Basic Design Study Report
on
the Project
for
the Expansion of the Faculty of Science
at
Makerere University
in
the Republic of Uganda

December, 1989

Japan International Cooperation Agency

PREFACE

In response to a request from the Government of the Republic of Uganda, the Government of Japan has decided to conduct a Basic Design Study on the Project for the Expansion of the Faculty of Science at Makerere University and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent to Uganda a survey team headed by Dr. Kenji Konishi, Professor, Faculty of Science, Kanazawa University, from July 16 to August 6, 1989.

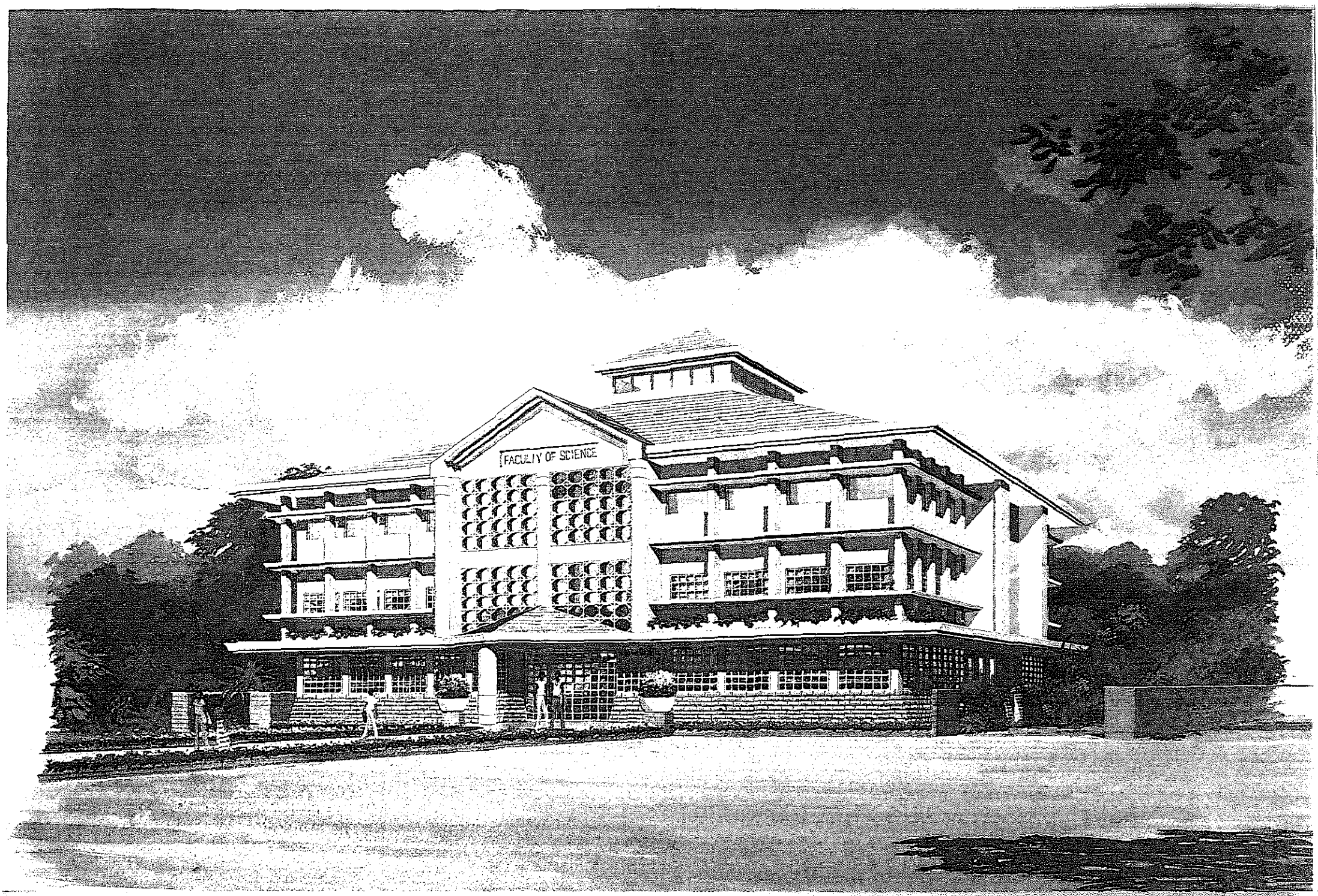
The team exchanged views with the officials concerned of the Government of Uganda and conducted a field survey. After the team returned to Japan, further studies were made. Then a mission was sent to Uganda in order to discuss a draft report and the present report was prepared.

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

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

December 1989

Kensuke Yanagiya
President
Japan International Cooperation Agency


FACULTY OF SCIENCE

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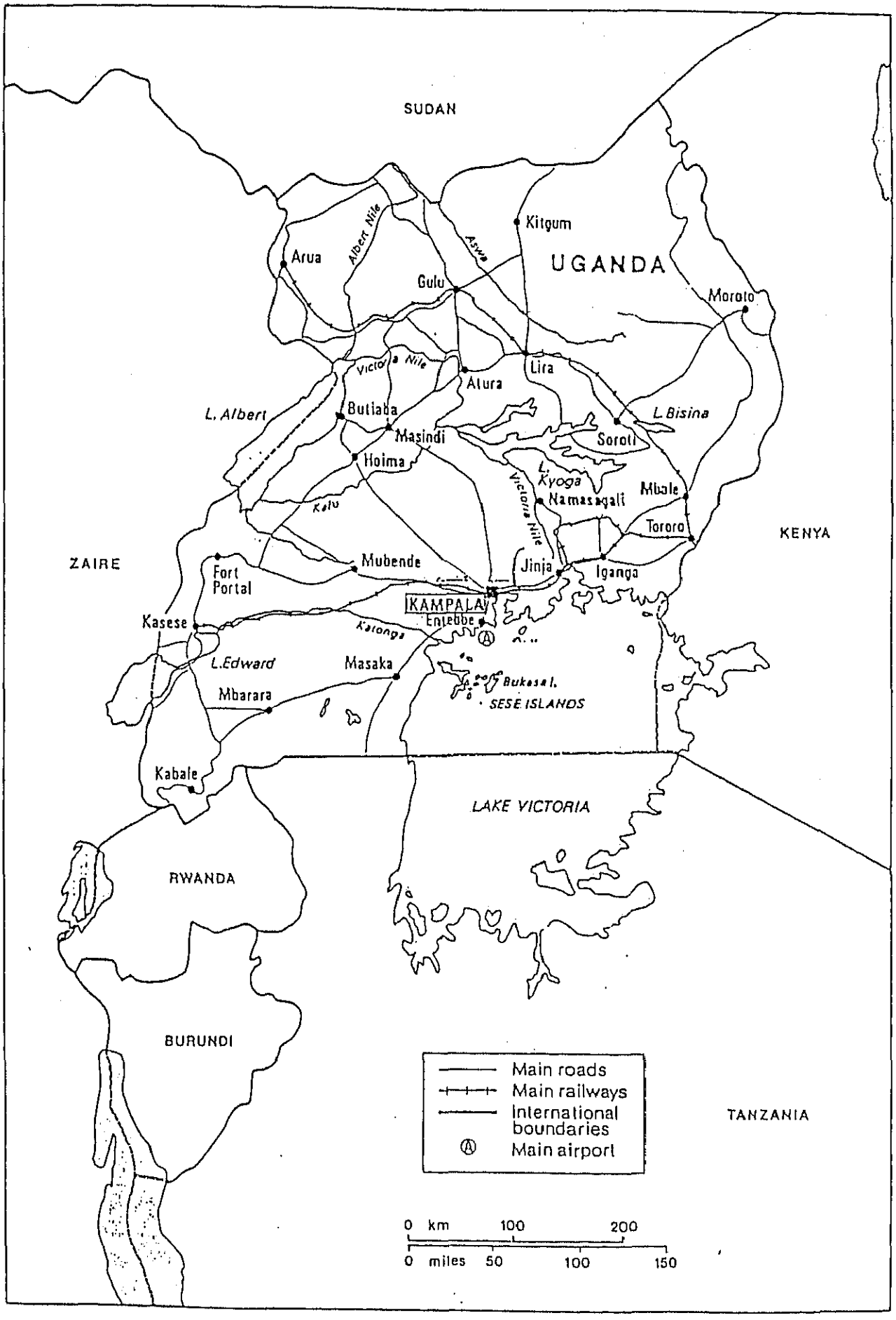
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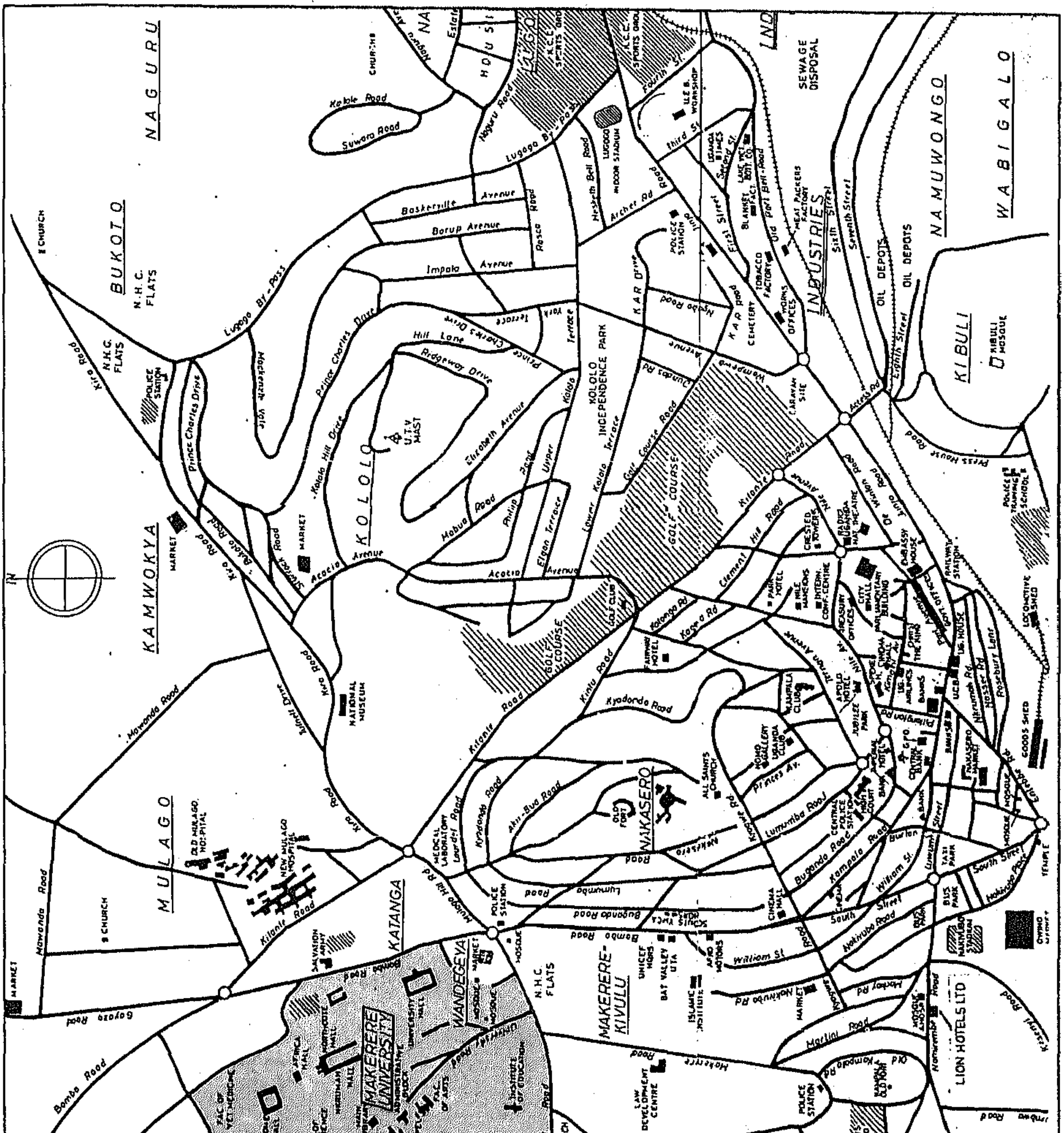
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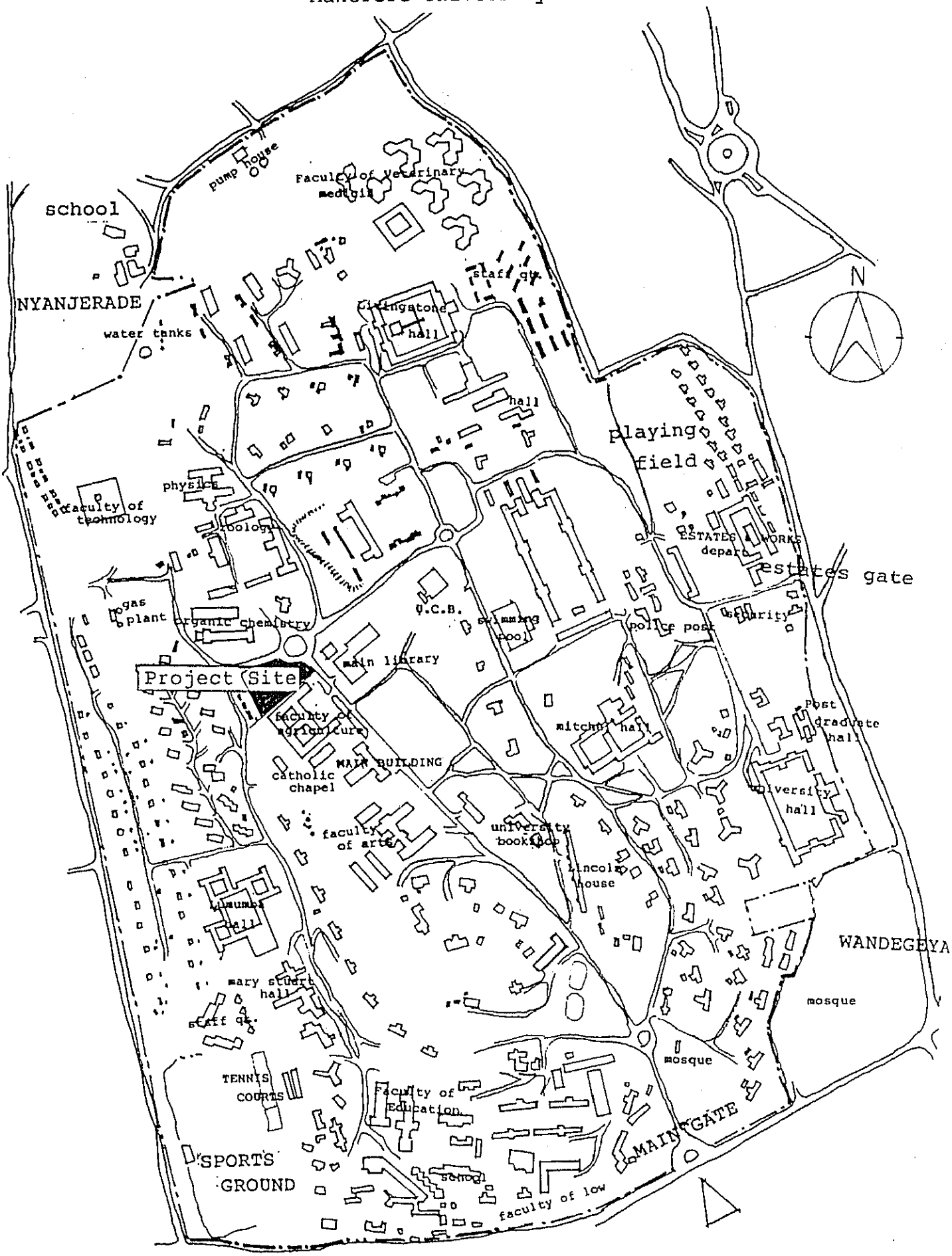

