

AIRGRAM

DEPARTMENT OF STATE

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FROM - NAIROBI

SUBJECT - NONCAPITAL PROJECT PAPER (PROP)

REFERENCE -

FROM EAORA

I. STANDARD IDENTIFYING INFORMATION

Country: East Africa Regional

Project No.: **618-11-110-653**

Submission Date: May 22, 1970

Original

Project Title: Graduate Agriculture Faculty

U.S. Obligation Span: FY 1971 - FY 1977

Physical Implementation Span: FY 1971 - FY 1978

Gross Life-of-Project Financial Requirements:

U.S. Dollars \$2,437,000

U.S. Owned Local Currency -

Cooperating Country Cash
Contribution (estimated) 9,471,500

Other Donors 3,650,000
Total \$15,558,500

*These totals must be read in conjunction with the
footnote on page 3.

PAGE PAGES
1 OF 34

DRAFTED BY R.A. Ottley, F&A, USAID/0 GTEaton:EAORA	OFFICE EAORA	PHONE NO.	DATE 5/21/70	APPROVED BY: James W. Howe Director, EAORA
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GRADUATE AGRICULTURE FACULTY (\$, 000)

Fiscal Years	Total	Cont. 1/	Personnel Svcs		Participants		Commodities		Other Costs	
			CONT	No.	U.S. Ag.	No.	DIR U.S. Ag.	CONT	DIR U.S. Ag.	CONT
Prior Through Oper. FY 70	-	(-)	-	-	-	-	-	-	-	-
Bud FY 71	749	(703)	622/	10	-	-	20	5	26	6
B + 1 FY 72	148	(92)	663/	10	15	2	15	-	26	6
B + 2 FY 73	426	(350)	346	10	35	3N 2E	15	-	26	4
B + 3 FY 74	436	(350)	346	10	50	4N 3E	10	-	26	4
B + 4 FY 75	359	(262)	278	8	50	3N 4E	5	-	22	4
All subs.	<u>319</u>	<u>(243)</u>	<u>238^{5/}</u>		<u>20</u>	<u>3E</u>	<u>0</u>		<u>56</u>	<u>5</u>
TOTAL LIFE	2,487	(2,020)	1,930		170		65	5	182	29

Footnotes (see next page)

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Footnote to Page 1: Gross Life-of-Project Financial Requirements

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*The figures on page 1 constitute the entire cost for the Makerere Faculty of Agriculture over the period indicated. As explained in the PROP, the U.S.-financed staff will concentrate their efforts in the graduate field, but it is inevitable (and desirable) that a certain part of their time be directed toward undergraduates. Consequently, as shown in the Appendix, a certain proportion of the AID project should be deemed assistance for undergraduate instruction. Since the GOU and other donors also finance graduate, undergraduate, and research costs, their entire input to the Faculty has been shown to make the figures comparable.

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(Academic Years 1970-78)	(S000)	<u>GOU</u>	<u>Other Donors</u>	<u>AID</u>
Post-Graduate Instruction		\$1,700	\$ 526	\$862
Undergraduate Instruction		3,617	1,297	291
Research		4,154	1,825	1,284
Totals		\$9,471	\$3,650	\$2,437

Further details will be found in the appendix.

Footnotes to Page 2, Table 1

- 1/ Non-add
- 2/ 2-year funding. 9 staff members topped off at 134,000 per man year. 1 staff member fully funded at \$40,000 per man year. Arrive last quarter FY 1971. See Table 12.
- 3/ 3-month funding. Technicians on board last quarter FY 71.
- 4/ Participant costs computed at \$7,300 for new participant (N) and 1,600 for extensions of training (E).
- 5/ FY 75 reduce 2 (Horticulture and Poultry)
 FY 76 reduce 3 (Chief of Party, Production Economist, Extension/Adm.)
 FY 77 reduce 3 (Ag Marketing, Pasture Agronomy, Crop Protection)
 FY 78 Final positions to be terminated (Soils, Agriculture Engineering).

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Table 2

Project No.
618-11-110-653

(\$000)
Exchange rate \$1 = Shs.7.1 (Shillings)

Fiscal Years
Cooperating Country
Annual Recurrent Contribution*

Prior through Oper. FY 70	-
Bud FY 71	969
B + 1 FY 72	1,182
B + 2 FY 73	1,299
All Subs.	6,022
TOTAL LIFE	9,472

*These include the Faculty of Agriculture budget, overhead costs, board and room plus books for students, subsidized housing for staff and depreciation of capital facilities.

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II. SUMMARY DESCRIPTION

The aim of this project is to assist in the development of a post-graduate program at Makerere University College, Kampala, Uganda, which will largely meet the needs of East Africa (and to a lesser extent those of nearby countries) for advanced agricultural degree holders. Since it will serve several countries, the project is regional. It is consistent with AID's emphasis upon institution-building, helping fill the high level manpower gap, and improving agricultural production.

Two major objectives are (1) to develop curriculum and teaching systems up to basic minimum professional standards, and (2) to contribute to the development of a superior research program stressing applied research coordinated with the regional and national research stations in East Africa. As a corollary to the latter, the project is expected to help establish Makerere as a major source of research information for government extension services, by linking its improved techniques and results to the needs of the farmer. Because of the location of the Graduate Agriculture Faculty, this benefit will naturally hold particular importance for Uganda.

The specific targets are to increase the number of post-graduates (M.Sc. or beyond) turned out by the Makerere Agriculture Faculty from two in 1969 to 30 in 1973 and thereafter; to help establish approximately a dozen post-graduate courses; and to provide participant training in the U.S. so that Makerere can africanize U.S. financial faculty positions as soon as possible.

To carry out the project, AID will obtain the services of nine highly competent and experienced U.S. professors and one chief of party, either by contract with an American university or universities outstanding in the field of post-graduate agriculture or by other suitable means. These services will be terminated position by position at the earliest possible date but not later than FY 1978.

As indicated in the appropriate parts of this document, the financing of the Makerere Agriculture Faculty's graduate program will be undertaken in large measure by the Government of Uganda and by other donors. The proposed AID share is a significant but not the majority portion of the costs.

