CHAPTER 5 PROJECT EFFECTS AND CONCLUSION

CHAPTER 5 PROJECT EFFECTS AND CONCLUSION

5.1 Project Effects

The Project intends to contribute to the future development of Kenya by meeting the social requirements for higher technical education as well as for academic research through the expansion of JKUCAT and is expected to have the following concrete effects.

(1) Manpower Development

Kenyan society requires manpower with a strong technical background to promote local development in diverse fields. JKUCAT has been providing practical education since its opening and the practical knowledge and skills of its graduates have an excellent reputation.

With the expansion of JKUCAT's facilities and the upgrading of its educational level under the Project in accordance with the upgrading of its status to a constituent college of Kenyatta University, JKUCAT is expected to produce engineers with not only strong technical skills but also with excellent theoretical knowledge.

(2) Promotion of Industries

Most JKUCAT graduates are expected to work in either agricultural or industrial fields. The promotion of agriculture and small but productive industries is given priority by the Government of Kenya, and efficient investment in highly productive projects is emphasized in the Sixth National Development Plan announced in March 1989.

Improved productivity is particularly stressed in the field of agriculture, and the promotion of agriculture is planned based on the combination of a scientific approach with agricultural technologies. Graduates of JKUCAT with both practical and theoretical knowledge will be well suited to push forward this national policy, acting as reformers and becoming the pioneers of agricultural development in Kenya.

In regard to the field of industry, the Sixth National Development Plan emphasizes the development of import-substitution industries as well as small but productive industries. JKUCAT graduates will act as reformers and

managers in small-scale industries for import-substitution, thereby contributing to the advancement of industries in Kenya.

(3) Increase of University Students

With the increase of the population, the improved school attendance rate and the increasing number of high school graduates with the necessary qualifications for university entrance in recent years, there is a strong social demand to increase the number of university places. The number of university applicants was 33,800 in 1989, of which some 14,800 passed the qualifying examinations. However, since only 7,700 were actually granted university places, half of the qualified applicants were rejected. The number of qualified applicants is expected to substantially increase in 1990 as those secondary school graduates under the new educational system will join those qualified under the old system. Although the total universisty admissions will increase to 17,000, only 38% of the applicants will have the opportunity for a university education.

Following its upgrading to a constituent college (and a full fledged university in the future), the expansion of JKUCAT will have a direct effect of expanding university education and will also reduce foreign currency spending by reducing the number of Kenyans studying abroad (estimated to be 12,000 at present).

(4) Indirect Effects

With fulfillment of its expected roles, JKUCAT will contribute to the development of Kenya by providing specialised knowledge and technologies to local communities solving pressing policy problems and assisting the successful implementation of national policies. Moreover, it will assist in the general improvement of the intellectual level of the people, spread knowledge and stimulate the cultural development of the country.

5.2 Appropriateness of the Project

The project outline described in Chapter 3 was compiled based on the results of consultations with the Kenyan Ministry of Education and JKUCAT on the contents of the request made by the Government of Kenya and also on the results of the field survey and analysis performed in Japan. The appropriateness of the Project's implementation in accordance with this project outline was examined in terms of financing for the Project and the maintenance and management systems for the planned facilities. As a result, implementation of the Project is judged appropriate in view of the following examination results.

5.2.1 Financing

The Government of Kenya has already secured the budget for the Project in its fiscal 1989 budget and has worked out budget plans for fiscal 1990 through 1994/95.

The working budget requested for fiscal 1989/90, the first year of project implementation, is approximately 81 million K.sh in annual total, which exceeds the appropriated budget of 47.2 million K.sh for fiscal 1988 by about 70%. The personnel cost is approximately 47 million K.sh and the maintenance and management cost of facilities is approximately 4.4 million K.sh, which both exceed the maintenance and management cost estimates in Par. 3-3-5 of approximately 30 million K.sh for the personnel cost and approximately 4.2 million K.sh for the maintenance and management cost of facilities and are therefore considered adequate to cover the necessary amounts.

As for the cost of work to be borne by the Government of Kenya, approximately 81 million K.sh has been appropriated in the development budget request for fiscal 1989/90, which is planned to be applied to the estimated project cost of approximately 80 million K.sh to be borne by the Government of Kenya as indicated in Par. 4-4-6 of the preceding chapter.

Given the above financial prospects, no serious shortage of funds is expected to arise in relation to the management and maintenance cost and the facility expansion cost in the future.

5.2.2 Maintenance System

63 staff members, including 3 officers, have already been assigned for facility and equipment maintenance and 2 officers will be added in fiscal 1989. In 1994, the target year of the Project, the total number of maintenance staff will be 75, including 5 officers. The facility and equipment plans of the Project have been designed to minimize the maintenance cost. Equipment and spare parts, the procurement of which is considered difficult in Kenya, will be provided in sufficient amounts at the planning stage to facilitate facility and equipment maintenance work following the completion of the Project. Where possible, priority is given to the selection of equipment which can be repaired and maintained in Kenya.

The technical level of JKUCAT's maintenance staff is fairly high based on the experience gained with the existing equipment which was provided in 1981. The equipment to be provided under the Project almost corresponds to the current technical level of the staff and a relatively short training period will make the staff fully capable of maintaining the new facilities and equipment. No serious problems are, therefore, anticipated in regard to facility and equipment maintenance in the future.

5.2.3 Management System

The Ministry of Education, which is responsible for university education, became responsible for JKUCAT at the time of its upgrading to the University College in September 1988 and also became the implementation agency for the Project.

The relationship between JKUCAT and Kenyatta University, the parent university of JKUCAT, is laid down by the University Act and University College act. The Principal and Deans of JKUCAT are members of the Kenyatta University Senate, together with other main members which include the Principal and Deputy Principal of Kenyatta University.

Expansion of JKUCAT will be gradually conducted with the restructuring of the existing organization and the subsequent gradual increase of its employees, and the management and operation of JKUCAT will not be affected by this gradual expansion. The 154 administrative staff in 1989/90 will be increased to 438 in 1994/95 according to the annual staff recruitment plan.

The number of teaching staff in 1994/95 will be 232 which will satisfy the recommended teacher/student ratio of 1 in 6 for university education in Kenya. The new recruitment of teaching staff will be conducted between 1989/90 and 1994/95 and the upgrading of the existing lecturers through training and the recruitment of mainly lecturers and graduates of the University of Nairobi and Egerton University are planned. JKUCAT's recruitment plan appears as realistic as possible in view of the number of post-graduate students of the University of Nairobi (1,300 in 1989) and the planned number of new teaching positions. The salary scales for lecturers were substantially increased (for example, 9,630 K.sh/year for a professor in 1988/89) with the upgrading of JKUCAT's status, bringing them in line with those of the University of Nairobi and brightening the prospects of recruiting new lecturers. While a shortage of teaching staff may occur at the beginning (1991 - 1993) of the provision of university education, this shortage may be solved by requesting the provision of associate and provisional lecturers for basic and common subjects from Kenyatta University and those for specialized subjects from the University of Nairobi and Egerton University.

5.3 Conclusion

The implementation of the Project is expected to successfully respond to the social demand for expanded university education and to supply experts with excellent theoretical knowledge and technical skills in diverse fields, thereby playing an important role in the provision of specialized knowledge and technologies to local communities and also in solving pressing policy problems. The Project is not a simple expansion project but aims at the qualitative and quantitative consolidation of a university to produce capable manpower which will be a driving force in Kenya in the future and, therefore, will play an extremely important role in the achievement of Keyna's economic development and social stability.

As so far described, the Project will respond to social demands by providing more opportunity for Kenyans to receive higher education, will foster capable manpower for the country's development and also contribute to not only the achievement of continuous economic growth, which is the long-term objective of Kenya, but also to the Kenyanization of economy and society. Therefore, the implementation of the Project with the capital grant assistance of the Government of Japan is quite significant, especially as the need for facilities is quite high in order to realize technology transfer more effectively under the project-type technical cooperation which is scheduled to commence in April, 1990. In addition, the management and control systems of the Project are also considered appropriate in terms of both manpower and finance.

Finally, the smooth and effective implementation of the Project will be further facilitated by the improvements suggested in 5.4.

5.4 Recommendations

(1) Firm Implementation of Teacher Recruitment and Training Programs

With regard to the increase of the teaching staff, the Kenyan side plans not to entirely rely on the new recruitment of master degree holders or doctorate holders but to train its existing teachers and newly recruited graduates by sending them to higher degree courses of other universities. Japan's cooperation will be required to carry out this type of training program, as was formerly the case. Priority should, however, be given to the smooth recruitment of new teachers. without successful recruitment, no training program will be possible. It is desirable that measures to facilitate academic exchange with other universities in Kenya and to enable JKUCAT graduates to proceed to the post-graduate courses of these universities be introduced as part of the training program.

(2) Exchange with Other Universities

The Project suggests that JKUCAT will be engaged not only in educational but in academic and research activities. In promoting those activities, it is desirable that JKUCAT deepen its interchange with other universities and exchange knowledge on extensive grounds by actively sponsoring seminars and other by events by inviting guest speakers from both domestic and foreign sources to provide a wider range of education.