MAKERERE UNIVERSITY

OUTLINE OF THE MAIN CAMPUS

Project Site

SUMMARY

SUMMARY

The Republic of Uganda, an independent nation which separated from the United Kingdom on October 9, 1962, is a landlocked country situated directly on the equator in East Africa, with little change in the temperature between 22°C ~ 24°C throughout the year. Its capital is Kampala, the center of politics and the economy.

Following its political independence, the country commenced the reformation of the whole economy with the aim of establishing the economic society of Uganda by and for the Ugandan people. In 1971, Amin assumed the presidency of the country. He rammed the Ugandanization policy ahead, and banished from the country the non-Ugandan people who until then held most of the economic and distribution structures of the country. This was done knowing that they would take out their own assets with them, and it consequently brought impoverishment on the economy of the country. Thereafter followed an age of repeated political changes and political instability. After the inauguration of Museveni as President in 1986, the political situation became stable and the economic activities were recovered.

With the aim of resuscitating the domain which was devastated due to political changes, the Government of Uganda has announced in June 1988 the 1988/89 ~ 1991/92 Rehabilitation and Development Plan, and has since been tackling the reconstruction of the state. Based on the perception that education is greatly essential for the reconstruction of the domain, the Plan advocates the necessity to uplift the quality of teaching staff, increase teaching manpower, and renovate or expand the facilities, of various educational institutions as well as Makerere University.

The Background to the 1989 ~ 1990 Budget which was announced in July 1989 by the Ministry of Planning and Economical Development places emphasis on that scientifical education is essential for the augmentation of the production capacities of both agriculture and industry which should play a primary role of developing the economy of the country, and that the development of educational and training expertises relating thereto.

As Makerere University, the only general university in the country, is in an important position regarding scientific education, the Government of Uganda,

with its hope on the results of scientific education by the university and with the aim of creating as much excellent manpower as possible from its Faculty of Science, has worked out a manpower augmentation plan to increase the students of the Faculty of Science from the present (1989) number to 2.8-fold by 1992.

In fact, the manpower accommodation capacity of the university in its entirety has already reached the limit, and also it has suffered from a shortage of teaching staff, deteriorating facilities, a shortage of teaching equipment, etc. Thus, implementation of the manpower augmentation plan is difficult.

For the purpose of improving such a situation, the government has implemented the renovation of existing deteriorating buildings and the training of teaching staff with aids from UNDP, EEC, USAID, etc. Based on such a background and in order to solve the problem relating to a shortage of facilities and equipment suffered by the Faculty of Science, which presently gives rise to a significant task, the Government of Uganda has envisaged the new construction of large and medium lecture rooms, and provision and supplementation of scientific, teaching equipment, both for use by the Departments of Biochemistry and Geology of the Faculty of Science, and has requested the Government of Japan for a Grant Aid as the Project for the Expansion of the Faculty of Science at Makerere University.

In response to the request from the Republic of Uganda, the Government of Japan decided to conduct a basic design study on the Project for the Expansion of the Faculty of Science at Makerere University, and Japan International Cooperation Agency (JICA) sent a basic design study team to the country for the period from July 16 to August 6, 1989.

During project site investigations, the team had discussions with the interested personnel of Makerere University regarding the details of the facilities and equipment covered by the request. Meanwhile, the team conducted project site investigations and collected necessary data. After return to Japan, the team prepared a draft basic design study report. Subsequently, for the purpose of explaining the draft report, another study team was sent to the country from October 15 to 29, 1989. The details of the project are as given below.

(1) Facility planning and scale

The facility planning is based on the following assumptions:

i) Student number should be limited to that for 1992, and, based on the available statistical data, the ratio of male students to female students is set at 4 to 1.

ii) Teaching staff number should be limited to that for 1989 (as the full number has not yet been reached).

iii) The curricula of the Faculty of Science for 1992 should be identical to those currently adopted.

iv) The ratio of student number taking lectures should remain unchanged even after implementation of the student augmentation plan.

v) The grade of the new facility should be identical to that of existing facility.

(Facilities)

	Room	Floor area (m^2)
GF	Faculty office of administrators, Dean's office, Head's office (Biochemistry), seminar room of Geology Dept., laboratory, library, etc.	Approx. 700
1F	Head's office (Biochemistry), biochemical seminar room, laboratory, darkroom, etc.	Approx. 700
2F	Lecture rooms etc.	Approx. 700
	Total	Approx. 2,100

Based on the perception that the existing Dean's office, each Head's office, secretary's office, laboratories and preparation rooms will be relocated from the existing buildings into the new facility, they should remain unchanged in scale.

For the rooms other than those mentioned above (such as the Faculty office of administrators, conference room, lecture rooms, seminar rooms,

departmental libraries, storages, hot-water service rooms, etc.), their scales have been determined by the team in consideration of their functional characteristics.

(2) Equipment planning

With high regard paid to preferential order, types and quantities of equipment have been envisaged from among those confirmed by the site investigations, on the basis of the following concepts:

(i) As the request places emphasis on the upgrading of manpower, the equipment deemed necessary for laboratory education matching the curricula of the university, should be selected.

The equipment with limited purposes or for use in particular research should be deleted from the scope of the Grant Aid even if it ranks high in the preferential order of the request.

(ii) In order to facilitate maintenance and control, the equipment requiring expensive perishables or perishables difficult to be obtained in the country, should be deleted, but spare parts with high necessity should be included, to a proper extent.

Equipment	Breakdown	Quantity
1. Laboratory equipment	Spectrophotometers, electrophoretic devices, polarized microscopes, etc.	47
2. Equipment for field work	Hammers, tents, magnetic needles, etc.	19
3. Audiovisual equipment	16mm projectors, video sets, universal projectors, etc.	8
4. Vehicle	Motor vehicle for field work	1
5. Office equipment	Data processors, photocopiers, rotary printing presses, etc.	12
	Total	87

(3) Approximate estimate of the project costs bone by Uganda

Uganda portion : Approx. US$ 35,600 (installation of infrastructural services, and site preparation)

(4) Construction Period

A period of approximately twelve (12) months will be required following the outset of foundation work.

(5) Facility maintenance and administrative cost

An estimated ratio of additional cost accrued from the operation of the project facility to the university's 1988 maintenance and administrative cost is approximately 1.1%. Thus, with additional burden limited to this extent, it would be possible for the university to acquire the corresponding budget for the maintenance of the project facility.

(6) Undertakings of both governments

The table below classifies the entire project into the scope of work to be undertaken by the Grant Aid of the Government of Japan, and that to be undertaken by the Government of the Republic of Uganda.

Table

Scope of work by Japan	Scope of work by Republic of Uganda
1. Building work Building structure and architectural finish. 2. Electrical work Power receiving/transforming installation, power and trunk line, lighting, receptacles, campus telephone system, broadcasting system, lightning arrester system. 3. Plumbing and ventilation systems Water supply system, drain and vent system, and sanitary fixtures. 4. Outdoor work Campus passages, and street lighting system. 5. Educational and office equipment Laboratory equipment, field work equipment, audiovisual equipment, vehicular equipment, and office equipment. 6. Furniture for teaching use	1. Building work Demolishment of existing buildings in the site. 2. Site preparation work Clearing and grubbing of existing trees, and site grading. 3. Outdoor work Landscaping and planting. 4. Installation and connection of infrastructural service Telephone lines. 5. Fixtures and furnishings Curtains, blinds, general furniture, and portable fire extinguishers. 6. Miscellaneous Charges for application for building permit, boring, surveying, formalities of customs clearance of goods for the project at ports and/or airports of disembarkation, and action to exempt these goods from taxes, import duties, etc. 7. Expenses required to properly and effectively maintain, control and operate all the facilities and equipment under the Grant Aid.

(7) Effect of the Project, and conclusion

The team has concluded that constructing the facility to accommodate the entire Faculty of Science including the two Departments of Biochemistry and Geology and providing/supplementing necessary equipment can cultivate such manpower as capable of responding to the country's social and economical needs, thereby contributing to the development of its national economy. Thus, extending Japan's cooperation to the country by providing the Project with a Grant Aid is considered as thoroughly adequate.

CONTENTS

CONTENTS

SECTION 1 INTRODUCTION

SECTION 1 INTRODUCTION

In order to augment the production capacities of agricultural and industrial fields which should lead the economical growth of the country, the Government of the Republic of Uganda lays emphasis on the necessity to evolve the education and training of these fields, and the development of expertise thereon.

Currently, however, the country's educational field suffers the shortages of necessary facilities and equipment and teaching staff. Although Makerere University, the only general university in the country, has produced a great outcome in scientific education, it faces the significant problems such as the deteriorating facilities, a shortage of accommodation capacity, lack of necessary laboratory equipment, and a shortage of teaching staff both in quality and quantity.

Given these conditions, in order to solve the existing problems, the Government of Uganda has planned to expand the Faculty of Sciences at Makerere University. A request for provision of a Grant Aid has been lodged with the Government of Japan. In response to the request from the Government of Uganda, the Government of Japan decided to conduct an investigation and draw up a basic design. A basic design study team headed by Dr. Kenji Konishi, Professor at the Faculty of Science of Kanazawa University, was sent to the country from July 16 to August 6, 1989, and subsequently another team was sent to the country from October 15 to 29, 1989, in order to provide explanation of the details of a draft basic design study report.

The study team confirmed the background of the request and purposes of the project. The team explained to the officials of the Government of the Republic of Uganda and Makerere University the basic framework of Japan's Grant Aid Program. The team also confirmed the scope of work to be undertaken by both governments. Additionally the team conducted an investigation into the adequacy of the construction site, the geographical conditions of its peripheral area, the status of education and the nature of the construction industry in the Republic of Uganda.