III. SETTING OR ENVIRONMENT

a. General

In common with most developing regions, East Africa is agricultural -- predominantly subsistence farming in terms of land use but with a growing proportion of total agricultural production entering the cash market. Close to 90 percent of the 33 million people make their living from agriculture. Agriculture accounts for

40-60 percent of the Gross Domestic Product (GDP) of Kenya, Tanzania and Uganda and 60-90 percent of exports, depending on the country. Sustained economic growth is largely contingent upon the development of agriculture, animal husbandry, forestry and fishing, although tourism, and in some parts the discovery and exploitation of mineral resources, also have development importance.

The prospects for further agricultural development in East Africa are promising. The region possesses large areas with good soil and adequate rainfall as well as range areas which have great potential for livestock production. Most of the high potential areas already have a good infrastructure of transport, communications and electric power. Large investments have been made in primary and secondary education, public health services, and disease control.

Popular enthusiasm for education has already had a fundamental effect on the attitudes and capabilities of the younger generation. The University in each of the three countries is moving toward making its education more relevant to development needs. For example a new undergraduate Faculty of Agriculture was opened in Tanzania in 1969, and another will start in Kenya in 1970. These new schools, along with the well established Faculty of Agriculture at Makerere University College in Uganda, will make it possible to train locally all the B.Sc. agriculture graduates East Africa requires for ~~the~~ the foreseeable future.

Despite these favorable trends, the need remains urgent for the three partner states to mobilize their resources and energy further for a major attack on rural problems. Although the annual per capita GDP figure in East Africa does not reach \$100, farmers as a group remain especially poor. A recent baseline survey of agriculture in Uganda showed that the average annual cash income on the farm is only \$100 per household.^{1/} Juxtaposed against this low income figure is an annual population growth of over three percent, which points up the necessity to increase agricultural production and to find additional cash crops. East Africa clearly requires packages of farm practices which will dramatically increase yields and market and production information on new cash crops. This information must come from agricultural and economic research, of which a practical university agriculture faculty should be a major source. Properly oriented agricultural research is one of the best investments of limited financial resources a country can make. For example, Dr. Theodore Schultz, Professor of Economics at the University of Chicago, has analyzed the research expenditures of the Mexican Government over the past 25 years and concluded that when all the costs of the research program (including the failures as well as the successes) are considered, the return realized on investment was 400% per year.^{2/}

In the East African setting, all aspects of agriculture education and research assume primary importance.

- 1/ Ralph Nelson, "Sample Characteristics and Cross Relationships of a Baseline Survey of Uganda Agriculture", April 1970.
- 2/ J.C. Harrar, Principles for Progress in World Agriculture, Rockefeller Foundation, New York, 1960, p. 16.

B. Agricultural Education

Agricultural education of all types has grown rapidly in East Africa in the 1960s, and AID support already has been given to programs in secondary schools, diploma and certificate colleges, and the University of East Africa. Increase in student enrollment is a clear measure of growth, and the following table shows the changes that have taken place since AID assistance in agriculture began.

TABLE 3

STUDENT ENROLLMENT IN AID-ASSISTED AGRICULTURE PROGRAMS

<u>Country & Institution</u>	<u>AID Program Began</u>	<u>Number of Students Then</u>	<u>Number of Students in 1969</u>	<u>% Increase</u>
<u>Kenya:</u>				
Six Secondary Schools	1965	878	1,632	86
Egerton College	1963	212	570	169
Nairobi University College Veterinary Faculty (UEA)	1962	4	203	4,975
<u>Tanzania:</u>				
Morogoro College	1965	55	199	262
<u>Uganda:</u>				
Arapai College	1963	20	135	825
Bukalasa College	1963	53	160	202
Veterinary Training Institute	1963	36	103	186
Makerere University College Agriculture Faculty (UEA); B.Sc. Training Only	1965	83	215	159
		<u>1,341</u>	<u>3,267</u>	

Gross enrollment increase: 144%

The undergraduate student population in the Faculty of Agriculture, Makerere University College, has nearly tripled since 1963-64 as planned and contributed to by the present AID project; in addition, some 40 students are registered this year for graduate studies (more than 75% of them for the M.Sc.).

In addition to serving all three partner states, the Faculty has some students from other African countries as well. However, the projected demand for agriculture graduates is great enough that Tanzania and Kenya are also justified in establishing degree-granting institutions. University College, Dar es Salaam opened a Faculty of Agriculture at Morogoro in mid-1969 with 18 students in the first class, while University College, Nairobi intends to commence B.Sc. agriculture studies in July 1970 with 40 students. It appears that these three facilities will be adequate to supply East Africa's needs for first-degree agriculture graduates for some time to come.

The structure of agricultural education in East Africa at the certificate, diploma, and B.Sc. levels is well fixed, and the major needs now are consolidation of gains already made and further work toward building high-quality, practical programs in the existing schools.^{3/}

Post-graduate agricultural education is the remaining field not satisfactorily covered by the present structure. Only at Makerere is any training beyond the B.Sc. offered (with the exception of a small graduate veterinary program at Nairobi), but this is at present strictly a narrow thesis degree with no course work and limited faculty-student interchange. Neither University College, Dar es Salaam nor University College, Nairobi is likely to consider major efforts in graduate agriculture for some years, as they are preoccupied with starting under-graduate instruction.

Meanwhile, Kenya, Tanzania, and Uganda lack qualified East Africans with post-graduate agriculture degrees to conduct agricultural research, serve as subject specialists in the government extension services, fill middle and top administrative, policy-making, and planning positions, and teach at degree and diploma institutions. Each country has estimated its overall needs for post-graduate manpower in agriculture, although not by special field of study. The 1966 Working Party Report on Agricultural Education in Tanzania foresaw a net average annual requirement of 20 post-graduates. The 1967 Weir Commission Report on Agricultural Education in Kenya estimates needs for the 1970-1980 period which reduce to an annual figure of about 16 advanced degree holders, and the Uganda Manpower Planning Section projects an annual demand for 6-9 post-graduates until 1970, 10-11 from 1971-1976, and 12-13 from 1976-1981. Therefore, the aggregate annual total for the three countries, based on these estimates, is approximately 45-50, not including probable demand for post-graduates in Ethiopia, Zambia, Malawi, Sudan, Botswana, Swaziland, and other English-speaking countries

^{3/} See Anderson, Combs, and McFarland "Diploma/Certificate Level Agricultural Education in East Africa", 18 September 1969 (Contract No. AID/afr-620 with University of Minnesota), pp. 4-5, 61-62, for elaboration on this point.