(3) Provision of Steady Cooperation over Long Period

The provision of Japan's project-type technical cooperation is planned to commence in April, 1990 along with the implementation of the Project. Since the Kenyan side considers the Project to be the first step towards the consolidation of JKUCAT facilities in view of its upgrading to an independent university in the future, it hopes that the Japanese side will provide technical guidance for the Kenyan counterparts and advice on educational, R & D and academic activities as part of the technical cooperation. However, the fruits of education are not borne overnight and steady activities from the long-term perspective are required to make educational cooperation successful. In implementing the technical cooperation, Japan should send first class experts to Kenyan and create favorable working conditions by establishing a system to properly evaluate the achievements of these experts. At the same time, an organization which can enlist the cooperation of various Kenyan ministries

and agencies and other educational institutions should be introduced in addition to the flexible management of JKUCAT.

(4) Timely Completion of Work by Kenyan Side

It is hoped that such processes as tender, contract, bank arrangement and customs clearance, etc. will be quickly completed for the smooth implementation of the Project. It is hoped that the land preparation work, including banking which is currently at the preparatory stage, will be completed on schedule prior to the commencement of the work to be undertaken by the Japanese side. It is also hoped that landscaping and the procurement of furniture and fixtures will be completed by the time of the completion of the new JKUCAT facilities.

APPENDIX

1. Member of the Study Team
2. List of persons interviewed
3. Minutes of Discussions
4. Condition of the construction site
5. Others

1. Member of the Study Team

1-1. The Basic Design Study Team

1-2. The Draft Final Report Explanation Team of the Basic Design Study

1. Member of the Study Team

1-1. The basic design study team (January 15 to February 11, 1989)

Team Leader (Faculty of Agriculture)	Dr. Junkichi Iwasa Professor, Faculty of Agriculture, Okayama University
Faculty of Engineering	Dr. Yutaka Fukui Professor, Faculty of Engineering Tottori University
Grant Aid Planning	Mr. Shinichi Teramura Official, Grant Aid Dgivision Economic Cooperation Bureau, Ministry of Foreign Affairs
Architectural Planning	Mr. Akitada Yanagisawa Kume Architects-Engineers
Architectural Design Planning	Mr. Sadakazu Ogawa Kume Architects-Engineers
Facilities Planning	Mr. Yuzo Nagashima Kume Architects-Engineers
Equipment Planning	Mr. Takao Miyazaki Kume Architects-Engineers
Water Treatment Plant Design	Mr. Masaharu Fujishima Kume Architects-Engineers

1-2. The draft final report explanation team of the basic design study (May 9 to May 22, 1989)

Team Leader (Faculty of Engineerig)	Dr. Eiichi Watanabe Professor, Faculty of Engineerig , Kyoto University
Coordinator	Mr. Osamu Nakagaki Deputy Head Second Overseas Assigment Div., JOCV / JICA
Architectural Planning	Mr. Akitada Yanagisawa Kume Architects-Engineers
Architectural Design Planning	Mr. Sadakazu Ogawa Kume Architects-Engineers
Equipment Planning	Mr. Takao Miyazaki Kume Architects-Engineers

2. List of persons interviewed

2. List of persons interviewed

Concerned Persons on the Kenyan Side

☐ Ministry of Educaiton

1.	Hon. Peter O. Aringo	Minister for Education
2.	Mr. Benjamin. K. Kipkulei	Permanent Secretary
3.	Prof. James M. Waithaka	Director of Education
4.	Mr. E. G. Avedi	Deputy Secretary (F&A)
5.	Mr. J. B. Ndungu	Deputy Secretary (P&D)
6.	Mr. D. Mwangi	Deputy Director of Education
7.	Mr. J. K. Kithome	Deputy Director of Education
8.	Mr. J. Bukusi	Deputy Director of Education
9.	Mr. D. M. Mule	Principal Finance Officer
10.	Mr. C. M. Kamau	Principal Planning Officer
11.	Mr. J. S. Biketi	Senior Asst. Secretary / Finance
12.	Mr. D. I. Kathambana	Senior Asst. Secretary (P&D)
13.	Mr. P. B. Mwangi	Education Officer
14.	Mrs. E. N. Murigo	Education Officer
15.	Mrs. L. C. Kirika	Senior Public Relations Officer
16.	Mr. J. M. Gichuhi	Superintendant Architect

☐ Ministry of Finance

	Mrs. Musau	Senior Asst. Secretary

☐ Ministry of Public Works

1.	Mr. Maurice O. Ayugi	Chief Architect
2.	Mr. Elisha O. Lando	Deputy Group Leader, Group 6, Architectural Department

☐ Ministry of Water Development

1.	Mr. Simeon Nchogu	Deputy Chief Engineer Head of Planning and Design Branch
2.	Mr. J. P. M. Thuku	Div., Chief, Head of Design Div.
3.	Mr. A. M. Kioko	Div., Chief, Head of Analysis Sec. Hydrology Div.

☐ Kenya Power & Lighting Co., Ltd..

Mr. D. N. Barua

☐ Kenya Posts & Telecommunication Co. Ltd.,

1.	Mr. J. M. Kamaru	District Works Engineer
2.	Mr. E. J. Nderitu	District Works Officer (Kiambu District)

☐ JKUCAT

1.	Prof. George S. Eshiwani	Principal
2.	Mr. O. K. Kitheka	Deputy Principal
3.	Mr. J. M. Mberia	Registrar
4.	Mr. N. Boro	Dean of Students
5.	Mrs. Esther M. Kahangi	Chairman, Department of Horticulture
6.	Mr. Stephen Weru	Chairman, Department of Agricultural Engineering
7.	Miss Lucy Mwajumwa	Chairman,Department of Food Technology
8.	Mr. Josephat K. Z. Mwatelah	Chairman,Department of Building & Civil Engineering
9.	Mr. Moses F. Oduori	Chairman, Department of Mechanical Engineering
10.	Mr. Francis G. M. Nalwa	Chairman,Department of Electrical & Electronics Engineering
11.	Mr. Joseph G. Macharia	Chairman, Department of Mathematics & Science
12.	Mr. John M. Kaudo	Chairman, Department of Social Sciences
13.	Mr. Reuben M. Kamonde	Librarian
14.	Mr. Muchira	Farm Manager
15.	Miss Margaret Gathiga	Catering Manager
16.	Mr. Jones K. Wambua	Finance Officer

☐ Kenyatta University

1.	Prof. R. W. Murungi	Deputy Vice Chancellor
2.	Mr. J. K. Yego	University Secretary
3.	Dr. F. N. Owako	Registrar
4.	Mr. H. K. Kiongo	Estates Officer
5.	Mr. J. M. Nganga	Librarian

☐ University of Nairobi (College of Architecture & Engineering, Main Campus)

1.	Prof. A. V. Otieno	Associate Dean, Faculty of Engineering
2.	Dr. S. M. Maranga	Head, Department of Mechanical Engineering

☐ University of Nairobi (College of Architecture & Veterinary Sciences, Kabete Campus)

1.	Prof. D. Oduor Okello	Principal
2.	Prof. Mogera	Dean, Faculty of Veterinary Medicine
3.	Prof. Mokeeya	Dean, Faculty of Agriculture
4.	Mrs. Muhavu	Librarian

☐ Egerton University

1.	Prof. R. S. Musangi	Vice Chancellor
2.	Prof. J. C. Kiptoon	Deputy Vice Chancellor (Finance & Administration)
3.	Prof. J. A. Lugogo	Deputy Vice Chancellor (Research & Extension)
4.	Dr. W. Nguyo	Registrar (Academic)
5.	Mr. P. V. Metto	Registrar (Administration)
6.	Mr. A. N. Shibira	Planning Officer
7.	Mr. S. Rutto	Senior Assistant Registrar

☐ Moi University

1.	Prof. S. O. Keya	Vice Chancellor
2.	Prof. E. M. Standa	Dean, Faculty of Education
3.	Mr. Anwar UL. Hag	Dean, Faculty of Forest Resources & Wildlife Management
4.	Prof. I. Irina	Dean, Faculty of Science
5.	Mr. S. Amasadasa	Dean, Faculty of Technology
6.	Prof. M. A. Ogutu	Dean, School of Social Cultural & Development Studies
7.	Mr. S. G. Njaguna	Principal Administrative Officer (Academic)
8.	Prof. K. O. Karei	Chief Academic Officer

Concerned Persons on the Japanese Side

☐ Embassy of Japan

1.	Mr. Naohiro Kumagai	Ambassador
2.	Mr. Shisei Kaku	Counsellor
3.	Mr. Nobuyuki Horie	First Secretary

☐ Japan International Cooperation Agency, Kenya Office

1.	Mr. Kenji Kumagishi	Resident Representative
2.	Mr. Yoshinori Ebata	Deputy Resident Representative
3.	Mr. Ryuji Matsunaga	Asst. Resident Representative

☐ JKUCAT Japanese Expert Team

1.	Mr. Takahiko Sugiyama	Team Leader / Food Technology
2.	Mr. Mitsuhiko Ohta	Asst. Team Leader / Coordinator
3.	Mr. Shinichi Kimura	Asst. Team Leader / Building & Civil Engineering
4.	Dr. Manabu Tsunoda	Asst. Team Leader / Agricultural Engineering
5.	Miss Naomi Okada	Asst. Team Leader / Education Technology
6.	Mr. Akihiro Wada	Asst. Coordinator
7.	Mr. Shnjirou Shiomi	Horticulture
8.	Dr. Yasuo Shibata	Agricultural Engineering
9.	Mr. Hiroshi Koaze	Food Technology
10.	Mr. Kanji Aoki	Farm Management
11.	Mr. Kiyoshi Kita	Farm Management
12.	Mr. Noriaki Arai	Building & Civil Engineering
13.	Mr. Fujio Ichinose	Mechanical Engineering
14.	Mr. Toshiaki Oshiba	Electrical & Electronics Engineering
15.	Mr. Tatsuo Kurosu	Electrical & Electronics Engineering

☐ Kenya Medical Research Institute

	Mr. Tsutomu Nakano	JICA Expert

☐ National Youth Service Institute

1.	Mr. Tsunehiro Kawakita	JICA Expert
2.	Mr. Etsuo Hashiguchi	JICA Expert

3. Minutes of Discussions

3-1. The Basic Design Study (January 24, 1989 signed)

3-2. The Draft Final Report of the Basic Design Study (May 18, 1989 signed)

MINUTES OF DISCUSSIONS
ON
THE PROJECT FOR THE IMPROVEMENT AND EXPANSION
OF
JOMO KENYATTA UNIVERSITY COLLEGE OF AGRICULTURE AND TECHNOLOGY (JKUCAT)
IN
THE REPUBLIC OF KENYA

In response to the request of the Government of the Republic of Kenya, the Government of Japan decided to conduct a basic design study on the Project for the improvement and expansion of Jomo Kenyatta University College of Agriculture and Technology (JKUCAT) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (Hereinafter referred to as "JICA").