The actual discussion results during the site investigation were compiled in a minute book, followed by the signing thereof by both Japanese and Ugandan representatives.

In Japan, the study team analyzed and examined the results of the investigation. The study team evaluated the potential effect of this project on education in the Republic of Uganda and drew up a basic design of optimum scale and content.

This report has compiled a basic design of facilities and equipment for this project, a plan to carry out the project, evaluation of the project, proposals for the project, etc. based on the aforementioned investigation.

SECTION 2 BACKGROUND TO THE PROJECT

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2-1 Outline of the Republic of Uganda

Name of the country	The Republic of Uganda
Origin of the country's name	Originated from the Kingdom of Bunyoro, the oldest Kindgom born in the 14th century, and the Kingdom of Buganda which prospered in the 19th century.
Independence	From 1894 to 1962 the country was a protectorate of the U.K., but became independent on October 9, 1962.
Area	241,139 km^2, but, of this, 44,081 square kilometers is occupied by lakes and rivers.
Population	An estimated 15,474,000 as of 1985. Its annual, average increase is 3.2%.
Major cities other than Kampala	Jinja with approx. 45,000 as of 1980, Masaka with approx. 30,000, Mbale with approx. 28,000, and Mbarara with approx. 23,000.
Official language	Swahili and English.
Political change	1962 : Mutesa II assumed the presidency upon the country's independence. April 1966 : Obote assumed the presidency. Feb. 1971 : Amin assumed the presidency. April 1979 : Yusufu Rure assumed the presidency. June 1979 : Binaisa assumed the presidency. Dec. 1980 : Obote assumed the presidency again. Jan. 1986 : Museveni assumed the presidency to date.
Polities	The former political party was dissolved, and the National Resistance Council has since been ruling the country virtually as a military administration.
Sovereign	President Yoweri Museveni.
Religions	More than 60% of the people are Christians, approximately 5% are Islamites, and the remainder keep their traditional religions.

(To be continued)

Education	Infant education (by private sector) begins between the ages of 3 ~ 5, followed by elementary education for ages 6 ~ 13, 4-year secondary school education and 2-year high school education. Although the country imposes no compulsory education system, the government affords assistance to most schools. Other than these schools, there are many schools, but a shortage of teaching staff. The highest institution is Makerere University, known for cultivating many elite at the initial period of East Africa.
Broadcasting	The 1983 survey revealed that there were 320,000 radio sets and 81,000 television sets.
Currency	(U) shilling. Rate to 1 US dollar is USH200 as of September 1989, with 1 US dollar equal to ¥140.44, 1USH =¥0.702 (the average in April ~ September, 1988).
GDP	USH366,434 million. USH22.980 per capita. With the country's economic growth calculated in terms of valuta, it was 7.2% for 1987 ~ 1988.
Trade	1988 imports account for US$626.1 million, exports, US$272.9 million. 1989 exports to Japan, US$15.98 million, and imports from Japan, US$ 36 million.
Foreign currency reserves	US$57 million in 1984.
Foreign debts	Long-term debt as of 1985 was US$72.6 million, short-term debt, US$22 million, debt from IMF, 282 million, totalling US$1,030 million.
Airline	Entebbe International Airways, Sabena Airlines and Ethiopia Airline.
Relations with Japan	The Embassy of Kenya to Japan acts also as the Embassy of the Republic of Uganda. In 1973 the Embassy of the Republic of Uganda was established in Tokyo, but closed in the autumn of 1987. Two Japanese textile firms and one fishing net manufacturer, have advanced to the country.

The Republic of Uganda is a landlocked country located directly on the equator in East Africa, having boundaries with Kenya on the east, Tanzania and Rwanda on the south, Zaïre on the west, and the Sudan on the north. As its elevation is high, the country enjoys cool weather despite its equatorial location, with little change in the temperature throughout the year.

The country's main industry is agriculture, and agricultural production consistently occupies 64.2% of the GDP.

Since the outset of its independence, the country has characteristically been a monoculture relying on coffee and raw cotton. In recent years, coffee has become the main axis of agricultural production, making the share of coffee exports reach as much as 97% (in 1988) among the country's total exports.

Following the country's 1962 political independence from the colonial administration, the Government of the Republic of Uganda liquidated the remains of the colonial government economically and socially, and aimed at establishing the Ugandan economy and society by the Ugandan people (the Ugandanization policy).

Firstly, the government imposed legal limitations on the economic activities of foreign people by the Industrial License Law, the Commercial License Law, etc. In addition, the government positively pushed the enterprise participation campaign ahead by state-run bodies.

In 1970, 60% of the stocks of insurance companies, coach companies, petroleum companies, and other major enterprises (a total of 85 companies) was nationalized. In the financial industry, 60% of the stocks of foreign banking institutions was nationalized. Furthermore, with the aim of expediting the economic self-reliance by the Ugandans, the state-run Bank of Uganda was established.

The initial thrust of the Ugandanization policy was directed towards the Asian Ugandans such as Indians and Pakistanis.

Although it evolved historically that non-Ugandans were introduced to the country by the colonial government, they had long domiciled in the country, engaging in economic activities, and had put under their control most of Uganda's distribution structures. However, despite the enormous profits they gained, they refrained from obtaining citizenship, and sent the accumulated wealth to their own countries. As one might put it, they were not settled in the country, but rather existed as temporary dwellers. The opposing emotion of the Ugandans steadily increased, and finally in 1972, President Amin purged them from the country.

At the time, Asian merchants accounted for 80% of the retailing, 30 ~ 40% of the wholesalers, and monopolized most of the industries engaged in textiles, sugar, galvanized iron sheets, cement, and household electric appliances. It is not difficult

to imagine then the acute, adverse effects of the Ugandanization on the economy of the country.

In response to such a situation, the United Kingdom cancelled its economic assistance to the country, terminated the already promised loans, and also called back the majority of the experts who had been sent to the country to give technical assistance. In dealing with such actions, the Government of the Republic of Uganda took countermeasures to prohibit English economic activities by derequisitioning the English enterprises and farms.

However, as the government granted the leaving Asians to take out their assets with them, the enormous outflow of foreign currencies took place. Furthermore, foreign countries, apprehensive of the political instability, stopped private investments and overseas assistance in succession, consequently leading to a serious shortage of foreign currencies.

This was followed by four military coups and in the early 1980s, after a civil war, the economy of the country recovered marginally with the aid of financial assistance from the IMF and the World Bank plus the economic rehabilitation plan. Neverthless, due to the expanding civil war and the domestic inflation, the country's economic growth denoted a minus 5.3% in 1984, and a minus 5.4% in 1988.

Despite this, after the assumption of the presidency by the present President Yoweri Museveni in 1986, the country's economy began moving towards stability due to the recovery of agriculture and the operation of the manufacturing industry. Comparing the 1987 GDP with its previous year's GDP in terms of the 1966 price, it indicates a 7.7% growth, and comparing the 1988 GDP in a likewise manner, it indicates a high growth of 7.2%. (See ATTACHMENT 6)

However, the tendency of inflation continues. Attempts were made to restrain inflation by setting the official rate at high levels; 32% in June 1987, 38% in June 1988, and 48% in April 1989. Nevertheless, immediately after devaluation of the exchange rate to balance commodity prices and exchange rates as observed in July 1988 and April 1989, cost-push inflation was provoked, causing commodity prices to soar to 28.3% and 14.1%, respectively, resulting again in the creation of an inflational trend. (See ATTACHMENTS 7 and 8)

The country's trade balance in 1987 registered US$333.7 million in exports, US$634.5 million in imports, a total of US$300.8 million in the red, and in 1988, US$272.9 million in exports and US$626.1 million in imports, resulting in a deficit of US$353.2 million. (See ATTACHMENT 9)

The financial state of the government is shown by the financial revenue for 1987/88 which was USH18,320.7 million versus the expenditure of USH27,205 million, a balance of USH8,884.3 million in the red. Likewise, for 1988/89, the financial revenue was USH45,552.4 million versus the expenditure of USH58,350.7 million, a balance of USH15,798.3 million in the red. (See ATTACHMENT 10)

2-2 Present Status of Education

2-2-1 Educational Policy

In the 1959 Educational White Paper, the Government of the Republic of Uganda outlined planned development of the country's future educational policy as follows:

1) to improve the living standard of the people of all classes by providing many children with a certain level of education.

2) to cultivate fully educated men and women with a sense of responsibility.

3) to provide training to engineers, teachers and office workers of semi-professional class, and to cultivate artists and craftsmen.

4) to achieve a non-illiteral society.

Notwithstanding the above doctrine, the Amin administration expedited the policy of Ugandanization to exile the Asians and subsequently other foreign people, resulting in an extreme shortage of teaching staff. This situation was further aggravated due to the shortage of education related funds caused by the collapse of the economy, whereby the education facilities and the basis of education were disrupted.

Under the Museveni administration established in 1986, the national state is now relatively stable, but despite a policy to up-grade the educational curricula, the administration has the following problems:

① the deterioration of existing, educational facilities due to a long-term shortage of maintenance and management costs;

② an extreme shortage of teachers due to the Ugandanization policy;

③ a decrease in the morale and quality of teachers due to a reduction of their emoluments;

④ a shortage of facilities and necessary equipment due to the rupture thereof by a number of coups.

In order to cope with these problems, the Government of the Republic of Uganda announced "the Rehabilitation and Development Plan" in June 1988 through the Ministry of Planning and Economic Development, in which many, education related projects were proposed.

According to the Background to Budget 1989 ~ 1990 which was made public in July 1989 by the ministry, the government emphasized that the character and pace of social and economic development is determined by education, and that expanding educational opportunities is the key to the growth of the nation.

The government aims at establishing an educational system compatible with new, academic needs and the status quo as well as to improve the quality of education.

The government's basic, educational policy can be summarized by two points; 1. expansion of educational opportunities and 2. improvement of educational quality, as detailed below:

① Expansion of educational opportunities:

- to rehabilitate and expand the existing educational facilities of primary and secondary schools throughout the country.
- to rehabilitate and expand the existing teachers training facilities.
- to rehabilitate Makerere University and to promote the present Project.
- to newly construct Mbale University and Mbarara University.
- to propagate adult education with Makerere University as its core.
- to study for planning long-distance education centers with a focus on educational broadcasting.

The government carries out the abovementioned policies by national budget and with foreign aids:

② Improvement of educational quality:

- to provide training for teachers.
- to improve the curricula with the aim of improving primary and secondary school education and teachers training through expansion of the National Curriculum Development Center.
- to make textbooks by the National Curriculum Development Center.
- to produce and supply the educational equipment including educational, teaching aids and scientific and engineering equipment.
- to request foreign aid institutions to send teaching staff.

  a. to send professionals from UNDP to the Faculty of Veterinary Medicine, Makerere University.

  b. to send teachers from the Cuban Government to Mbarara University of Science and Engineering.

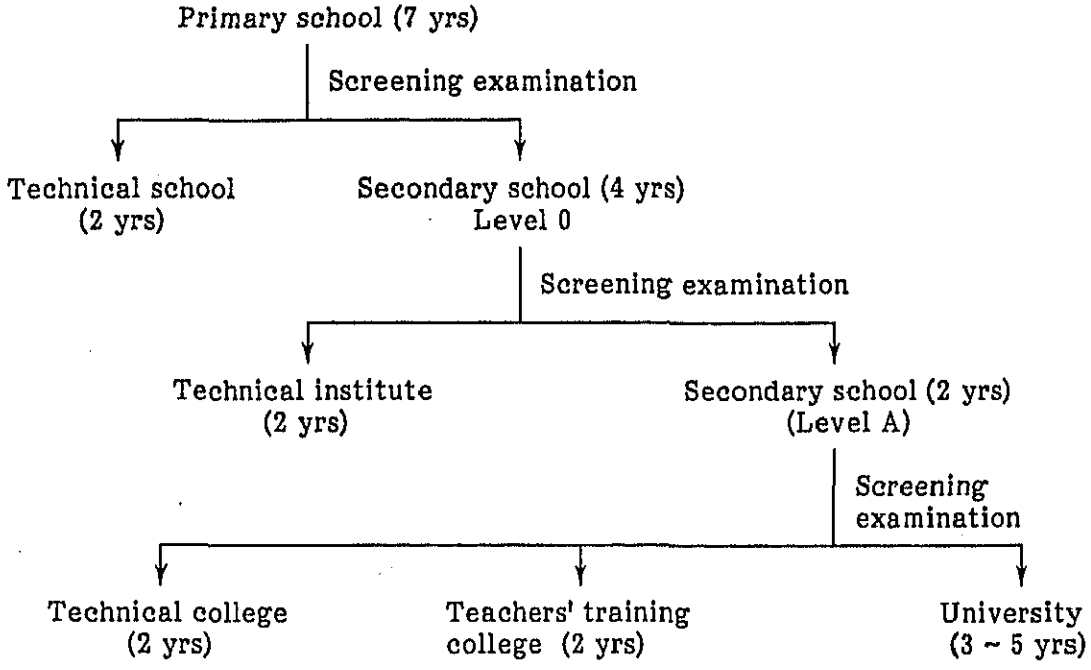
  c. to send teachers from the Government of Canada to technical schools.

