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AGRICULTURAL EDUCATION IN UGANDA

- Arapai Agricultural College, Seroti
- Bukalasa Agricultural College, Bombo
- Veterinary Training Institute, Entebbe



OFFICE OF INTERNATIONAL PROGRAMS
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PROGRESS REPORT AID/afr-297
WEST VIRGINIA UNIVERSITY - USAID PROJECT
AGRICULTURAL EDUCATION IN UGANDA

Victor F. Amann
Chief of Party

INTRODUCTION

West Virginia University has been involved in this diploma level agricultural education project for 5 years. This is a progress report of the developments and achievements of the West Virginia University/USAID Contract program for the period June 1967 through May 1968.

Much of this report was compiled from monthly progress reports submitted by West Virginia University staff located at the colleges. Information was also taken from monthly and annual reports submitted by the principals of the colleges to their Ministries. Other sources of information were notes taken at meetings with staff members and communications with officials of USAID, Uganda Government ministries, college principals, staff members, and the University.

Copies of the report in draft form were sent to all West Virginia University staff and the principals of the colleges. This was done to allow comments from people on the scene at the colleges, thereby insuring maximum accuracy in the information.

This report also includes evaluations of the progress of the project since its beginning. These evaluations are judgments made by the writer and errors in judgment are his responsibility. The report includes information about the project from its beginning, but major emphasis is on the period June 1967 - May 1968. A historical development of the project is included for the convenience of readers not familiar with the project.

ECONOMIC NEED FOR AGRICULTURAL TRAINING

Uganda has a predominately agricultural economy which employs about 80% of its population and produces 60% of its gross domestic product. A large proportion of the farmers in Uganda produce mostly for subsistence with only small amounts of their production moving through the market.

The market sector of the economy has traditionally consisted of two crops -- coffee and cotton. These crops contribute about 88% of the foreign exchange earnings to Uganda's economy. In 1960-61, cotton earned 41% of Uganda's foreign exchange and in 1965-66, 31%. Coffee increased in

relative importance from 47% to 57% of foreign exchange earnings in the same period.

Other agricultural products produced relatively small amounts of export earnings. In 1965-66, total exports amounted to \$52.5 million, of which tea was valued at \$2.3 million, hides and skins \$1.9 million, while coffee sales amounted to \$30.4 million and cotton \$16.7 million.

The Government of Uganda has recognized the hazards depending on a two-crop economy and has made concerted efforts for diversification. There is a need to produce a greater variety of crops for export. There are also growing needs for more food and fiber production to satisfy internal demands as population and income grow.

The population of Uganda increased from 6.8 million to 7.7 million people in the period 1961-1966. During this period, income increased from \$23 to \$31.5 per capita per year. The goals of the Five Year Plans are to increase per capita income to \$50 per annum by 1981.

If this goal is achieved, there will be increased demands for food and fiber, because as incomes rise there will be greater demands for higher resource using foods such as livestock products, fruit and vegetables. This will require greater output from farmers and changes in production patterns.

Changing production patterns to meet growing food and fiber needs for domestic consumption and greater export demands will require a large input of trained manpower. These men will be needed to fill positions in government services in extension, research, teaching and administration. The private sector of the economy will also need trained manpower in the processing and marketing industries. As incomes rise and people demand more perishable products, improved market management will be necessary and more highly trained technicians will be needed in processing, wholesaling, and retailing firms. To fill these manpower needs, graduates from the diploma level agricultural colleges will be in demand.

The Government of Uganda (G.O.U.) has recognized the need for more trained manpower in agriculture. The extension service was grossly understaffed by Ugandans in 1963, and the USAID, on request from G.O.U., agreed to help Uganda develop its agricultural colleges to train the needed staff. The G.O.U. has a goal of about 1,400 extension workers who will have contact with farmers. These men will work in the Department of Agriculture in the Ministry of Agriculture, Forestry, and Cooperatives. This Ministry also has rapidly expanding requirements for trained personnel in government sponsored agricultural enterprises.

The Department of Veterinary Services in the Ministry of Animal Industry, Game and Fisheries also has requirements for extension personnel. The Department of Veterinary Services trains its people at the Veterinary Training Institute, Entebbe. This college trains students to both the certificate and diploma levels.

Entrance requirements for all students at the Veterinary Training Institute is the Cambridge School Certificate with passes in biology and chemistry. At the end of their second year, students are evaluated and only those with the best academic performance pass to the third year as candidates for the diploma. Students who have not performed as well are awarded a certificate and are posted in the field as Veterinary Assistants (V.A.'s). There is also a possibility that some students may fail at the

end of the second year. Those who earn the diploma go in the field as Animal Husbandry Officers (A.H.O's) with a higher salary and more responsibility.

The Department of Agriculture in the Ministry of Agriculture, Forestry and Cooperatives has two agricultural colleges, which train students to the 3-year diploma level. Bukalasa Agricultural College is located 30 miles north of Kampala and Arapai Agricultural College is located 230 miles north and east of Kampala. The Cambridge Certificate with passes in biology and chemistry is also required for students entering these colleges. Arapai and Bukalasa do not award the 2-year certificate at the present time, but award only the 3-year diploma.

The curriculum at Arapai is biased toward farm mechanization, while the one at Bukalasa is oriented toward general agriculture. Basic course offerings are much alike, except that Arapai has a greater number of courses in farm mechanization and mechanics, but Bukalasa is also developing a stronger shop skills course. Both institutions award diplomas in agriculture and graduates are posted to all parts of Uganda.

At the time of independence, Uganda had a small number of trained Ugandans in its extension services. G.O.U. requested help from the United States government to develop its agricultural manpower training institutions. West Virginia University (WVU) under a contract with USAID has provided instructors, who played an important role in developing these three institutions. This was done through classroom teaching, developing improved practical training courses and selecting and purchasing books and other teaching aids and audio-visual equipment purchased with funds provided by USAID.

Curricula at the three colleges were revised and upgraded to include improved classroom teaching and increased practical training. Bukalasa had both certificate and diploma curriculums before this date, but since then both Bukalasa and Arapai have had only the 3-year diploma curriculums. New courses were added and existing courses were revised and upgraded.

This report is concerned with the activities of the WVU in the three colleges. The emphasis in this report will be to point out the accomplishments, problems and goals of West Virginia University in helping the G.O.U. build three institutions.

OBJECTIVES OF THE CONTRACT

USAID/WVU/afr-111 was the first contract signed between USAID and WVU to assist the G.O.U. in its agricultural education program. This contract was signed May 28, 1963, but was superseded by USAID/WVU/afr-297 signed on August 11, 1965. West Virginia University has been operating under this contract since that date.

The objective of the contract was for USAID through WVU to assist the G.O.U. expand and develop the diploma level agricultural education institutions. The main goal was to increase numbers of trained manpower to staff the extension service establishment.

WVU contracted with USAID to assist the G.O.U. in developing improved curriculums and increase the quantity and quality of practical training.

This was to be done by providing instructors, books, farm shop equipment, audio-visual equipment and other teaching materials.

WVU's original staff commitment was for:

- 2 - Extension Methods training instructors
- 2 - Agricultural Economists, specialized in Farm Management
- 3 - Animal Husbandry instructors, one each at Bukalasa, Arapai, and V.T.I.
- 1 - Veterinary Medicine instructor, V.T.I.

The agreement also stated that one team member should be designated as team leader. He was to be an Agricultural Education advisor to USAID, teach full time and carry the administrative duties for the contractor. In 1966 a full time Chief of Party was provided under the contract. He is located in Kampala with no teaching responsibilities.

G.O.U. provided housing and basic furnishing and office space for all WVU teaching staff. USAID provides kitchen stoves and refrigerators for contract staff, plus draperies, rugs and cushions for the chairs which G.O.U. provides. USAID provides housing, furniture and office space for the Chief of Party. In 1967, a half-time secretary was provided for the Chief of Party and an administrative assistant who is shared with USAID/WVU Contract 411.

The project output goal in the April 1963 agreement was 40 agricultural diploma graduates, 60 agricultural certificate graduates and eight animal husbandry officers, annually. An additional group of field staff from the 164 assistant agricultural officers (A.A.O's) and 600 agricultural assistants (A.A.'s) were to receive refresher training in extension methods.

In December 1963, G.O.U. requested USAID to change the staff makeup. The contract was amended and WVU agreed to furnish, under this amendment, the following staff:

- 1 - Extension Methods Instructor
- 2 - Agricultural Economists specialized in Farm Management
- 3 - Animal Husbandry Instructors, one each at Arapai, Bukalasa, and V.T.I.
- 1 - Veterinary Medicine Instructor
- 1 - Agricultural Engineer
- 1 - Vocational Agriculture Instructor

The WVU contract staff increased by one, but the type of expertise was changed to include one agricultural engineer and one vocational agriculture instructor, and an extension methods position was eliminated. The agricultural mechanics instructor was added to assist the Ministry of Agriculture, Forestry and Cooperative train manpower in farm mechanization. This changed program began in 1964 and was located at Arapai, where farm mechanization and farm management were emphasized in the curriculum. Arapai began training students at the diploma level, and graduated its first class in 1966. The vocational agriculture instructor was added primarily to help teach the 30 Tanzania students, USAID sponsored at Bukalasa.