^{4/} NORAD and Canada have made funds available for scholarships to African students coming from Makerere from outside East Africa.

^{5/} F.F. Hill, Vice President of the Ford Foundation.

of Eastern and Southern Africa.^{4/} It is likely that this total is conservative, since "the number of highly-trained persons required fully to develop a science-based agriculture is commonly under-estimated by a wide margin."^{5/}

On the supply side of the ledger, certain Africans are, of course, returning from overseas with post-graduate degrees in agriculture. Records of those abroad, their specialities, and intended dates of return are fragmentary at best. According to a Ministry of Education tally in Uganda, seven such students finished degrees or actually returned in 1966, five were due in 1969, three in 1970, and one in 1971. (The apparently decreasing number may be due to lack of advance information on prospective students.) The Weir Commission projected the return from overseas of Kenyan agriculture graduates as follows: 1968 - 38, 1969 - 48, 1970 - 29. No under-graduate vs. post-graduate breakdown was given, but presumably post-graduates would not account for more than ten or fifteen percent of these totals. One can hardly venture more than the crudest sort of guesses from this kind of material, but it could be surmised that roughly 15-20 holders of post-graduate degrees return to East Africa annually. It is recognized that the number of post-graduate students abroad is likely to decrease as Makerere's program is improved and enlarged. But those studying outside East Africa now will only partly off-set the continuing demand. (Makerere's present post-graduate output is negligible: only two M.Sc. (Agric.) degrees were granted in 1969, and these degrees were earned without benefit of course work.)

By correlating supply and demand - and treating the statistics extremely cautiously - a net annual shortfall of 30 agriculture post-graduates in East Africa at the present time can be estimated. Given the unreliable information it would probably be better to say 25-35, rather than 30.

Two other relevant factors should be mentioned, although they cannot readily be measured. One is increased demand for post-graduates as the economy in East Africa grows. The other is expected interest from non-East African Community countries in obtaining places for their students in the Makerere graduate agriculture program.

C. The Makerere Agriculture Faculty

In view of the demand, the Faculty of Agriculture, Makerere University College, has decided to establish a modern post-graduate degree program. The Board of the Faculty already has approved two kinds of M.Sc. (Agric.) programs: one comprising a term of course work and a major thesis, and the other requiring three terms of courses and a minor thesis. Each program will require a minimum of 18 months or two academic years for completion. Classes are due to begin in July 1970. A draft Faculty of Agriculture development plan for the 1970-1973 triennium, which outlines projected student enrollment and required staff as well as the role of research and extension, has been approved by the Faculty Board. It must now be cleared by the University College itself and the Government of Uganda, although these approvals are virtually certain.

^{4/} & ^{5/} See page 8.

With the stimulus of the Dean of the Faculty (a Rockefeller Foundation-financed American) and the AID contract technicians in the Makerere Agriculture Faculty project (618-11-110-618), Makerere is moving toward an effective practical under-graduate agriculture school influenced by U.S. methods. A new syllabus introduced in mid-1969 divides the B.Sc. degree work into discrete courses with set numbers of lectures, laboratory periods and practicals. Giving second-year students seven weeks of practical training at Kabanyolo, the site of the Faculty's demonstration-experiment and research farm, is an innovation introduced in 1968. The examination system has been reformed; whereas previously the entire degree depended upon the results of comprehensive examinations at the end of each year, individual course exams and "continuous assessment" of the students' performance are now given significant weight in determining grades and standing. These are major accomplishments of the present AID project.

Historically, Makerere Faculty members have followed their own research interests. Often this meant satisfying individual curiosity rather than working to help solve East African agricultural problems. This individual approach to research is being modified sharply by the practical coordinated methods of the AID contract staff who are directing eleven research projects (in poultry and dairy production as well as crops) at the Makerere University Farm and supervising the same number of post-graduate student research activities. At one time the crops part of the farm was little more than a commercial enterprise used as a plants museum. In 1966 only two acres were planted for research purposes. By late 1969 nearly 60 acres were planted for research. All research projects financed under the AID contract must be presented for concurrence by the head of department and the Dean of the Faculty in a specific format laying out the goals and contributions of all parties involved. The eleven contract projects are all operated cooperatively with other staff members; in addition, four involve the Government of Uganda and one is coordinated with private industry.

These efforts by the AID technicians have had an effect on other staff members. Although approval as such of each research proposal is not yet required, a Faculty Research Committee identifies research priorities and evaluates the research project to determine priority, reviews each project annually, organizes research colloquia, and establishes procedures for presenting proposals. Favorable comments by the Committee are useful for attracting funds and attention to research projects.

Makerere's pre-eminent position in East African undergraduate degree agricultural education makes it a suitable university location for a post-graduate school of agriculture. With U.S. assistance, major changes have already been accomplished and a strong undergraduate foundation has been laid upon which more advanced, specialized graduate courses of instruction and research can be built. By contrast, neither Dar es Salaam nor Nairobi has, or will have for many years, a comparable foundation for commencing advanced agriculture instruction. Both Kenya and Tanzania have informally indicated in conversation with Makerere University officials that they expect to continue sending post-graduate agriculture students to Makerere at least throughout the next triennium, and Makerere intends to accept them.

The major post-graduate emphasis will be on the M.Sc. program. The M.Sc. degree in agriculture will have two options - one emphasizing research and the other emphasizing course work. The research option will include the equivalent of one term of post-graduate course work plus a major dissertation. The course work option will include three terms of course work and a minor dissertation. Both options will contain certain common courses which are considered as basic education for a M.Sc. in agriculture.

The Ph.D. program will continue for the present as only a dissertation program. The Faculty of Agriculture does not have sufficient staff to mount a course work plus dissertation Ph.D. at this time. This may be a future development, until which Ph.D. aspirants will be encouraged to go abroad for their Ph.D. degree work but, whenever possible, they should do their dissertation research in their home country.

The following eleven subjects have been designated for emphasis in graduate study because of their importance to East African agricultural development. Graduate students were enrolled in ten of these subjects last year.

	<u>No. of Students Enrolled in Graduate Study 1969-70</u>
1. Plant breeding	3
2. Plant protection	4
3. Agronomy/crop physiology	6
4. Soil fertility	3
5. Nutritional biochemistry	1
6. Livestock and poultry management	1
7. Agriculture planning	3
8. Agriculture extension	2
9. Agriculture marketing	0
10. Small scale mechanization dev.	1
11. Horticulture	2

The graduate agriculture project will help build a program unique to Eastern Africa, based on the above priorities, which will meet needs in Kenya, Tanzania, and Uganda and will be prepared to train graduate students from other Eastern African countries. The cost advantages of sharing facilities--especially in expensive undertakings like graduate education--

do not require reiteration here.