The aforementioned policies have been carried out by the national budget of the country and foreign aids.

2-2-2 Present Status of Educational Field

(1) Educational system

- The Republic of Uganda's educational system is as shown below:



- The table below shows the educational system and estimated ratios of students entering higher schools.

Table 2-1 Educational system of the Republic of Uganda and rates for entering higher schools

	Age	Duration of school attendance (years)	No. of students (Note 2)	No. of students per school year	Ratio of students entering higher schools
Infant education	3 ~ 6				
Primary school	7 ~ 13	7	2,632,764	376,109	(Note 3)
Secondary school (Level 0)	14 ~ 17	4	250,696	62,674	16.6%
Technical school	14 ~ 17	2	3,621	1,810	0.5%
Secondary school (Level A)	18 ~ 19	2	25,080	12,540	20.0%
Technical institute	18 ~ 19	2	2,974	1,487	2.4%
University	20 ~	3 (Note 1)	(Note 4) 5,268	1,633	13%

Note 1 : The years required for graduation vary by departments, as follows:

Literature, physical science, social science, fine art, and education	3 years
Engineering and agriculture	4 years
Medical and veterinary science	5 years
Master's degree	2 years
Doctor's degree	4 ~ 5 years
Professor's office	1 year

Note 2 : The numbers of both primary and secondary school students requested from the Government of the Republic of Uganda. The number of students in university is limited to that of Makerere University.

Note 3 : Failure to pass examinations in primary schools was 15% in 1984, and the school dropout rate was 5%.

Note 4 : The number of students belonging to the faculties is 5,028, and that of students belonging to the graduate school is 240.

The National Examination Bureau conducts screening examinations at individual stages for entrance to higher-grade schools. In the case of Makerere University, there are a large number of students who have passed screening examinations but are held back from entrance due to the university's incapacity to accommodate those students.

Table 2-2 Numbers of eligible candidates and admitted students in Makerere University

Year	No. of eligible candidates	No. of admitted students	%
84/85	2,524	1,602	63.5
85/86	3,359	1,662	49.5
86/87	3,441	1,483	43.1
87/88	3,661	1,591	43.5
88/89	4,131	1,633	39.5

In the table above, the number of students admitted in 1988/89 to the university is only 39.5% of the number of eligible candidates. The remaining 60.5% are unable to receive university education despite their level of ability.

For this reason, the government has newly provided Mbale University (an Islamic university) and Mbarara University of Science and Technology.

(2) Contents of education

- The following subjects are studied at the Level 0 secondary school: Mathematics, science, religion, geology, history, English, literature, agriculture, and music.

- At the Level A secondary school, the students are divided into the two specialized departments of science and literature.

  The Department of Literature is divided into economics, English literature, history and religion while the Department of Science is divided into physics, biology and chemistry.

- Students not selected as eligible for entrance into a university are given the opportunity to enter a college or a professional school of technology or education.

  A technical college offers the technologies of electric or civil engineering and mechanical fields.

  A commercial school offers courses in accounting and management.

  In addition to the schools of the aforementioned kinds, there are colleges where the students learn agriculture, forestation, seedling culture, and surveying.

- Except for infant education, the educational expenses at all state-run schools ranging from primary school to university are borne by the government.

- All education is given in English, the common language of the country.

(3) Number and quality of teaching staff

- Number of teaching staff

The country is extremely short of teaching staff; a shortage of 7,300 teachers at ordinary secondary schools and 500 teachers at high schools throughout the country as shown in Table 2-3. The Rehabilitation and Development Plan which was announced in June 1988 aims to increase state-run education specialized colleges from the existing ten (in 1982) to twenty, so that 2,430 teaching staff can be educated every year.

Each of the following two Tables (2-3 and 2-4) shows the present state of shortages of teaching staff by educational institution/qualification and educational field/qualification.

Table 2-3 Shortage of teaching staff by educational institution/qualification

(As of January 1, 1988)

Educational institution	Requirements				
	Doctor and master	Bachelor	Teaching staff	Others	Total
Ordinary secondary school	1,801	4,442	349	709	7,301
High school education	435	31	0	35	501
Teacher education	154	492	12	87	745
Technical education	18	125	222	28	393
Vocational education	5	51	24	2	82
Commercial education	39	44	20	8	111
Professional education	44	47	13	0	104
Others	47	27	24	14	112
Total	2,543	5,259	664	883	9,349

Source: "Background to the Budget 1989 ~ 1990" issued by the Labor Force Planning Department, the Planning and Economical Development Ministry

Table 2-4 Shortage of teaching staff by educational field/qualification

(As of January 1, 1988)

Educational field	Requirements				Total
	Postgraduate or graduate school	Degree	Teaching staff	Others	
Agriculture	112	345	29	35	521
Medicine	110	55	11	36	212
Scientific and industrial technology	30	106	128	0	264
Basic science	904	1,689	89	273	2,955
Social science	401	938	141	106	1,586
Cultural sciences	593	1,492	72	313	2,470
Teaching staff education	91	210	8	41	350
Sciences of law	25	2	0	0	27
Art and music	62	196	7	29	294
Others	215	226	179	49	669
Total	2,543	5,259	664	882	9,348

Source: "Background to the Budget 1989 ~ 1990" issued by the Labor Force Planning Department, the Planning and Economical Development Ministry.

- Quality of teaching staff

"The Rehabilitation and Development Plan" announced in June 1988 indicates that 63,000 teaching staff are in employment with the primary schools throughout the country, of which 35% are untrained and 81% maintain low standards.

(4) Number of educational facilities

The country is also short of educational facilities. According to the Rehabilitation and Development Plan 1988/89 ~ 1991/92 which was announced in June 1988, the government has planned the extension and rehabilitation of educational facilities as follows:

Table 2-5 Number of educational facilities

(As of December 1985)

	Number of existing schools	Number of schools requiring construction	Number of schools requiring rehabilitation	Number of schools completely rehabilitated
Primary school	6,420 (Note 1)	700	-	
Secondary school Level 0	500 (Note 2)			
Secondary school Level A	170 (Note 3)	58	-	
Technical school	30	21	9	
Technical institute	24	-	-	4
Technical college	4	-	-	-
College for training of primary school teachers	67	-	47	-
College for national teaching staff	10 (Note 4)	10	-	-
University	2 (Note 5)	1 (Note 6)	1 (Note 7)	-

Note 1 : The request from the Government of the Republic of Uganda represents the existing 8,326 primary schools (as of October 1988).

Note 2 : 210 of the 500 secondary schools utilize parts of primary schools' facilities. The said request represents 512 secondary schools.

Note 3 : The Rehabilitation and Development Plan does not clarify the number of Level A secondary schools, but the 170 secondary schools are considered to be included in 500 secondary schools. The said request represents the number of 170 secondary schools.

Note 4 : This figure dates back to the year 1982.

Note 5 : Makerere University and Mbale (an Islamic) University.

Note 6 : Mbarara University of Science and Technology.

Note 7 : Makerere University.

(5) Number of postgraduates

The number of postgraduates from ordinary middle schools in 1987 were 32,670 throughout the country, 5,255 from teacher training schools, and 2,394 from higher-level schools.

2-2-3 Present Status of Makerere University

(1) History

The predecessor of Makerere University is Makerere College established as a technical institute in 1922. Later in 1939, from the necessity to improve the educational level in the whole East African, and, in response thereto, Makerere College was reorganized structurally to make it an international, educational institution; Makerere University as a general university.

With the advent of 1949, the high-level education of the university was recognized by London University in the U.K., and authorized to be a university with the capacity to grant academic degrees of London University. Since then, the students graduating from the university have been granted degrees.

In 1952, the adjoining countries of Kenya and Tanzania agreed to share the university's maintenance, management and operating costs with the Government of the Republic of Uganda.

Before the independence of Uganda, the Government of the U.K. was assisting Makerere University in the costs of colonial development and welfare.

In 1961, an extraordinary council was established between the aforementioned three countries of East Africa, and, in June 1963, Kenya Royal University of Kenya, Dar-es-Salaam University of Tanzania, and Makerere University of Uganda were united to transform into East African University on the basis of a long-term vision involving the three countries. Since the independence, however, friendly relations between this East African University and London University have toned down, and the close ties between the three countries have also lessened considerably. London University's degree granting system therefore no longer exists.

(2) Organization of university

The university bylaws stipulate that the president of the Republic of Uganda takes the office of the Chancellor of the university. The president appoints a Vice Chancellor, who virtually assumes the sole responsibility of operating and managing the university, and of academic aspect. In fulfilling the duties of

the Vice Chancellor, a Deputy Vice Chancellor who reports directly to the Vice Chancellor provides assistance.

The Educational Council of the University, as the supreme machinery of the university, is responsible for carrying out all operating and management activities of the university, including its budget matters.

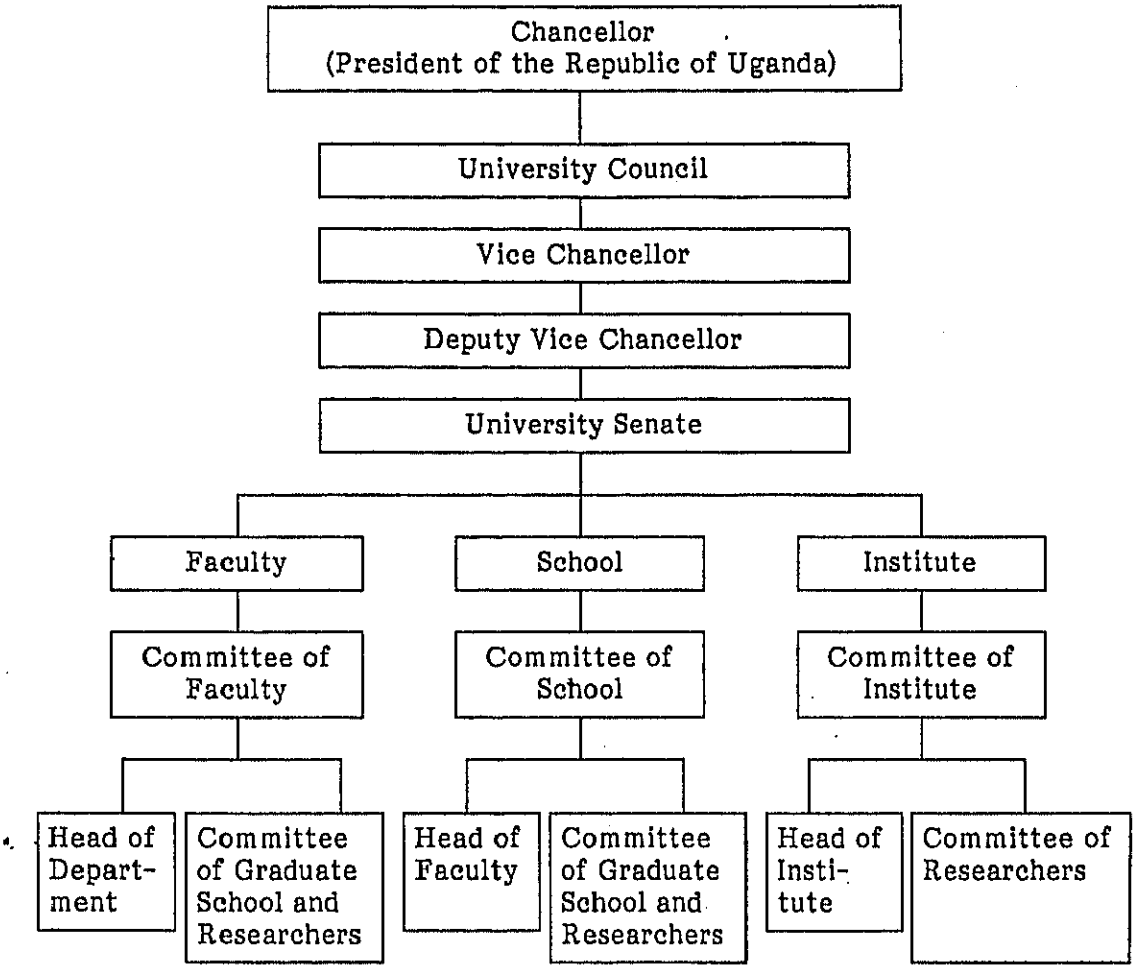
The University Senate is the supreme steering organization of the university in academic aspect. It not only administers the university's educational programs but also establishes university regulations. The details of education implemented by individual faculties and institutes need the approval of the University Senate. The Chief Director of the University Council is a managing member thereof and responsible for the transaction of administrative matters of the university. The accountant of the university is responsible for the financial aspect of the university.

