OTHERS 4-9		O	O					O	O				H=100	O	O						O	O							3000	
	3RD		ADMINISTRATION 6-17	FS-1	O						O					H=100	O							O								3000	
	3RD		RESEARCH LABS 2-15	FS-2		O						O				H=100		O							O							3000	
	3RD		OTHERS 10-16		O	O					O	O				H=100	O	O						O	O							3000	
	4TH		PROFESSORS OFFICE 1-18	FS-1	O						O					H=100	O							O								3000	
	4TH		ACADEMIC STAFF ROOM 1-3	"	O			Ⓔ			O			Ⓔ		H=100	O			Ⓔ				O			Ⓔ					3000	Ⓔ — EXECUTIVES
	GENERAL		TOILET	FS-5			O						O			H=1800			O							O						2500	
	GENERAL		STAIR CASE	FS-6					O			O							O												O		
	GENERAL		CORRIDOR & TERRACE	FS-4		O						O				H=100	Ⓘ				Ⓘ		H=1100		Ⓒ					Ⓘ			Ⓒ CORRIDOR Ⓘ TERRACE
			MULTI HALL	FS-7				O						O								O						O					

1	FS-1	SCALE 1:20



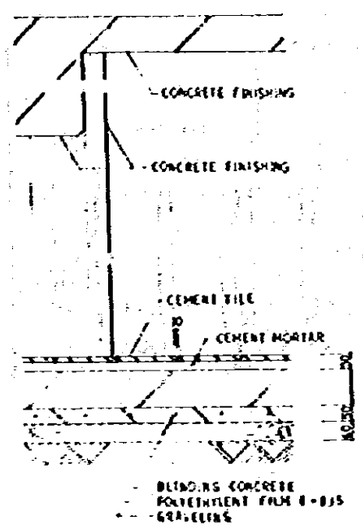
NOTE : ADMINISTRATION, CLASS ROOM, GRADUATED STUDENT ROOM, TECHNICIANS ROOM, PROFESSORS OFFICE, ACADEMIC STAFF ROOM

2	FS-2	SCALE 1:20



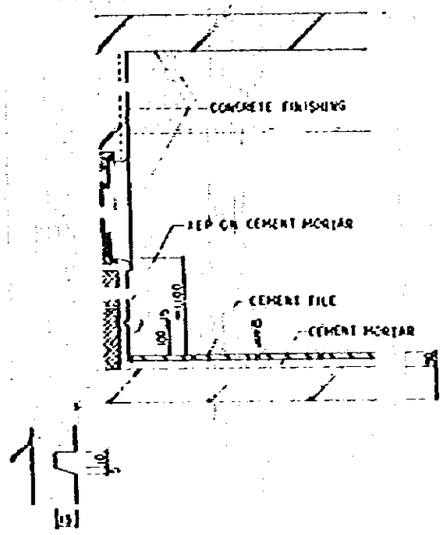
NOTE : SHARED LABORATORIES, RESEARCH LABS, INSTRUCTIONAL LABS CORRIDOR

3	FS-3	SCALE 1:20



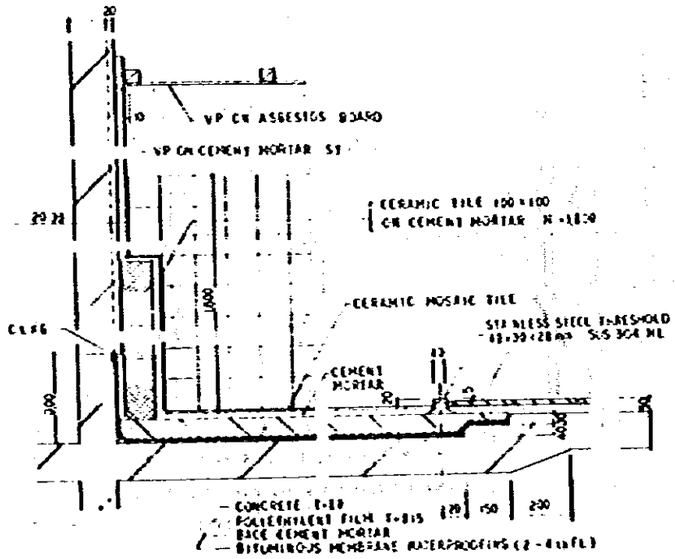
NOTE : OPEN SPACE, CORRIDOR & TERRACE, MALL

4	FS-4	SCALE 1:20



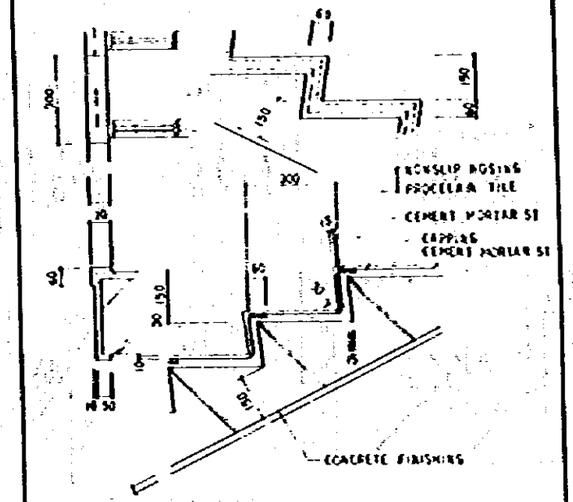
NOTE : CORRIDOR & TERRACE

5	FS-5	SCALE 1:20



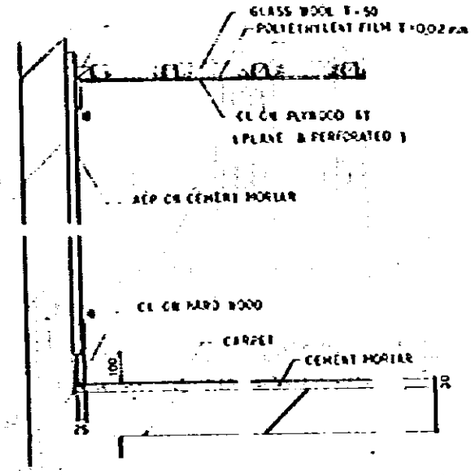
NOTE : TOILET

6	FS-6	SCALE 1:20



NOTE : STAIRCASE

7	FS-7	SCALE 1:20



NOTE : MAIN HALL

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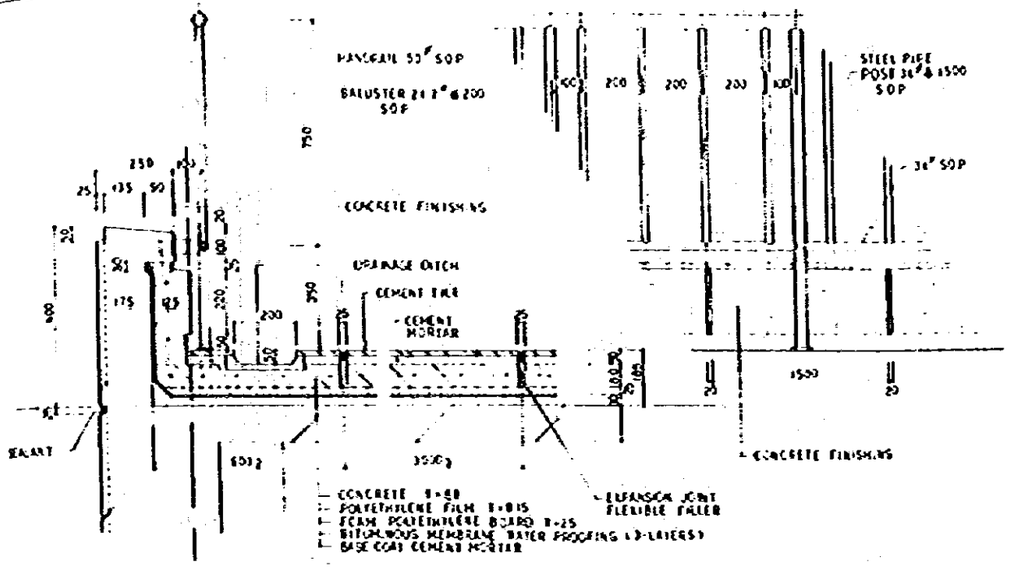
FINISH SET