It is worth noting that another major donor, the Rockefeller Foundation, has decided to concentrate its Eastern African university agricultural assistance at Makerere on account of the Faculty's potential for service to all countries of the region. Along with the Nairobi Veterinary Faculty, the Makerere Graduate Agriculture Faculty is East Africa's leading example of higher education extending its service across national boundaries. The physical arrangements and agreements for the project will be made in FY 1971 for the first time with the independent Makerere University and the Government of Uganda, although the project will be regional in purpose and nature.

Other than the usual negotiations on project details, there are no particular administrative obstacles to be overcome in operating this activity successfully. Nor are there significant economic, social or legislative barriers to be surmounted.

IV. STRATEGY

This project will address mainly East Africa's needs and secondarily the needs of other African countries for post-graduate agriculturalists. The proposed approach is to assist the Faculty of Agriculture, Makerere University College, in establishing a strong, practical post-graduate program to serve primarily Uganda, Kenya, and Tanzania by producing enough graduates with advanced degrees to man the posts in East Africa requiring such qualifications.

The project meets the Economic Commission of Africa recommendations for strengthening research activities in the member countries.^{6/} It also is consistent with the recent agricultural education report of Anderson, Combs and McFarland which concluded that "the provision of a U.S. staff input of sufficient size to firmly set the pattern of post-graduate study at Makerere is much needed, and action in the immediate future would be most timely."^{7/}

In the broadest sense the proposal is fully attuned to U.S. foreign assistance policy, which lays considerable emphasis upon technical assistance aimed at helping create viable, self-sustaining institutions in the field of agriculture and rural development. This is particularly true in East Africa where the establishment of an initial pool of properly trained African manpower and the founding and maintenance of institutions to provide a continual supply of that manpower are major development problems. Since agriculture is incontestably the dominant economic factor in East Africa, agricultural education and institution building should be a

^{6/} The 6th Summit Conference of East and Central African States in Khartoum, 26th to 28th January 1970. Recommendation to the Summit Conference by the Conference of Foreign Ministers held in Lusaka from 5th to 8th January 1970 as amended during the Special Meeting held at Khartoum on January 28, 1970.

^{7/} Anderson, Combs, McFarland, Ibid., page 53.



significant part of the AID program.

As an activity the benefits of which will cross national boundaries within East Africa and also should have impact outside Kenya, Tanzania, and Uganda, this project will contribute to the U.S. goal of encouraging regional cooperation, thus making better use of limited development funds and scarce teaching and research resources. The economic value of using expensive, specialized higher education facilities internationally is clear, and the post-graduate program of the Makerere Agriculture Faculty is a good illustration of the principle.

4. Alternatives

There are three alternatives open to lesser developed countries requiring the post-graduate education necessary for agricultural development. Individuals can be trained in the developed countries which have well established post-graduate institutions; they can be trained in neighboring countries which have similar ecology and development problems, or they can be trained in their home country. Up to the present, most East African post-graduates have received their training in the developed countries, financed primarily by external grants. But there is a growing realization that post-graduate education in the developed temperate areas is not by and large a successful solution to the needs of the underdeveloped tropical countries. It has these disadvantages: (1) the training is based on temperate zone crops, soils, animals and ecology, much of which is not relevant to tropical agriculture, (2) the agriculture of the developed countries is at an advanced stage of managerial and technical development, and knowledge of this advanced agriculture is not always relevant to the small farmer agriculture at home, (3) most of the research equipment in the developed countries is more intricate and expensive to be practical in poorer countries, so much research methodology is of limited use, and (4) the benefits of research done as part of the training often accrue to the developed countries, since much of the research is applicable to their problems. If this research were done in the student's home country, it might make a significant contribution to the solution of agricultural problems of that country.

In addition to educational deficiencies, post-graduate training in the United States is probably more expensive. AID estimates an annual cost of \$7,000 per student for U.S. training while the annual cost of post-graduate training in the Faculty of Agriculture at Makerere (see Appendix, tables 16 and 18) is calculated at less than \$5,000 per student, including amortization of capital expenditures but excluding the major costs of research (which has other, separate benefits).

The alternative of post-graduate agricultural training in countries with similar ecological and developmental conditions is not open to the East African countries. Strong established post-graduate institutions in agriculture do not exist in East or Central East Africa.

B. Cross Relationships

The proposed project which has as its main objective the establishment of a graduate agriculture program, is built on the achievements of the undergraduate Makerere Agriculture Faculty project (618-11-110-618) begun in 1965. That activity is receiving its final funding in FY 1970. Details may be found in Part III (Setting or Environment) of this PROP and in the PROP and PAR for the earlier project.

The AID loans made in fiscal years 1967, 1968 and 1969 for engineering services and construction at Makerere University College are related in part to the proposed project. Among other items, these funds will finance the design and construction of a crop production laboratory and a residential block for students built at the Kabanyolo Farm. A 750-man dormitory and cafeteria, also being undertaken with these loans, will be available for use by agriculture students as well as those in other fields. In addition, certain library and teaching equipment, office equipment, library books, and audio visual aids will be provided for the Faculty of Agriculture.

The Ugandan Ministry of Agriculture and Forestry has requested AID to furnish a six-man team for four years to head up its national research establishment. The research organs of the Ministry have never worked in close cooperation with the Makerere Faculty of Agriculture because the latter carried on very little research until the last two years. This request offers a significant opportunity to coordinate all agricultural research activities in Uganda, including Makerere efforts, and direct them towards practical results to be used by the farmer. Consideration should be given to using the same contractor to provide the staff for both the Makerere Graduate Agriculture Faculty and the new Uganda Agricultural Research project--a step toward the "intensive, self-contained" approach.

Less intimately connected but still in the field of agricultural education are other AID projects at diploma/certificate schools in East Africa and the Nairobi Veterinary Faculty. These are listed above in Part III (Setting or Environment).

V. PLANNED TARGETS, RESULTS, AND OUTPUTS

A whole new range of tasks must be performed at Makerere to build a sound graduate agriculture education program attuned to East African needs. Although graduate studies have been started already, much remains to be done. To date there have been only nine graduates, and all work has been based solely on the preparation of a comprehensive thesis.