Each of the faculties is composed of departments, each with the head of the department. The head of department operates his department through the Session of Faculty Deans, and any matters decided by the session need the approval of the University Senate. "The Committee of Researchers and Graduate School" of each faculty is responsible for the screening of students as to their entrance into the Graduate School. The students selected and recommended by each faculty as eligible for entrance into the Graduate School will be finalized by the University Senate.

The University Senate is also responsible for the training of graduate students of the whole university.

The chart below shows the organization of the university.

Fig. 2-2 Organization of Makerere University



(3) Budget to Makerere University

The following represents the budgetary schedule by ministry and expenditures.

Since 1989, Makerere University has been independent in national budget from the Ministry of Education, and therefore is a single budget sector.

Table 2-6 Expenditures by ministry

(In millions of USH)

Budgetary year / Ministry	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89
Ministry of Education	72.6	132.4	293.5	563.7	1,093.7	4,911.8	8,308.5
Makerere University	-	-	-	-	-	-	1,346.4

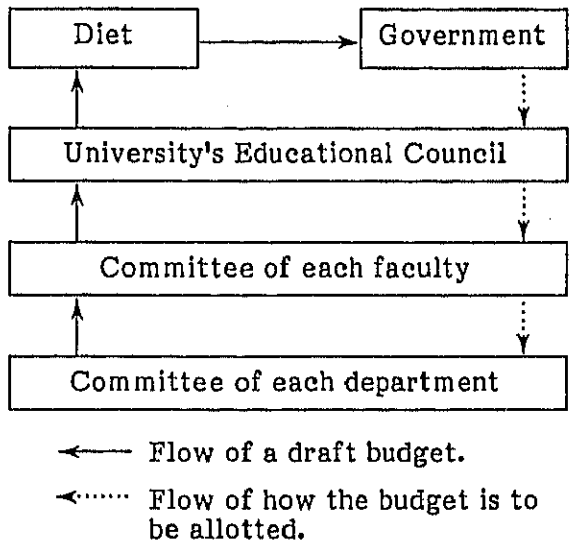
Note : The expenditures of Makerere University are included in the figures of the Ministry of Education.

Source: "Background to the Budget 1989 ~ 1990," issued by the Ministry of Education (see ATTACHMENTS as 12 and 13).

- Budget decision and operation flow of Makerere University

At Makerere University, the school personnel proposes the desired budget to the Committee of Department in November every year, the Committee of Department submits a draft budget to the Committee of Faculty after adjustment of the departmental budget, the Committee of Faculty passes the draft budget to the University Council after adjustments, and the University Council submits, apart from the Ministry of Education, the draft budget to the Diet after adjustments, the Diet resolves a national budget in June every year, and the government operates it to allot a budget to Makerere University. The chart at the right hand shows the budget decision and operation flow.

Fig. 2-3 Budget Decision and Operation flow of Makerere University



(4) Composition of individual faculties of Makerere University

Makerere University has the following faculties granting the qualifications shown:

① Faculty of Agriculture and Forestry

Departments : Agricultural Engineering, Animal Science, Agricultural Economics, Soil Science, Forestry, and University Farm.

Awards : B.Sc. (Agric.), B.Sc. (For), M.Sc. (Agric.), and Ph.D.

② Faculty of Arts

Departments : Literature, History, Language, Geography, Religious Studies and Philosophy, Music, Dance and Drama.

Awards : B.A., M.A., Ph.D., D.Lit., and Diploma in Music, Dance and Drama.

③ Faculty of Commerce

Departments : Finance, Banking and Accounting, Marketing and Management.

Awards : B. Com.

④ Faculty of Law

Departments : Commercial Law, Law and Jurisprudence, and Public and Comparative Law.

Awards : LLB. and LL.M.

⑤ Faculty of Medicine

Departments : Anesthetics, Anatomy, Biochemistry, Dentistry, Public Health, Medical Illustration, Microbiology, Obstetrics and Gynecology, Opthalmology Pediatrics, Pathology, Pharmocology, Physiology, Psychiatry, Surgery, Radiology, Orthopedics, E.N.T, and Regional Medical Teacher Training Center.

Awards : M.B.Ch.B., D.D.S., B.Sc. (Biochemistry or Anatomy or Physiology), M.Sc. (Clinical Biochemistry), M.Med., Ch.M., M.D., Ph.D., D.Sc., and Postgraduate Diplomas in Child Health, Tropical Pediatrics, and Obstetrics and Public Health.

⑥ Faculty of Science

Departments : Botany, Biochemistry, Chemistry, Geology, Mathematics, Physics, and Zoology.

Awards : B.S., M.Sa., Ph.D., and D.Sc.

⑦ Faculty of Social Sciences

Departments : Economics, Political Science and Public Administration, Sociology, and Social Work and Social Administration.

Awards : B.A., M.A., Ph.D., B.A., and Social Work and Social Administration.

⑧ Faculty of Technology

Departments : Civil Engineering, Electrical Engineering, Mechanical Engineering, Architecture, and Surveying.

Awards : B.Sc. (Eng.), M.Sc., Ph.D., D.Sc., and B.Ar.

⑨ Faculty of Veterinary Medicine

Departments : Veterinary Anatomy, Veterinary Physiological Science, Veterinary Pathology, Veterinary Parasitology and Microbiology, Veterinary Public Health and Preventive Medicine, Veterinary Medicine, and Veterinary Surgery and Reproduction.

Awards : B.V.M., M.Sc., Ph.D. and D.Sc.

⑩ School of Fine Art

Awards : B.A. (Fine Art) and M.A. (Fine Art).

11 School of Education

Departments : Educational Phychology, Adult and Higher Education, Curriculum Teaching and Media, Educational Foundations and Management, Science Technical Education, Social Science, Arts Education, Teacher Education and Extension.

Awards : Postgraduate Diploma in Education, B.A. (Ed.), B.Sc. (Ed.), M.Ed., M.A. (Psy), and Ph.D.

12 Institute of Statistics and Applied Economics

Awards : B.Sc. (Stat.), M.Sc. (Stat.), Ph.D., and Postgraduate Diploma in Statistics.

13 East African School of Librarianship

Awards : Certificate of Librarianship, Diploma in Librarianship, and Postgraduate Diploma in Librarianship.

14 Center for Continuing Education

Awards : Certificate in Adult Education.

15 Makerere Institute of Social Research

16 Institute of Environmental and Natural Resources

Awards : M.Sc. (Environmental Science).

17 Institute of Computer Science

Awards : Diploma in Computer Science

Library-related facilities include the Main Library, the Medical School Library, School of Education Library, Makerere Institute of Social Research Library, Center for Continuing Education Library, and other departmental libraries.

Makerere University has campus accommodation for students, and the majority of the male students are domiciled in nine buildings, and female students in two buildings. However, the buildings' facilities are considerably inadequate.

On campus, there are a Protestant church, a Roman Catholic Church, and a mosque for Mohammedans.

The university staff reside in the housing provided on or off campus by national subsidy.

(5) Present Status of Teaching Staff at Makerere University

In Makerere University, the shortage of teachers is a problem. The table below shows the full number of teachers, the number of incumbent teachers, and the number of vacancies, by faculty.

Table 2-7 Present status of teaching staff at Makerere University

(In persons)

	Full number of teachers					Incumbent teachers					Vacancies				
	P	AP	SL	L	To-tal	P	AP	SL	L	To-tal	P	AP	SL	L	To-tal
Faculty of Agriculture	9	8	15	27	59	6	7	11	21	45	3	1	4	6	14
Faculty of Arts	7	7	20	35	69	4	6	11	26	47	3	1	9	9	22
Faculty of Commerce	2	3	6	8	19	0	2	1	8	11	2	1	5	0	8
Faculty of Law	3	3	9	9	24	3	1	2	2	8	0	2	7	7	16
Faculty of Medicine	28	17	45	79	169	12	10	15	42	79	16	7	30	37	90
Faculty of Science	13	15	27	49	104	6	*12	20	33	71	7	4	7	16	34
Faculty of Social Science	6	7	16	28	57	3	6	12	14	35	3	1	4	14	22
Faculty of Engineering	10	9	18	34	71	0	4	8	15	27	10	5	10	19	44
Faculty of Veterinary Medicine	8	7	16	22	53	1	3	9	16	29	7	4	7	6	24
Faculty of Fine Arts	1	1	3	6	11	0	0	2	3	5	1	1	1	3	6
Faculty of Education	17	25	37	53	132	2	4	14	18	38	15	21	23	35	94
Institute of Statistics and Applied Economics	4	4	6	12	26	1	2	1	6	10	3	2	5	6	16
East Africa Librarian School	1	1	2	3	7	1	0	0	2	3	0	1	2	1	4
Correspondence Education Center	1	2	4	15	22	1	0	4	6	11	0	2	0	9	11
Institute of Computer Science	1	1	1	2	5	0	0	0	2	2	1	1	1	0	3
Total	111	110	225	382	828	40	57	110	214	421	71	54	115	168	408

P : professor
AP : associate professor
SL : senior lecturer
L : lecturer

※ One Indian assistant professor as a guest is included.

(6) Numbers of students and graduates, Makerere University

In the case of the number of students shown below by specialty in the year 1989 at Makerere University, the largest number of 975 students are enrolled with the Faculty of Social Science. The Faculty of Science ranks second with 740 students, and the Faculty of Education ranks third with 625 students.

From this tendency, it is evident that the government focuses on the country's prosperity by cultivating those who have majored in social science, science and education. Furthermore, Makerere University has the thought that in response to the policy of the government, it will set the ratio of future students at 60% for science departments and 40% for liberal arts departments.

Table 2-8 Numbers of students (all grades) and graduates by faculty, Makerere University

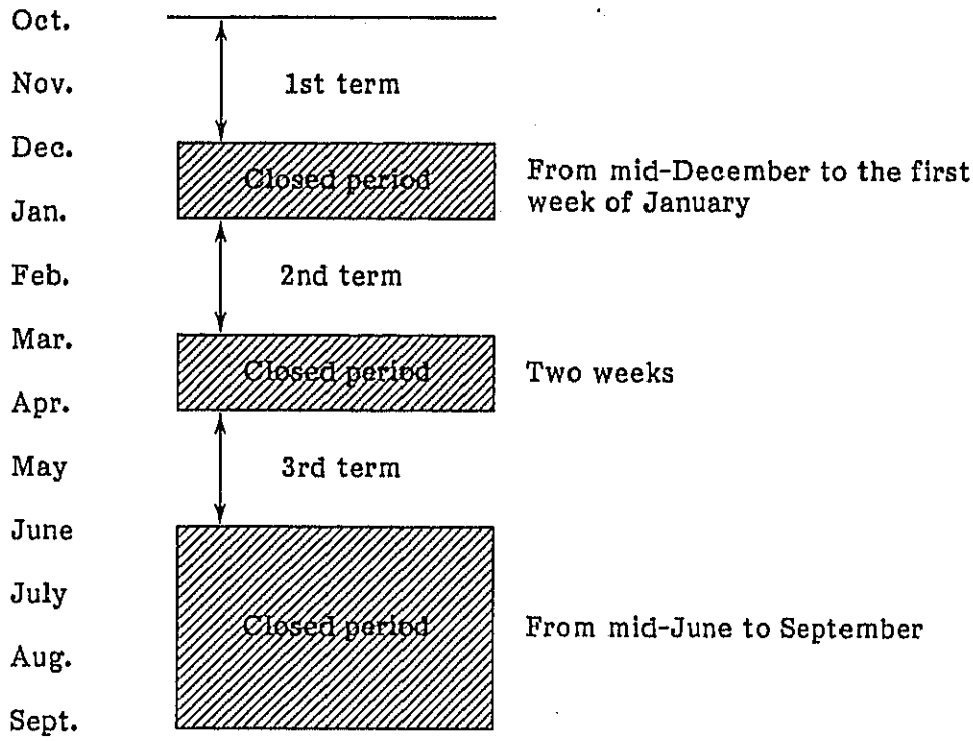
(1983 ~ 1987)

Faculty	Number of department students (all grades)						Number of post-graduates	Number of graduates				
	1983	1984	1985	1986	1987 (Note 1)	1988	1988	1983	1984	1985	1986	1987
Agriculture	294	306	259	373	378	373	-	72	98	87	86	105
Literature	-	-	-	-	-	514	22	-	-	-	-	-
Commerce	195	180	170	233	259	233	-	68	72	89	82	53
Law	193	189	158	205	197	205	-	83	84	62	58	52
Medicine	481	476	376	407	415	407	63	80	96	80	112	62
Science	689	758	617	740	727	740	40	175	172	186	203	205
Social Science	1050	1074	754	975	1046	975	6	273	400	359	269	364
Engineering	206	235	213	237	232	237	-	47	45	38	45	37
Veterinary Medicine	149	163	165	150	174	350	-	39	38	27	25	29
Arts	-	-	-	-	-	85	8	-	-	-	-	-
Education	699	612	496	625	610	625	79	245	255	175	194	178
Statistics	113	120	121	169	163	169	22	19	42	21	43	45
Library staff	-	-	-	-	-	60	-	-	-	-	-	-
Correspondence Education	-	-	-	-	-	55	-	-	-	-	-	-
Total	4069	4113	3329	4114	4201	5028	240	1101	1302	1124	1117	1130

Source : The Manpower Planning Department, the Ministry of Planning and Economic Development.
Note 1 : The number of students for 1989 was obtained from Prof. P. E. Mugambi, Dean of the Faculty of Science.
Note 2 : - denotes unidentified figures.