In 1966 WVU contract staff had changed again, with further changes in 1967.

1966-67

ARAPAI AGRICULTURAL COLLEGE

- 2 - Agricultural Engineers
- 1 - Animal Husbandry
- 1 - Soils and Agricultural Chemistry

1966-67

BUKALASA AGRICULTURAL COLLEGE

- 2 - Vocational Agriculture
- 1 - Soils and Agricultural Chemistry
- 1 - Animal Husbandry

1966-67

VETERINARY TRAINING INSTITUTE

- 1 - Animal Husbandry
- 1 - Dairy Husbandry
- 1 - Veterinary Medicine

1966-67

KAMPALA

- 1 - Chief of Party

1967-68

ARAPAI AGRICULTURAL COLLEGE

- 1 - Extension Methods
- 1 - Farm Mechanics
- 1 - Soils and Agricultural Chemistry

1967-68

BUKALASA AGRICULTURAL COLLEGE

- 2 - Vocational Agriculture
- 1 - Soils and Agricultural Chemistry
- 1 - Animal Husbandry

1967-68

VETERINARY TRAINING INSTITUTE

- 1 - Animal Husbandry
- 1 - Dairy Husbandry
- 1 - Veterinary Medicine

1967-68

KAMPALA

- 1 - Chief of Party

The contract team reached its peak in 1966, but was reduced by one Animal Husbandry instructor, at Arapai, in 1967. There will be further staff changes in 1968-69 which will be discussed later in this report.

The broad objectives of the project have remained to train staff for the Department of Agriculture and the Department of Veterinary Services. The role of West Virginia University in specific areas of instruction has changed from providing extension methods and farm management instructors to more emphasis on farm mechanization and soil chemistry. There was a shift back to extension methods in the FY 68 project agreement, and plans are for greater emphasis in extension methods in the future.

These changes have come about by a shift in requirements for training by G.O.U. since the earlier part of the project. In the past year the changes were due to positions being filled by Ugandans who returned from training in the participant training program in the U.S.A. As more trained Ugandans return, more of the positions presently filled by WVU staff will be filled by Ugandans and WVU staff will be reduced.

The G.O.U. projected need for graduates was much lower in 1963 than it was in later years. The anticipated needs in 1963 were for 40 agricultural diplomates and 60 agricultural certificates and eight animal husbandry diplomates. By 1965, the goals had changed to an annual output of 80 general agricultural diploma graduates from Bukalasa, 80 farm management and farm mechanization diploma graduates from Arapai, and 40 animal husbandry diploma graduates from V.T.I.

The annual intake of students in 1965 and 1966 was 100 first year students at Bukalasa and Arapai. The large increase in student body has presented many problems in housing, availability of classroom and teaching materials and books. The problem of teaching practical sections were compounded with the large number of students. USAID has provided large amounts of funds for teaching aids, books, and construction to supplement the needs of large classes.

The largest inputs by USAID in teaching facilities were made at Bukalasa to construct an animal husbandry unit and classroom. The animal husbandry teaching unit consists of a teaching arena, a modern dairy unit and some farm machinery for forage and feed production associated with livestock production. Since then, small inputs were made to construct facilities at V.T.I., where a small dairy unit was built with USAID funds.

Other facility inputs financed by USAID were a house for Agricultural College staff at Bukalasa, a dormitory of permanent construction and five quonset huts for temporary student housing. Temporary student housing was provided at Arapai where USAID provided four quonset huts.

These facilities were necessary to meet the increasing numbers of graduates from the institutions. The other inputs of books, laboratory equipment, shop tools and equipment and visual aid equipment were necessary to implement the objectives of changing and upgrading curriculums.

USAID funds were used to provide the staff and other inputs that WVU needed to carry out its contract agreement. G.O.U. has put in greater amounts of money to finance the needs of a larger student body and for operation of larger institutions. As more Ugandans return from training programs and are posted to the staff, the G.O.U. inputs in funding will rise. More of the teaching responsibility will be shifted to Ugandans as WVU staff members are reduced. USAID inputs in teaching materials and commodities will be reduced as its staff inputs are reduced.

STAFFING OF THE COLLEGES

The diploma level agricultural college staffs consist of Ugandans, Expatriates (mostly from the U.K.) and WVU Contract members. This provides students with a mixture of approaches to education. The objective of this project is to have an entire Ugandan staff trained for all the positions. A participant training component is incorporated in the project agreement between USAID and G.O.U. to provide this training.

The staff is the most important part of the teaching process. Level of education and years of experience can be measured and numerically categorized. Attitudes toward teaching involves a whole spectrum of measures beyond the purpose of this report. Attitudes toward teaching depend largely on the working atmosphere the institution provides its staff members. Many attitudes are related to salaries, opportunities for advancement and opportunities to provide a sense of achievement in student progress.

Length of Service

The WVU staff is recruited for a 24-month period with options to return if all parties concerned agree to it. In most cases, staff members have

stayed for at least one 2-year tour, but in a few instances staff members took a shortened tour. In this reporting period, several staff members have gone on home leave or declared their intention to take another tour. Bennie A. Perry and Calvin C. Merinar have returned from home leave for their second tour. Frank Woodson and William B. Easley, who are presently on home leave, will return for their third and second tours, respectively. S.A. Thies has decided to terminate his contract in August, 1968.

Several people have declared intentions to extend beyond the 24-month period. C. Patrick Moore will extend from September to December; Victor F. Amann will extend for the same period. Gordon Ferguson declared a desire to extend from January to June of 1969 and Dennis Kluver requested an extension from March 1969 to June 1969. Jack Gay requested an extension of tour from November 1968 to June 1969. This has been agreed to by USAID and the Ministry. All five of these positions will be phased out at the end of the requested extensions.

The average length of stay by WVU contract has been increasing. This is necessary to develop a program where greater continuity and staff members who have greater familiarity with local problems is important.

There will, however, be a reduction in WVU staff in the next fiscal year. Part of this cut will be due to the normal and planned development of the contract program, but several positions will be reduced because of orders from Washington D.C. to cut overseas USAID staff. This was called the Balance of Payments (Bal Pa) exercise.

The WVU Agricultural Mechanics instructor positions at Arapai and Bukalasa Agricultural College will be phased out in June 1969, because Ugandans have returned from the USAID participant training program to fill these positions. Mr. A. S. M. Mukacha, who has a double B.S. degree in Agricultural Mechanics and Agricultural Engineering, will replace Gordon Ferguson and Mr. Z. Olum with a B.S. in Agricultural Mechanics, will replace Dennis Kluver. The requested extensions by Gordon Ferguson and Dennis Kluver have been verbally approved. The extension will provide a one-year overlap by WVU staff members and their replacements, which is considered adequate by USAID and WVU.

The WVU staffed Animal Husbandry at Bukalasa will be phased out by USAID, in December, 1968, due to BalPa staff cuts. The Bukalasa Agricultural College Animal Husbandry section now has three men. Two of the present staff are Ugandans; E. K. Oduhuba, who has a M.S. degree from WVU and has 2½ years experience on the Bukalasa staff. R. U. A. Ruvwa is a recent graduate from Makerere, with a B.Sc. in Agriculture, but will depart in August 1968, as a participant trainee to study for a M.S. degree in Agronomy. The departure of Patrick Moore will leave the Animal Husbandry section weakened unless replacements are recruited and placed at the college soon. The Department of Agriculture does not want a WVU replacement for the position because they plan to fill it with a Makerere graduate in April, 1969.

The Chief of Party position will be phased out by unilateral USAID decision. It will not be eliminated, but will be combined with the Chief of Party position USAID/WVU Contract 411. That contract has seven positions at Makerere, but when the two positions are combined it will require one administrator to work with four institutions in two Ministries, plus Makerere

and USAID. This will require some quick footwork at times. This decision by USAID indicates that USAID places less value on the need for University representatives as liaison persons than it placed on the need for these positions when they were first established.

Clearing second tours through the Ministry of Agriculture encountered some difficulties. In two cases, WVU staff members were cleared for home leave and return, but before departure the Ministry questioned whether they needed them for another tour. This indicates lack of planning. The result of this action caused consternation among the staff and could lead to a drop in morale. The decision of S. A. Thies to terminate was a direct result of this indecision by the Department of Agriculture. His position was one which was placed in doubt by the Ministry after a second tour had been approved.

One staff member terminated during this reporting period. One voluntary termination was announced for early next reporting period, plus five programmed terminations which will take place during the 1968-69 reporting period. All but one WVU staff members reported on post last year are still on post or on home leave. The only WVU staff member who terminated during this reporting period was Robert Gay, Animal Husbandry Instructor at Arapai. He terminated in July 1968, and the position was eliminated in early 1969 due to orders from Washington to cancel all unfilled positions. The present WVU staff is listed in Table 1. The table also indicates dates of arrival and expected departure.