SCALE
1 : 20

11

8 ROOF DETAIL

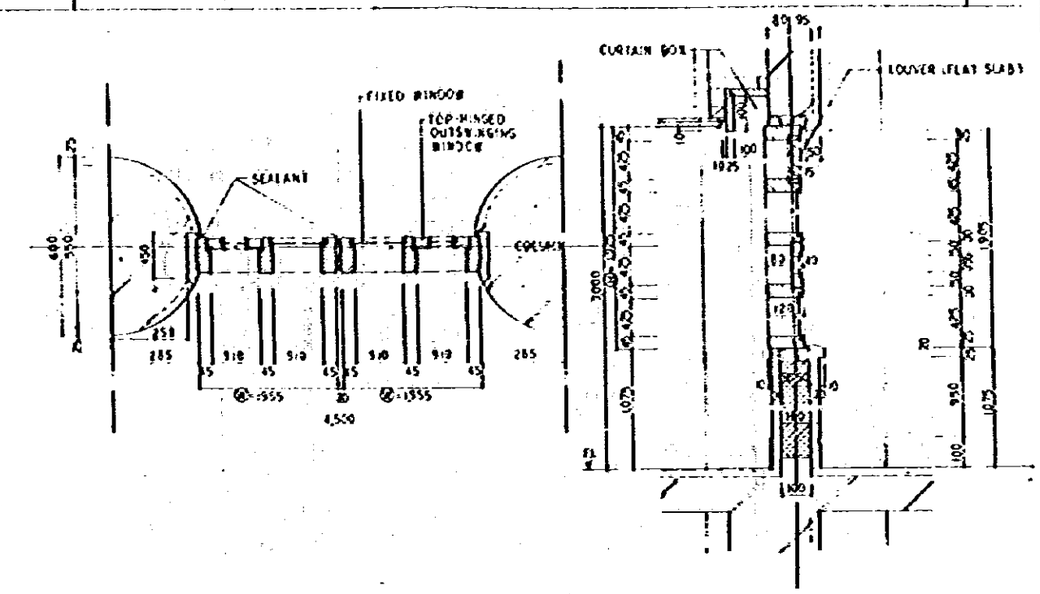
SCALE 1:20



NOTE

9 WOOD WINDOW

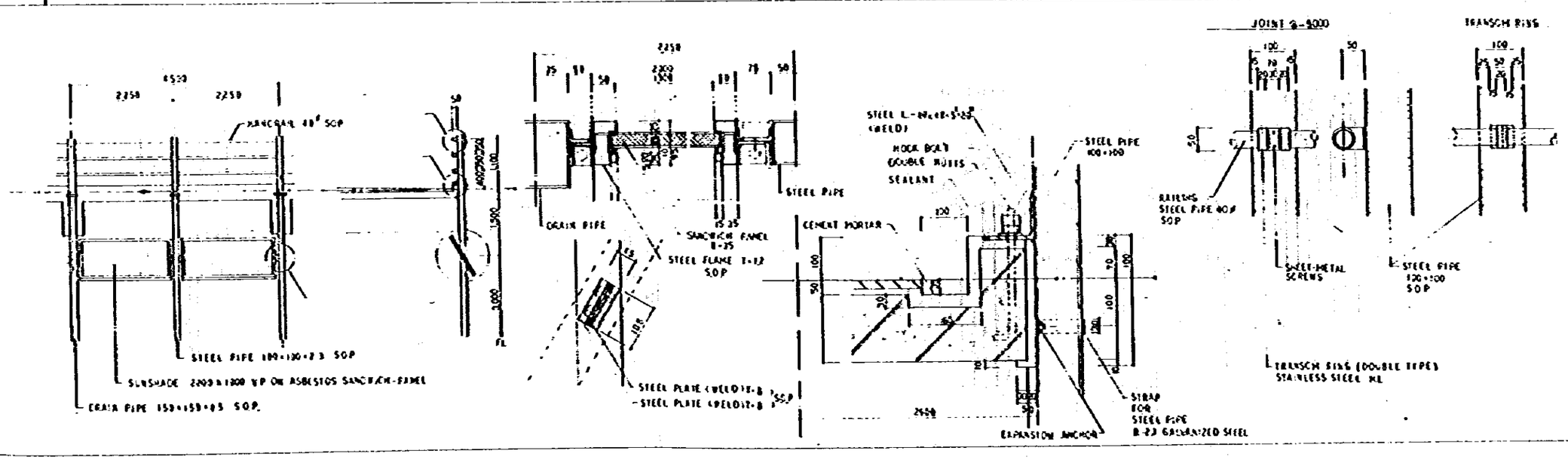
SCALE 1:20



NOTE

10 SUNSHADE & HANDRAIL

SCALE 1:100 | 1:10



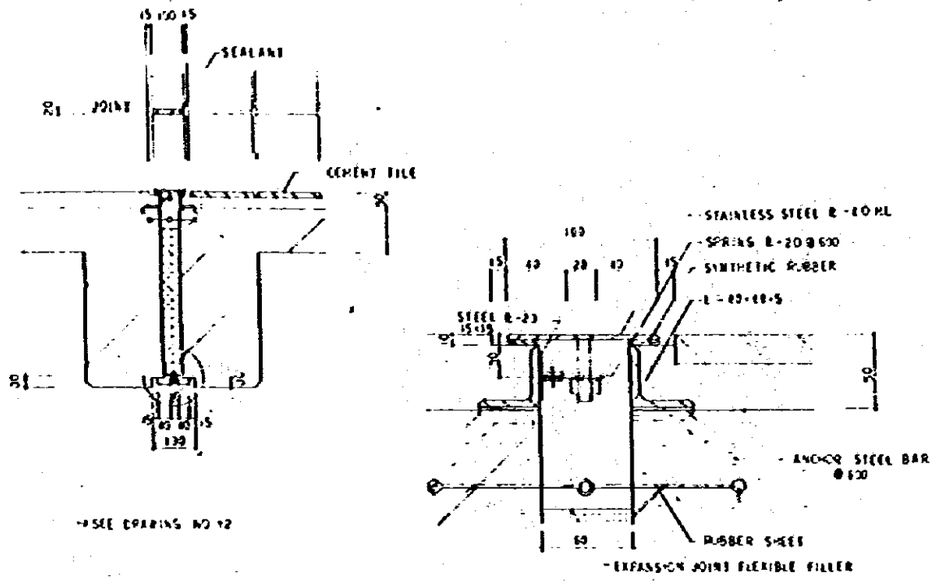
SITE

DETAILS – 1

SCALE
1 : 10, 20, 100

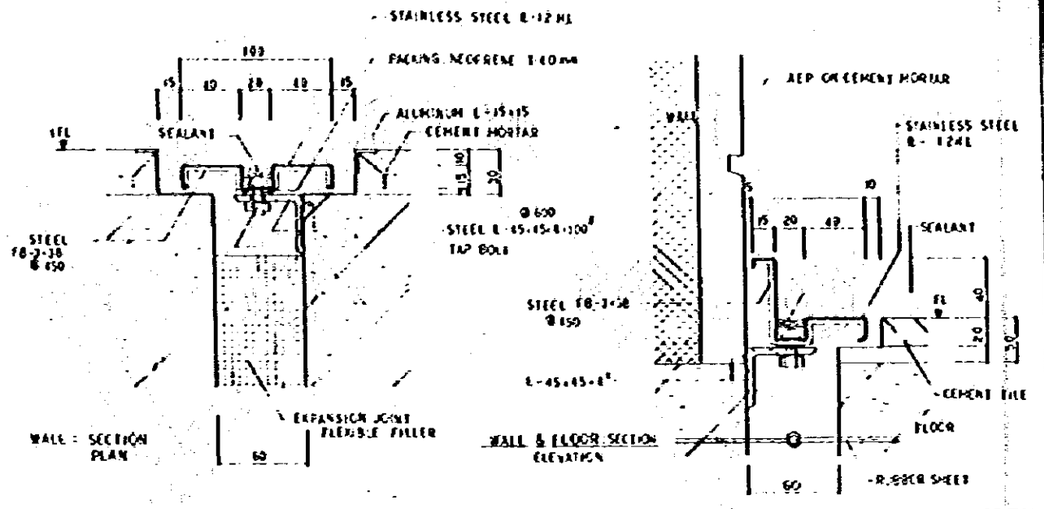
12

11 FLOOR & SEILING EXPANSION JOINT — SCALE 1:20 | 1:4



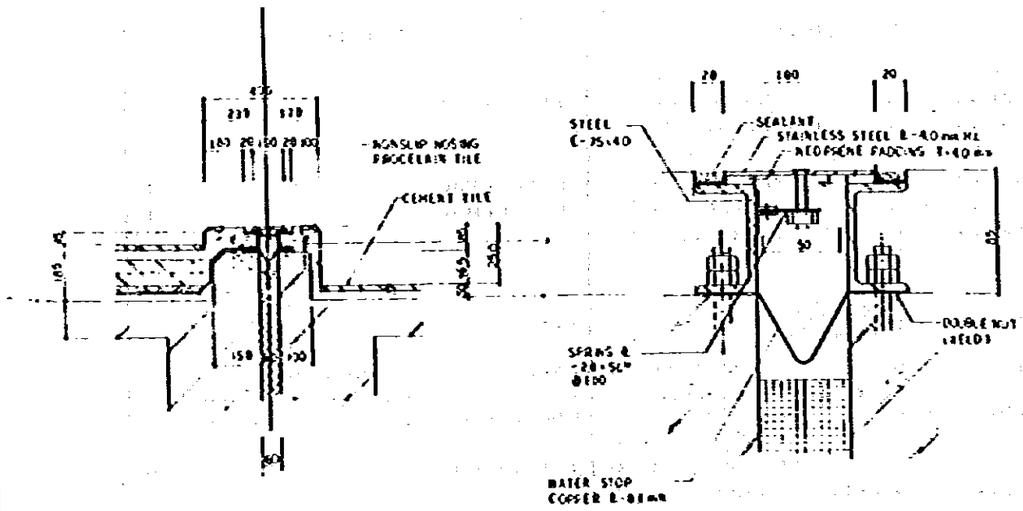
NOTE

12 WALL & FLOOR EXPANSION JOINT — SCALE 1:4



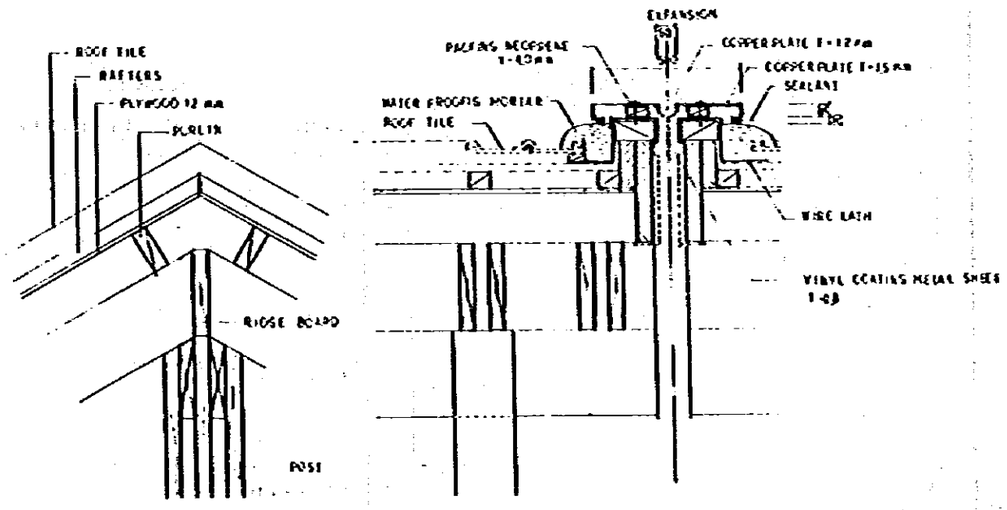
NOTE

13 RF FLOOR EXPANSION JOINT — SCALE 1:20 | 1:4



NOTE

14 ROOF TILE EXPANSION JOINT — SCALE 1:20



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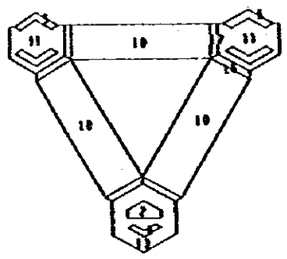
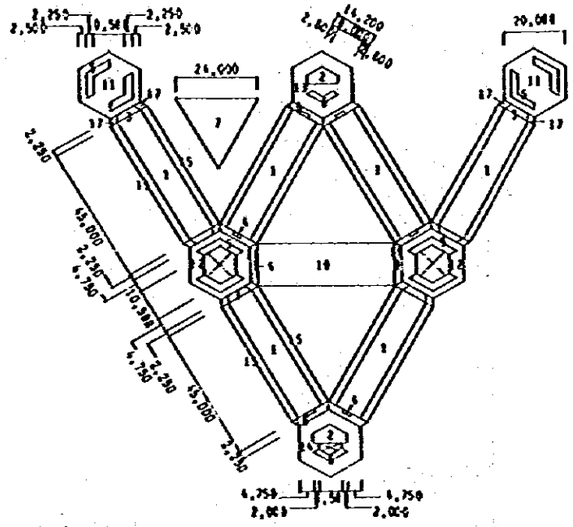
DETAILS – 2
SCALE
1 : 20,4

13

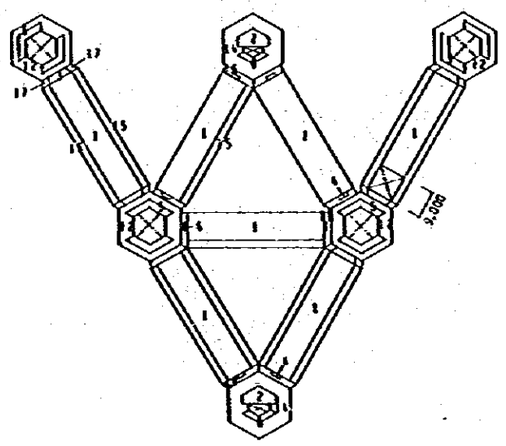
1st FLOOR



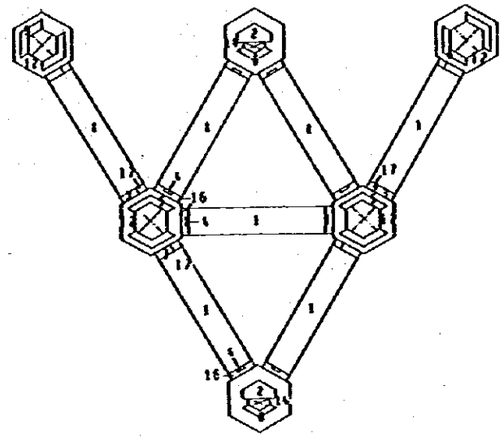
2nd FLOOR



3rd FLOOR



4th FLOOR



		1st FLOOR		2nd FLOOR		3rd FLOOR		4th FLOOR		TOTAL	
NET FLOOR AREA	2	48.54 x 1 =	48.5	1 45.0 x 9.0	=405.00 x 6 =2430.0	1 635.00 x 6 = 30.0 x 9.0	=3756.0	1 625.00 x 7 =4035.0		9	9018.0
				2 6.113 x 5.214 x 1/2 x 3	= 48.54 x 2 = 97.1	2	97.1	2	97.1	2	388.4
				3 (9.0 + 8.359) x7.25 x 1/2	= 17.32 x 6 = 103.9	3	103.9	3 8.0 x 2.25	= 13.50 x 6 = 81.0	3	288.8
				4 3.0 x 3.0	= 3.00 x 8 = 24.0	4	24.0	4	24.0	4	72.0
	5	37.78 x 6 = 555.6		5 (9.0 + 6.111) x 2.5	= 37.78 x 8 = 302.2	5	302.2	5	302.2	5	1057.7
	6	19.83 x 2 = 19.8		6 (6.111 + 3.824) x 2.0	= 19.83 x 2 = 39.7	6	39.7	6	39.7	6	138.9
				7 27.0 x 23.343 x 1/2	=315.07 x 1 = 315.7					7	315.7
			210.4		3312.6		3370.9		3370.9		10231.9