JICA sent to the Republic of Kenya the study team headed by Dr. Junkichi Iwasa, Professor, Faculty of Agriculture, Okayama University for 28 days from 15th January to 11th February, 1989.

The team had a series of discussions and exchanged views with the authorities concerned of the Government of the Republic of Kenya.

As a result of the study and discussions, both parties agreed to recommend to their respective Governments that the major points of understanding reached between them attached herewith, should be examined towards the realization of the Project.

24th January, 1989 NAIROBI

J. Iwasa

DR. JUNKICHI IWASA
Team Leader
JICA Study Team

MR. BENJAMIN K. KIPKULEI
Permanent Secretary
Ministry of Education
The Republic of Kenya

(1/6)

ATTACHMENT

1. Objective
The objective of the Project is to provide adequate and necessary facilities and equipment for JKUCAT as a Constituent College of Kenyatta University to receive the students of Higher National Diploma and Bachelor courses.

2. Project Site
The site of the Project is located at Plot No. 13094, Juja, Kiambu District, Republic of Kenya (Site map is attached as ANNEX - I)

3. Executing Agency
Ministry of Education is responsible for the execution of the Project.

4. Future Plan of Student Population by Courses respectively.
(Student Population by Courses is attached as ANNEX - II)

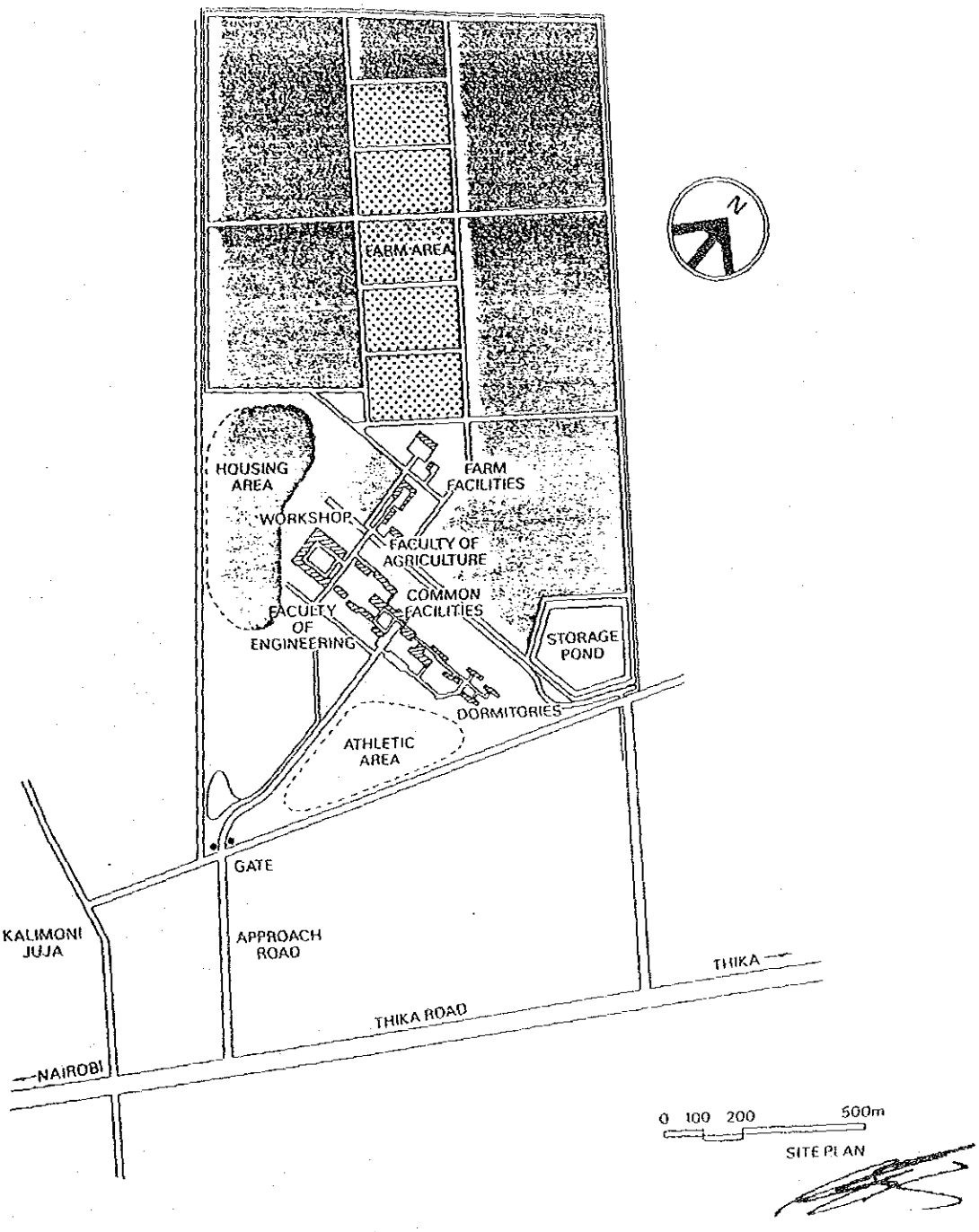
5. Understanding of the Government of Japan
The Team will convey to the Government of Japan the request of the Government of the Republic of Kenya that the former takes necessary measures to cooperate by implementing the Project within the scope of Japanese Grant Aid Program.
(List of Main facilities and equipment requested by the Government of the Republic of Kenya for Japan's Grant Aid is attached as ANNEX - III)

6. Understanding of Japan's Grant Aid System
The Kenyan side has understood Japan's Grant Aid System as explained by the Team.

7. Undertaking of the Government of the Republic of Kenya
The Government of the Republic of Kenya will take the necessary measures listed in ANNEX - IV on condition that the Grant Aid is extended to the Project.

J. A

ANNEX I


N
FARM AREA
HOUSING AREA
FARM FACILITIES
WORKSHOP
FACULTY OF AGRICULTURE
COMMON FACILITIES
FACULTY OF ENGINEERING
STORAGE POND
DORMITORIES
ATHLETIC AREA
GATE
KALIMONI JUJA
APPROACH ROAD
THIKA
THIKA ROAD
NAIROBI
0 100 200 500m
SITE PLAN

J. L

(3/6)

ANNEX II

PROJECTED STUDENT POPULATION AT JKUCAT (1988 - 1994)

	1988	1989	1990	1991	1992	1993	1994
1. Education							
Technician Course	Technician						
Diploma	Diploma						
Higher Diploma			H.D.				
Bachelor Course			B.Sc/B. Tech				
2. Student Population							
a) Technician Course	416	416	312	208	104		
b) Diploma	270	282	360	436	492	492	492
c) Higher Diploma	0	0	120	240	240	240	240
d) Bachelor Course (Tech/Science)	0	40	200	360	520	640	640
e) Total	686	738	992	1244	1356	1372	1372

(4/6)

ANNEX III

Main Facilities and Equipment requested by the Government of the Republic of Kenya for Japan's Grant Aid.

1. Academic Structures and Facilities for Higher courses
   (1) Laboratories
   (2) Lecture Rooms
   (3) Water Treatment Plant
   (4) Workshops
   (5) Offices
   (6) Library
   (7) Resource Centre
   (8) Teaching Equipment
   (9) Others

2. Administration facilities including maintenance workshop

3. Student Halls of Residence and Catering

J. J

(5/6)

ANNEX IV

Measures to be undertaken by the Government of the Republic of Kenya.

1. To secure the site for the Project.

2. To clear and reclaim the site prior to the commencement of construction work.

3. To provide facilities for distribution of electricity, water supply, telephone, drainage and other incidental works leading and up to the site.

4. To ensure prompt unloading, tax exemption and customs clearance of the project goods at the port of disembarkation.

5. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contracts such facilities as may be necessary for their entry into the Republic of Kenya and stay therein for the performance of their work.

6. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the Republic of Kenya with respect to the supply of the products and services under the verified contracts.

7. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant Aid.