(7) Terms and closed days of Makerere University

Fig. 2-4 School years and closed periods at Makerere University



2-2-4 Present Status of Faculty of Science

1) Numbers of teaching staff and students in Faculty of Science

The table below shows the present status of the teaching staff enrolled in the Departments of Biochemistry and Geology:

Table 2-9 Present status of teaching staff at Departments of Biochemistry and Geology

(In persons)

	Full number					Incumbent number					Number of vacancies				
	P	AP	SL	L	Total	P	AP	SL	L	Total	P	AP	SL	L	Total
Department of Biochemistry	2	2	4	6	14	1	*3	4	1	9	1	0	0	5	6
Department of Geology	1	1	2	4	8	0	0	0	4	4	1	1	2	0	4
Total of the two departments, Faculty of Science	3	3	6	10	22	1	*3	4	5	13	2	1	2	5	10

P : professor
AP : associate professor
SL : senior lecturer
L : lecturer

※ One Indian assistant professor as a guest is included.

The table below shows the numbers of students at the Faculty of Science by department in the year 1989:

Table 2-10 Number of students in the Faculty of Science in the year 1989

(In persons)

Department	Freshman	Sophomore	Senior	Total
Biochemistry	15	15	15	45
Geology	20	20	20	60
Botany	40	40	40	120
Chemistry	80	60	60	200
Mathematics	120	50	50	220
Physics	40	20	20	80
Zoology	30	30	30	90
Total	345	235	235	815

Ratio of male to female students: 77.4% to 20.6%.

2) Contents of education covered by the Departments of Biochemistry and Geology

The both departments place emphasis on practical education.

(1) Education by Department of Biochemistry

- Contents of Biochemistry Lectures

Table 2-11 Contents of lectures at Department of Biochemistry

Freshman	The freshman does the general cultural course, and therefore receives no biochemical lecture.
Sophomore	1. History and outline of biochemistry. 2. Structural biochemistry. 3. Physical chemistry of biochemistry. 4. Cytobiochemistry (cellular structure). 5. Metabolism. 6. Bio-thermodynamics and energetics. 7. Enzymology. 8. Molecular genetics. 9. Histobiochemistry. 10. Theory of nutrition. 11. Technical method for biochemical research. 12. An introduction to immunology. 13. Microbiochemistry. 14. Organism control. 15. Comparison biochemistry.
Senior	1. Special theory of botany (composition of light). 2. Structural theory of composite organism high molecule. 3. Organism metabolism. 4. Organism energetics. 5. Organism membrane and conveyance. 6. Molecular enzyme chemistry. 7. Molecular genetics. 8. Molecular immunology. 9. Theory of incretion. 10. Metabolic control. 11. Theory of organism evolution.

(2) Education by Department of Geology

- Contents of Geological Lectures

Table 2-12 Contents of geological lectures

Freshman	1. General geology. 2. Mineralogy and crystal theory. 3. Lithology. 4. Paleontology. 5. Regional earth science.
Sophomore	1. Optical mineralogy. 2. Structural geology. 3. Field geology and research. 4. Geophysics. 5. Earth science. 6. Sedimentary science. 7. Topography. 8. Photogeology and remote sensing. 9. Stratigraphy. 10. Hydrogeology.
Senior	1. Pyrogenetic and metamorphic lithology. 2. Economic geology. 3. Mineral geology. 4. Civil engineering and environmental geology. 5. Regional geology.

- Field work

Field work is conducted mainly at the following areas:

Table 2-13 Contents of field work by Department of Geology

Area	Objective	Period
a. Kampala and its vicinity	An introduction.	1 day
b. Mitayana area	Rock investigation	1 day
c. West area of Uganda	Investigation of Lift Valley	7 days
d. East area of Uganda	Investigation of carbonite, and visit to a chemical fertilizer plant and a cement plant	5 days
e. West area of Uganda	Preparation of geological maps	2 weeks
f. Monbasa (Kenya)	Investigation of crushed rock pieces	2 weeks

3) Numbers of graduates from the Departments of Biochemistry and Geology

(1) Number of graduates from the Department of Biochemistry

School year	No. of graduates
1970	23
1972	32
1987	13
1988	7
1989	6

(2) Number of graduates from the Department of Geology

School year	No. of graduates
1986	18
1987	14
1988	9

The evolution of the numbers of graduates shown above is indicative of a declining tendency.

4) Courses for the students who have mastered biochemistry or geology

The courses taken by the students who have mastered biochemistry or geology are as follows:

(1) Biochemistry

The students who study biochemistry are extensively spread, needless to say, from the Department of Biochemistry, the Faculty of Science, to the Faculties of Medicine, Veterinary Medicine, Agriculture, and the Departments of Zoology, Botany, and Chemistry, the Faculty of Science.

They are roughly as shown below according to Mr. Bimenya G.S., assistant head of the Department of Biochemistry:

- Medical industry
- Pharmaceutical industry
- Agricultural industry
- Animal industry
- Food industry
- Brewing industry
- Drinking water manufacturing industry
- Education industry

(2) Geology

The students who study geology are broadly spread, needless to say, from the Department of Geology, the Faculty of Science, to the Department of Civil Engineering, the Faculty of Technology, the Department of Geography, the Faculty of Arts, and the Department of Agriculture, the Faculty of Agriculture and Forestry. At the present, however, the shortage of teachers has caused lectures to the students of the Department of Agriculture, the Faculty of Agriculture and Forestry to be suspended.

According to Mr. C.J.R. Migisha, assistant head of the Department of Geology, the future courses of these students are as outlined below:

- Secondary school teachers (40%).
- The Department of Geological Survey and Mines, the Government of the Republic of Uganda (20%).
- The Department of Water Development, the Government of the Republic of Uganda (10%).
- Mining industry, cement industry, brick manufacturing industry, and other various sectors (30%).

5) Present status of existing facilities relating to the project

Subsequent paragraphs represent the planar views of the Office of the Dean, the facilities of the Departments of Biochemistry and Geology, and how they have used the large lecture theater of the Department of Chemistry.

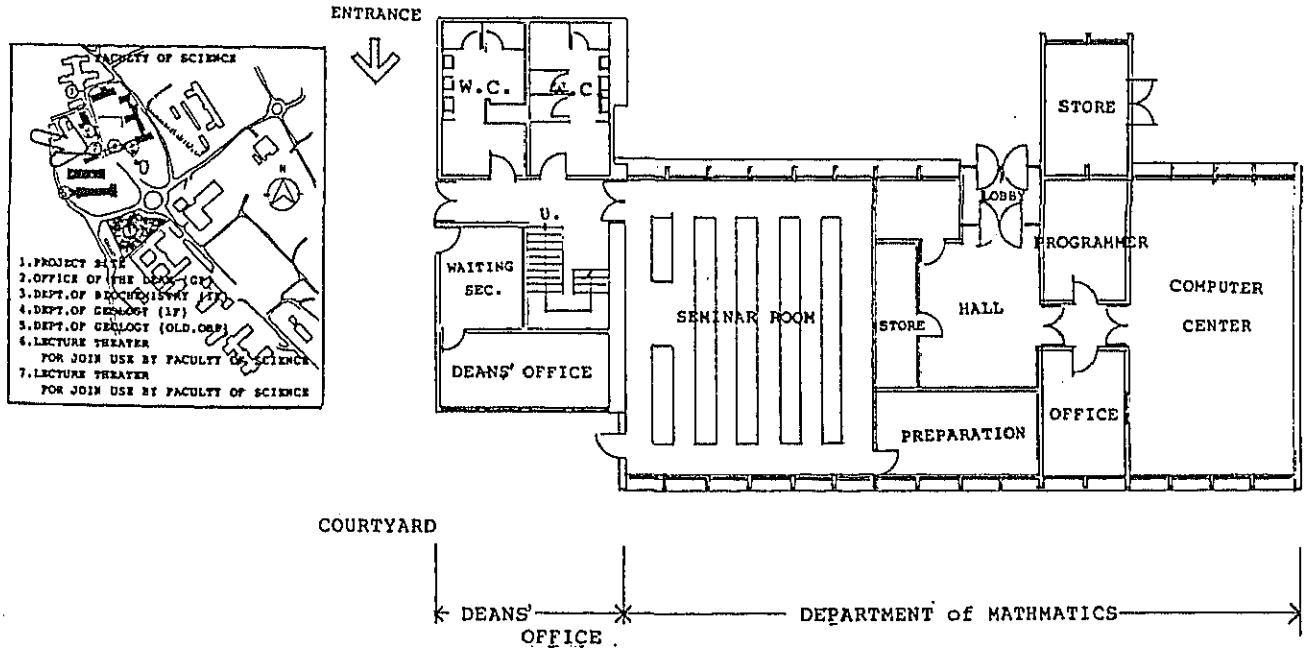
① Present status of the Dean's Office

The Dean's Office is located near the ground floor entrance of the Department of Mathematics' building. It consists of a 19.5m^2 Dean's Office and a 14m^2 room which is used both as a secretary's office and a waiting room.

② Present status of Institute of Computer Science

The Institute of Computer Science is provided on the western side of the ground floor of the Department of Mathematics' building. Its area is 201.5m^2. The floor of the computer practice room is constructed of plywood, and heaves up and down with human traffic as if it may fall out. This floor is loaded with long tables and seven personal computers mounted thereon.

Fig. 2-5 Existing planar view of Dean's Office and Institute of Computer Science



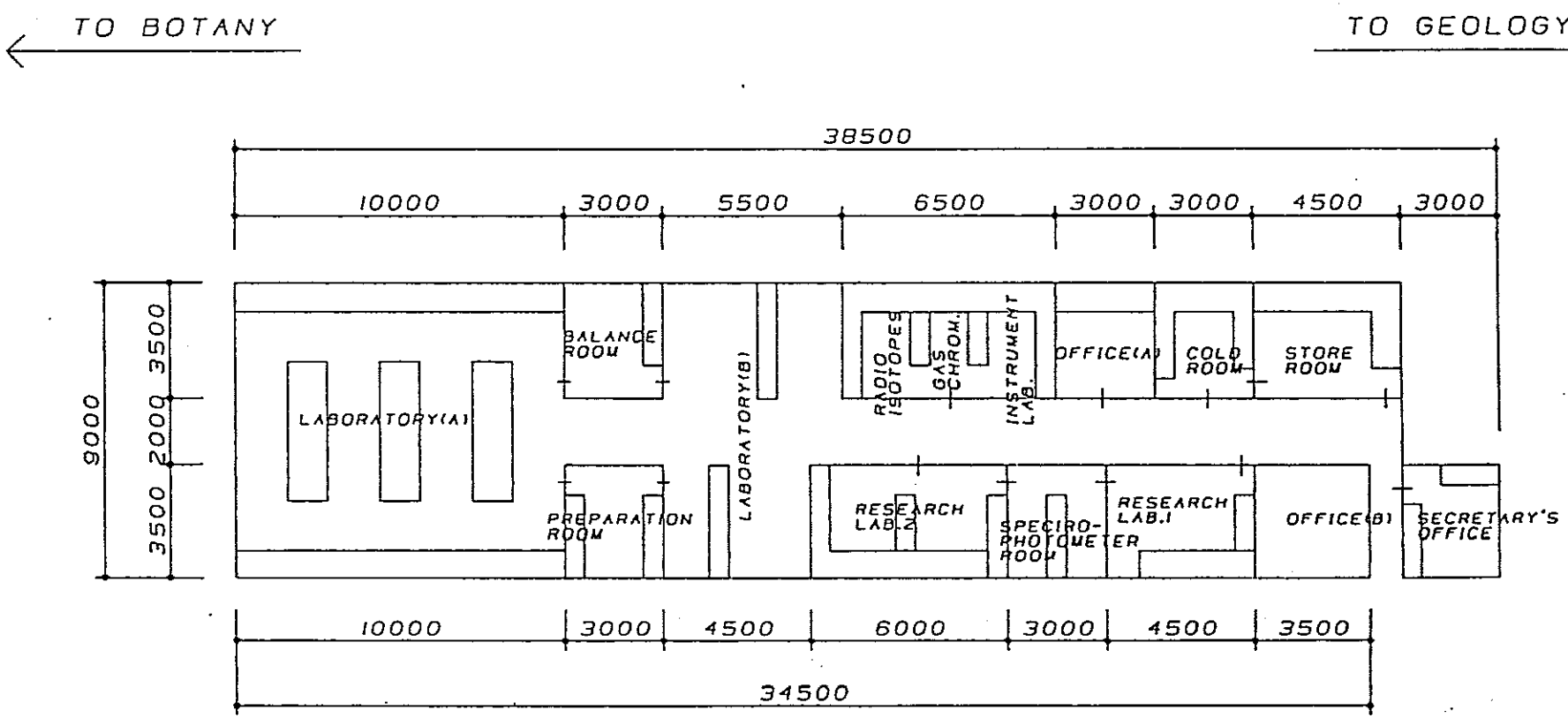
③ Present status of Department of Biochemistry's existing facilities

The Department of Biochemistry borrows the first floor of the Department of Botany's building. The laboratory of the Department of Biochemistry borrows one of the two rooms divided simply with a blackboard and is used jointly with the Department of Botany.