OTHERS	10	839.00 x 2 + 45.0 x 11.8	=1830.0	10 45.0 x 14.2	=639.00 x 1 = 639.0					10	2469.0
	11	222.01 - (9.0 + 11.550) x 2.25 - 8.239 x 2.25	=224.83 x 2 = 449.7	11 11.550 x 10.006 x 1/2 x 6 (369.63) - 37.78 x 2	=293.91 x 2 = 587.8					11	95.1
				12 232.91 - 37.78	=195.13 x 2 = 353.2	12	195.13 x 6 = 787.3	12	787.3	12	3788.3
	13		281.10 x 1 = 281.1	13 369.63 - 48.54 - 19.83	=281.10 x 1 = 281.1					13	562.2
				14 281.10 - 3.824 x 3.214 x 1/2 x 3	=262.30 x 1 = 262.3	14	262.30 x 2 = 524.6	14 282.30 - 19.83 x 1/6	=257.34 x 2 = 514.7	14	1301.6
				15 45.0 x 2.6	=117.00 x 12=1404.0	15	117.00 x 11=1287.0			15	2691.0
	16	(14.2 + 11.550) x 2.25 x 1/2	= 29.02 x 6 = 210.1	16 (14.2 x 11.550) x 2.25 x 1/2 - 3.04	29.02 x 8 = 258.2	16	29.02 x 8 - (5.3 x 2.0) x 2.25 x 3 = 181.8	16 8.0 x 2.25 - 3.0	= 15.25 x 8 = 138.0	16	844.1
	17	(10.301 + 11.0) x 2.25 x 1/2	= 24.53 x 2 = 49.1	17 2.6 x 2.25	= 5.85 x 12= 70.2	17	70.2	17 3.0 x 2.25	= 8.75 x 6 = 49.5	17	230.0
			2835.6		3768.3		2378.8		1490.5		10433.9
TOTAL			2835.6		7080.8		8091.8		6720.5		20665.2

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SCHEDULE OF AREA

14

CHAPTER 5
PROJECT EXECUTION SYSTEM

5. PROJECT EXECUTION SYSTEM

5-1 Execution Body of the Project

The implementing organization of the Project is headed by the Ministry of Education and Culture, followed by members of IPB as the core, the steering committee and technical team. Implementing organization of the project is indicated in the following organization chart.

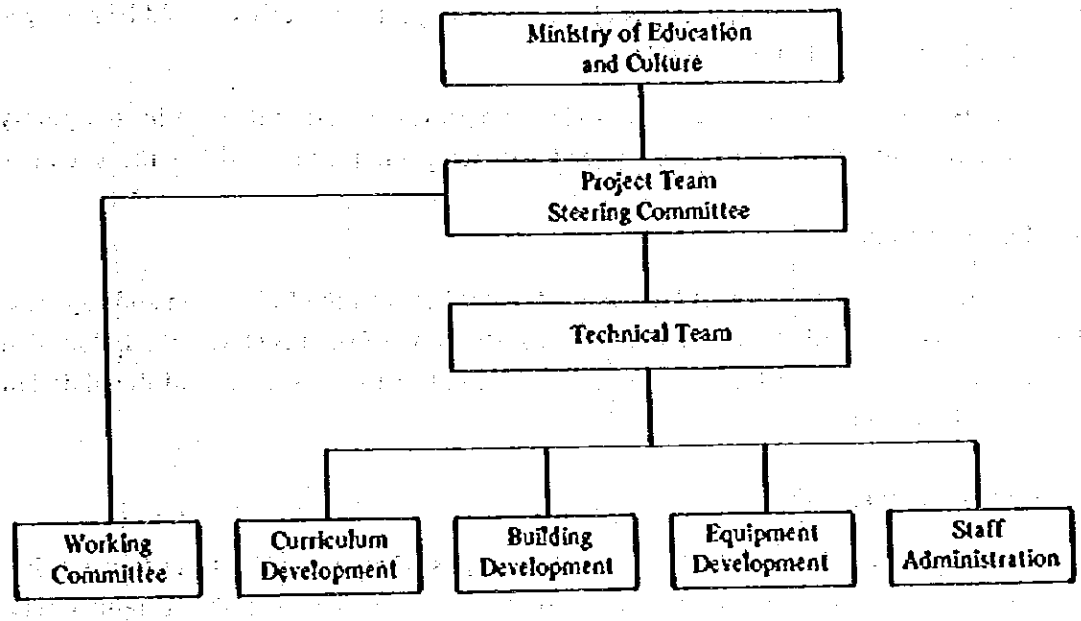


Fig-29 Implementation Organization Chart

5-2 Construction Work Program

Construction period for the Project shall be 15.5 month in total.