Table 1: West Virginia University Staff, June 1968

<u>Position and Post</u>	<u>Name</u>	<u>Arrival Date</u>	<u>Expected Departure Date</u>
<u>Kampala</u>			
Chief of Party	Amann, Victor F.	Sept. 1966	Dec. 1968 ^{3/}
<u>Arapai Agricultural College</u>			
Lecturer, Soil Chemistry	Perry, Bennie A.	Sept. 1965	Jan. 1970
Lecturer, Extension Methods	Easley, William B.	Feb. 1966	Aug. 1970
Lecturer, Agr. Mechanics	Ferguson, Gordon E. ^{1/}	Jan. 1967	June 1969 ^{3/}
<u>Bukalasa Agricultural College</u>			
Instructor, Vo. Agriculture	Thies, S. A.	July 1966	Aug. 1968 ^{2/}
Instructor, An. Husbandry	Moore, C. P.	Sept. 1966	Dec. 1968 ^{3/}
Lecturer, Agronomy	Sperow, C. B.	Jan. 1967	Jan. 1969
Instructor, Agr. Mechanics	Kluver, D. E. ^{1/}	March 1967	June 1969 ^{3/}
<u>Veterinary Training Institute</u>			
Instructor, An. Husbandry	Gay, J. M. ^{1/}	Nov. 1966	June 1969 ^{3/}
Instructor, Dairy Husbandry	Merinar, C. C.	April 1965	Sept. 1969
Lecturer, Vet. Medicine	Woodson, F. E.	Oct. 1963	July 1970

Table 1 (continued)

- 1/ Contingent on approval of extension of tour.
- 2/ Voluntary Termination.
- 3/ Programmed Phase-Out.

Table 2: West Virginia Staff Departures and Arrivals from Home Leave
June 1967 - June 1968

<u>Name</u>	<u>Departure</u>	<u>Arrival</u>	<u>Post</u>
Merinar, C.C.	July 10, 1967	Sept. 23, 1967	V.T.I.
Perry, B.A.	Sept. 25, 1967	Jan. 1, 1968	Arapai
Woodson, F.E.	Mar. 31, 1968	July 1, 1968	V.T.I.
Easley, W.B.	May 27, 1968	approx. Aug. 15, 1968	Arapai

Appendix Table B presents the present Ugandan staff at the colleges. There has been an increase in Uganda staff members since last reporting period.

Arapai has the same number of Ugandans on the senior staff but has increased junior staff members by one. Bukalasa has increased its senior staff by two Ugandans. J. C. O. Nyankori is now teaching Agricultural Economics but is scheduled to go to the U.S. as a participant trainee in August, 1968, to study toward a M.Sc. degree in Agricultural Economics. R. U. A. Ruvwa teaches Animal Husbandry and is also scheduled to leave in August 1968, to study toward a M.Sc. degree in Agronomy. The junior staff at Bukalasa has been enlarged with the addition of Miss Mary Mutonyi, who teaches Horticulture.

The Veterinary Training Institute has had the greatest change in staffing. The Principal position formerly held by Mr. Maurice Smith, (an expatriate) has been filled by S. Nondo (a Ugandan), since November 25, 1967. There has also been the addition of a Ugandan Biologist and an Animal Husbandry Officer on the V.T.I. staff.

Each college will receive one Ugandan returning from the USAID participant training program. According to the scheduled appointments, G. Kafero will return to V.T.I. with a B.S. in Animal Husbandry. Z. Olum will go to Bukalasa and A. S. N. Mukacha will go to Arapai in Agricultural Mechanics, both men have B.S. degree in Agricultural Mechanics. Olum and Mukacha returned to Uganda before June 1, 1968, and G. Kafero will return before August.

The addition of Ugandan staff members is partially meeting the objectives of the program. However, the Ugandans added to the staff this reporting nearly all have B.S. degrees and little or no teaching experience. They are scheduled to replace staff members with M.S. degrees and quite a few years teaching experience. This could lead to a decrease in professional competence in the classroom and practical teaching. USAID and the ministries concerned have agreed to provide a one-year overlap between each returning participant trainee and the WVU staff member. This was designed to help orient the new staff member with the past teaching program.

The average length of teaching experience at the colleges by the Ugandan staff is considerably less than that of WVU and expatriate staff members. A large part of the Ugandan staff has been trained in the past 5 years. Some were former extension field staff but few had any formal classroom teaching experience. A period of overlap with former staff members (whether he is WVU, Expatriate or Ugandan) can be important and useful if the new staff member uses it as a learning experience and if the departing staff member uses it as an opportunity to impart useful knowledge and orientation information.

Appendix Table C indicates the years of tenure by the expatriate staff at the colleges. They have the longest average time on the teaching staff, plus a fairly long tenure in Uganda as extension field staff before teaching in several instances. The increase in number of WVU staff member second tours will tend to reduce the large differences that existed in the past. There has been a reduction of one U.K. expatriate staff member at Bukalasa. A. W. J. Todd, who taught Agricultural Economics at Bukalasa, returned to the U.K. in June 1967, and was replaced by a Ugandan field staff member who taught part time for the remainder of that academic year. This year the position was filled by J. C. O. Nyankori, but he will leave in August 1968.

Formal Education of Staff Members at the Colleges

There is some difficulty in equating levels of educational experience in different systems of education. The methods of training and educational experience between the systems of education in the U.S. and British oriented universities differ. This report is not designed to evaluate these systems but it will be assumed that the B.Sc. and M.Sc. degrees in both systems are equal. Appendix Table D presents the academic training of all the college staff members.

All but one of the WVU staff members have M.S. degrees and one (B. A. Perry) has a Ph.D. in progress. The Chief of Party, who does not teach, has a Ph.D. in Agricultural Economics.

Eight expatriate staff members at the colleges are exclusively on the college staffs. V.T.I. has three F.A.O. and I.L.O. staff members who teach part time on that staff. Of the eight expatriate staff members, two have M.A. or M.Sc. degrees, four B.S. or B.A. degrees and two diploma or certificates.

There are 17 Ugandan senior staff members, three of whom are principals who do some teaching. Eight of the Ugandans presently on the staff have their degree education from U.S. universities. Five of these eight have earned M.S. degrees and three have earned their B.S. degrees in the U.S.

Six of the remaining Ugandan senior staff members have a B.S. as their highest degree and five of these earned their degrees in the University of East Africa and one earned his B.S. degree in England. Two senior staff members have diplomas which they earned at Makerere.

The level of formal education is not the sole criterion for measuring the ability of a teacher. Experience, attitude, and interest in teaching

are also important ingredients. Level of education is important from the standpoint of breadth and depth of knowledge of a subject and must be considered as a very important factor. Experience can partially substitute for formal classroom education but cannot be the only factor which makes a teacher competent. A high attainment of education, plus experience in teaching are very important and complementary ingredients in making instructors able to successfully impart knowledge.

PARTICIPANT TRAINING AND UGANDAN STAFFING

This project agreement states that WVU staff members act as instructor/advisors at the colleges in Uganda. This is a misconception because they are considered regular staff members like anyone else. Another part of the project agreement states that USAID will finance scholarships for competent Ugandans to obtain degree training in a qualified U.S. University. The purpose of this training is to prepare Ugandan staff member to fill the staff positions now filled by WVU and expatriate staff members.

The first participants were sent in 1963. These men were trained at the M.S. level and filled vacant positions on the staff. Six were sent and five returned to teach at the colleges (see Table 3).

Three of those sent later for B.S. level training and have returned to the teaching staff. Two who recently returned to Uganda were assigned to teach at the colleges. Z. Olum is at Bukalasa, and A. Mukacha is at Arapai. M. Okot returned in February 1968, and has been on the Arapai staff since March, 1968.

Table 3: Placement of Participant Trainees Who Returned to Teach at the Colleges

<u>Name</u>	<u>Departure Date</u>	<u>Date of Return</u>	<u>Level of Training</u>	<u>Specialty</u>	<u>Location</u>
Odhuba, E.K.	8-13-63	7-25-64	M.S.	Animal Husbandry	Bukalasa
Waibale, J.M.	8-13-63	3- 6-65	M.S.	Crop Husbandry	Arapai
Irigiei, R.A.	1-22-64	9-24-65	M.S.	Animal Husbandry	Arapai
Osuban, A.K.	8-13-63	7-12-64	M.S.	Agric. Economics	Arapai
Mwoga, V.N.	2- 3-65	9-16-66	M.S.	Agric. Chemistry	Bukalasa
Okot, M.W.	8-15-66	2-18-68	B.S.	Animal Husbandry	Arapai
Olum, Z.J.	8-20-66	5-24-68	B.S.	Agric. Mechanics	Bukalasa
Mukacha, A.S.	1-28-66	5-19-68	B.S.	Agric. Mechanics	Arapai

Three of the eight returned participant trainees are teaching at Bukalasa and five at Arapai. The posting of G. Kafero at V.T.I. will be the first participant training returnee to be posted at that institution. G. Kafero is scheduled to return to Uganda in July 1968.

J. Serwanja obtained his B.S. degree in December, 1967 at WVU. His academic performance was above average and suitable for acceptance in graduate school. It was suggested that he be allowed to remain at WVU and continue his studies toward a M.S. degree. USAID agreed to finance this M.S. program and G.O.U. agreed to allow him to stay. He is scheduled to return to the V.T.I. staff in August 1969.