The receptacles mounted to the laboratory tables and walls of every room were mostly stolen during the past insurrection, hence all the laboratory equipment is connected directly to the bare conductors protruding from the vacated receptacles holes. Broken windows remain unrepaired and the building walls where rainwater leaks are extremely musty and damaged. The entrance leading by stairs to the Department of Biochemistry's room, and another entrance leading to the laboratory which is jointly used by the Department of Biochemistry and Botany, are provided with an iron-barred door. Lectures are delivered in the large lecture theater of the Department of Chemistry.

Table 2-14 Room areas

Teaching laboratory (A)	90 m^2
Teaching laboratory (B)	44 m^2
Research laboratory 1	15.75m^2
Research laboratory 2	21 m^2
Instrument laboratory	10.5 m^2
Preparation room	10.5 m^2
Radioisotope and gas laboratory	22.75m^2
Office (A)	10.5 m^2
Office (B)	12.25m^2
Store room	15.75m^2
Secretary's office	10.5 m^2
Total	263.5 m^2



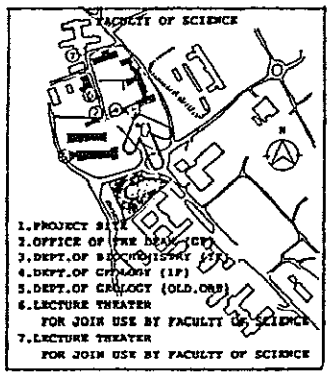


Fig. 2-6 Existing planar view of the Department of Biochemistry

④ Present status of Department of Geology's existing facilities

The Department of Geology is located both on the first floor of the Department of Mathematics' building and in the one-storied building constructed in 1930. Compared with the Department of Biochemistry, this department's areas were less damaged by the insurrection. The store rooms and a specimen room accommodating educational and research equipment and mineral samples are small. There is also a lack of shelves in these rooms, interfering with pigeonholing documents, books and specimens.

The tables below show the room floor areas of the Department of Geology:

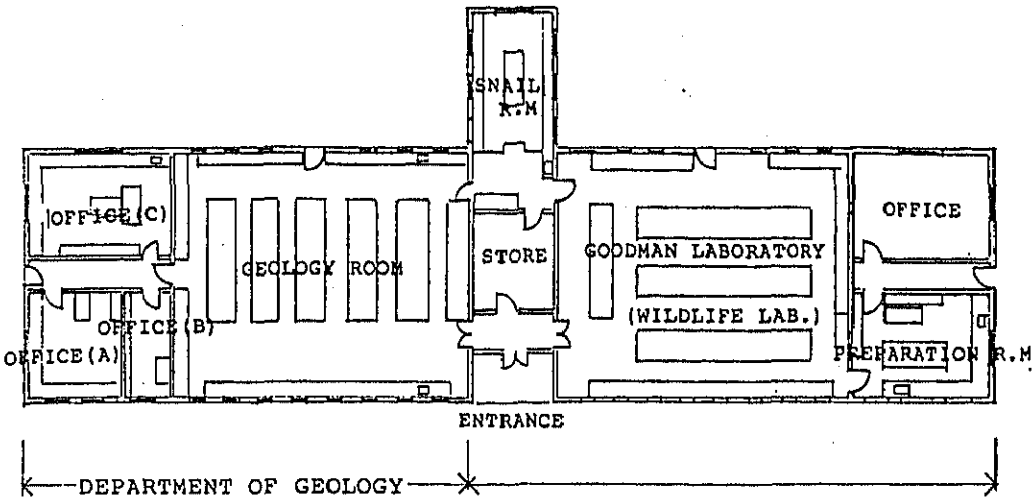
Table 2-15 Floor areas (1F) of Department of Mathematics

Head's office	18 m^2
Secretary's office	12 m^2
Library, graphic laboratory	24 m^2
Darkroom	3 m^2
Workshop	5 m^2
Staff office (A)	17.5 m^2
Staff office (B)	17.5 m^2
Postgraduate research laboratory	30 m^2
X-ray diffraction room	18 m^2
Teaching laboratory II	57 m^2
Specimen room	47 m^2
Geochemical laboratory	18 m^2
Geochemical laboratory	6 m^2
① Subtotal	273 m^2

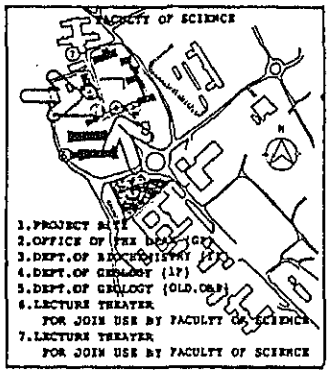
Table 2-16 Department of Geology's building constructed in 1930

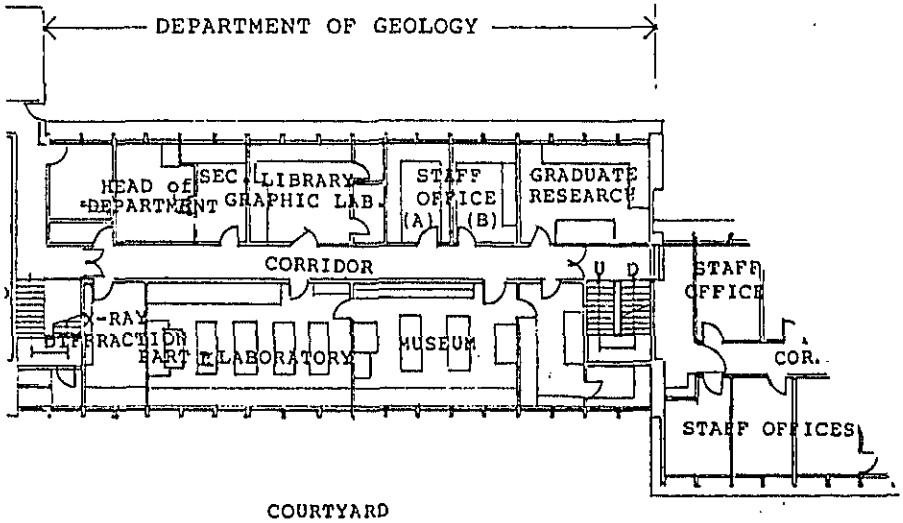
Geology room	158.7 m^2
Office (A)	22.5 m^2
Office (B)	11 m^2
Office (C)	33.5 m^2
Store room (A)	27.5 m^2
Store room (B)	27.5 m^2
② Subtotal	280.7 m^2
Total ① + ②	553.7 m^2

Fig. 2-7 Existing planar view of Geology Department



GEOLOGY DEPARTMENT GROUND FLOOR





COURTYARD

⑥ Present status of the large lecture theater of Department of Chemistry

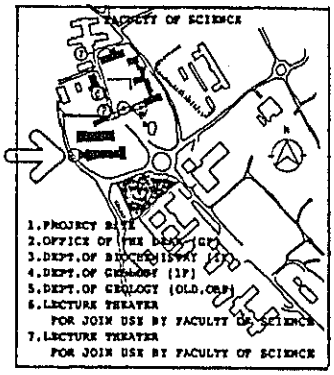
The large lecture theater currently used extensively by the Faculty of Science has the floor area of 228m^2 capable of accommodating a maximum of 170 students. The ceiling of the lecture theater leaks severely and the rear wall of the room has been terribly damaged.

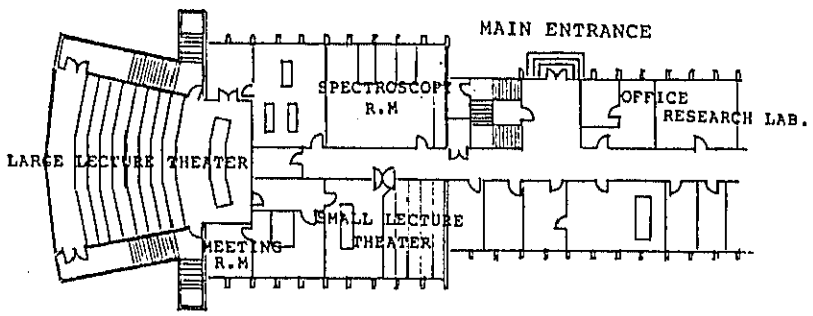
The lecture theater is occupied for 29 hours of the weekly 45 hours, frequently used at a rate of 65% and fully serving the teaching schedule. Also, as other faculties use it, all faculties and departments experience difficulty in ensuring use of the lecture theater especially during examination periods, thus giving rise to a serious problem.

The Department of Biochemistry uses the lecture theater seven times a week.

The figure below shows the planar view of the lecture theater.

Fig. 2-8 Existing planar view of the lecture theater





CHEMISTRY DEPARTMENT GROUND FLOOR

⑥ Existing laboratory equipment

The laboratory equipment currently owned by these two departments is of poor quality and in a deteriorated condition.

For example, the equipment owned by the Department of Biochemistry includes extremely basic equipment such as a centrifugal separator, chemical balance, calorimeter, spectrophotometer, and hot-water bath, which were all acquired at least ten years ago. This is a longer period than the equipment expected to last.

In addition, due to the poor maintenance system caused by the shortage of funds for repairs, and the absence of technicians or engineers, possibly repairable, mechanical troubles have not been dealt with, and the equipment remains unrepaired, and left unused.

The Department of Geology similarly has extremely basic equipment such as a polarizing microscope, diamond cutter and slice making machine which are the only items worthy of appraisal. There is no equipment available for field work, one of the important curricula for this department. An outdated X-ray diffraction unit is provided, but has been left unused due to the failure of its pump.

These conditions are the critical factors to cripple the students' laboratory work in these two departments, and basic educational activities such as field work in the Department of Geology.

2-2-5 Present Status of Education Related Institutions

In addition to the traditional Makerere University as a general university, the Republic of Uganda has Mbale (Islamic) University which was newly built in January 1988, and Mbarara University of Science and Technology which was opened in October 1989.

Mbale University has undergone the first phase of its construction project. It accommodates two Departments of Education and Islamics, and will be added with two more departments; Medicine and Social Science in the future. The university project has been implemented with finance from the Organization of Islamic Conference. The core facility of the university is the renovated building of Nkoma Secondary School. The Phase II project includes the renovation of an existing building for use as part of the faculties and plans the construction of a new building.

In Mbarara University, thirteen Faculties of Food Technology, Applied Science, Architecture, Design, Land Survey, Ecology, Environmental Science, Transportation/Traffic, Information Systems, Leather Engineering, Textiles, Chemistry, and Mining Technology, are envisaged.

Furthermore, a project to provide a new medical school as an annex to Mbarara University is in existence. The new medical school with the Faculty of Medicine has commenced education with 50 students. It will be provided with the Faculties of Medicine, Education and Applied Science. the Faculty of Medicine will be provided with the Departments of Grouth Anatomy, Micro Anatomy, Psychology, Biochemistry, and Veterinary Medicine.

Neither Mbale University nor Mbarara University has any direct relationship with our project to expand the Faculty of Science. However, the two universities will lighten the burdens of university education which have formerly been shouldered only by Makerere, and at the same time, be capable to a certain degree of accommodating the eligible candidates unable to be accommodated by the latter due to incapacity.