8. To bear all the expenses other than those to be borne by the Grant Aid necessary for the execution of the Project.

9. To increase the vested water right of 1,000m³ per day upto the necessary volume according to the Basic Design Study.

J. I

(6/6)

MINUTES OF DISCUSSIONS
ON
THE DRAFT FINAL REPORT OF THE BASIC DESIGN
ON
THE PROJECT FOR THE IMPROVEMENT AND EXPANSION
OF
JOMO KENYATTA UNIVERSITY COLLEGE OF AGRICULTURE AND TECHNOLOGY (JKUCAT)
IN
THE REPUBLIC OF KENYA

In response to the request made by the Government of the Republic of Kenya, the Government of Japan decided to conduct a basic design study on the Project for the Improvement and Expansion of Jomo Kenyatta University College of Agriculture and Technology (JKUCAT) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Republic of Kenya, a study team from January 15 to February 11, 1989.

As a result of the study, JICA prepared a draft final report of the Basic Design and dispatched a mission, headed by Dr. Eiichi Watanabe, Professor of Kyoto University, to explain and discuss it from May 9 to May 22, 1989.

The team had a series of discussions on the Project with the officials concerned, of the Government of the Republic of Kenya headed by Mr. Benjamin K. Kipkulei, Permanent Secretary, Ministry of Education.

After clarifying its contents, both parties had agreed to recommend to their respective governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

18th May, 1989, NAIROBI

Eiichi Watanabe

Prof. Eiichi Watanabe
Team Leader
Draft Report Team
of Basic Design Study, JICA

Mr. Benjamin K. Kipkulei
Permanent Secretary
Ministry of Education
The Republic of Kenya

(1/3)

ATTACHMENT

1. The Kenyan side agreed in principle to the basic design proposed in the Draft Final Report.

2. The Kenyan side understood the system of Japan's Grant Aid Program and confirmed the arrangements to be taken by the Government of the Republic of Kenya for realization of the Project as agreed upon in the "Minutes of Discussions" dated January 24, 1989.

3. The Government of the Republic of Kenya will release the necessary budget including the construction of student hostels at the proper time according to the construction schedule.

4. The Kenyan side confirmed that University College Council be constituted as soon as possible.

5. The Kenyan side confirmed that the recruitment of minimum number of teaching staff be ensured according to the Project schedule as described in APPENDIX-I.

6. Both sides, Kenya and Japan, confirmed the syllabus and curricula of JKUCAT as contained in the Draft Final Report and that the detailed syllabuses and curricula are being prepared.

7. Both sides, Kenya and Japan, confirmed that the consideration for further technical cooperation and grant aid to the University College would be restricted to Faculties of Agriculture and Engineering and their supporting fields.

8. The final report (10 copies in English) on the Project will be submitted to the Kenyan side in the middle of July, 1989.

(2/3)

■ TEACHING STAFF RECRUITMENT PLAN (1989/90~1994/95)

(Person)

Year / Clarify / Faculty / Dept.	1989/90				1990/91				1991/92				1992/93				1993/94				1994/95				
	B	M	D	T	B	M	D	T	B	M	D	T	B	M	D	T	B	M	D	T	B	M	D	T	
Agri.																									
Horticulture	-	2	1	3	-	2	1	3	1	2	-	3	1	1	-	2	1	1	-	2	-	1	-	1	
Agri. Engineering	-	1	1	2	2	1	-	3	2	-	-	2	2	-	-	2	2	-	-	2	-	-	-	-	
Food Technology (includ. Post Harvest)	2	3	-	5	2	2	1	5	3	2	-	5	3	2	-	5	2	2	-	4	3	-	-	3	
Farm Management	1	-	-	1	-	-	-	-	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	
Engi.																									
Building & Civil Engineering	1	-	1	2	2	1	-	3	2	-	-	2	1	-	-	1	-	-	-	-	-	-	-	-	
Architecture	1	1	-	2	1	-	-	1	1	-	-	1	-	-	1	1	-	-	-	-	-	-	-	-	
Mechanical	2	1	-	3	4	-	-	4	1	-	-	1	-	-	1	1	-	-	-	-	-	-	-	-	
Electrical & Electronic	2	1	-	3	2	-	-	2	1	-	-	1	1	-	-	1	1	-	-	1	-	-	-	-	
Common																									
Mathmatic & Science	-	2	-	2	-	3	1	4	-	3	1	4	2	1	1	4	1	2	-	3	1	2	-	3	
Social Science	-	2	-	2	-	4	1	5	-	2	1	3	-	3	-	3	-	2	-	2	-	1	-	1	
Grand Total	9	13	3	25	13	13	4	30	13	9	2	24	10	7	3	20	7	7	-	14	4	4	-	8	121

Remarks: B : Bachelor, M : Master, D : Doctor, T : Total

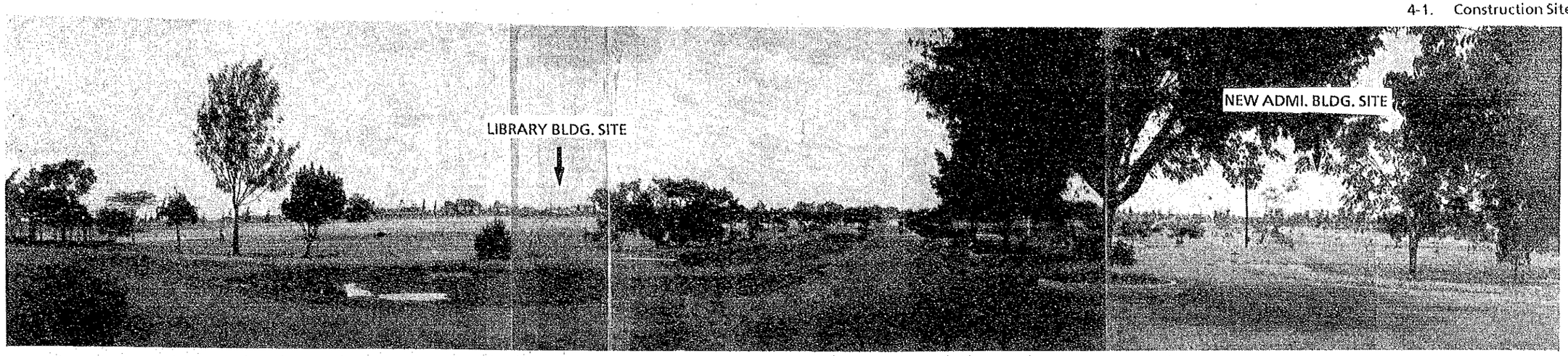
Total No. of Teaching Staff Recruitment (1989/90~1994/95) : 121 persons

(3/3)