Prior to commencement of work, services for water, sewage, electric power supply and grading to the proposed site should be completed by Indonesian side.

As mentioned before, the proposed site is inclined greatly from north to south, and the grading work is expected to be a major part of the work.

During the construction period, customs clearance of imported materials should be managed smoothly at port also by Indonesian side.

The Project is a part of the overall campus plan and provided sufficient space for temporary staff office, construction material storage and batcher plant facilities within the site area.

i) Contract System

Subsequent to the conclusion of Exchange of Notes between the Indonesian and Japanese Governments in regard to Grant-Aid for the construction of the FATETA, the Indonesian Government will select a Japanese Consultant, and after that, execution of detail design work will be commenced.

ii) Construction Planning

The proposed site is located on the Darmaga Campus where many facilities in use exist, and as the campus road shall be used as the approach road to the site, careful safety measures should be considered.

iii) Supervising Schedule

Viewed from the scope of construction, the Consultant shall station a resident supervisor throughout the construction period.

Besides, as the work progresses, necessary experts shall also be dispatched to the site for required inspection.

5-3 Construction Schedule

The construction schedule is planned to be implemented as follows.

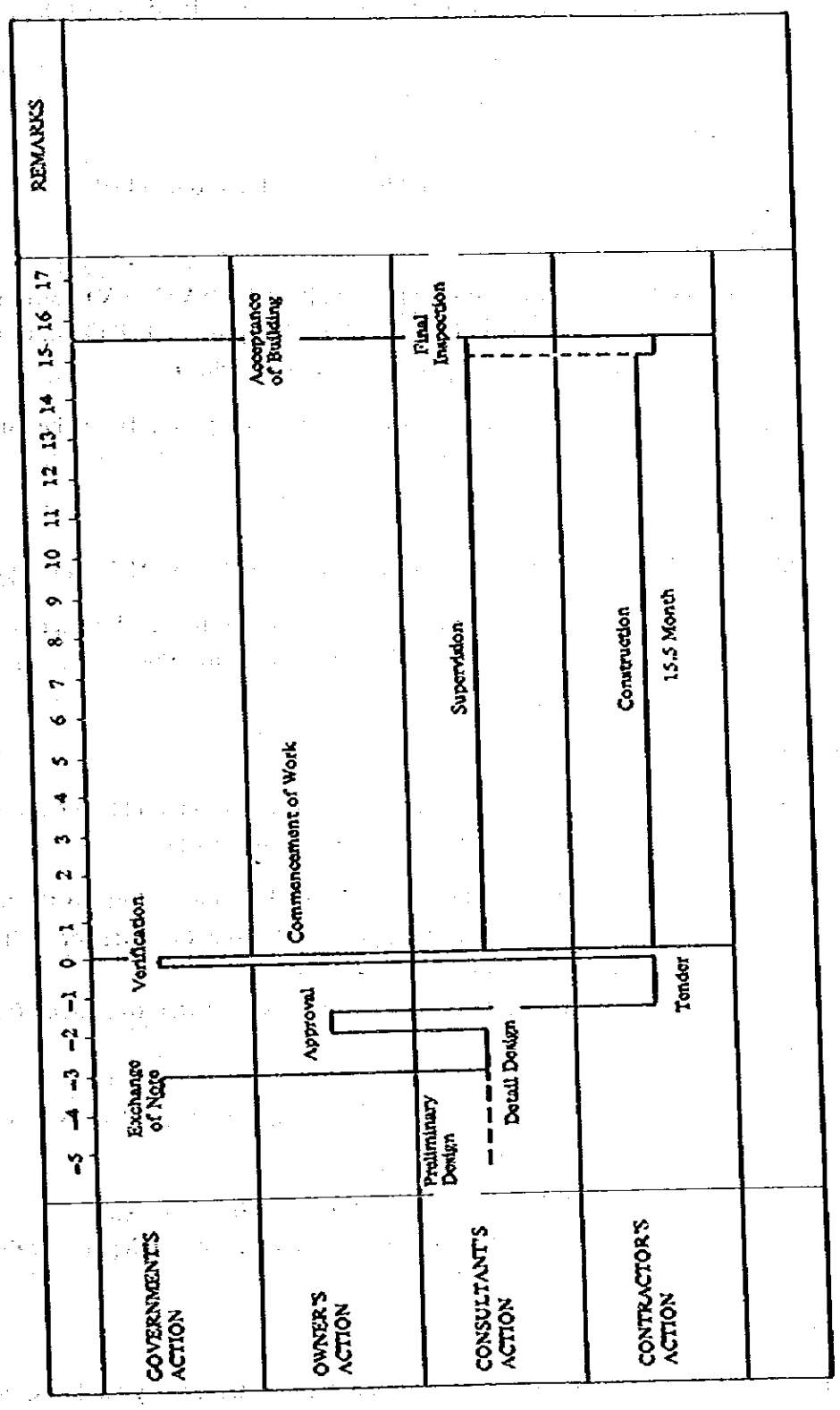


Fig-30 Construction Schedule

5-4 Scope of Work

The respective construction scope for the Indonesian and Japanese sides which are stated in the Minutes of Discussion are rearranged herein into classified construction items.

i) Infrastructure

a) Site Preparation

Indonesian side: Clearance and levelling of the proposed site

b) Electricity

Indonesian side: Installation of low voltage (380 V/220 V) power to distribution board inside the proposed buildings. (Include temporary power for construction)

Japanese side: Receiving and distribution of power from the said distribution board.

c) Water supply

Indonesian side: Installation of water main within 5.0M from the premises.

Japanese side: Branch plumbing work from the said water main and plumbing work subsequent to the above mentioned piping.

d) Drainage

Indonesian side: Plumbing work from the terminal catch basin in the premises to the lake south of the site.

Japanese side: Plumbing work inside the building and up to the terminal catch basin (approx. 2.0M from the exterior wall of the building)
Installation of soil and waste water treatment facilities.

e) Telephone

Indonesian side: Installation of telephone line to the telephone exchange in the building.

Japanese side: Telephone piping work inside the building.
Installation of telephone exchange, telephone cable and telephone hand sets.

f) Others

Indonesian side: Provision of adequate area for temporary facilities. Supply of electric power and water for the construction.

a), b) c), and f) of Indonesian side work shall be completed prior to commencement of the construction work.

ii) Buildings

Indonesian side:	Construction work of buildings which are not cited in the Basic Design Study Report.
Japanese side:	Construction work of buildings which are cited in the Basic Design Study Report.

iii) Exterior Work

Indonesian side:	Planting and landscaping work
Japanese side:	Part of exterior work in the courtyard (excluding planting)

iv) Furniture and Furnishings

Indonesian side:	General furniture, curtain and other furnishings.

v) Equipment

Japanese side:	All experimental and research equipment which are listed in the equipment list.

vi) Transportation of Materials

Indonesian side:	Assurance of prompt unloading and customs clearance in Indonesia for imported materials and equipment for the construction. Exemption of Japanese nationals concerned from customs, duties, internal taxes and other fiscal regulations which may be imposed in Indonesia on the occasion of the supply of materials, equipment and services for construction.
Japanese side:	Payment for packing, loading, shipping, marine transportation, unloading, insurance and inland transportation for the construction materials and equipment.

5-5 Transportation and Labor Procurement

i) Marine Transportation

As mentioned before, applicable materials and equipment should be procured locally as much as possible, although there are many items which have to be imported from Japan. Consequently, detailed schedule must be planned, as transportation schedule from Japan will assume remarkable weight on total construction process.

ii) Inland Transportation

All imported articles to be employed for the Project will be unloaded at Port Jakarta. After the customs clearance by Indonesian side, the materials and goods will be transported overland the approx. 65 km distance from Jakarta to Bogor. Smooth transportation will be expected by using highways.

There are many transportation companies available in Jakarta, but the Government will appoint a certain agency for unloading and also for inland transportation.