The preparation of comprehensive course outlines for a whole range of graduate courses will be a major part of this project. Material must be developed to support all course syllabuses. Reference materials, films, and audio-visual aids are also

to be gathered. Examinations must be planned for each new course. New research activities for the expanded enrollment are needed with individual comprehensive supervision provided by the Faculty for each graduate student. Participants to replace Americans teaching in the graduate school must be trained at the Ph.D. level and given at least 6-9 months on-the-job guidance and assistance before taking over completely.

In establishing a comprehensive graduate agricultural education program, it is inevitable that the Graduate Faculty will also be involved in some work at the undergraduate level. All of the nine American professors to be recruited for this project will serve in disciplines which will require them from the outset to spend the majority of their time on the graduate program. But it is not possible for the Faculty of Agriculture at this point in its development to provide two or more professors for every discipline; consequently, although the American professors will devote more than half of their time to carrying out graduate responsibilities of the type outlined above, they will also spend some ^{time} with undergraduate students, primarily in class work. Of course, graduate students as part of their training will assist undergraduates in the same field and, in some cases, graduate students under the supervision of American professors will actually teach undergraduate classes, thus helping lighten the burden on the project staff.

The overall staff-student ratio in the Faculty at present is 1 to 9.7. Because post-graduate studies require more staff time per student, the Faculty has requested additional positions to permit a 1 to 8 ratio in the future (see Appendix, table 5). A survey made by the Dean of the Faculty of Agriculture shows that the 1 to 8 ratio is similar to that maintained by most agriculture faculties throughout the world which offer graduate training.

The specific project targets, results, and outputs are as follows:

1. To increase the number of post-graduate students from 40 in 1969-70 to 85 by 1972-73; to produce about 30 holders of advanced degrees (primarily M.Sc.) annually by the end of 1973, compared with two in 1969, to fill top positions in the academic, government, and business communities of East Africa.

2. To establish and teach approximately one dozen post-graduate courses, and to prepare and assemble supporting course outlines, syllabus materials, other related teaching materials, and examinations.

3. To provide training in the U.S. (and in-service training for 6-9 months thereafter) to permit complete Africanization of U.S.-financed staff positions by the end of the project (see Appendix, table 6).

4. To develop further a superior applied research program coordinated with the regional and national research stations in East Africa.

5. To help make the University a major source of research results for government extension services in agriculture and to strengthen its liaison with Ministries concerned with agriculture, livestock production, and marketing.

Ministries concerned with agriculture, livestock production, and marketing.

With reference to target 3, the following table shows Makerere's staff development plans:

TABLE 4

Faculty of Agriculture Staff Development Program
1970-71 Establishment

<u>Department</u> <u>Position</u>	<u>Incumbent &</u> <u>Nationality</u>	<u>Africanization Plans</u>
* AID-funded, old project		
** AID-funded, new project & phase-out date		
<u>Central Administration</u>		
Dean	Nickel - American	Drs. Ndungu, Mugerwa & Oloya are possible and promising successors.
Farm Manager	Barlow - Ugandan	
Asst. Farm Manager	Ssewanyana - Ugandan	
Adm. Assistant	Serwanga - Ugandan	
<u>Department of Agr. Eng. & Local Planning</u>		
Professor & Dept. Head	Boshoff - British	
Lecturer*	Van Eck	Mr. Uma is studying for a M.Sc. at Michigan State University and is expected to return in late 1970; Dr. Van Eck is scheduled to leave June 30, 1971.
Lecturer	Vacant	John Naireme has been nominated for an AID scholarship
Lecturer** (ag engineer) FY 70	Vacant	
Lecturer	Vacant	



<u>Department Position</u>	<u>Incumbent & Nationality</u>	<u>Africanization Plans</u>
<u>Department of Animal Science & Production</u>		
Professor - Dept. Head	Gibson - Canadian	Dr. Mugerwa is being groomed to become the Dept. Head in 1974.
Lecturer * S ** (FY 75)	Abbott - American	Mr. Okot is expected to complete his M.Sc. at Makerere in 1972, his Ph.D. in the U.S. in 1975, and will fill this position in 1975.
Lecturer	McIlroy - American	Dr. Mugerwa returned to U.S. in 1970 and is an understudy to McIlroy. Mugerwa will replace McIlroy in June, 1971.
Lecturer	Kiwuwa - Ugandan	Presently on leave of absence and studying for his Ph.D. at Cornell. Funded by Rockefeller Foundation.
Lecturer	Goodman - American Ford Foundation - funded	Mr. Ongoma is presently studying for his Ph.D. at Makerere. He is expected to fill this position by 1971.
Lecturer	Vacant - expected to be filled by a Canadian	Gacheru studying for his M.Sc. in Scotland. Expected to return for Ph.D. at Makerere and fill this position by 1974.
Lecturer	Vacant - expected to be filled by a Canadian	
Lecturer	Vacant	
<u>Dept. of Crop Science and Production</u>		
Professor & Head	Holliday - British	Dr. Ddungu is being groomed to become Department Head by 1974.
Professor	Heide - Norwegian	

<u>Department Position</u>	<u>Incumbent & Nationality</u>	<u>Africanization Plans</u>
<u>Dept. of Crop Science and Production (Cont'd)</u>		
Lecturer	Willey - British	Basime is studying for a M.Sc. at Makerere. It is hoped he will study abroad and complete his Ph.D. by 1975.
Lecturer * & ** (FY 77)	Olsen - American	Tiharunhondi will complete his M.Sc. at Makerere in 1970. If he is considered as "staff material" he will go to the U.S. for Ph.D. studies and hopefully complete it by 1974.
Lecturer* & ** (FY 75)	Wurster - American	Kori is studying for his M.Sc. at Makerere and it was planned that he would fill this position after receiving a Ph.D. On leave of absence from Ministry of Agriculture in Kenya and will need a release to join the staff.
Lecturer	Mukiibi - Ugandan	
Lecturer	Leakey - British	Rubaihayo is studying in the U.S. for a Ph.D. Expected to fill this position by 1973. Funded by Rockefeller
Lecturer** FY 77 (crop prot.)	Vacant	
Lecturer	Taksdal - Norwegian	Nyilira is studying for a M.Sc. at Makerere. Expected to study abroad for Ph.D. and fill this position by 1974.
Lecturer	Vacant	Olumbo will commence M.Sc. study in June, 1970 at Makerere.