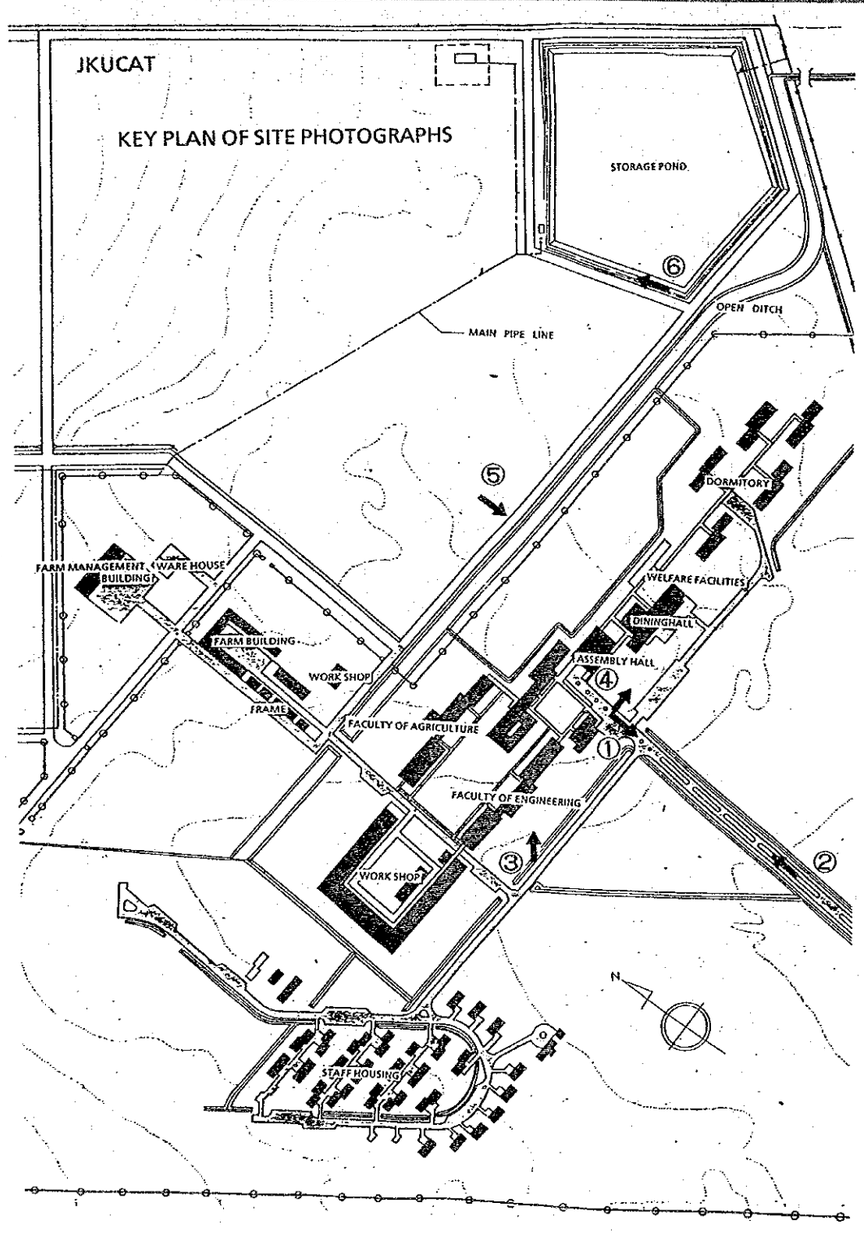
4. Condition of the construction site

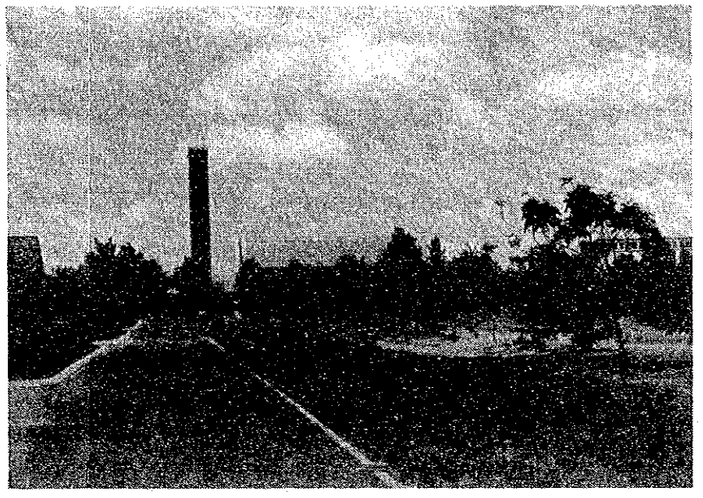
4-1. Construction Site

4-2. Soil Data



①

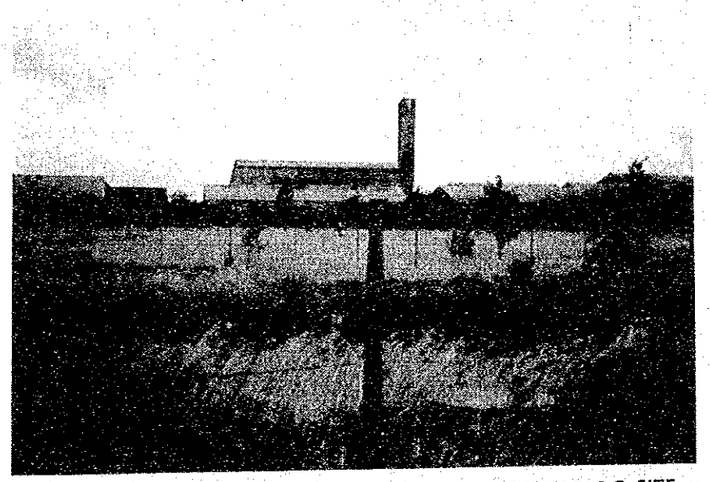




② LIBRARY BLDG. SITE

③ ENGI. NEW LABORATORY BLDG. SITE

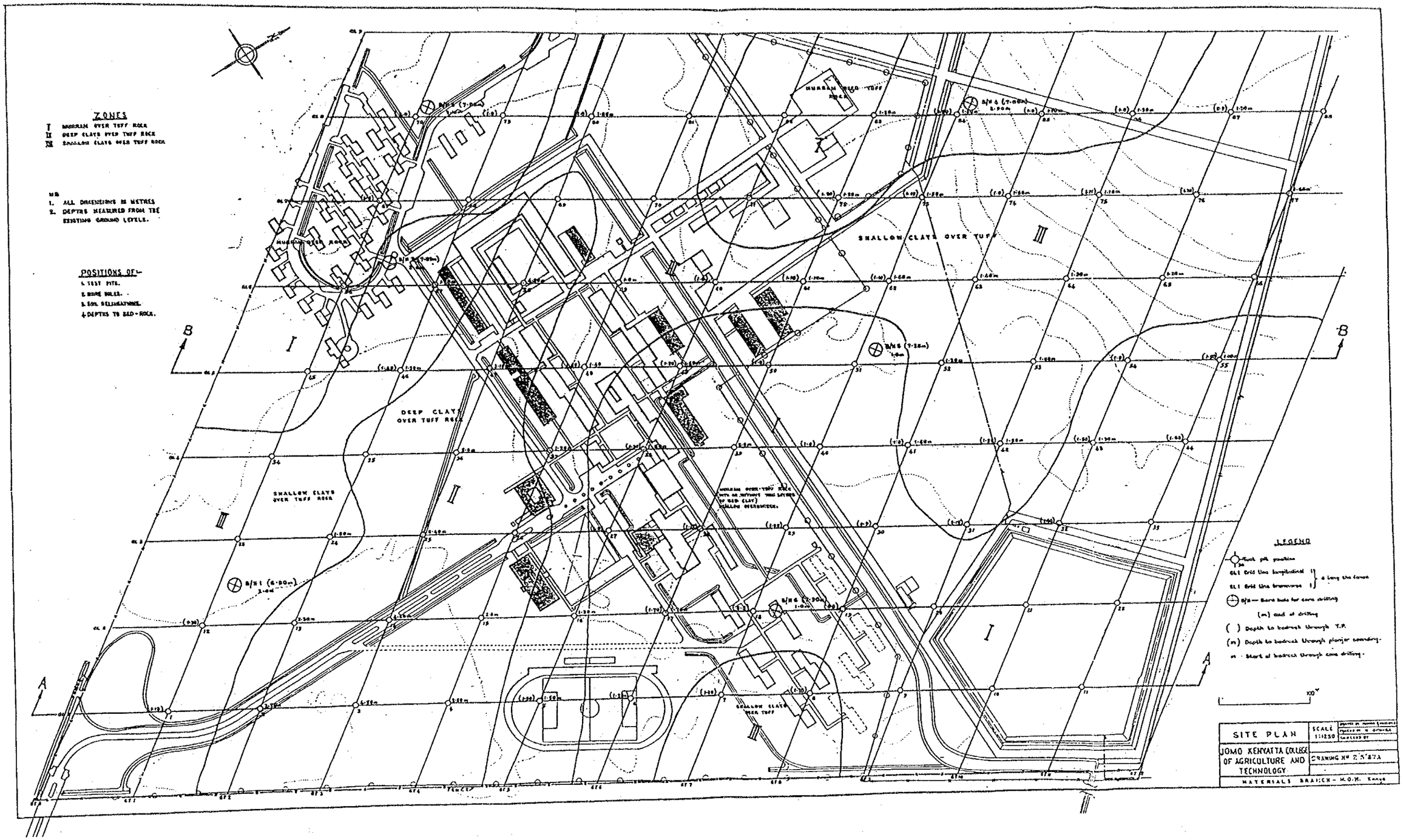
④ CANTEEN BLDG. SITE



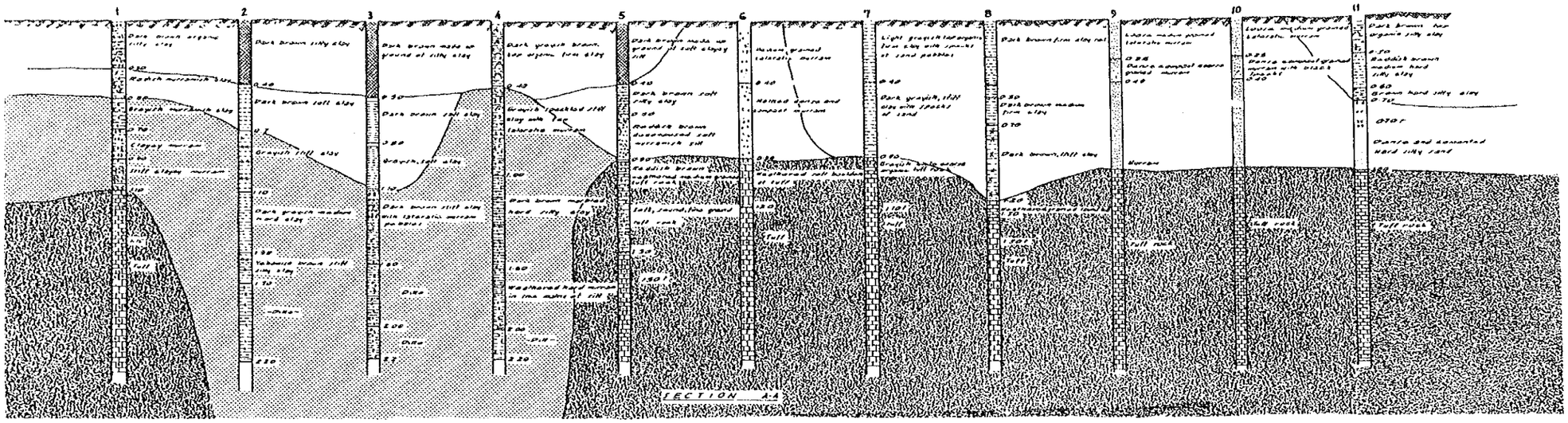
⑤ NEW COMMON LECTURE BLDG. SITE

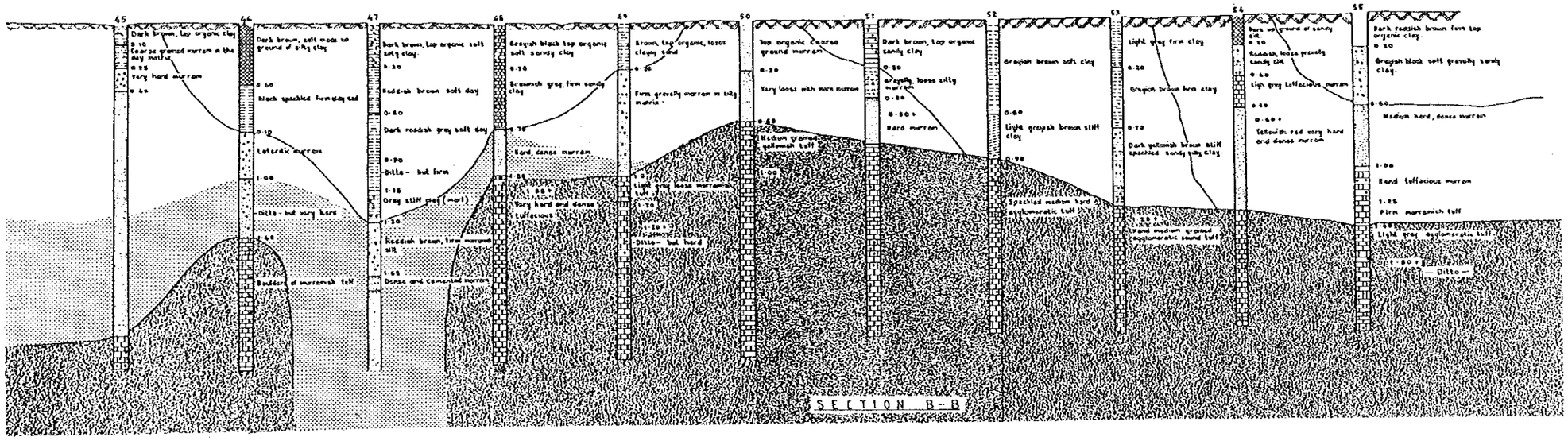
⑥ STORAGE POND

FACULTATIVE POND


ZONES
I MURRAM OVER TUFF ROCK
II DEEP CLAYS OVER TUFF ROCK
III SHALLOW CLAYS OVER TUFF ROCK
NB
1. ALL DIMENSIONS IN METRES
2. DEPTHS MEASURED FROM THE EXISTING GROUND LEVELS.
POSITIONS OF:-
1. TEST PITS.
2. BORE HOLES.
3. SOIL ESTIMATIONS.
4. DEPTHS TO BED-ROCK.
MURRAM OVER TUFF ROCK
SHALLOW CLAYS OVER TUFF
DEEP CLAY OVER TUFF ROCK
SHALLOW CLAYS OVER TUFF ROCK
MURRAM OVER TUFF ROCK
SHALLOW CLAYS OVER TUFF
LEGEND
Bore pit position
Grid line longitudinal
Grid line transverse
a long the faces
B/H — Bore hole for core drilling
(m) end of drilling
( ) Depth to bedrock through T.P.
(m) Depth to bedrock through plunger sounding.
m - Start of bedrock through core drilling.
SITE PLAN
SCALE 1:1250
JOMO KENYATTA COLLEGE OF AGRICULTURE AND TECHNOLOGY
DRAWING No 2.5'87A
MATERIALS BRANCH - M.O.W. Kenya

SOIL PROFILE	SCALE	
JOMO KENYATTA COLLEGE OF AGRICULTURE AND TECHNOLOGY	DRAWING Nº 2/5/87 E	
MATERIALS BRANCH - ROAD [illegible]		





LEGEND

1. Existing ground level
2. Soil profile, defined by [illegible] examination of cuttings
3. Existing ground slope assumed.

5. Others

Syllabuses and Curricula

STUDYING HOURS TABLE OF SUBJECTS
(COMMON & SPECIALIZED SUBJECTS)

UNIT : HOURS

DEPARTMENTS			SUBJECTS		STUDYING HOURS		
FACULTY	DEPARTMENTS	CONTENTS	COMMON	SPECIALIZED	SUB TOTAL	GRAND TOTAL	RATIO(%)
FACULTY OF AGRICULTURE (BACHELOR)	HORTICULTURE	LECTURE	720	1485	2205	3270	67
		PRACTICE	360	705	1065		33
	AGRICULTURAL ENGINEERING AGRICULTURAL CIVIL ENG. COURSE	LECTURE	780	1425	2205	3300	67
		PRACTICE	360	735	1095		33
	AGRICULTURAL ENGINEERING AGRICULTURAL MECHANICAL ENG.COURSE	LECTURE	780	1230	2010	3300	61
		PRACTICE	360	930	1290		39
	FOOD TECHNOLOGY	LECTURE	720	1305	2025	3270	62
		PRACTICE	360	885	1245		38