All participants who returned to the college staffs and those who will return in 1968, received their U.S. degree training at W.V.U. Most of those who will return in 1969 from U.S. training are now studying at other Universities. There has been a tendency by USAID (U) or USAID/W to send participants to WVU, but a greater diversify of experience in training at various U.S. universities is recommended. It should be encouraged in the future that participants be sent to other universities in the U.S.

There was some difficulty in other universities in determining the amount of advanced standing the students with a Uganda diploma in agriculture should receive. Dr. Newton Baughman and Dr. Victor F. Amann wrote a paper which could be used as a basis of evaluation (Appendix G). The suggestions were followed with satisfactory results in several universities in the U.S.

The largest number of participants in the history of this project will be sent in 1968. Five of the eight scheduled to go will receive training at M.S. degree level. Table 4 presents the names and area of training of participants presently in training, plus those who have been selected to go for training in August 1968.

Table 4: Future Staff Members of Diploma Level Colleges in Uganda who are Presently Participant Trainees or Selected to Leave for Study in 1968 in U.S. Universities

<u>Name</u>	<u>Date Departure</u>	<u>Expected Return</u>	<u>Academic Degree Working Toward</u>	<u>Expected Location</u>
Kafero, G.	Aug. 1966	July, 1968	B.S. An. Husb.	V.T.I.
Serwanja, J.	Aug. 1966	July, 1969	M.S. An. Husb.	V.T.I.
Kemba, E.M.	Jan. 1967	Jan. 1969	B.S. Botany	Bukalasa
Hudda, M.A.	Aug. 1967	July, 1969	B.S. Voc. Agr.	Bukalasa
Kiyingi, C.	Aug. 1967	July, 1969	B.S. An. Husb.	V.T.I.
Nyankori, J.C.O.	Aug. 1968	July, 1970	M.S. Agr. Econ.	Bukalasa
Ruvwa, R.U.A.	Aug. 1968	July, 1970	M.S. Agronomy	Bukalasa
Lematia, G.A.	Aug. 1968	July, 1970	M.S. Agronomy	Arapai
Mukasa, Kiggundu	Aug. 1968	July, 1970	M.S. Agr. Chem.	Bukalasa
Eyedu, S.J.N.	Aug. 1968	July, 1970	M.S. Agr. Chem.	Arapai
Isabirye, J.L.K.	Aug. 1968	July, 1970	B.S. Agr. Extn.	Bukalasa
Nsereko, J.	Aug. 1968	July, 1970	E.S. Agr. Extn.	Arapai
Ssebowa, Miss S.	Aug. 1968	July, 1970	B.S. Home Econ.	Bukalasa

The return of trained Ugandians will improve the counterpart and staffing situation and will provide for the planned Ugandanization of the staffs by 1970 and 1971. A program of phase out has been worked out and presented to the ministries. Formal approval has not been received at the time of this report, but the plan suggests a one-year overlap between each participant returnee and the WVU staff member. Under present planning, the project will be completed by June 1971. After July 1969, the contract teaching staff will consist of three extension methods instructors, two soil chemists, one veterinarian and one dairy husbandry instructor.

Only two staff members have counterparts, with a third expected soon. The three WVU staff positions which have counterparts will be phased out by June 1969. The Bukalasa Animal Husbandry position has no counterpart but

will be phased out in December 1968. No one will be recruited by WVU to fill it. The Department of Agriculture will recruit a Makerere graduate.

Table 5: Ugandan Counterparts of WVU Staff at Diploma Level Colleges, June 1968.

<u>WVU Staff Member</u>	<u>Position</u>	<u>Ugandan Counterpart</u>
<u>Arapai Agricultural College</u>		
Easley, W.B.	Agricultural Extension	None
Ferguson, G.E.	Agricultural Mechanics	Mukacha, A.S.
Perry, B.A.	Agricultural Chemistry	None
<u>Bukalasa Agricultural College</u>		
Kluyer, D.E.	Agricultural Mechanics	Olum, Z.
Moore, C.P.	Animal Husbandry	None
Sperow, C.B.	Agricultural Chemistry	None
Thies, S.A.	Agricultural Extension	None
<u>Veterinary Training Institute</u>		
Gay, J.M.	Animal Husbandry	None (Kafero Exp.)
Merinar, C.C.	Dairy Husbandry	None
Woodson, F.E.	Veterinary Medicine	None

There are 34 senior staff positions in three colleges of which eight are filled by returned Ugandan participant trainees. There will be 12 in training in the U.S. in September 1968, of which four are scheduled to return in 1969. The remainder will return in mid-1970. In addition to this, three principal positions are filled by Ugandans and four veterinarian positions that will be filled from the University of East Africa.

There will be a need for about seven more participants for 1969 to return by 1971. The present plans are to complete this project by July 1971. If all participants now in training return to teaching and if sufficient numbers are sent next year, there will be a Uganda staff by the end of the contract period. This will meet the project agreement staffing objectives as presently planned.

OFFICIAL VISITS AND STUDY TOURS

Several WVU visitors stopped in Uganda since the last report. The first one was Dr. Homer Evans, Assistant Director of the Agricultural Experiment Station at WVU. He was not in Uganda on official business, but was on official business in Nigeria and Nairobi and stopped in Kampala enroute. He was here June 11-12, 1967.

The next unofficial visitor was Dr. Robert Munn, Acting Provost, and Director of Libraries at WVU. He was officially out on a study tour at Makerere, but spent August 8, 1967 on a visit to Bukalasa.

Mr. Hugh E. Cameron, Editor, International Programs at WVU was in Uganda on official business for Contract 411. He spent the period September 11-14

presenting an Audio-Visual workshop to diploma college staff. The workshop was attended by 18 Ugandan and expatriate staff members. The principals of all three colleges attended at least one day of the program.

The objective of the program was to create more interest in the use of Audio-Visuals as teaching tools. The program included the definition of Audio-Visual methods and the potential use of existing equipment available at the colleges. Emphasis was given to materials and equipment locally available for use in Audio-Visuals.

Victor F. Amann accompanied Mr. E. Odeke, Assistant Commissioner of Agriculture in charge of education, and Mr. H. Kagoda, Deputy Commissioner of Veterinary Services in Ministry of Animal Industry, Game and Fisheries, Department of Veterinary Services, to Ethiopia. The purpose of the trip was to acquaint the Ugandan officials the facilities and curriculum at the College of Agriculture, Haile Sellassie I University.

The reason for this trip was to determine if the ministries wanted to send participant trainees to study there. The present directive from AID/W is that if undergraduate training is available in Africa for USAID sponsored participants it must be taken in Africa. At the time it appeared that several Uganda students would fit that category of training. The results shown earlier indicate that a large proportion of the participants chosen were for M.S. level training and the B.S. candidates were for fields of study not presently available in Ethiopia.

The one official trip from WVU was Dr. Ernest Nesius, Vice President, who visited Uganda March 16-25, 1968. He visited all the colleges in East Africa which have WVU staff members. In Uganda he briefly conferred with all WVU staff members, USAID officials and many Uganda ministry officials, and the principals of the three colleges.

STUDENT TRAINING RELATED TO MANPOWER NEEDS

Arapai and Bukalasa Agricultural Colleges are financed with funds provided to the Department of Agriculture, and V.T.I. is financed by funds from the Department of Veterinary Services. These being departmental institution, the primary purpose of the training is to provide trained manpower for the respective departmental staff, with emphasis on the extension service.

The present and projected establishments for the extension service are presented in Table 6. If this establishment is not changed, there will be a need for 790 certificate graduates in the Department of Agriculture and 90 certificates in the Department of Veterinary Services, between 1968 and 1972. There will also be need for 183 diplomates in the Department of Agriculture and 58 diplomates in the Department of Veterinary Services during the same period. There will be additional requirements to fill losses due to resignations, transfers and retirements.

Table 6: Extension Staff Establishment, Showing Personnel in 1968 and Projected Needs by 1972

<u>Organization Position Title</u>	<u>Year</u>	
<u>Department of Agriculture</u>	<u>1968</u>	<u>1972</u>
Agricultural Assistants (A.A.'s) Certificate	610	1400
Assistant Agriculture Officers (A.A.O's) Diploma	126	309
<u>Department of Veterinary Services</u>		
Veterinary Assistants (V.A.'s) Certificate	260	350
Assistant Animal Husbandry Officers (AAHO's) Diploma	60	90
Livestock Improvement Officers	2	30

The need for certificate level trained manpower in the Department of Veterinary Services can be met through the present system of education at V.T.I. Under this system only the best performing second year students are promoted to the third year with the opportunity to study for the diploma. Those not promoted, but who complete the second year successfully, are awarded a certificate and sent to the field as Veterinary Assistants.

The results of the 1967 class indicate how the procedure works. The second year class at V.T.I. had 30 students: two that failed, 17 received certificate and 11 passed to the third year to be candidates for the diploma.