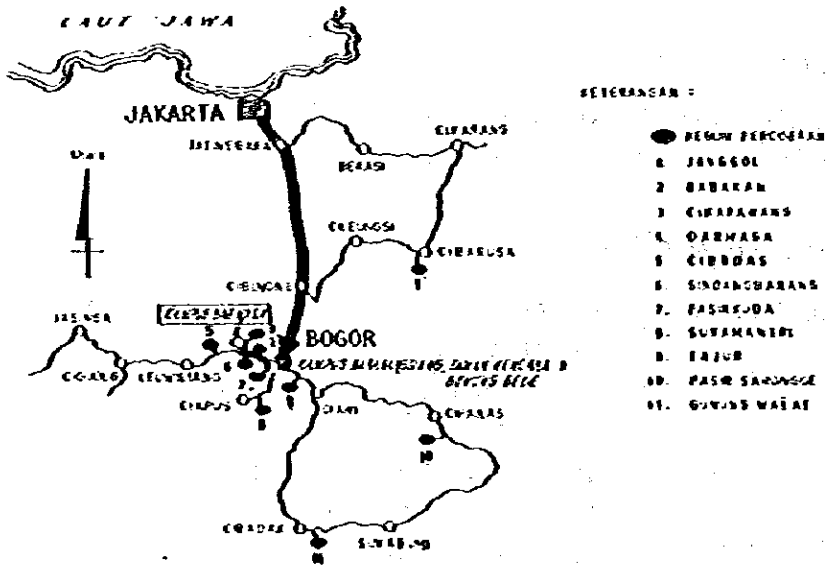
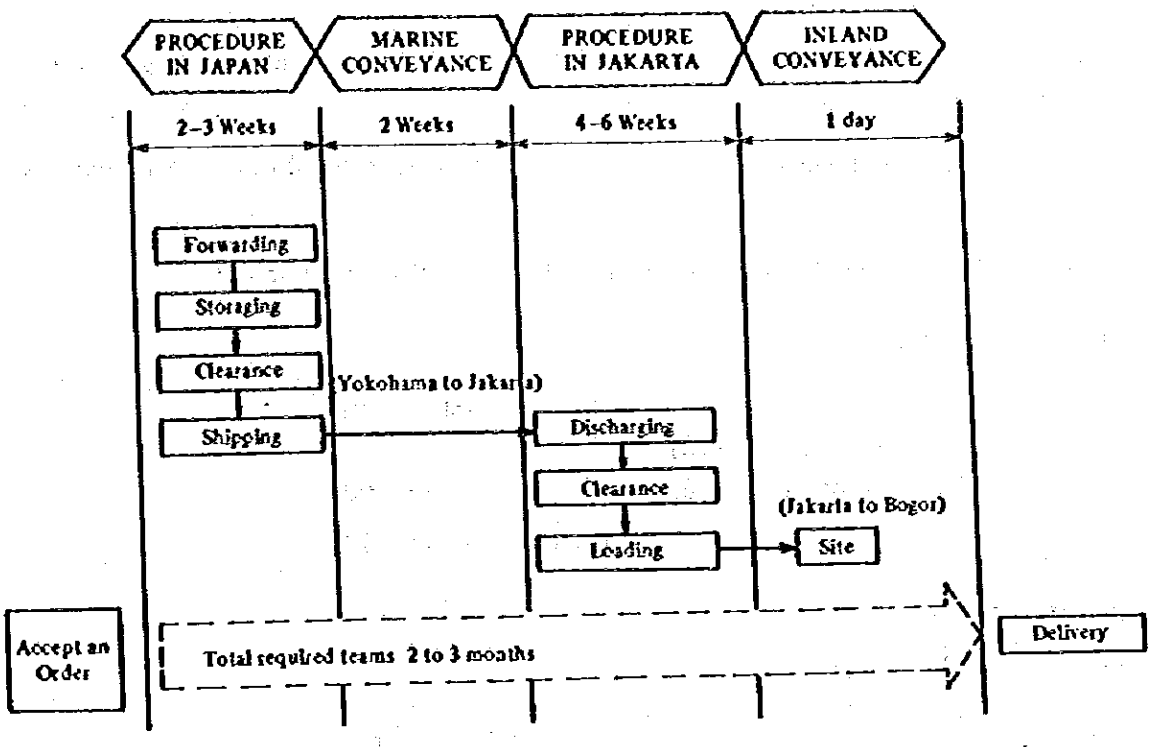


Fig-31 Inland Transportation Route

iii) Terms of Conveyance

Conveying days from Japan to Bogor, involving mateiral shipping, customs clearance and inland transportation to the site, will take approx. 2 to 3 months. Conveying chart and necessary terms are shown in Fig-32.

For smooth progress of the above, prior preparation of related documents and full cooperation by Indonesian authorities concerned are required.



Fig–32 Conveying Chart

iv) Labor Procurement

Although skilled labor in Indonesia is rather scarce, generally there is plenty of manpower. Labor cost per laborer varies widely with their degree of skill, but is relatively cheap.

In regard to specific work, technical advisor should be dispatched from Japan, but in the execution of the Project, practical employment of local labor will be fully possible.

5-6 Maintenance Program

In order to operate the facilities smoothly and efficiently, analysis of necessary operation cost for future will be needed.

Outgoing expenses for facility operation are personnel cost, material cost, and running expenses.

As regards to personnel cost, the number of personnel is as of the starting time.

i) Personnel Cost

		(Million Rp)
Teaching staff	(90)	
Adm. and others	(90)	600.00
Total		600.00

ii) Material Cost

	(Million Rp)
Administration	12.00
Consumables	18.00
Total	30.00

iii) Maintenance cost of the building which consists of running expenses based on unit price by survey and project scale of the facility is assumed as follows;

Item	Annual Expenses (Million Rp)
Electricity	216,000 kWH x 125 Rp/kWH = 27.00
Generator fuel	21,200 lit x 150 Rp/lit = 3.18
Gas	2,880 m^3 x 600 Rp/m^3 = 1.73
Building Spare parts Consumables	10,000 m^2 x 2,000 Rp/m^2 = 20.00
Sum	51.91
Others (10% of above)	5.19
Total	57.10

Grand total i) + ii) + iii) 687.1 Million Rp/year

The total budget for the IPB (1984/85) is 11,680 million Rp and above mentioned running cost becomes 5.9% of the total budget.

CHAPTER 6
EVALUATION OF THE PROJECT

6. EVALUATION OF THE PROJECT

6–1 Social Needs

i) At present, there are approximately 700,000 Indonesian University students. (Table–10)

ii) By the year 2000 this will increase to an estimated one million

iii) Agriculture majors comprise 10% of the total University students population, and thus, will reach 100,000 students (Table–11)

iv) IPB accepts 20% of this students or 20,000 students in the year 2000. (Table–13)

v) FATETA enrolls 10% of these students or 2000 students.

vi) There will be 1800 undergraduate students and 200 graduate students (Table–6–2)

vii) Each year a total of 690 students will graduate, 600 as undergraduates and 90 as graduates. (Table–6–2)

viii) The student's post-graduate activities, calculated according to the ratios cited in Table–3, will be as follows:

	FATETA	DAE	DFT	DIT
Academic	76	25	25	26
Research	90	30	30	30
Government	97	32	32	33
Major Industries	110	36	36	38
Small and medium size industries	34	11	11	12
Other	283	95	94	94
Total	690	229	228	233
(Total; without academic staff)		(204)	(203)	(207)

In other words, each department will graduate some 200 students.

ix) Since agricultural engineering is a new field even at IPB, its total graduates number only in the hundreds.

x) As agriculture-related industries develop, this field can be expected to expand.

xi) The desired result of progress in this field is increased productivity in agriculture and agriculture related industries.

xii) The quality of research upgraded by this project cannot be measured by quantitative terms, but the effectiveness of this investment in such research is unquestionably remarkable.

xiii) As part of an educational plan to raise the level of all of Indonesia's universities, 12 universities will be expanded to be university centers functioning as a central facility.

IPB is one of this center, and the expansion of IPB is, beyond its own expansion, part of the completion of Indonesia's entire University structure.

Table–10 Number of Pupils/Students 1981/82 – 1982/83 (D–4)

(in thousands)

Types of School	1981/82	1982/83
Primary Schools	23,862	25,024
Islamic Primary School (Madrasah Ibtidaiyah)	3,164	3,214
Junior High Schools	3,732	4,263
Junior Polytechnic Schools	74	71
Senior High Schools	1,286	1,503
Senior Polytechnic High Schools	520	545
Teacher Educational School/Sport Teacher Schools	234	237
Universities	597.2	692.7

Table–11 Number of Students, Graduates, Doctorate degrees conferred and Faculty Staff with Doctorates (1975) (D–1)

Field of Study	Number of Students	Graduates	Doctorate degrees Conferred	Faculty Staff with Doctorates
1. Nutral Sciences	5,672 (4)	356 (6)	5	53
2. Social Sciences & Humanities	53,761 (40)	1,975 (22)	16	68
3. Medical Sciences	11,012 (8)	1,059 (20)	12	48
4. Technology	17,409 (13)	891 (27)	1	35
5. Agriculture	13,973 (10)	789 (12)	43	87
6. Education	32,501 (25)	989 (13)	8	22
	134,328	6,061	85	313

Table–12 Percent of Indonesian Agro-complex Students in Training at IPB – 1981 (D–2)

Faculty	IPB % of Total
Agriculture	12
Veterinary Medicine	20
Fisheries	20
Animal Science	11
Forestry	28
Agricultural Eng. & Tech.	42
Graduate	82
Other	20
Total	19

Table–13 Projected Distribution of IPB Students by Faculty and Program Objective by the Year 2000 (D–2)

Faculty	No. Students by Program Objective				Total
	S1	S2	S3	S0	
Agriculture	4,950	450	200	600	6,200
Veterinary Medicine	1,320	100	70	150	1,640
Fisheries	1,980	50	30	250	2,285
Animal Science	1,980	100	50	250	2,355
Forestry	2,310	100	50	300	2,760
Agricultural Technology	2,310	100	50	300	2,760
Mathematics & Natural Science	1,650	50	50	200	1,950
Total	16,500	950	500	2,050	20,000

6-2 Social Expenditure

i) The instructional and research facilities of the Darmaga campus, the academic clusters will be totally 196, 131 NSM.

ii) The Clusters are as below.