	POST HARVEST COURSE	LECTURE	720	1425	2145	3270	66
		PRACTICE	360	765	1125		34
F. OF ENG. (BACHELOR)	BUILDING & CIVIL ENGINEERING CIVIL ENG. COURSE	LECTURE	780	1125	1905	3315	66
		PRACTICE	300	1110	1410		34
FACULTY OF ENGINEERING (HND)	BUILDING & CIVIL ENGINEERING ARCHITECTURAL HND COURSE	LECTURE	390	540	930	1740	53
		PRACTICE	210	600	810		47
	ELECTRICAL & ELECTRONICS ELECTRICAL ENGINEERING HND COURSE	LECTURE	390	555	945	1740	54
		PRACTICE	210	585	795		46
	ELECTRICAL & ELECTRONICS ELECTRONICS HND COURSE	LECTURE	390	600	990	1740	57
		PRACTICE	210	540	750		43
	MECHANICAL ENGINEERING AUTOMOBILE & PRIME MOVERS ENG. HND COURSE	LECTURE	390	540	930	1755	53
		PRACTICE	210	615	825		47
	MECHANICAL ENGINEERING PRODUCTION ENG. HND COURSE	LECTURE	390	600	990	1755	56
		PRACTICE	210	555	765		44

STUDYING HOURS TABLE OF SUBJECTS
(COMMON SUBJECTS)

UNIT : HOURS

	COURSE	BACHELOR								H N D					
	FACULTY	FACULTY OF AGRICULTURE						FACULTY OF ENGINEERING		FACULTY OF ENGINEERING					
1	DEPARTMENTS	HORTICULTURE		AGRICULTURAL ENGINEERING		FOOD TECHNOLOGY		BUILDING & CIVIL ENGINEERING (BUILDING & CIVIL ENGINERRING COURSE)		BUILDING & CIVIL ENGINEERING (ARCHITECTURAL COURSE)		ELECTRICAL & ELECTRONICS		MECHANICAL ENGINEERING	
	CONTENTS	LECTURE	PRACTICE	LECTURE	PRACTICE	LECTURE	PRACTICE	LECTURE	PRACTICE	LECTURE	PRACTICE	LECTURE	PRACTICE	LECTURE	PRACTICE
2	MATHEMATICS	240		300		240		300		240		240		240	
	COMPUTOR		60		120		60		120		90		90		90
	PHYSICS		60		120		60		120		90		90		90
	CHEMISTRY		120		60		120		60		30		30		30
	BIOLOGY		120		60		120								
	Sub Total	240	360	300	360	240	360	300	300	240	210	240	210	240	210
	TOTAL	600		660		600		600		450		450		450	
3	ENGLISH	180		180		180		180		120		120		120	
	SOCIOLOGY	60		60		60		60		(30)		(30)		(30)	
	ANTHROPOLOGY	60		60		60		60		(30)		(30)		(30)	
	ENVIRONMENTAL ENG.	60		60		60		60		(30)		(30)		(30)	
	ECONOMICS	60		60		60		60		(30)		(30)		(30)	
	POLITICS	60		60		60		60		(30)		(30)		(30)	
	Sub Total	480		480		480		480		150		150		150	
	TOTAL	480		480		480		480		150		150		150	
4	Sub Total	720	360	780	360	720	360	780	300	390	210	390	210	390	210
	GRAND TOTAL	1,080		1,140		1,080		1,080		600		600		600	

REMARKS : '( )' MEANS ELECTIVE SUBJECTS.