The Department of Agriculture does not have a similar system. All students at Arapai and Bukalasa are candidates for the Diploma and no Certificates are awarded. It was decided in July 1967 that Arapai would take in 75 students for a certificate program, beginning in March 1968. However, in March 1968, just before the beginning of the first term, this decision was reversed and students were admitted for diploma level training.

The projected establishment for the extension service indicates a need for 790 Agricultural Assistants by 1972 but no plans have been made to train them. There are however, 481 diplomates in training for the Agriculture Department and only 183 A.A.O. vacancies in the present establishment. Plans should be made and instituted to adopt a system similar to the one used at V.T.I., or to change one school to certificate level training. No announcement has been made of plans to change the training programs in the Department of Agriculture funded colleges.

Enrollment and Output of the Colleges

One of the targets of this project was the expansion of enrollment and number of graduates from the three colleges. The total number of students was 109 in 1963, all of whom were enrolled at the certificate level of training. The peak enrollment was reached in 1966, when 497 students were enrolled, but this number decreased in 1968 to 451 students. Table 7 presents the chronological change in class size at the colleges for the period 1963-1968.

Bukalasa has had a decrease in enrollment in 1968 because the cooperative college which is on the same campus is using more of the existing

facilities. Bukalasa had its peak student enrollment of agricultural students in 1966, when it had 208 students.

Table 7: Enrollment by Academic Year, Diploma Colleges in Uganda, 1963-1968

ARAPAI AGRICULTURAL COLLEGE

<u>Class</u>	<u>1963</u>	<u>1964</u>	<u>Enrollment</u> <u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>
1st Year	11	30	97	100	44	76
2nd Year	9	5	30	86	95	44
3rd Year	-	-	-	30	81	93
Total	<u>20</u>	<u>35</u>	<u>127</u>	<u>216</u>	<u>220</u>	<u>213</u>

BUKALASA AGRICULTURAL COLLEGE

<u>Class</u>	<u>1963</u>	<u>1964</u>	<u>Enrollment</u> <u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>
1st Year	26	29	90	100	54	28
2nd Year	5	15	20	47	88	50
3rd Year	22	15	14	61	48	80
Total	<u>53</u>	<u>59</u>	<u>124</u>	<u>208</u>	<u>190</u>	<u>158</u>

VETERINARY TRAINING INSTITUTE

<u>Class</u>	<u>1963</u>	<u>1964</u>	<u>Enrollment</u> <u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>
1st Year	14	26	35	33	40	36
2nd Year	22	6	14	20	31	26
3rd Year	-	8	14	20	11	18
Total	<u>36</u>	<u>40</u>	<u>63</u>	<u>73</u>	<u>82</u>	<u>80</u>

Women students were accepted for diploma level training at Bukalasa Agricultural College in 1965. Two agriculture diplomas were awarded to women in 1966. These were the first women to receive diplomas at Bukalasa. One of these graduates, Miss Sarah Ssebowa, will go to the U.S. for B.S. degree training in Home Economics in August 1968. She will be sponsored partially by a University scholarship. USAID will fund her transportation and at the end of her WVU scholarship will support her training for the remainder of the period required to earn a B.S. degree.

The women student population at Bukalasa increased since 1965. Table 8 presents the numbers of women students studying at the diploma level agricultural education colleges during the period 1965-1968.

Table 8: Women Students, Registered by class at Bukalasa and V.T.I., 1965-1968

Class	Enrollment							
	Bukalasa				V.T.I.			
	1965	1966	1967	1968	1965	1966	1967	1968
1st Year	8	17	9	5	-	-	5	10
2nd Year	-	6	15	8	-	-	-	5
3rd Year	-	2	5	11	-	-	-	-
Total	8	25	29	24	-	-	5	15

Arapai has not accepted any women students. Education of women in agriculture is a step forward because a large share of the subsistence farming is done by women in Uganda. There has been a movement by the Ministry of Agriculture to post a woman instructor on the staff of each D.F.I.

The total number of graduates from the three colleges during the period 1963-1967 was 383, of which 98 were at the certificate level. Some students from Tanzania and Zanzibar were graduated from Bukalasa and Arapai in 1966. They totaled 26 foreign students. Table 9 presents numbers of graduates from the colleges for the 5-year period 1963-67, and indicates a total of 236 agricultural diploma graduates during this period. Ugandans make up the greatest proportion of this group or 210 out of 236 graduates. In addition to this, 26 certificates were awarded at Arapai and Bukalasa in 1963 and 1964.

The Veterinary Training Institute produced 121 graduates during the period of this USAID/WVU Contract, of which about 60% were granted a certificate. Table 8 indicates that in the period 1963-68, 72 certificates and 49 diplomas were awarded at V.T.I.

Table 9: Certificate and Diploma Graduates of Three Diploma Agricultural Education Colleges in Uganda 1963-1967

Year		Colleges			Total
		Arapai	Bukalasa	V.T.I.	
		Number of Graduates			
1963	Certificate	6	12	22	40
	Diploma	-	-	-	-
1964	Certificate	-	8	6	14
	Diploma	-	15	8	23
1965	Certificate	-	-	12	12
	Diploma	-	13	14	27
1966	Certificate	-	-	15	15
	Diploma	27 ^{1/}	52 ^{2/}	16	95
1967	Certificate	-	-	17	17
	Diploma	81	48	11	140
Total for 5 Years					
	Certificate	6	20	72	98
	Diploma	108	128	49	285

^{1/} 2 Students from Zanzibar.

^{2/} 24 Students from Tanzania.

SHORT COURSES

The Veterinary Training Institute offered several short courses during the past year. They conducted F.A.O. Dairy Courses for participants from English speaking African countries.

The third course began on May 19, 1967 with 11 students from five countries. The fourth course began on November 15, with 19 students. The fifth course started on May 15, 1968 with 11 students from six African countries.

The courses are 2 months long and are conducted by F.A.O., but the WVU staff is involved in teaching. The WVU staff also was involved in setting up and conducting the practical parts of these courses.

Several other short courses were conducted at V.T.I. and the WVU staff was involved in teaching parts of most of them. Two tannery and leather short courses commenced on August 1, 1967 and March 25, 1968, respectively. A meat inspectors course for six meat inspectors who will go to Soroti Packing Plant upon its completion was started on January 8, 1968. This course was conducted for 6 weeks of formal training at V.T.I. followed by 9 months of practical training at the Uganda Meat Packers in Kampala.

A short course was conducted at Arapai from January 4th, to 27th, 1968. The course was a workshop in Soil and Water Conservation Surveying, conducted for 14 Central Government Prison Farm Managers. Bennie Perry and Gordon Ferguson were the instructors.

Bukalasa conducted a 3-week Tractor Driving, Home Economics and Electrification course in January, 1968. Dennie Kluver (WVU) and Miss Male were the instructors.

These extra courses offered by the colleges were useful in training personnel needed in Uganda's agricultural development. WVU staff has provided some of the teaching needed for this training outside the regular college curriculums.

RESULTS OF EAST AFRICAN DIPLOMA EXAMINATIONS

Students from Arapai and Bukalasa Agricultural Colleges are given opportunities to compete for the East African Diploma for Agriculture (E.A.D.A.). The best students who are awarded the diploma in agriculture at the colleges in Kenya, Tanzania and Uganda are selected by the Principals of the colleges to sit for the E.A.D.A. test. The proportion of the graduating class which sit for the examination vary from college to college.

Uganda has had the largest number of students participating in the examination for the years 1966 and 1967. Arapai had the greatest percentage of students who sat for the EADA examination pass both years.

The results of the E.A.D.A. examination are often used as a basis of evaluating the performance of the colleges. In Table 10, the results of the examination are shown and Arapai has the best apparent performance both years.

Table 10: Results of East Africa Diploma in Agriculture Examinations, 1966 and 1967

College	1966		1967	
	Number Sat	Number Passed	Number Sat	Number Passed
Arapai	23	15	35	29
Bukalasa	36	11	35	25
Morogoro	None Sat	-	56	9
Egerton	11	3	18	11
Total	70	29	144	74

It was stated above that the principals can select students whom they think have the best chance of passing the examination. This approach can lead to biased results if a great amount of emphasis is given to the outcome. The tendency will develop among principals to screen students too closely when selecting them to sit for the examination and many who could possibly pass are not given opportunities to compete.

A more complete analysis of the results for Arapai and Bukalasa performance is presented in Table 11. This shows the screening process can bias the apparent results of the E.A.D.A. examination.

Table 11: Analysis of Results of East Africa Diploma for Agriculture Examination, Arapai and Bukalasa, 1966-1967

	Arapai		Bukalasa	
	1966	1967	1966	1967
Total Number of Graduates	27	81	52	48
Number who sat for E.A.D.A.	23	35	36	35
Percentage of Graduates who sat	85	43	69	75
Number who Passed E.A.D.A.	15	29	11	25
Percent of those who sat that Passed	65	83	30	71
Percent of all Graduates that Passed E.A.D.A.	55	36	21	52

The selection process was more severe at Arapai in 1967 than in 1966. In 1966, 85% of the graduates sat for the E.A.D.A. examination, but in 1967 only 43% sat. At Bukalasa, the participation included a greater proportion of its 1967 graduates. Table 11 indicates it increased from 69 to 75% of all Bukalasa graduates.