Plants cluster		
Faculty of Agriculture	22.0%	(10.0%)
FATETA	11.0%	(6.0%)
Faculty of Forestry	12.0%	(7.0%)
Animal cluster		
Faculty of Animal science	11.0%	(6.0%)
Faculty of Fisheries	6.0%	(3.0%)
Service cluster		
Faculty of Science & Mathematic	17.0%	(10.0%)
IPB Faculty (first year)	3.0%	(2.0%)
Social & Economics cluster		
Faculty of Social & Economics	11.0%	(4.0%)
Animal sciences & community Health cluster		
Faculty of Veterinary Medicine	7.0%	(4.0%)
Total	100%	(57.0%)

iii) Total square area of the Darmaga compus facilities.

Academic cluster	196,131 NSM	57%
Existing facility	8,831 NSM	2%
Residential facility	96,804 NSM	28%
Attachment facility	44,908 NSM	13%
Total	346,674 NSM	100%

iv) FATETA as shown under heading ii) comprises only 6% of the total facilities.

v) The campus comprises 250 ha.

If final land preparation costs are estimated at ¥ 30 million per hectare, the total comes to be ¥7.5 billion.

If construction costs are set at ¥150,000 per NSM, the total is¥51 billion.

If equipment costs are set at ¥50,000 per NSM, the total is ¥17 billion.

Land preparation costs	7.5 billion	10%
Construction & equipment costs	68.0 billion	90%
Total	75.5 billion	100%

vi) According to the studies cited in v, about, FATETA requires 5.4% of the Darmaga campus expansion budget.

This proposal appropriates one half of that amount.

vii) In the year 2000 it will become 2% of the total IPB University, according to 6–1 iii) and iv).

viii) On the assumption that the entire Indonesian University system will be rearranged by the 21st century, FATETA will comprise no more than 5.4% x 0.02 x 0.5 = 0.054%.

ix) The cost effectiveness of this project, however, lies in the fact that the FATETA in the plant cluster, IPB Darmaga campus is a ¥100 billion project and that FATETA now and until the 21st century will continue to be an extremely important facility.

Thus the high cost effectiveness and great influence of this project as well as its significance as a grant aid project are unquestionable.

Table–14 and 15 show the supply and demand of university graduates.

In 1975, Indonesia suffered a shortage of 1600 researchers and 10,000 scientists, and a shortage of 16,000 researchers and 200,000 scientists is counted to be in the year 2000.

Despite the extremely high social costs of breaking through this situation the need for a solution to this imbalance in supply and demand is considered to be critical.

Table–14 Agricultural Researchers and Scientists Available and Needed, 1975 – 2000 (D–2)

Year	Ag. Research		Ag. Scientists	
	Available	Needed	Available	Needed
1975	900	2,500	5,750	15,972
1985		7,416		48,444
2000		39,000		249,917

Table–15 Agricultural Researchers Needed by Sub-sectors, 1975 – 2000 (D–2)

Area	Ag. Researchers Needed		
	1975	1985	2000
Food and estate crops	1,400	3,400	16,000
Livestock and animal health	400	1,300	7,000
Fisheries	300	1,200	6,000
Forestry	240	800	4,000
Basic ag. research	160	716	6,000
TOTAL	2,500	7,416	39,000

6-3 Expected Social Benefits

The key issues in Indonesian agriculture are as cited in the 3rd 5-year development plan.

i) Achievement of agricultural self-sufficiency.

ii) An increase in national income through agriculture product exports.

iii) Increased employment through the development of agriculturally related industries.

Based on these objectives, the key issues confronting agricultural development are as cited below.

i) Increased productivity

ii) Development of industrial resources

iii) Development of agricultural product processing facilities

iv) Development of agricultural product distribution facilities

v) Development of primary agricultural facilities

vi) Conservation of eco-system

vii) Establishment of an agricultural development system

Among these, the most important projects for agricultural productivity are as cited below

i) Development of intensive agriculture

ii) Expansion of arable land

iii) Diversification of crops

iv) Improvement of agricultural technology

v) Development of irrigation technology

This should be considered as part of general agricultural technology

In any case, the following issues have always been central to agriculture and will be of increasing importance in the future

i) Development of agricultural product distribution system

ii) Development of agricultural product processing technology

iii) Development of agricultural machinery technology

iv) Development of informational management technology

v) Development of environmental science and technology

As explained above, agriculture is a main component of a nation's development, and an increase in agricultural productivity is a major part of the long-term development plan. Developing the human resources necessary for this task, furthering constructive research, and contributing to social progress are tasks of social significance.

IPB is the nucleus of Indonesia's upper level institutions of agricultural education. As Japan is also an Asian agricultural nation, and one which is at the forefront of industrial technology, we expect Japan's economic and technical assistance to contribute greatly through the successful expansion of the FATETA to the effective cooperation to Indonesia.

CHAPTER 7
CONCLUSION AND RECOMMENDATION

7. CONCLUSION AND RECOMMENDATION

7–1 Conclusion

The objective of the Project is to extend the facilities, instructional and research equipment to FATETA, IPB, as part of the graduate program.

At the time of project request, the contents of assistance involved the several years plan on FATETA and the Faculty of Fisheries, containing material assistance such as facilities and equipment, and technical cooperation such as dispatch of experts and training of Indonesian personnel.

After studying the request, the Japanese Government has decided that the Project shall take the form of a grant aid cooperation. However education involves training and nurturing talented personnel, and this applies equally to the undergraduate and graduate levels.

At IPB also, they are positive in training personnel. Especially, in cooperation with the University of Wisconsin, U.S.A., increasing numbers of Indonesians are obtaining PhD degrees at American Universities and returning home.

By increasing the teaching staff holding PhD or MS degrees, IPB has become an authorized University to award PhD degrees in the country, and they have already awarded some degrees in the field of Food & Technology and Human Nutrition and Agricultural Engineering.

From the above results, it has been realized that IPB has the staff to cultivate PhDs by itself and that what are lacking now are only physical items such as facilities and equipment for research.

In response to this, the improvement and development of the IPB as the graduate university with a grant aid program by the Government of Japan is thought to be appropriate.

7–2 Recommendation

To make the assistance effective, the following recommendations are made.

i) The actual circumstances of research activities in IPB

ii) Basic policy on selection of equipment

iii) Necessity and requisite for research and technical cooperation

7–2–1 The Actual Circumstances of Research Activities in IPB.

The actual circumstances of research activities in IPB can be summarized as follows.

i) Shortage of research equipment

ii) Necessity of research expenses

iii) Difficult to carry out laboratories works

iv) Enthusiasm to lectures

v) Difference between each section, and each research laboratory

vi) Great desire for research project

vii) Many talented and promising personnel

viii) Philosophy on research and education differs from that of Japan

7–2–2 Basic Policy on Selection of Equipment

From the above background, Indonesia has enormous expectations toward the Project. Therefore, their request had tended to be excessive and adjustments had to be made to the Basic Design, according to some rules.

As mentioned before, the outline and scope of the Project are summarized as follows.

i) Net area of buildings is reduced from 20,000 m^2 to 10,000 m^2 -

ii) The area of each section is adjusted

iii) Area, kind and number of laboratories have been changed

The basic policy on selection of equipment is summarized as follows.

i) Avoid distinction among three sections

ii) Adjust the shared laboratories.

iii) Attach importance to inevitability of research and education program

iv) Evaluate their attitude toward the research

v) Attach importance to the basic equipment

vi) Attach importance to the measuring instrumentation

vii) Separate the research and educational equipment from the productive machine

viii) Careful consideration for the selection of expensive equipment

ix) Attach importance to the maintenance and management of equipment

x) Consider the expendables

xi) Refer to Japanese university equipment standards

7-2-3 Necessity and Requirements for Research and Technical Cooperation

The necessity and requirements for research and technical cooperation as a backup system for the future and matters that demand special attention are described below.

i) Necessity

Needless to say, physical assistance alone is not enough for the graduate program. Graduate program assistance without research and technical cooperation is the same as giving computers without software.

To make the grant aid effective, backup by Japanese experts are necessary.

ii) Requirements for the Cooperation

Requirements for the cooperation cover the following.

1) Rank and power of dispatched experts
2) Research expenses and equipment which are to accompany experts
3) Counterparts

As for first item, the rank in IPB shall not be merely staff member, but must be positioned on line. He will be a member of the educational committee toward the PhD degree, according to the rules and regulations of the Graduate School of IPB.

It is advantageous also if he has the power to nominate excellent students to study in Japan.

As for research expenses, staff expenses as in Japanese universities at least are necessary. Moreover, he should be given discretionary power to use such expenses within the total budget, such as traveling expenses, labor fee, etc.

As for equipment which is to accompany experts, necessary equipment for graduate program education in Japan should be preferably considered.

The philosophy and technology of the Japanese graduate program should be studied through research and educational activities with those equipment to enlarge and enhance the existing research programs.

Indonesian counterparts should be full-time staff members to ensure smooth cooperation. The selection of Japanese experts is also important.

Leading Japanese researchers who have inevitable research theme in Indonesia shall be selected. For this purpose, a responsible organization in Japan shall be established to back up the activities.

The proposed themes which are inevitably to be done by Japanese expert in Indonesia and the good results of which are expected in a short period (about 2 years) by Japanese research method are as follows.

1) Development of appropriate technology to enhance efficient utilization of soil water and other natural resources in the tropics.

2) Postharvest technology of tropical fruit.

3) Isolation and identification of microbe organism.

The last theme is now under way by Professor Matsuyama, the Japanese expert to AP-4.