2-3 Present Status of International Cooperation to Educational Field

International cooperation to the education field has been conducted by UNESCO, IDA, ADB, UNDP, USAID, EEC, OIC, West Germany and Italy. In the future, Norway, Cuba and Canada are to extend cooperation. The details of such international activities are as follows.

(1) International cooperation to Makerere University

① UNDP

a. Technical advice for the rehabilitation of the Faculties of Veterinary Medicine, Technology, and Science.

b. Despatch of professionals to Makerere University to assist in the training program of the Faculty of Veterinary Medicine.

② WHO

Assistance to the Faculties of Medicine and Social Science.

③ EEC

a. Rehabilitation of the facilities of the Faculties of Science, Education and Medicine.

The rehabilitation of the facilities of the Faculty of Science includes the renovation of roofs, repainting of wall surfaces, electricity, gas, water and telephone services of the buildings of the Departments of Botany, Zoology, Mathematics and Chemistry. Provision of educational equipment is not included.

The Department of Mathematics' building accommodates the Institute of Computer Science, which is the subject of rehabilitation by EEC. This EEC's project is independent of the proposed Project for the Extension of the Facilities of the Departments of Biochemistry and Geology, and therefore the proposed project does not duplicate EEC's project.

b. Training of teachers.

④ USAID

a. Rehabilitation of the facilities of the Faculty of Agriculture.

b. Training of teachers.

⑤ Government of the Federal Republic of Germany

Technical assistance to the university by sending professionals to the Faculty of Veterinary Medicine, and granting four motorcars, through a GTZ organization.

⑥ Government of the Republic of Italy

Rehabilitation of the workshop of the Faculty of Technology, provision of books and special equipment, and rehabilitation of two staff quarters. Commencing the rehabilitation of the university's hospital.

⑦ Government of the Kingdom of Norway

The Government of the Kingdom of Norway is to rehabilitate the university's Graduate School Hall.

⑧ Rockefeller Foundation

Training of teachers for the university's Faculties of Medicine and Social Science.

⑨ Ford Foundation

Training of teachers for the university's Medicine Faculty and Social Science Facultys.

(2) International cooperations to general educational field

① UNESCO

- In 1983, UNESCO released a report "Education: Recovery and Reconstruction".

- In the aforementioned report, UNESCO concluded that it would be necessary to increase the number of teachers engaged in secondary education from approx. 4,000 in 1982 to approx. 5,700 in 1985.

- Cooperation commenced from 1968 to the basic education through local development and integration.

② IDA (International Development Association)

- The Government of the Republic of Uganda requested assistance from IDA for the new construction of primary schools and improvements to existing school buildings, so that the country's primary education can be raised to the world level by 2000.

- IDA has decided to pilot the proposal under the IDA 4th Education Project in the near future, and supplement the deficiency of the country's budget for the proposal.

- IDA has decided to give instructions on the improvement of a Primary School Teacher Training College under IDA's 4th Education Project.

- IDA also assists the Republic of Uganda in financing for the teaching materials to be furnished to 3,400 primary schools of the country based on IDA's 4th Education Project.

③ AfDB (African Development Bank)

- Technical assistance to strengthen the Planning Department of the Ministry of Education.

- A grant aid to the consultant service in the construction of Uganda Polytechnic College's large lecture theaters, auditorium, and staff quarters.

④ UNDP

- Rehabilitation of the Institute of Public Admistration through a joint project of EEC and World Bank.

- Rehabilitation of the Government Employees Training Center.

⑤ EEC

- Rehabilitation of the Institute of Public Admistration through a joint project of UNDP and World Bank.

- Rehabilitation of secondary schools.

⑥ OIC (Organization of Islamic Conference)

- Provision of Islamic University's establishing fund.

⑦ Government of the Republic of Cuba

- Promised to send teachers and research equipment to Mbarara University of Science and Technology.

⑧ Government of Canada

- The Government of Canada is concerned about the provision of technical assistance by granting printing machines and materials.

2-4 History and Contents of Uganda's Request

2-4-1 History

According to the "Background to the Budget 1989 ~ 1990" announced in July 1989, the Government of Uganda places emphasis the necessity to augment the productive capacities of agriculture and industries which are destined to pioneer the growth of the country's economy, thereby developing the essential expertises on education, training and technology.

The biochemistry and geology covered by the Request are the basic subjects dealing with the basic studies required for the development of the country's agricultural and industrial technologies. Namely, biochemistry is applicable to the development of agriculture which is represented by the home-production of raw material for beer, the development and manufacture of pharmaceuticals, and the development of medical technology, while geology can be applied to the development of mineral resources including petroleum, and the development of technologies on the related industries.

The country lacks educational facilities, equipment and teaching staff. University education relating to physical science such as biochemistry and geology is also in similar state.

Although Mbale (Islamic) University and Mbarara University of Science and Technology have been newly provided with the aim of expanding educational facilities, Mbale University has no Faculty of Science as well as Mbarara University of Science and Technology has been inaugurated with the Department of Medicine alone. Consequently, the responsibility of Makerere University, the only general university of the country, is weighty in terms of manpower cultivation, and therefore the Government of Uganda wishes to increase the manpower capacity of Makerere University's Faculty of Science, thereby producing still more scientific engineers from the faculty.

However, it is impossible for the faculty to augment its present capacity with the scale of the existing facilities. To cope with this problem, the Government of Uganda has drafted a plan for constructing new buildings to accommodate the Departments of Biochemistry and Geology, which are important as part of the national policy and now borrow the buildings of the Departments of Botany and

Mathematics, as well as the Faculty Office of Administrators, thereby expanding the facilities to augment the manpower capacity of the whole faculty including the Departments of Biochemistry and Geology. In planning for manpower augmentation, the capacity shortage of the existing large and medium lecture theaters will surface as a question. Therefore, the Government of Uganda has also included in its Request a plan for the construction of new, large and medium lecture theaters with the capacities greater than those of the existing ones as well as for providing new pieces of equipment required by the Departments of Biochemistry and Geology to supplement their deteriorating or malfunctional or otherwise useless equipment.

2-4-2 Contents of the Request

The request from the Government of Uganda is for buildings and equipment. The buildings are for use by the Office of Faculty Administrators, the Biochemistry Department, the Geology Department, lecture theaters, and Institute of Computer Science, while the equipment includes various physicochemical equipment and office equipment. The following lists the contents of the request.

A. Building Facilities

1. Department of Blochemistry

(1)	150-person teaching laboratory	
(2)	Preparation room annexed to teaching laboratory	1
(3)	Wash room	1
(4)	Stores room	2
(5)	Research laboratories	
	a. Clinic (metabolic) laboratory	1
	b. Insect biochemistry	1
	c. Radioisotope laboratory	1
	d. General biochemistry laboratory	1
(6)	Head's of Department office (annexed to secretary's office)	
(7)	Academic staff office	15
(8)	Chief technician's office	2
(9)	Supporting staff room	1
(10)	Small animals' room	1
(11)	Seminar room	1

(12)	Departmental library (collection room)	1
(13)	Graduate Students room	1
(14)	Strong room	1

2. Department of Geology

(1)	Teaching laboratory	2	
(2)	Rock specimen laboratory		
(3)	Maps laboratory	1	
(4)	Stores	3	
(5)	Preparation room	1	
(6)	Department library (collection room)	1	
(7)	Darkroom	1	
(8)	Rock polishing room	1	
(9)	Mineral dressing room		
(10)	Research laboratory		3
(11)	Head's of Department office (annexed to secretary's office)		
(12)	Academic staff offices		10
(13)	Chief technician's office		1
(14)	Supporting staff room		1
(15)	Seminar room		1
(16)	Geochemical laboratory		

3. Faculty Administration Office

(1)	Office of the Dean	1
(2)	Office of the Faculty administrators	2
(3)	Stores	2
(4)	Dean's Secretary's office	1
(5)	Stenographer & typists office (requiring space for 3 desks)	
(6)	Student records room	1
(7)	Duplicating/photocopying room (Reproduction room)	1
(8)	Custodians room	1
(9)	Small tea room	1
(10)	Conference or Meeting room	1

4. 600-person lecture theater 1

5. 200-person lecture theater 1

6. Institute of Computer Science

(1) Mini computer room
(2) 50-person laboratory
(3) Work rooms (coding rooms) 2
(4) Directors' office
(5) Staff offices 8
(6) Stores 2
(7) Strong room (vault)
(8) Seminar room 2

B. Outdoor facilities

1. Pavement

2. Entrance Garden

C. Furniture and equipment

1. Department of Biochimistry

(1) All necessary furniture for offices and laboratories
(2) Typewriters
a. Manual typewriter b. Micro 1
c. Filing cabinet 6 d. Electric fans (16 units)
(3) Teaching equipment
a. Calorimeters, b. Spectrophoto meter
c. Fluorimeters
d. Electrophoretic equipment
e. Centrifuges (Bench model)
f. Vacuum pumps g. Microscopes
h. High speed centrifuges
i. Rat/Mice cages

(4) Research equipment

a. Scientitation counters 2

b. Ultracentrifuges

c. Tissue culture equipment

d. Spectrophotometers

e. Gas Liquid Chromatograph 1

f. HPLC Chromatograph g. Auto analyzer 2

h. Bimolecular microscope

i. Density gradient former

j. Word processor k. Refrigerators (4 units)

l. Deep freezers 2

m. NMR

n. Electrophoretic equipment

2. Department of Geology

(1) X-ray fluorescent machine

(2) Electron microscope

(3) Scanning electron microscope

(4) Automatic heating and freezing stage for fluid inclusion studies

(5) Research microscope with built-in camera

(6) Electrical typewriter

(7) Word processor

(8) Vicer's hardness determination equipment

(9) Ore reflectioning microscope 10

(10) Reflectance measurement equipment

(11) Electric balance (12) Rock grinder

(13) Automatic polished and thin section-making machine

4. Faculty Administration Office

(1) Office furniture (2) Photocopler (2 units)

(3) Dupicating machine (1 unit)

(4) Word processor (micro)

(5) Typewriter: a. electric-type (1 unit) and

b. manual-type (2 units)

(6) Filing cabinet

4 & 5 Lecture Rooms

(1) All the necessary furniture for functional lecture theaters
(2) 16mm film projector (2 units)

6. Institute of Computer Science

(1) Mini computer and accessories
(2) Furniture

SECTION 3 CONTENTS OF THE PROJECT

SECTION 3 CONTENTS OF THE PROJECT

3-1 Objective of the Project

The objective of the Project is to improve the quality of educational and research activities by the Biochemistry and Geology Departments, the Faculty of Science, Makerere University by expanding these facilities in order to enable a larger number of students to enter the Faculty of Science, including the two departments which will be relocated into the Project facility, as a whole.

The Project has been created not only to develop expertise in scientific technology required for the advancement of the country, but also to improve the facilities and educational equipment owned by educational institutions, especially by Makerere University, which have greatly deteriorated, therefore needing repairs and service. Furthermore, building expansion has become essential in order to increase the capacity to accept more students.

3-2 Review of Contents of the Request

3-2-1 Position of Makerere University

Makerere University is the only general university in the country. Despite increasing numbers of young men wanting to enter the university, its limited capacity has only allowed the entry of 40% of the eligible candidates. The government has endeavored to reduce the burden of the university and, at the same time, has inaugurated Mbale University and Mbarara University of Science and Technology in order to increase the number of candidates the university can accept. However, the both now universities are still small in scale, and therefore the role of Makerere University as a higher education organ has grown to be more important.

3-2-2 Positions of Biochemistry and Geology Departments in Makerere University

1) Position of Office of Faculty of Science Administrators

The Office of Faculty of Science Administrators is provided to manage the Faculty of Science. It plays an important role in promoting both a plan to increase teaching staff and that to increase students.

2) Position of the Department of Biochemistry

Biochemistry is the subject to be studied by the students of the Faculties of Medicine, Veterinary Medicine, and Agriculture, and the Departments of Zoology, Botany and Chemistry of the Faculty of Science, as well as the Biochemistry Department, and therefore this department gives the education of biochemistry to the students of individual faculties and departments. Thus, the substantiality of education given by this department affects the educational levels of the other faculties and departments mentioned above, so biochemistry is an important subject at the university.

3) Department of Geology

Similarly, geology is the subject studied by the students of the Civil Engineering Department of the Engineering Faculty, the Geography Department of the Literature Faculty, as well as the Geology Department, the education of geology is given by this department. Thus, substantiality of education given by this department affects the educational levels of the abovementioned faculties, departments as well as this department, so geology is an important subject at the university.

4) Positions of large and medium lecture rooms

Makerere University suffers a shortage of teaching staff. Due to this, a small number of teaching staff gives lectures to a large number of students, so the university regards the large and medium lecture rooms as very important.