The end result was that Arapai had only 36% of its graduating class receive the E.A.D.A. in 1967 as compared to 52% at Bukalasa. There is no real way to evaluate the proportion of the Arapai class which could have received the E.A.D.A., if the selection process had been as liberal as that at Bukalasa.

The greater percentage of the Bukalasa graduates receiving the E.A.D.A.

in 1967 may partially be explained by its greater proportion of Grade II diplomas. Arapai had 18% Grade II diplomas and 82% Grade III diplomas in 1967. Bukalasa had 48% Grade II and 50% Grade III diplomas in 1967. In 1966 both colleges awarded approximately the same proportion of Grade I, II, and III diplomas.

PLACEMENT OF THE AGRICULTURAL COLLEGE GRADUATES

This project was designed to train manpower for Uganda's agricultural development needs. The original target was to train manpower for the extension services, but large numbers of graduates are placed in other sections of the Department of Agriculture (Table 12), no similar breakdown of placement of V.T.I. graduates was available.

Not all graduates had been placed when the information from which this list was extracted was produced. The number of diplomates posted in more diverse jobs is indicated in Table 12. Less than half the 1967 agricultural college graduates were posted in the extension service. Some were posted in the Cooperative Department in the Ministry of Agriculture, Forestry, and Cooperatives and some were posted in the Department of Veterinary Services in the Ministry of Animal Husbandry, Game, and Fisheries. The large output of the Agricultural Colleges is helping satisfy manpower requirements outside the Department of Agriculture, plus filling many gaps within the Department's manpower requirements.

Table 12: Placement of Diploma Graduates, Arapai and Bukalasa Agricultural Colleges, 1966 and 1967

<u>Posting</u>	<u>Number of Students</u>	
	<u>1966</u>	<u>1967</u>
<u>Extension Service</u>	24	49
<u>Research Institutions</u>		
Serere	1	4
Kwanda	1	-
Nanulange	-	1
<u>Education</u>		
Arapai	3	-
Bukalasa	1	-
D.F.I.'s	-	7
<u>Information</u>		
(Entebbe)	2	3
<u>Special Development</u>	23	23
Statistics (Entebbe)	-	3
Ngetta Farm	-	1
Irrigation	-	2
Citrus Project	-	1
Uganda Tea Growers Corp.	-	8
Animal Husbandry	-	6
Cooperative Credit	-	10
Total	<u>55</u>	<u>118</u>

PROGRESS TOWARD OBJECTIVES

The targets of this project were to increase student output, develop improved curriculum to meet local needs, develop facilities and teaching aids, and train Ugandan staff. Not all goals have had equal success or have made equal progress.

STUDENT INTAKE AND OUTPUT OF GRADUATES

The greatest degree of success in this project was the increase in student numbers. Total enrollment at the colleges increased from 109 students in 1963 to 451 in 1968. This is more than a fourfold increase. The level of training was continued only to the diploma level as the certificate course was deleted by a directive of the Ministry of Agriculture in 1965.

A total of 383 graduates have been produced by the three colleges from 1963-1967, of which 140 were graduated in 1967. There will be an even larger graduating class in 1968. If all the present third year students are successful, there will be a total of 191 graduates from three colleges in 1968.

G.O.U. and other donors also made large financial and personnel contributions to bring about this expansion in student numbers. G.O.U. has had increased expenditures in many ways e.g. financial support for many more students, facility and housing for a larger staff members and general development budgets.

A general review of developments of physical facilities will be presented in this report for the period 1963-1967. Then a more specific and detailed accounting will be presented for this reporting period.

PHYSICAL FACILITY DEVELOPMENT 1963-1967

All the colleges had some development in facilities during this period. The amount of USAID input varied from college to college.

Arapai Agricultural College

The facility development at Arapai was concentrated mostly on the shop teaching area and equipment. G.O.U. provided the building and USAID purchased most of the equipment and provided some WVU staff. The entire complement of inputs was designed to increase the amount of training in farm mechanization. The targets were met.

In 1967, G.O.U. provided a senior staff member in farm mechanics and a junior staff demonstrator. The U.K. provided a staff member in that section under a separate agreement with G.O.U.

USAID provided four quonset huts for temporary student housing. These were constructed in 1967 and house 18 students each. G.O.U. provided funds for erecting these buildings and installing toilet and shower facilities.

G.O.U. provided funds for enlarging classrooms at Arapai. This was accomplished by joining small rooms into larger lecture halls to accommodate large classes.

Some smaller inputs, but very important to the program, were the construction of the pens for housing bulls used in cooperative Arapai-Serere crossbreeding program. Pasture renovation increased the carrying capacity of the pasture land needed to carry the large herd of cattle at Arapai.

Construction of a bicycle shed was done by the students, under the supervision of Bill Easley. They also constructed a storage area for the supplies needed in shop teaching. This helped remove these supplies from the teaching area.

The chemistry laboratory had a large increase in equipment with limited space to hold it. G.O.U. built more storage area in the laboratory in 1967, which relieved the table top space formerly used for equipment storage.

Bukalasa Agricultural College

The building program at Bukalasa received the most attention from USAID. This was partially due to the need for housing both the Agricultural and Cooperative College on the same campus.

USAID financed most of the construction of a livestock unit at Bukalasa. This included a modern dairy unit teaching arena, enlargement of the pig unit and construction of a poultry house. A fairly complete set of hay and forage equipment was provided to complement the dairy unit.

USAID also financed construction of one staff house for the Agricultural College staff, one small classroom, and one permanent dormitory. The enlargement of the student body brought with it a shortage of student housing, so USAID provided five quonset huts for temporary student housing. G.O.U. provided funds for their erection and construction of toilet and shower facilities.

Two pairs of small classrooms were joined into two larger lecture rooms to accommodate the larger student body. This was financed by G.O.U. Funds were provided by G.O.U. to upgrade and modernize five junior staff houses.

Veterinary Training Institute

During the period 1963-1966, USAID provided no funds for facility development at V.T.I. In 1966 G.O.U. built a Small Animal Clinic on the campus which provides students an opportunity to work with animals with several kinds of diseases, under the supervision of the Veterinary Officer in charge.

G.O.U. provided funds to enlarge the shelving space in the library and to make some minor improvements on other buildings, e.g. fitting mosquito netting on windows, fitting openable windows on the six dormitory blocks and proper ceiling lights in all old dormitories.

During 1966-67 a pasture renovation program was initiated at V.T.I. under the supervision of Calvin Merinar. The work was done by students in their practical work. This increased the carrying capacity of the land for the cattle used for teaching students but owned by the Animal Health Research Center.

FACILITY DEVELOPMENTS DURING THIS REPORTING PERIOD

During June 1967 to May 1968, some facility construction was completed at the colleges. A few others were begun or planned and funds were committed for their completion. Most of the facility construction was on a small scale.

Arapai Agricultural College

The main USAID input at Arapai was 25,034/- shillings to construct a cool room. This was a self help project which will be discussed in a later section of this report.

G.O.U. funded the construction of a turkey house and a pig house. Pigs and turkeys were previously not available at Arapai for the teaching program. Funds have also been provided to construct a grain storage area near the livestock area. This will remove the grain and grain cleaning from the farm shop building where it served a lot of nuisance value in the past with the dust and noise it produced.

Double fencing was completed around much of the pasture to help maintain a tick free barrier.

The three-phase election power was extended in the farm shop teaching area. This made it possible to put the drill press, grinder, and metal cutting machine into use. These machines were purchased by USAID and were rendered useless for over a year because of lack of three-phase power. The three-phase power was also extended to the cool room and will be available when the hammer mill and feed mixer purchased by USAID are put into operation.

Large fans were installed in the quonset huts. One 18-inch fan was purchased by USAID for each quonset to make the buildings more usable. Ceiling fans were installed in some classrooms by G.O.U. The quonset huts were also sprayed with aluminium paint to help reflect the sun and help lower the inside temperature.

Plans have been drawn and USAID has provided funds to build a calf barn. The barn will be built by the students as part of the farm construction practical learning and teaching section. Gordon Ferguson and M. Okot developed the plans and will supervise the construction.

Initial plans have been produced for a reading room extension to the library. The present reading room is quite small and inadequate. USAID has committed about \$5,000 to construct this room and the necessary tables and chairs.

Bukalasa Agricultural College

Five quonset huts were completed and put into use during this reporting period. One is being used to house women students.

The livestock section was improved by renovating the pig unit under C. Patrick Moore's supervision. During the year, 20 acres of pasture was

renovated and fenced to improve its grass production. A project of grass-land fertilizer began by Chalres Sperow is increasing output of grass.

A hay drying rack was built to help dry hay cut during the rainy season. Besides providing hay, some improvement in the concentrate feeding facilities was developed by C. Patrick Moore. He redesigned the grinding and feed mixing area for greater efficiency.

Dennis Kliver and Pat Moore designed and built a feed mixer for the college. The mixer is a small cone unit with an internal auger, all built by hand from locally purchased materials, funded by \$550 provided by USAID. USAID purchased a large feed mixer which had not been used because of the lack of proper building to house it. The mixer has been moved to Arapai where it will be installed in a new feed mixing area now under construction by G.O.U.