<u>Department Position</u>	<u>Incumbent & Nationality</u>	<u>Africanization Plans</u>
<u>Dept. of Rural Economy and Extension</u>		
Head of Department	Dr. Oloya - Ugandan	
Lecturer* & ** FY 76 (Prod. Econ.)	Smann - American	Rukadema is studying for a M.Sc. at Makerere. He needs Ph.D. study abroad and should fill this position by 1975.
Lecturer	Watts - British	
Lecturer	Mbithi - Kenyan	
Lecturer	Njukia - Kenyan	Presently on leave of absence studying for a Ph.D. in the U.S. Expected to finish by 1972. Funded by Rockefeller Foundation.
Lecturer** FY 77 Marketing	Vacant	
Lecturer** FY 76 Ag. Ext.	Vacant	
<u>Dept. of Soil Science and Agric. Chemistry</u>		
Department Head	Vacant	
Lecturer**	Moe - American	Keya is studying for M.Sc. in the U.S. and hopefully to qualify for Ph.D. Expected to fill this position by 1974.
Lecturer	Witham - Australian	
Lecturer	Kakonge - Ugandan	
Lecturer		Zake will complete his coursework for Ph.D. in 1970 and will return to Makerere to do research and dissertation.
Lecturer** FY 78 Soils	Vacant	

<u>Department Position</u>	<u>Incumbent & Nationality</u>	<u>Africanization Plans</u>
<u>Dept. of Soil Science and Agrc. Chemistry</u>		
Lecturer	Vacant	
<u>Forestry</u>		
Department Head	Jorgensen - Norwegian	
Lecturer	Fitse - Norwegian	
Lecturer	Nagoda - Norwegian	
Lecturer	Haveraen - Norwegian	

Targets 4 and 5 provide for the project to assist the Faculty of Agriculture in developing a superior applied research program which will be coordinated with national and regional agricultural research and will be a source of research results for government extension services.

Cooperation with national research projects already exists on an informal basis. For example matoke (plantain) experiments are being conducted at five locations in Uganda and Tanzania as cooperative field trials with the respective Ministries of Agriculture. The Uganda Ministry has been cooperating in grain legume research by conducting district trials on improved cowpeas and soybeans developed at Makerere. A potato improvement project is being conducted jointly between Makerere and the Uganda Ministry of Agriculture. Three research workers at the Kitale, Kenya, research station are being supervised by Makerere staff, as part of their post-graduate studies.

While this de facto cooperation already exists on an informal basis, more formalized coordination, especially with research bodies in Uganda, is likely in the near future. Until recently, repeated attempts by Makerere to formalize integration of agricultural research in Uganda have been repulsed by the Ministry of Agriculture. Recently, however, the Ministry of Planning has taken an active interest in overall research coordination. It appears likely that this Ministry will soon take the lead to facilitate coordination which will result in Makerere's being recognized and financed as a major partner in the overall research program of Uganda.

Formal agreements already exist in which the East African Community's East African Agriculture and Forestry Research Organization (EAAARO), the Coffee Research Foundation of Ruiru, Kenya, the Tea Research Institute of Kericho, Kenya, and the Cotton Research Station of Namulonge, Uganda, are in a "Connected Institute" relationship with the Makerere Faculty of Agriculture.

VI. COURSE OF ACTION**A. Technicians**

AID will finance the services of a group of nine U.S. professors to teach and conduct research in the graduate program at Makerere's Faculty of Agriculture during the years 1970-1978. The technicians, who will be obtained through a largely self-contained contract with an American university or universities highly qualified in post-graduate agriculture studies, or by other suitable means, will be specialists in the following fields (listed in order of priority in terms of East Africa's needs and particular U.S. capabilities):

1. Agricultural Marketing
2. Crop Protection
3. Agricultural Production Economics
4. Horticulture
5. Soil Science (Fertility)
6. Pasture Agronomy
7. Poultry Science
8. Agricultural Extension/Administration
9. Agriculture Engineering

Each of these positions will be a formal established post within the Faculty of Agriculture. The Project Agreement will state that Makerere will pay each American professor under the contract in shillings an amount equal to the amount of salary for the position which would be paid an East African professor if one were available. AID will pay the difference between this basic local salary and the salary necessary to hire the professor. Makerere also will provide university housing at sub-economic rent, hard furniture, office space, and clerical and secretarial assistance similar to that given to other faculty members. AID will provide international transportation for the professor and his family and the related costs for shipment of household effects, education allowances, cost differential, and R&R.

Each position will be phased out when a suitable local replacement has been found--but no later than the end of academic year 1977-78. The goal is to terminate two U.S. technicians by June, 1975; three more (including Chief of Party) by June, 1976; three by June, 1977; and the remaining two by June, 1978. If replacement of the Americans at a more rapid rate should prove to be possible, this target timetable will be revised accordingly.

In addition to the nine technicians provided to teach and conduct research on a full-time basis, a fully-funded, full-time chief of party will be provided. This chief of party should have the status of a full Professor or above in the U.S. so that he can provide academic leadership to the members of the contract team and also within the Faculty as a whole.

Some consideration may be given to the occasional financing of a short-term (3-6 months) U.S. faculty member. This will depend on the Faculty's specific needs at any given moment. AID will review any such proposals that may come from the Faculty of Agriculture on their individual merits; however, it is not intended that any sizeable or regular supply of short-term professors be financed from this project.

B. Participants

For the purpose of this project, some U.S. participant training is necessary. Makerere offers but does not emphasize a Ph.D. in Agriculture. At the present time the Ph.D. is a dissertation degree and does not include any formal course work. It will be a number of years before a course work component can be added to this degree so that it will be equivalent in quality to a Ph.D. granted from a U.S. institution. Even if the Faculty had the resources to provide a strong Ph.D. program, it would be unwise for the Faculty to train its own staff. A vigorous, first-class academic environment needs the stimulation of faculty members who have been trained in different institutions.