APPENDIX

1. SURVEY SCHEDULE

1st day	16 Feb.	(Thu)	Lv. Tokyo Av. Jakarta Messrs. Morishima, Nakamura, Nakamura (JICA), Ito, Matsuno, Mochizuki
2nd	17 Jakarta	(Fri)	Courtesy call and meeting at Embassy of Japan and JICA office. Courtesy call and meeting at BAPPENAS.
3rd	18 Jakarta Bogor	(Sat)	Courtesy call and meeting at SEGNEC Courtesy call to IPB Explanation of Inception Report
4th	19 Darmaga	(Sun)	Field survey of construction site
5th	20 Jakarta Bogor	(Mon)	Courtesy call and meeting at Directorate General of Higher Education Explanation of Inception Report
6th	21 Darmaga	(Tue)	Discussion (Building & Equipment)
7th	22	(Wed)	Discussion (Building & Equipment) Lv. Tokyo Av. Jakarta Messrs. Hirota, Tanaka
8th	23 Darmaga	(Thu)	Technical discussion (Building & Equipment)
9th	24 Darmaga	(Fri)	Draft the Minutes of Discussion
10th	25 Jakarta	(Sat)	Signing of "Minutes of Discussions" Signing of "Minutes of Meeting" Lv. Jakarta Messrs. Morishima, R. Nakamura, M. Nakamura
11st	26 Jakarta	(Sun)	Survey and data collecting on construction material supply in Jakarta
12nd	27 Darmaga	(Mon)	Technical discussion (Composition for loft and room)
13rd	28 Darmaga	(Tue)	Technical discussion (Suggestion to partial architectural criteria)
14th	29 Darmaga	(Wed)	Technical discussion (Mutual consent to major and partial architectural criteria)

15th	1 Mar. Darmaga Jakarta	(Thu)	Technical discussion (Required space for each department)
16th	2 Jakarta	(Fri)	Survey and data collecting on construction material supply in Jakarta Lv. Hirota, Tanaka
17th	3 Jakarta	(Sat)	Survey and data collecting on construction conditions in Jakarta
18th	4 Jakarta	(Sun)	ditto
19th	5 Bogor	(Mon)	Courtesy call to IPB Explanation to major & partial architectural criteria
20th	6 Jakarta	(Tue)	Suggestion to alternative E plan
21st	7	(Wed)	Lv. Ito, Mochizuki

2. MEMBERS OF STUDY TEAM

Dr. Hiroshi MORISHIMA	Leader	Prof. of the University of Tokyo, Department of Agricultural Engineering
Dr. Ryota NAKAMURA	Agricultural	Associate Prof. of the University of Tokyo, Department of Agricultural Engineering
Mr. Mikio NAKAMURA	Project Coordinator	Grant Aid Dept. JICA
Mr. Toshio ITO	Acting Leader	Yamashita A & E, Inc.
Mr. Akira MOCHIZUKI	Architect	Yamashita A & E, Inc.
Dr. Tadashi MATSUNO	Equipment Specialist	Associate Prof. Tokyo University of Agriculture
Mr. Takeshi HIROTA	Mechanical	Yamashita A & E, Inc.
Mr. Minoru TANAKA	Structural Engineer Cost Estimate	Yamashita A & E, Inc.

3. MEMBERS OF COUNTERPARTS

- PROJECT TEAM

GENERAL CHAIRMAN	Prof. Dr. Ir. H. ANDI HAKIM NASOETION (Rector of IPB)
STEERING COMMITTEE CHAIRMAN	Prof. Dr. Ir. Sitanala Arsjad (First Associate Rector of IPB)
MEMBERS	1. Prof. Ir. S. Pramoetadi (Directorate General for Higher Education)
	2. Drs. Widodo Gondowardoyo (Staff. Secretary Cabinet Secretariate, (SBTKAB))
	3. Drs. Qomaruzzaman Sulhani (Staff BAPPENAS)
	4. Mulyana Wirasendjaya, S.H. Staff, Bureau of Foreign Technical Cooperation Ministry of Education and Culture
	5. Dr. Ir. Edi Guhardja Dean, Graduate School, IPB
	6. Dr. H.M. Eidman Dean, Faculty of Fisheries, IPB
	7. Dr. Ir. Soedodo Hardjoamidjojo, M. Sc. Dean, FATETA, IPB
	8. Drh. Ikin Mansjoer, M. Sc. Chairman of Planning Board, IPB
	9. Ir. Boedoyo Bureau of Logistics, Ministry of Education and Culture
	10. Drs. Purwadi HP Staff, Directorate General of Higher Education, Ministry of Education and Culture

- WORKING COMMITTEE

CHAIRMAN	Dr. Kamaruddin Abdullah
VICE CHAIRMAN	Dr. Moeljarno Djojomartono MSA
FIRST SECRETARY	Drh. Slamet Maoen
SECOND SECRETARY	Ir. Sri Mudiastuti Priyanto

MEMBERS	Ir. Oetomo Djajanegara
	Ir. Bambang Pranggodo
	Dr. Ir. Bambang Murdianto
	Ir. Sarib Murtadi M. Sc.

- TECHNICAL TEAM

COORDINATOR	Dr. Ir. Soedodo Hardjoamidjojo MSC (Dean, Faculty of Agriculture Engineering and Technology, IPB)
CHAIRMAN	Dr. Kamaruddin Abdullah
SECRETARY	Dr. Muriano Dhahamautono MSA
STAFF SECRETARY	Drh. Slamet Maoen
	Ir. Sri Mudiastuti Priyanto
	Ir. Machfud

- SECTIONS

Curriculum Development	Prof. Dr. Ir. Siswadhi Soepardjo MSAE
	Prof. Dr. F. G. Winarno
	Dr. Ir. M. Azron Dhalhar MSAE
	Dr. Ir. Dedi Fardiaz MSc.
	Dr. Ir. A. Aziz Darwis MSc.
Building Development	Ir. H. Aris Priyanto MSAE
	Dr. Ir. Eriyatno MSc.
	Dr. Ir. M. Aman Wirakartakusumah MSc.
Equipment Development	Dr. Ir. Hadi K. Purwadaria MSc.
	Dr. Ir. Jenny K. Dewipadma MSc.
	Dr. Ir. Bambang Djatmiko
STAFF Administration	Wattimena Paulina
	Nurdin
	Kosasih
	Nurackmat
	Muchlis

4. LIST OF DATA

1. Institutional Development Project 1979 – 1989
   (D–1) (Institut Pertanian Bogor May, 1978)

2. Institut Pertanian Bogor, Academic Plan, to the year 2000
   (D–2) (Institut Pertanian Bogor 1982)

3. Indonesia 1978 – (an official hand book)
   (D–3) (Department of Information, Republic of Indonesia 1984)

4. Indonesia in brief
   (D–4) (Department of Information, Republic of Indonesia 1984)

5. A Hand book for new comers to Bogor
   (D–5) (Bogor International Club & P.T.A. Bogor expatriate school, May, 1981 3rd edition)

6. Future of Food demand and Agricultural policy
   (D–6) (Experience and prospect for Asian development)
   by: Saburo Yamada, Asian Economic Research Institute

7. Asian Manpower and Economic Growth
   (D–7) by: Motohisa Kaneko
   Asia Economic Research Institute

8. Asia & Oseanian agricultural Education
   (D–8) by: Miyama & Ishizuka JAPAN ACADEMY

9. Master Plan Report
   (D–9) by: Perkins & Will, Sangkurian

10. Preliminary Study Minutes
    (D–10) JICA

11. Indonesian Climate in 1979
    (D–11) Meteorology Bureau

12. Basic Design Survey
    (D–12) JICA

6. MINUTES Feb. 25th, 1984

MINUTES OF DISCUSSIONS
ON
THE CONSTRUCTION PROJECT FOR THE DEVELOPMENT OF GRADUATE PROGRAM AT THE FACULTY OF AGRICULTURAL ENGINEERING AND TECHNOLOGY INSTITUT PERTANIAN BOGOR
IN
THE REPUBLIC OF INDONESIA

In response to the request made by the Government of the Republic of Indonesia for the Construction Project of the Development of Graduate Programs in Agricultural Engineering and Technology at Instutut Pertanian Bogor (hereinafter referred to as "the Project"), the Government of Japan has sent, through the Japan International Cooperation Agency, a team headed by Dr. HIROSHI MORISHIMA, Professor of the Faculty of Agriculture, the University of Tokyo, to conduct a basic design study from February 16, 1984.

The team has been sent after the examination of the result of the Preliminary Study conducted in November 1983. The team has carried out a field survey, held a series of discussions and exchanged views with the authorities concerned of the Project.

As the result of the study and discussions, both parties have agreed to recommend to the their respective Government to examine the results of the survey aatached herewith towards the realization of the Project. The request of Institut Pertanian Bogor (IPB) to the assistance for the Graduate Program in Fisheries is acknowledged, but out of the scope of this study.

Febuary 25th, 1984

SIOHARTA PRAWOTAOI
For the Director General
Directorate General of
Higher Education, Ministry
of Education and Culture

HIROSHI MORISHIMA
Team Leader
Basic Design study Team

ATTACHMENT

1. The objective of the Project is to provide necessary buildings, facilities and equipments for the Development of the Graduate Programs in Agricultural Engineering and Technology (hereinafter referred to as "the Program").

2. The proposed site of the Project is the land acquired by the Institut Pertanian Bogor, and the space allocation of the Project is shown in Annex I.