A major improvement at Bukalasa during this period was the completion of the extension to the farm shop. Tools and equipment purchased with USAID contract commodity funds during the year have arrived and are now being used. S. A. Thies has done most of the internal shop set up.

A new Bedford lorry was purchased by G.O.U. for the college. This is used for transport of students on field trips and for general hauling for college needs.

USAID provided funds to purchase an outside water storage tank for each WVU staff members house. The water is caught from the runoff from the roof of the houses. Water supplies at Bukalasa are inadequate, at times, due to break down of pumps. This supplementary water supply has helped alleviate the problem during these periodic shortages.

G.O.U. provided funds for a new water borehole, which is under construction. The old pumps, which are being overhauled and put into operation, were installed by the colleges.

Bukalasa will have a cool room for a meats laboratory which will be built by students under staff supervision. USAID provided funds for material and equipment. The compressor unit and cooling unit have been ordered with FY 1968 PIC/C funds and will arrive soon.

The cool room will be used in developing a meat cutting classroom. This will be an improvement in the animal husbandry curriculum at Bukalasa.

USAID has committed \$750 to construct a potting shed, to be used by the Soils and Horticulture sections at the college. The potting shed will be built as soon as the bids for construction are received and accepted by USAID, according to provision in the project agreement.

Veterinary Training Institute

Several buildings were constructed at V.T.I. during this reporting period. The largest was the \$10,000 Dining Hall/Kitchen Unit financed by G.O.U.

Another development was the erection of the three unipart cottages on campus to house the women students. G.O.U. funded the erection costs with \$2,800 during the year.

The facility contributed by USAID at V.T.I. was the dairy unit, which included materials for the milking stable, calf house and spray race. USAID/WVU contract commodity funds were used to purchase the equipment for interior of the milking stable.

The material fund of \$5,000 provided enough money to build the fencing, construct the buildings and purchase four exotic cows. The students provided the labor to build the unit, under staff supervision.

Another and more simple dairy cow milking unit was constructed during the year. This consisted of two portable milking bails. These will be used for milking the five Jersey-Nganda cross bred cows provided to V.T.I. by G.O.U.

These two units provide the students in the second year an opportunity to learn hand milking in the simple unit with crossbred cows. They then move to milking the exotic cows during the third year. The students manage the cattle and get practical experience in dairy cow management including feeding, milking, and record keeping.

USAID also provided V.T.I. with some surplus steel for use in building construction at a later date.

During this period, a rabbit husbandry unit was added to V.T.I., including some Italian X New Zealand crossbred white females. Two New Zealand purebred males have also been added. The students constructed most of the cages and will be responsible for management of the rabbits.

USAID has allocated an additional \$1,500 to construct a pig and a poultry unit at V.T.I. Funds will be used to purchase materials and students will provide the labor for construction. The poultry house is presently under construction.

The G.O.U. financed workshop was completed during the period and the tools were moved into it. It has been in use as both a place to store tools and as a classroom.

An additional 9 acres of pasture were renovated by the students under the supervision of Calvin Merinar. This land will be part of the new modern dairy unit which will be built by funds loaned to G.O.U. by the Government of Denmark.

USAID has allocated about \$5,000 for a 20 X 30-foot reading room extension to the library. This will double the area of the existing small and inadequate library. Construction will be done in the near future by a local contractor.

LIBRARY FACILITIES

The libraries are very important facilities and will be reported on separately in this report. The libraries have improved greatly during the period 1963-1968. USAID has been the largest contributor to the libraries, but G.O.U. and the U.K. have also made contributions as well as private individuals.

The lack of adequate numbers of text books was a problem and remains a problem, but is of a smaller magnitude. The large classes due to increased enrollment has brought about demands for texts which could not all be satisfied. Students have had to share text books and will continue to do so as long as classes remain large.

Arapai Agricultural College

The library at Arapai is a small room which is a book storage and check out room. An adjoining room serves as a reading room. It is small, but will be enlarged with fund allocated by USAID for that purpose.

One text book was assigned for three students in many cases. This was alleviated by the large input of books with PIO/C funds and with USAID/WVU contract commodity funds. Reference books and periodicals were also purchased from the funds. G.O.U. has also supplied funds for purchase of books.

In 1963 there were 143 books in the Arapai library; in 1964, 650; 1966, 1600; of which USAID funded a large percentage.

During this reporting period, USAID provided funds to purchase 202 books and 766 bulletins from USDA. G.O.U. supplied the library with 106 books and has a large number of books on order at the present time. The British High Commission provided 19 books. In addition to this a personal donation of 118 economic journals were given to the library, by the Chief of Party of USAID/WVU Contract 297. Additional books were ordered for the Arapai library with USAID funds which will provide a more adequate book collection for student use.

Bukalasa Agricultural College

The library at Bukalasa had about 4600 volumes in 1967, of which nearly 60% were purchased by USAID. During this reporting period, 374 volumes and 600 bulletins were supplied to the Bukalasa library by USAID. Many bulletins are used by students during the school year as required reading and returned to the library at the end of the period. Other donors provided 306 books to add to the library at Bukalasa during the reporting period.

Bukalasa has the largest book collection of the three colleges. Its library facility is also fairly adequate to serve the needs of the students. More books have been ordered to add to the library collection in the next year.

Veterinary Training Institute

The library at V.T.I. is a small, but attractive, well-lighted building. The shelving space has been extended, so it has room to hold the books now in stock. There are enough tables and chairs for 40 students. The reading room USAID will add will more than double the reading room capacity.

In 1963 there were 1,058 volumes in the library under 250 titles. This has been increased to 2,330 volumes under 70 titles in 1966. During

1967-1968 a large input of books was added which brought the total up to 2817 volumes under 787 titles. USAID funds amounting to \$1,650 were used to purchase books for the V.T.I. library. The funds purchased 333 books under 75 titles to be added to the collection, and an input of 590 bulletins was also added. An additional \$700 was allocated for book purchase for V.T.I. which will arrive during 1968.

SELF HELP PROJECTS

USAID provided funds for self-help projects at Bukalasa and Arapai. The construction at Arapai is complete. An input of 25,034/- shillings was provided to purchase materials and equipment to construct a student cooperative cool room. The room was designed to hold perishable products, such as vegetables, milk and meat. These products are produced on the farm and sold to the kitchen to feed students and surpluses are available to the staff.

The scheme was designed to provide students with experience in operating a small cooperative retail sales business. The plan was that surplus perishable products would be sold to students at wholesale prices and retailed to staff members. The students were also encouraged to sell vegetables they produce on small plots provided for them by the Crop Husbandry Department. The purchase and resale of college produced products has not materialized because it is against Government policy.

The cool room has been put to use in demonstrating to students methods of dressing and holding chickens and vegetables. It is serving a useful purpose as a teaching tool.

Construction was done by the students under the supervision of William Easley. The electrical installations were done by the U.E.B. A commercial refrigeration firm from Kampala installed the refrigeration unit.

The self help student canteen is under construction at Bukalasa and will soon be completed. USAID provided 14,000/- shillings for materials. Students are providing the labor and S. A. Thies is supervising construction.

The canteen will provide a place for students to purchase items not available on campus. It will also serve as a center for student recreation for which facilities are presently not available.

COMMODITIES

The project agreement between USAID and G.O.U. has a provision that USAID will provide commodities for teaching aids. Most funds were provided in PIO/C but some were provided under the contract. Contract funds were spent to clear the pipe line in 1966-67. Funding for commodities in 1967 under PIO/C's was only \$6,000 of which \$5,000 was used to construct the dairy unit at V.T.I.

During FY 1968 about \$14,200 was spent for commodities and building materials. These funds have been committed and the commodities are beginning to arrive. An additional appropriation was made in May 1968, and the proposed lists of commodities and expenditures for building materials have been sent

to USAID and have been approved.

Expenditures for books and commodities including transport for FY 1968 were: Arapai - \$1,900; Bukalasa - \$5,500; and V.T.I. - \$6,800. However, the additional appropriations for commodities will increase the total amount for commodities by \$5,000 and for buildings and building materials by about \$12,000.

A list of commodities received during this reporting period is presented in Appendix Table E. Expenditures for these commodities came from the contract commodity funds. The expenditure for the various colleges were: Arapai, books \$1,500 and commodities \$7,290; Bukalasa, books \$940.00 and commodities \$14,000; and V.T.I., books \$1,650 and commodities \$3,670. Transportation charges of about 20% must be added to arrive at total expenditures.

The total expenditure for commodities and books has been adequate. These expenditures will decrease as staff members are phased out. The laboratories, shops, libraries and work areas are fairly well equipped. It is important that in the future the equipment is maintained and properly used. Difficulties are often encountered in maintaining equipment because spare parts for much U.S. equipment are not available, even though local dealers sell some of the equipment.

CURRICULUM

One aim of this contract has been to develop improved curriculums. A primary goal was to increase the amount of practical training as well as strengthen the classroom training. Improvement in curriculum is hard to measure, except by accounting for the things that affect improvement.