Consequently, the proposed project includes participant training funds for two specific reasons: to help prepare qualified East African citizens who show potential for replacing the U.S. technicians, and to assist Makerere in its general efforts to create an indigenous staff by offering U.S. training ~~to those who may be suitable~~ for other posts in the Faculty of Agriculture. Toward those ends, a maximum of 24 academic years of postgraduate training will be available under this project. To the extent possible, those chosen as AID participants will already have completed the M.Sc. degree at Makerere, enabling the university to examine their work closely and determine whether they are potential faculty material. Those selected for training in the U.S. would be expected to complete a doctoral program, the research element of which would usually be conducted in East Africa. All international air fares for the participants in this project will be shared equally between AID and Makerere or the Government of Uganda.

When an AID-financed participant has completed his training and is hired by Makerere, AID will then fully-finance the U.S. contract technician during the over-lap period from the date that the participant is hired until the date that the U.S. technician departs (usually 6-9 months).

C. Commodities

1. Direct

Over the seven fiscal years of the project, an expenditure of \$65,000 is anticipated for the direct AID purchase of teaching and demonstration commodities for the technicians, audio-visual equipment for use at the Faculty, and books, bulletins, and professional journals to improve the agriculture holdings of Makerere's library.

2. Contract

Over the life of the contract, \$5,000 will be allowed for the purchase of American office supplies and equipment for the use of the contract administrator in support of the U.S. technicians. It is anticipated that these funds will mainly be expended in the early years of the project.

3. Other Costs

1. Direct

Direct other costs consist of funds to lease housing for the chief of party at an annual cost of \$4,000. In addition, \$7,000 is proposed--available at the rate of \$1,000 per fiscal year---for miscellaneous support costs for the American technicians and the contract administrator.

An average of \$2,500 per staff member per year is included for conducting research under this project, for a total of \$135,000. This is necessary to pay for labor, specialized research equipment and supplies and expendable inputs such as fertilizer, lime, flasks, chemicals, etc.

2. Contract

An allowance of \$6,100 per year for the first two years reduced to \$3,700 for the remainder of the project is provided for hiring local administrative and secretarial help and purchasing local supplies according to the following budget:

<u>Cost Item</u>	<u>Annual Cost</u>
Secretary	\$3,500
Administrative Assistant	\$2,400 (first two years only)
Local Supplies	\$ 200 (first two years only)

APPENDIXTABLE 5Faculty of Agriculture - Additional Positions
Established in the Triennial Plan

<u>Department</u>	<u>Additional Positions</u>	
	<u>1971-72</u>	<u>1972-73</u>
Agric. Engineering & Land Planning	1	0
Animal Science and Production	1	1
Crop Science and Production	2	2
Rural Economy and Extension	2	1
Soil Science and Agric. Chemistry	1	1
Forestry	0	0
Home Economics	1	1

APPENDIXTABLE 6

Participant Training Schedule - 2 years each

<u>Position</u>	<u>FY</u>			
	<u>72</u>	<u>73</u>	<u>74</u>	<u>75</u>
1. Agriculture Marketing			X	
2. Crop Protection			X	
3. Agriculture Production Econ.		X		
4. Horticulture	X			
5. Soil Science (Fertility)				X
6. Pasture Agronomy			X	
7. Poultry Science	X			
8. Agriculture Extension/Admin.		X		
9. Agriculture Engineering				X
10. Other		X	X	X

APPENDIX

TABLE 7
COU Recurrent Dollar Staff Cost for
Makerere Faculty of Agriculture

<u>Academic Year</u>	<u>Triennial Estimate</u>	<u>Research^{2/}</u>	<u>Instruction^{3/}</u>	
			<u>Under-graduate</u>	<u>Post-Graduate</u>
1970-71	510,000 ^{1/}	235,000	191,200	63,800
1971-72	649,000 ^{1/}	324,500	233,800	90,700
1972-73	723,000 ^{1/}	361,500	251,800	109,700
1973-78	<u>4,000,000^{1/}</u>	<u>2,000,000</u>	<u>1,400,000</u>	<u>600,000</u>
Total	5,882,000	2,941,000	2,076,800	664,200

^{1/} Cost figures taken from Makerere University College triennial estimates 1970-73 dated February, 1970.

^{2/} John Nickel, Dean of the Faculty of Agriculture, estimates that 50 percent of the recurrent costs are spent on research.

^{3/} Based on the estimated full-time student equivalent (FISE) in the Triennial Development Plan. Each post-graduate student is calculated as 1 $\frac{1}{2}$ FISE. Undergraduate instruction includes students in agriculture, forestry, agricultural education, home economics, and economics students taking the rural economics option.

APPENDIXTABLE 8GOU Direct Student Dollar Costs in the Faculty of Agriculture^{1/}

<u>Academic Year</u>	<u>Undergraduate</u>		<u>Postgraduate</u>		<u>Total</u>
	<u>Number</u>	<u>Cost</u>	<u>Number</u>	<u>Cost</u>	
1970-71	269	192,000	60	43,000	235,000
1971-72	291	208,000	75	54,000	262,000
1972-73	294	210,000	85	61,000	271,000
1973-76	300	<u>1,072,000</u>	90	<u>322,000</u>	<u>394,000</u>
Total		1,662,000		460,000	2,162,000

^{1/} Calculated at \$715 per student per year. This includes room, board, books, allowances, laundry and special fees.

TABLE 9GOU Dollar Cost of Subsidized Housing for Faculty of Agriculture Staff

<u>Academic Year</u>	<u>No. of Staff</u>	<u>Housing Subsidy</u> ^{1/}	<u>Allocated to Research</u>	<u>Allocated to Instruction</u>	
				<u>Undergraduate</u>	<u>Postgraduate</u>
1970-71	39	35,000	17,500	13,100	4,400
1971-72	46	41,000	20,500	14,800	5,700
1972-73	51	46,000	23,000	16,100	6,900
1973-76	55	<u>228,000</u>	<u>114,000</u>	<u>79,800</u>	<u>34,200</u>
Total		350,000	175,000	123,600	51,200

^{1/} Subsidy estimated at \$900 annually per staff member.

APPENDIXTABLE 10COU Dollar Overhead Costs of the Faculty of Agriculture

<u>Academic Year</u>	<u>Overhead Costs</u> ^{1/}	<u>Allocated to Research</u>	<u>Allocated to Undergraduate</u>	<u>Allocated to Postgraduate</u>
1970-71	102,000	51,000	38,240	12,760
1971-72	128,000	64,900	46,760	18,140
1972-73	154,600	72,300	50,360	21,940
1973-78	<u>800,000</u>	<u>400,000</u>	<u>280,000</u>	<u>120,000</u>
Total	1,176,400	588,200	415,360	172,840

^{1/} Calculated at 20 percent of annual staff recurring costs. This includes central administration, libraries, halls of residence, administration, and sports program.