3. The Program has the following objectives :

   (a). To increase the number of well qualified researchers and instructors in agricultural engineering, food sciece and agro-industrial technology ;

   (b). To implement research directed mainly toward the solution of agricultural engineering, food science and agro-industrial problems,

   (c). To provide opportunities for conducting intensified collaborative research among researchers in Indone sia as one of the main centers for the higher agri cultural education , and to facilitate foreign sci entists to participate directly in tropical agri - cultural research, and

   (d). To increase IPB's capability as an advaced degree granting institution in higher agricultural education .

4. The Japanese Study Team will convey to the Government of Ja pan the desire of the Indonesian Government that the former takes necessary measures to cooperate in implementing the Project and provides the building and other items listed in Annex II within the scope of economic cooperation program in grant form.

5. The Government of the Republic of Indonesia has understood Japan's Grant Aid System explained by the team which include a principle use of a Japanese Consultant Firm and Japane se General constructor for the implementation of the Project.

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6. The Government of the Republic of Indonesia will take necessary measures to supply ample quantity and appropriate quality of water and electricity which are indispensable for research and experimental activities of the laboratories in the Program, in addition to the items to be undertaken signed in the Minutes of Discussion of the Preliminary Study in November 1983 as attached in Annex III on condition that the grant aid by the Government of Japan is extended to the Project.

ANNEX I

SITE LOCATION MAP

ANNEX II

Items requested by the Government of Indonesia the cost of which will be borne by the Government of Japan.

1. Buildings

Research and Instructional Laboratories
Class rooms and Lecture Hall
Academic Staff rooms
Graduate Students rooms
Administration rooms
Accessory rooms

2. Equipment

Related equipments for the activities of the three departments, namely, Department of Agricultural Engineering, Department of Food Technology and Human Nutrition and Department of Agro-Industrial Technology

ANNEX III

Following arrangements are required to be undertaken by the Government of the Republic of Indonesia.

1. To provide data and information necessary for the construction including topographic survey, soil test, water test and other geological survey Reports.

2. To secure land necessary for the Project and to clear, fill and level the Project site, as needed before the start of the construction.

3. To construct and prepare the access road to the Project site.

4. To provide facilities for distribution of electricity, telephone, water supply or deep well and other incidental facilities to the building, and external drainage from the Project site.

5. To provide office furnitures.

6. To cover maintenance and operation cost.

7. To ensure prompt unloading, tax exemption and customs clearance at ports of disembarkation in Indonesia and prompt internal transportation therein on the products and related equipments purchased under the Grant.

8. To exempt Japanese nationals engaged in the Project from custom duties, internal taxes and other fiscal

levies which may be imposed in Indonesia with respect to the supply of the products and related equipments and the services under the verified contracts.

9. To approve Japanese nationals, whose services may be required in connection with the supply of the products and related equipment and services under the verified contracts, such facilities as may be necessary for their entry into Indonesia and their stay therein for the performance of their work.

10. To maintain and use properly and effectively the facilities constructed as well as equipments provided under the Grant.

11. To bear all the expenses, other than those to be borne by the Grant, necessary for the construction of related facilities.

12. To undertake incidental civil works such as planting, gates and fencing.

13. To provide the space necessary for such construction as temporary offices, working areas, stock yards and others.

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6. DRAFT FINAL REPORT

6–1 Schedule

MOEC	:	Ministry of Education and Culture
Embassy	:	Japanese Embassy

1.	May 29th (Tue)	
	Tokyo	Lv. Tokyo (Morishima, Nakamura, Ito, Mochizuki)
	Jakarta	Av. at Jakarta
2.	May 30th (Wed)	
	Jakarta	Courtesy Call to Embassy, JCA, MOEC and BAPPENAS
3.	May 31st (Thu)	
	Jakarta	Survey of Situation in Jakarta
	Bogor	Survey of Surroundings in Bogor
4.	June 1st (Fri)	
	Bogor	Courtesy Call to Rector of IPB
	Darmaga	Explanation of Report
5.	June 2nd (Sat)	
	Darmaga	Explanation of Report
		Discussion on Report
6.	June 3rd (Sun)	
	Darmaga	Site Re-survey
		Discussion on Report
7.	June 4th (Mon)	
	Bogor	Report to Rector of IPB
	Jakarta	
8.	June 5th (Tue)	
	Jakarta	Signing of Minutes at MOEC
		Report to Embassy, JICA and SEKAB,
		Lv. Jakarta for Tokyo

6–2 Member of Mission

Leader	Hiroshi MORISHIMA	Professor of the University of Tokyo, Department of Africultural Engineering, Faculty of Agriculture
Member	Mikio NAKAMURA (Coordinator)	JICA
Member	Toshio ITO (Acting Leader)	Yamashita Architects and Engineers, Inc.
Member	Akira MOCHIZUKI (Architect)	Ditto

6–3 Counterparts

C: Countesy Call
R: Report
M: Attend to Meetings

Representative of MOEC	Director General of High Education Sukadji Ranuwihardjo (C)
Project Leader	IPB Rector Prof. Dr. Ir. H. Andi Hakim Nasoetion (C & R)
Steeling Committee	Chairman first Associate Rector Prof. Dr. Ir. Sitanala Arsjad (C)
Members	1. Directorate General for Higher Education Prof. Ir. S. Prametadi (R & C) 2. Staff Secretary Cabinet (SEKAB) Drs. Widodo Gondowardoyo (R & C) 3. Staff BAPPENAS Drs. Qomarynzzaman Sulhani (C) 4. Dean, Graduate School, IPB Dr. Ir. Edi Guhardja (M)

5. Dean, Faculty of Fisheries, IPB
   Dr. H.M. Eidman
   (M)
6. Dean, FATETA, IPB
   Dr. Ir. Soedodo Hardjoamidjojo, M.Sc.
   (M)
7. Chairman of Planning Board, IPB
   Drh. Ikin Mansjoer, M. Sc.
   (M)

6–4 Attendants to Meeting

Chirman	Second Associate Rector, IPB Ir. Oetomo Djajanegara
In charge of Planning	1. Chairman of Planning Board, IPB Drh. Ikin Mansjoer M. Sc. 2. Staff. system & Agri. mechanization management lab. (DAE) Ir. Bambang Pranggodo
In charge of Graduate School	1. Dean, Graduate School, IPB Dr. Ir. Edi Guhardja 2. Associate Dean, Graduate School, IPB Dr. Kamarudin Abdullah
In charge of FATETA	1. Dean, FATETA, IPB Dr. Ir. Soedodo Hardjoamidjojo 2. Head, Soil & Water engineering lab. (DAE) Ir. Aris Priyanto MSE 3. Head, Food Processing lab. (DFT) Dr. Ir. Aman Wirakartakusumah M.Sc. 4. Staff Food Chemistry lab. (DFT) Dr. Ir. Dedi Fardiaz M. Sc. 5. Head Farm Power & Mashinery lab. (DAE) Dr. Ir. Siswadhi Soepardjo MSAE 6. Head, System & Agri. mechanization management lab. (DAE) Dr. Moeljarno Djojomartono 7. Head, Food & Agri Processing lab. (DAE) Dr. Ir. Hadi K. Purwadaria M. Sc. 8. Head, Quality control lab. (DIT) Dr. Ir. Bambang Djaomiko

9. Staff, Soil & Water engineering lab. (DAE)
   Dr. Ir. Mohamed Agron Dhalar M. Sc.
10. Head, Agro-chemical technology lab. (DIT)
    Dr. Jr. A. Azij Darwio
11. Head, Agro-industrial engineering lab. (DIT)
    Dr. Ir. Eriyatno MSAE

In charge of Secretary

1. Head, system & Agri. mechanization management lab. (DAE)
   Dr. Moeljano Djojomalono
2. Staff, Food processing lab. (DFT)
   Drh Slamet Ma'oen
3. Staff, Agri-farm structure & environment lab. (DAE)
   Ir. Sri Mudistuti Prijanto
4. Staff, Agro-industrial engineering lab. (DIT)
   Ir. Machfud

MINUTES OF DISCUSSIONS
ON
THE DRAFT FINAL REPORT ON THE BASIC DESIGN STUDY
ON
THE CONSTRUCTION PROJECT FOR THE DEVELOPMENT OF THE GRADUATE PROGRAM
AT
THE FACULTY OF AGRICULTURAL ENGINEERING AND TECHNOLOGY, INSTITUT PERTANIAN BOGOR
IN
THE REPUBLIC OF INDONESIA

The Government of Japan has sent, through the Japan International Cooperation Agency (JICA), a Basic Design Study Team to the Republic of Indonesia from May 29 to June 5, 1984, for the purpose of presenting and explaining the Draft Final Report of the Basic Design Study (the Report) on the Construction Project for the Development of the Graduate Program at the Faculty of Agricultural Engineering and Technology, Institut Pertanian Bogor.

The team held meetings with the officials concerned to explain and to discuss the Report. As a result of the discussions, both parties have agreed to the following items :

1. The Indonesian side principally has agreed to the basic design proposed in the Report, and appropriate alterations agreed during the discussions will be incorporated in the Final Report.

2. The Final Report (10 copies in English) on the Project will be submitted to the Indonesian side by the end of July 1984.

3. The following works shall be completed by the Indonesian side prior to the commencement of the construction work :

a) Land clearing and levelling of the proposed site,

b) Installation of electricity, water supply and telephone line to the proposed site,

c) Provision of the space necessary for temporary offices, working areas, stock yards and others,

4. Level 3 of the Master Plan will be the first floor of the proposed building which will be four storied.

Jakarta, June 5, 1984

SUKADJI RANUWIHARDJO
Director General of Higher Education, Ministry of Education and Culture

HIROSHI MORISHIMA
Team Leader
Basic Design Study Team

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