1 = DEPARTMENT
2 = MATHEMATICS & SCIENCE
3 = SOCIAL SCIENCE
4 = HOURS

DEPARTMENT OF HORTICULTURE

	Subjects	Hours (Lecture)	(Practice)	Total
1.	Core Subjects			
1-1	Int. to General Agriculture	30	0	30
1-2	Int. to General Horticulture	30	0	30
1-3	Introduction to Animal Husbandry	30	0	30
1-4	Agricultural Production in the Tropics	30	0	30
1-5	Forestry & Agroforestry	30	0	30
1-6	African Geography for Agric.	30		
1-7	African Agrometeorology	30		
1-8	Rural Development in Africa	30	CHOICE	90
1-9	History of World Agriculture	30		
1-10	Environment & Polution	30		
1-11	Statistics for Agricultural Experiment	30	15	45
	(Sub Total)	(270)	(15)	(285)
2.	Basic Cultivation			
2-1	Morphology & Anatomy of higher plants	60	30	90
2-2	Plant Taxonomy	30	30	60
2-3	Physiology of Plant Growth	30	15	45
2-4	Flowering Physiology of Plants	30	15	45
2-5	Plant Ecology	30	15	45
2-6	Entomology for Agriculture	60	15	75
2-7	Pathology for Agriculture	60	15	75
2-8	Plant Genetics for Agriculture	30	15	45
2-9	Plant Breeding	60	15	75
2-10	Weed Science & Weed Control	30	15	45
2-11	Soil Science	60	15	75
2-12	Tropical soil Science	30	0	30
2-13	Plant Nutrition	60	15	75
2-14	Plant Propagation & Seed Production	30	15	45
2-15	Soil & Water Conservation	30	0	30
2-16	Farm Power & Machinery	30	30	60
2-17	Surveying & Drawing	15	30	45
	(Sub Total)	(675)	(285)	(960)

	Subjects	Hours (Lecture)	(Practice)	Total
3.	Cultivation Technology			
3-1	Crop Production	60	15	75
3-2	Olericulture	60	15	75
3-3	Pomology	60	15	75
3-4	Floriculture	60	15	75
3-5	Amenity Horticulture	30	15	45
3-6	Postharvest Physiology & Technology in Horticulture	30	15	45
3-7	Landscape Design & Management	30	15	45
	(Sub Total)	(330)	(105)	(435)
4.	Farm Management			
4-1	Agricultural Policy	30	0	30
4-2	Agricultural Marketing	30	0	30
4-3	Rural Sociology	30	0	30
4-4	Farm Management	30	0	30
4-5	Farm Records & Accounts	30	30	60
4-6	Co-operative in Agriculture	30	0	30
4-7	Agricultural Extension	30	0	30
	(Sub Total)	(210)	(30)	(240)
5.	Practice			
5-1	Farm Works		60	60
5-2	Cultural Management of Horticultural Crops for Field Experimentation		90	90
5-3	Field Attachment		8 weeks	
	(Sub Total)		(150)	(150)
6.	Special Projects		120	120
	Total	1,485	705	2,190

DEPARTMENT OF AGRICULTURAL ENGINEERING

(AGRICULTURAL MECHANICAL ENGINEERING COURSE)

	Subjects	Hours (Lecture)	(Practice)	Total
1.	Core Subjects			
1-1	Introduction to Agric. Engineering	30	0	30
1-2	Introduction to Agriculture	60	0	60
1-3	Principles of Crop Production	60	30	90
1-4	Farm power & Machinery	60	30	90
1-5	Animal Production	30	0	30
1-6	Soil Science	60	30	90
1-7	Thermodynamics	60	0	60
1-8	Fluid Mechanics	60	30	90
1-9	Survey	30	60	90
1-10	Engineering Drawing		120	120
1-11	Mechanics of Machines	60	30	90
1-12	Statistics	45	0	45
1-13	Computer Programming	45	0	45
1-14	Principles of Agric. Engineering	60	0	60
1-15	Agricultural Extension	45	0	45
	(Sub Total)	(705)	(330)	(1035)
2.	Basic Machinery Engineering			
2-1	Thermodynamics	60	30	90
2-2	Electrical Engineering	60	30	90
2-3	Strength of Materials	60	15	75
	(Sub Total)	(180)	(75)	(255)
3.	Agricultural Machinery Engineering			
3-1	Tractor Engineering	30	30	60
3-2	Farm Machinery	30	30	60
3-3	Design of Machine Elements	30	60	90
3-4	Materials & Production Engineering	60	30	90
3-5	Refrigeration & Air Conditioning	45	15	60
3-6	Agricultural Processing Eng.	60	30	90
3-7	Agricultural Mechanisation	30	15	45
3-8	Farm Machinery Design	30	45	75
3-9	Renewable Energy Sources	30	0	30
	(Sub Total)	(345)	(255)	(600)

Subjects	Hours (Lecture)	Hours (Practice)	Total
4. Practice			
4-1 Field Practicals		60	60
4-2 Work shop		90	90
4-3 Field/Industrial Practice		8 weeks	
(Sub Total)		(150)	(150)
5. Special Project		120	120
Total	1230	930	2,160

DEPARTMNET OF AGRICULTURAL ENGINEERING
(AGRICULTURAL CIVIL ENGINEERING COURCE)

	Subjects	Hours (Lecture)	(Practice)	Total
1.	Core Subjects			
1-1	Introduction to Agric. Engineering	30	0	30
1-2	Introduction to Agriculture	60	0	60
1-3	Principles of Crop Production	60	30	90
1-4	Farm power & Machinery	60	30	90
1-5	Animal Production	30	0	30
1-6	Soil Science	60	30	90
1-7	Thermodynamics	60	0	60
1-8	Fluid Mechanics	60	30	90
1-9	Survey	30	60	90
1-10	Engineering Drawing		120	120
1-11	Mechanics of Machines	60	30	90
1-12	Statistics	45	0	45
1-13	Computer Programming	45	0	45
1-14	Principles of Agric. Engineering	60	0	60
1-15	Agricultural Extension	45	0	45
	(Sub Total)	(705)	(315)	(1035)
2.	Structural Engineering			
2-1	Solid & Structural Mechanic	60	30	90
2-2	Soil Mechanics	30	15	45
2-3	Agricultural Structures	60	30	90
2-4	Design Project	30	45	75
	(Sub Total)	(180)	(120)	(300)
3.	Agricultural Foundation Engineering			
3-1	Soil Physics	60	30	90
3-2	Soil & Water Conservation	60	15	75
3-3	Soil & Water Engineering	75	15	90
3-4	Rural Development	30	0	30
3-5	Farm Management	45	0	45
	(Sub Total)	(270)	(60)	(330)

Subjects		Hours (Lecture)	Hours (Practice)	Total
4.	Irrigation and Drainage Engineering			
4-1	Irrigation & Drainage	45	15	60
4-2	Hydraulics	45	15	60
4-3	Hydrology	45	15	60
4-4	Rural Water Resources Development	45	0	45
4-5	Water Resources Engineering	45	0	45
4-6	Watershed Management	45	0	45
	(Sub Total)	(270)	(45)	(315)
5.	Practice			
5-1	Field Practicals		60	60
5-2	Field/Industrial Practice		8 weeks	
	(Sub Total)			(60)
6.	Special Projects		120	120
	Total	1425	735	2,160

DEPARTMENT OF FOOD TECHNOLOGY

	Subjects	Hours (Lecture)	(Practice)	Total
1.	Core Subjects			
1-1	Introduction to Food Technology	30	0	30
1-2	Plant Food	30	0	30
1-3	Animal Food	30	0	30
1-4	Physical Chemistry	60	30	90
1-5	Analytical Chemistry	60	30	90
1-6	Organic Chemistry	60	30	90
1-7	Biochemistry	60	30	90
1-8	Microbiology	60	30	90
1-9	Thermodynamics	60	0	60
1-10	Fluid Mechanics	60	0	60
1-11	Statistics	30	30	60
	(Sub Total)	(540)	(180)	(720)
2.	Food Chemistry			
2-1	Human Nutrition	60	0	60
2-2	Food Chemistry	60	45	105
2-3	Food Toxicology	30	0	30
2-4	Instrumental Analysis	30	30	60
	(Sub Total)	(180)	(75)	(255)
3.	Food Microbiology			
3-1	Food Microbiology	60	30	90
3-2	Food Hygiene	60	15	75
3-3	Enzymology	60	30	90
3-4	Fermentation Technology	30	45	75
	(Sub Total)	(210)	(120)	(330)
4.	Food Technology			
4-1	Food Engineering	60	45	105
4-2	Food Processing Machinery	30	30	60
4-3	Food Production	60	30	90
4-4	Plant Layout & Design	15	30	45
4-5	Quality Control	30	0	30
	(Sub Total)	(195)	(135)	(330)

Subjects		Hours (Lecture)	Hours (Practice)	Total
5. Food Processing				
5-1	Food Preservation & Processing	60	45	105
5-2	Postharvest Technology	30	15	45
5-3	Fruits & Vegetables	15	45	60
5-4	Baking	15	45	60
5-5	Meat	15	45	60
5-6	Dairy	15	45	60
5-7	Food Packaging	30	15	45
	(Sub Total)	(180)	(255)	(435)
6.	Field Attachment	(8 weeks)		
7.	Special Projects		120	120
	Total	1305	885	2,190

DEPARTMENT OF FOOD TECHNOLOGY
(POSTHARVEST COURSE)

	Subjects	Hours (Lecture)	(Practice)	Total
1.	Core Subjects			
1-1	Int. to Postharvest Tech.	30	0	30
1-2	Plant Food	30	0	30
1-3	Animal Food	30	0	30
1-4	Physical Chemistry	60	30	90
1-5	Analytical Chemistry	60	30	90
1-6	Organic Chemistry	60	30	90
1-7	Biochemistry	60	30	90
1-8	Microbiology	60	30	90
1-9	Thermodynamics	60	0	60
1-10	Fluid Mechanics	60	0	60
1-11	Statistics	30	30	60
	(Sub Total)	(540)	(180)	(720)
2.	Food Chemistry			
2-1	Human Nutrition	60	0	60
2-2	Food Chemistry	60	45	105
2-3	Food Toxicology	30	0	30
2-4	Instrumental Analysis	30	30	60
	(Sub Total)	(180)	(75)	(255)
3.	Food Microbiology			
3-1	Food Microbiology	60	30	90
3-2	Food Hygiene	60	15	75
3-3	Enzymology	60	30	90
3-4	Fermentation Technology	30	45	75
	(Sub Total)	(210)	(120)	(330)
4.	Food Technology			
4-1	Food Technology	60	45	105
4-2	Plant Layout & Design	15	30	45
4-3	Quality control	30	0	30
	(Sub Total)	(105)	(75)	(180)