TABLE 11Estimated Dollar Depreciation of Capital Facilities of Faculty of Agriculture

<u>Academic Year</u>	<u>Total Depreciation</u>	<u>Research</u>	<u>Instruction</u>	
			<u>Undergraduate</u>	<u>Postgraduate</u>
1970-71	86,000	43,000	32,000	11,000
1971-72	100,000	50,000	36,000	14,000
1972-73	114,000	57,000	40,000	17,000
1973-78	<u>600,000</u>	<u>300,000</u>	<u>210,000</u>	<u>90,000</u>
Total	900,000	450,000	318,000	132,000

APPENDIXTABLE 12Estimated Dollar Contribution (Recurrent) of Other External Donors to Faculty of Agriculture

<u>Academic Year</u>	<u>Total Recurrent Contribution</u>	<u>Research</u>	<u>Instruction</u>	
			<u>Undergraduate</u>	<u>Postgraduate</u>
1970-71	550,000	275,000	69,000	206,000
1971-72	550,000	275,000	77,000	198,000
1972-73	550,000	285,000	82,000	193,000
1973-78	<u>2,000,000</u>	<u>1,000,000</u>	<u>300,000</u>	<u>700,000</u>
Total	<u>3,650,000</u>	<u>1,825,000</u>	<u>528,000</u>	<u>1,297,000</u>

TABLE 13Estimated Dollar Cost of Proposed AID Assistance to Faculty of Agriculture (\$'000)

<u>Academic Year</u>	<u>Net Cost</u>	<u>Research</u>	<u>Instruction^{3/}</u>	
			<u>Undergraduate</u>	<u>Postgraduate</u>
1970-71	749 ^{1/}	383	91	275
1971-72	149 ^{1/2/}	82	17	50
1972-73	427 ^{1/}	221	53	153
1973-78	<u>1,112</u>	<u>598</u>	<u>130</u>	<u>384</u>
Total	2,437	1,284	291	662

1/ Nine contract staff (OPEX) calculated at \$34,000/staff member. One contract staff member fully funded at \$40,000 per annum. All staff expected to arrive in last quarter of FY 1971.

2/ Three months' funding. Staff on board only last quarter of FY 1971.

3/ Seventy-five percent of total instructional costs allocated to postgraduate instruction. This is a greater proportional allocation to postgraduate instruction than for the rest of the faculty as it is anticipated that the AID-supported staff will devote more of their time to development and implementation of the postgraduate program.

APPENDIXTABLE 14

Source of Total Annual Dollar Expenditures for Research at the Faculty of
Agriculture

<u>Source</u>	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>
<u>G.O.U.</u>				
Recurrent costs	255,000	324,500	301,000	2,000,000
Staff housing	17,500	20,500	23,000	114,000
Overhead	51,000	64,900	72,300	400,000
Capital depreciation	<u>43,000</u>	<u>50,000</u>	<u>57,000</u>	<u>300,000</u>
Total G.O.U.	366,500	459,900	513,300	2,814,000
A.I.D.	383,000	82,000	221,000	590,000
Other Donors	<u>275,000</u>	<u>275,000</u>	<u>275,000</u>	<u>1,000,000</u>
Total	1,024,500	816,900	1,009,300	4,414,000

APPENDIXTABLE 15Source of Total Annual Dollar Expenditures for Undergraduate
Instruction in the Faculty of Agriculture

<u>Source</u>	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>
<u>G.O.U.</u>				
Recurrent Costs	192,100	233,600	251,800	1,400,000
Direct student costs	192,200	208,000	210,000	1,072,000
Staff housing	13,100	14,800	16,200	79,800
Overhead	38,240	46,760	50,360	260,000
Capital depreciation	<u>32,000</u>	<u>36,000</u>	<u>40,000</u>	<u>210,000</u>
Total G.O.U.	467,540	539,360	568,360	2,041,800
A.I.D.	91,000	16,750	52,750	130,750
Other Donors	<u>206,000</u>	<u>198,000</u>	<u>193,000</u>	<u>700,000</u>
Total	764,540	754,110	814,110	3,677,550

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APPENDIXTABLE 16Source of Total Annual Dollar Expenditure for Postgraduate
Instruction in the Faculty of Agriculture

<u>Source</u>	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>
<u>G.O.U.</u>				
Recurrent Costs	63,800	90,700	109,700	600,000
Direct student costs	43,000	54,000	61,000	322,000
Staff housing	4,400	5,700	6,900	34,200
Overhead	12,760	18,140	21,940	120,000
Capital depreciation	11,000	14,000	17,000	90,000
Total G.O.U.	134,960	182,540	216,540	1,166,200
A.I.D.	275,000	50,000	153,000	354,250
Other Donors	69,000	77,000	82,000	300,000
Total	488,960	309,540	451,540	1,850,450

APPENDIXTABLE 17

Annual per FTSE Dollar Cost of Undergraduate Instruction in
the Faculty of Agriculture

<u>Year</u>	<u>Total Cost</u>	<u>No. of FTSE</u>	<u>Cost/FTSE</u>
1970-71	764,540	269	2,842
1971-72	754,110	291	2,591
1972-73	814,110	294	2,769

TABLE 18

Annual per Student Dollar Cost of Postgraduate Instruction in
the Faculty of Agriculture

<u>Year</u>	<u>Total Cost</u>	<u>No. of Students</u>	<u>Cost/Student</u>
1970-71	488,960	60	8,316*
1971-72	309,540	75	4,154
1972-73	451,540	85	5,418

*Includes two-year funding for AID contract. \$8,316 for two years or \$4,158 per year.

APPENDIXTABLE 19

Estimated Contribution of Other External Donors (per annum,
1970-73 triennium)

	<u>Total</u>	<u>Recurrent</u>	<u>Capital</u>
Norway	400,000	150,000	250,000
Rockefeller Foundation	250,000	195,000	50,000
Canada	180,000	130,000	50,000
United Kingdom	70,000	65,000	5,000
Denmark	25,000	10,000	15,000
Total	920,000	550,000	370,000

The Faculty of Agriculture estimates that these funds are assigned approximately 80% to post-graduate studies and research and 20% to undergraduate studies.

M'GILVAINE