	Subjects	Hours (Lecture)	Hours (Practice)	Total
5.	Basic Postharvest			
5-1	Postharvest Plant Physiology	60	15	75
5-2	Postharvest Plant Pathology	60	15	75
5-3	Pest Control & Entomology	60	15	75
5-4	Food Preservation	60	0	60
	(Sub Total)	(240)	(45)	(285)
6.	Postharvest Technology			
6-1	Applied Unit Operation for Postharvest Technology	30	30	60
6-2	Postharvest Tech. & Syst. for Grains & Tuber Crops	60	30	90
6-3	Postharvest Tech. & Syst. For Horticultural Crops	60	30	90
	(Sub Total)	(150)	(90)	(240)
7.	Farm Works	60	60	
8.	Field Attachment	8 weeks		
9.	Special Projects		120	120
	Total	1425	765	2,190

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
(CIVIL ENGINEERING COURSE)

	Subjects	Hours (Lecture)	Hours (Practice)	Total
1.	Core Subjects			
1-1	Fluid Mechanics	45	45	90
1-2	Hydraulics	45	45	90
1-3	Hydrology	45	45	90
1-4	Public Health Engineering	45	15	60
1-5	Geology	30		30
1-6	Soil Mechanics	45	45	90
1-7	Structural Mechanics	45	45	90
1-8	Mechanics of Materials	45	45	90
	(Sub Total)	(345)	(285)	(630)
2.	Civil Engineerings			
2-1	Concrete Technology	60	30	90
2-2	Reinforced Concrete	60	30	90
2-3	Construction Materials	45	15	60
2-4	Irrigation Engineering	45	30	75
2-5	Foundation Engineering	45	30	75
2-6	Transportation Eng.	45	15	60
2-7	Structural Analysis	60	30	90
2-8	Steel & Timber Design	45	45	90
2-9	Masonry Design	45	45	90
	(Sub Total)	(450)	(270)	(720)
3.	Architectural Engineerings			
3-1	Principles of Arch.	45	15	60
3-2	Urban & Reg. Plan	45	30	75
3-3	Ventilation & Air Cond.	30	30	60
3-4	Building Const. & Serv.	15	30	45
3-5	Engineering Graphics	15	30	45
	(Sub Total)	(150)	(135)	(285)

Subjects		Hours (Lecture)	Hours (Practice)	Total
4. Construction Engineerings				
4-1	Construction Management	45	45	90
4-2	Cost Estimates	30	45	75
4-3	Engineering Economics	30		30
	(Sub Total)	(105)	(90)	(195)
5. Practice				
5-1	Architectural Drawing	15	30	45
5-2	Port folio		30	30
5-3	Concrete Specification	15	90	105
5-4	Survaying	15	90	105
	(Sub Total)	(45)	(240)	(285)
6. Special Projects		30	90	120
	Total	1125	1110	2,235

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
(ARCHITECTURAL HND COURSE)

	Subjects	Hours (Lecture)	(Practice)	Total
1.	Core Subjects			
1-1	Applied Dynamics	30	30	60
1-2	Building Materials	30	30	60
1-3	Basic Soil Engineering	30	30	60
1-4	Architectural Laws and Regurations	30		30
1-5	History of Western Architecture	30		30
1-6	History of Modern Architecture	30		30
1-7	Construction Method	30	15	45
	(Sub Total)	(210)	(105)	(315)
2.	Building Planning and Designing			
2-1	Architectural Planning I. II.	30	30	60
2-2	Physical Environment I. II.	30	30	60
2-3	Urban Planning	45	15	60
2-4	Architectural Equipment I. II.	30	30	60
	(Sub Total)	(135)	(105)	(240)
3.	Structural Engineering			
3-1	Structural Dynamics I. II.	30	30	60
3-2	General Theory of Structures I. II.	30	30	60
3-3	Steel Structure	30	30	60
3-4	Aseismic Structure	30	30	60
3-5	Reinforced Concrete I. II.	30	30	60
	(Sub Total)	(150)	(150)	(300)
4.	Practice			
4-1	Drawing	15	30	45
4-2	Architectural Design and Drawing		60	60
4-3	Material Experiments		60	60
4-4	Cost Estimate		30	30
	(Sub Total)	(15)	(180)	(195)
5.	Special Subjects	30	60	90
	Total	540	600	1,140

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
(ELECTRIC ENGINEERING HND COURSE)

	Subjects	Hours (Lecture)	Hours (Practice)	Total
1.	Core Subjects			
1-1	Intorduction to Electronics Engineering	30	15	45
1-2	Electromagnetic Theory	60	30	90
1-3	Computer Applications	60	45	105
1-4	Electric and Electronic Circuits	30	15	45
	(Sub Total)	(180)	(105)	(285)
2.	Basic Electrical Engineering			
2-1	Power Electronics	45	30	75
2-2	Control Engineering	30	15	45
2-3	Power Systems I	30	30	60
2-4	Machines and Utilisation I	30	30	60
	(Sub Total)	(135)	(105)	(240)
3.	Basic Electronics Engineering			
3-1	Digital Electronics I	30	15	45
3-2	Communication Systems I	30	15	45
	(Sub Total)	(60)	(30)	(90)
4.	Electrical Engineering			
4-1	Power Electronics II	45	45	90
4-2	Power System II	45	45	90
4-3	Instrumentation and Meas.	30	45	75
4-4	Machines and Utilisation II	30	45	75
	(Sub Total)	(150)	(180)	(330)
5.	Practice			
5-1	Electrical Drawing		45	45
5-2	Field Practice		60	60
	(Sub Total)		(105)	(105)
6.	Special Projects	30	60	90
	Total	555	585	1,140

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

(ELECTRONICS HND COURSE)

Subjects		Hours		
		(Lecture)	(Practice)	Total
1.	Core Subjects			
1-1	Introduction to Electronics Engineering	60	30	90
1-2	Electromagnetic Theory	30	15	45
1-3	Computer Applications	60	45	105
1-4	Electric and Electronic Circuit	30	15	45
	(Sub Total)	(180)	(105)	(285)
2.	Basic Electrical Engineering			
2-1	Power Electronics	15	15	30
2-2	Instrumentation and Meas.	30	15	45
2-3	Power Systems I	15	15	30
2-4	Machines and Utilisation I	30	30	60
	(Sub Total)	(90)	(75)	(165)
3.	Basic Electronics Engineering			
3-1	Digital Electronics I	45	30	75
3-2	Communication Systems I	60	30	90
	(Sub Total)	(105)	(60)	(165)
4.	Electronics & Communication System			
4-1	Electronics II	45	30	75
4-2	Industrial Electronics	60	30	90
4-3	Communication Systems II	45	45	90
4-4	Digital Electronics II	45	30	75
	(Sub Total)	(195)	(135)	(330)
5.	Practice			
5-1	Electrical Drawing		45	45
5-2	Field Practice		60	60
	(Sub Total)		(105)	(105)
6.	Special Projects	30	60	90
	Total	600	540	1,140

DEPARTMENT OF MECHANICAL ENGINEERING
(AUTOMOBILE & PRIME MOVERS ENGINEERING HND COURSE)

Subjects		Hours (Lecture)	Hours (Practice)	Total
1. Core Subjects				
1-1	Strengths of Materials	60	30	90
1-2	Metallurgy and Non-Metals	60	30	90
1-3	Mechanics of Machines	60	30	90
1-4	Systems Engineering	60	30	90
1-5	Applied Thermodynamics	45	15	60
1-6	Mechanics of Fluids	45	15	60
1-7	Metrology	15	15	30
1-8	Industrial Organization and Management Studies	15	15	30
	(Sub Total)	(360)	(180)	(540)
2. Practice				
2-1	Drawing	15	30	45
2-2	Mechanical Drawing & Design	15	60	75
2-3	Field Practice		150	150
	(Sub Total)	(30)	(240)	(270)
3. Automobile Engineerings				
3-1	Automobile Engineering	45	45	90
3-2	Prime Movers Engineering	45	45	90
3-3	Others	30	45	75
	(Sub Total)	(120)	(135)	(255)
4. Special Projects		30	60	90
	Total	540	615	1,155

DEPARTMENT OF MECHANICAL ENGINEERING
(PRODUCTION ENGINEERING HND COURSE)

Subjects		Hours (Lecture)	Hours (Practice)	Total
1. Core Subjects				
1-1	Mechanics of Machines	45	30	75
1-2	Metallurgy and Non-Metals	45	30	75
1-3	Mechanics of Machines	45	30	75
1-4	Systems Engineering	60	30	90
1-5	Applied Thermodynamics	30	15	45
1-6	Mechanics of Fluids	30	15	45
1-7	Metrology	60	30	90
1-8	Industrial Organization and Management Studies	60	30	90
	(Sub Total)	(375)	(210)	(585)
2. Practice				
2-1	Drawing	15	30	45
2-2	Mechanical Drawing & Design		45	45
2-3	Field Practice		120	120
	(Sub Total)	(15)	(195)	(210)
3. Production Engineering				
3-1	Production Engineering	60	30	90
3-2	Others	120	60	180
	(Sub Total)	(180)	(90)	(270)
4. Special Projects		30	60	90
	Total	600	555	1,155

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