During the life of this contract, more experienced staff members were provided by WVU than were available formerly. Trained Ugandan staff members were added, the majority of whom had M.S. degrees, earned in U.S. universities.

A large number of teaching aids and books were added to the colleges. There have been increases in the amount of practical work in the curricula, and lecture periods have also increased. The present curricula should be evaluated to determine if there is a proper balance between classroom and practical work.

Emphasis in practical work has shifted from merely doing menial tasks during practical work periods to doing jobs which teach a skill related to agriculture. Building programs at all colleges provided students with real on-the-job training in construction. USAID has been very helpful in providing funds to purchase materials and designating it for student practical experience. Some examples of this are the dairy unit at V.T.I., the self-help cool room at Arapai, and the self-help student canteen at Bukalasa. G.O.U. has also provided funds for some buildings which used student labor in construction e.g. the bicycle shed at Arapai and the shop extension at Bukalasa.

Developing well-equipped shops provided students with practical training in shop skills and farm mechanics. Students learn fundamental tool use and the basic mechanics of farm machinery. Arapai and Bukalasa now have well-equipped shops. USAID donated most of the tools and machinery in these

shops. Further revisions in curricula and course contents should include use of equipment now on hand but not in use. The case in point is the group of small engines at Arapai which are not being used in teaching.

Student management of the dairy herd at V.T.I. is another kind of practical training which has developed improved curricula. Students also have opportunities to work with cattle at Arapai and Bukalasa.

Students have become more involved in pasture agronomy work at all the colleges. Arapai renovated a large area of pasture land. Bukalasa is now carrying out some fertilizer trials on pastures and some renovation has been completed during the past year. The most organized pasture renovation work has been at V.T.I. Land heavily infested with termite mounds and low producing grasses has been cleared, plowed and reseeded. This system of renovation has been in progress for 2 years and will continue several years in the future.

W.V.U. STAFF ACTIVITIES

The activities of the staff members and their innovations in teaching can be indicators of curriculum development. WVU staff activities indicate that each man has contributed to changes in the programs. Teaching and improvement in curriculum require imagination and some experimentation to find the most satisfactory methods of communication between the instructor and the students. Practical teaching in all colleges has been emphasized and is an integral part of the curriculum.

Arapai Agricultural College

William Easley: Used the construction of the student self-help cooler room as a practical teaching aid. Construction not only showed students how to build an ordinary building but involved problems with insulating a building against hot weather. It involved installing insulation and using refrigeration to cool a room to a constant low temperature.

The building will be useful in demonstrating the need for proper facilities for holding perishable products. Operation of the cooperative could also be an experience in business management and record keeping useful for teaching purposes in the economics section.

He also supervised spray painting the quonset huts. Besides which is an experience with a spray painter, this exercise demonstrated the value of reflective material to help reduce the inside temperature of a building. He was a chairman of the Arapai Exhibit Committee for the Agricultural District Show in Karamoja. This provided students an opportunity to participate in setting up an agricultural show.

Gordon Ferguson: Introduced a practical course in the principles of farmstead wiring. He also introduced mechanical drawing to the workshop skills course. This was in conjunction with training skills in carpentry and farm building construction principles.

He introduced a work simplification unit in the farm implements and machines section, which provided students with the basics in efficient

use of time and equipment. Another introduction was a practical section addition to the Extension Methods course. Students were requested to set up demonstrations, practice lesson planning and use teaching methods. Students were involved in the first on-campus large scale display of student-planned activities. Displays were judged and rated. This provided students practical experience in teaching which they can use on the job after graduation.

Bennie Perry: Organized and was advisor to the Soil Science Club. Club members make field trips to experiment stations, group farms and agriculturally oriented industries.

Students are encouraged to bring soil samples from their home area to Arapai for analysis. Soil from the paddocks and blocks on the college farm were analyzed by the students.

Bukalasa Agricultural College

Dennis Kluver: Developed a record keeping system for Bukalasa farm equipment. The purpose is to find the annual maintenance cost of machinery and to demonstrate the value of records in determining maintenance costs. He developed an early morning practical evaluation sheet to evaluate student performance.

He established a demonstration plot showing mechanical planting of maize and soybeans. Mechanical cultivation using a spring tooth cultivator was introduced. A complete set of monographs and hand-outs was provided each student in the farm power section.

C. Patrick Moore: Drew plans and secured materials for a vertical feed mixer. He and Kluver constructed the mixer, which will help the livestock section produce higher quality feed and reduce time spent on mixing feeds. The mixer will serve as a demonstration to students in preparing feed mixes and methods of combining macro and micro nutrients to prepare a balanced ration.

He demonstrated the slaughtering techniques of swine to students. He also introduced the auction method of marketing pigs. A feeder-pig auction was organized with the third year students in charge of the sale. Second year students purchased pigs for their demonstration farms during this demonstration.

Moore set up and carried out a poultry feeding demonstration using day-old chicks and fed them to broiler weight. This showed the difference between the presently used Bukalasa mixed ration and a commercially prepared ration. He also investigated the difference between the effects of wire floor versus deep litter housing.

The project was set up as follows:

	<u>Wire Floor</u>	<u>Deep Litter</u>
Local feed	Group 1	Group 3
Commercial feed	Group 2	Group 4

Groups 1 and 2 were brooded in a box type brooder with wire floor for 4 weeks and at the beginning of the fifth week were placed on a 0.5 inch wire mesh. Groups 3 and 4 were brooded on coffee husks, then transferred to a coffee husk litter. Each group was reared in rooms providing an average of 2.5 sq. ft. per bird. All birds were weighed at the end of 4-week intervals.

Feed consumption for all groups showed no significant difference, but birds on commercial feed had the highest average weight at the end of the demonstration, with those on wire floor slightly heavier than those on deep litter. Birds on commercial feed were healthier looking birds with greater development than those on local feed.

Feed costs were calculated and birds were valued at existing market prices. The birds on commercial feed were worth 50 cents East African (about 7¢ U.S.) more per bird, than those on local feed. This was a profit of 25/- shillings more than the 100 birds on commercial feed than those on local feed. Those on commercial feed began laying eggs sooner than the other group.

This kind of demonstration work is very useful to students. It provides a real experience in how a simple feeding trial is conducted and shows monetary results.

Moore also conducted a milk consumption study for a large part of Uganda in June 1967. Students from each area were asked to interview milk consumers. The study was requested for and financed by USAID and approved by the Ministry of Animal Industry, Game, and Fisheries.

S. A. Thies: Teaches extension methods in which a large amount of time was spent in practical work, presenting methods of demonstrating information with flip charts, constructing visual aids of various sorts. He assisted in a week-long extension course for 1967 graduates before they were assigned to the field. The course was organized by the Rural Economy section of Makerere University. Students were given an opportunity to visit Radio Uganda and T.V. studios.

He also attended a meeting of Extension Methods Teachers in Dar es Salaam in January. He presented a paper relating to the problems encountered in teaching extension methods at diploma level schools. Makerere University asked him to prepare a series of lecture outlines on extension methods, which will be used in East African University syllabus. Workshop Skills is another responsibility of S. A. Thies. The shop extension financed by G.O.U. is near completion and students have been active in building work benches, cabinets, racks and tables for the work area.

Tools and equipment purchased by USAID arrived and are presently being put in proper storage cabinets for use as teaching aids. Students have used these tools to build a two-wheel trailer, five work benches, a 48-compartment tool bin and wall cabinets. In addition, they built two farm gates, 40 poultry feed troughs and nine truss rafters for the student self help canteen.

Charles Sprow: Teaches agricultural chemistry and has established some pasture fertilizer trial plots under wire cages. Between November 1967 and mid-March 1968, the control pasture area yielded 1400 pounds of

dry matter per acre and the fertilized plots 5,000 pounds of dry matter. This data was later extended to four calf plots of 0.5 acre each but no data is available yet.

Soil Science and Chemistry are taught separately now, so students can start to take soils courses in the first term. This reorganization will give students more time for both chemistry and soil science.

Students are provided with more experience in soil sampling and testing, plus laying out demonstration plots for fertilizer and soil and water conservation. Sperow started a new soil conservation program on the second year demonstration farms. This will give students an opportunity to make a practical lay-out of a small farm.

A project was started to test the milk from the dairy herd each month. Tests are made for butterfat and non-fat solids. This is part of the chemistry practical training program.

Veterinary Training Institute

The practical teaching at V.T.I. is not as confined to specific staff member areas as at the other colleges. All staff members take part in part of the entire practical teaching program, but the WVU staff has been very instrumental in developing programs.

Student Practical Work Training

The greatest assets to students training are the morning and afternoon periods at V.T.I. The present practical program was initiated in 1967 by the WVU staff with the assistance of other staff members. Construction of the USAID financed dairy unit and availability of facilities from the Animal Health Research Center and Livestock Experiment Station have enabled staff and students to have a successful program.

Students were formerly organized in eight groups, but this was increased to 10 in April 1968. This will increase to 12 groups with the addition of the swine and beef units. The proposed program is presented in Appendix Table F. The swine unit will be added in 1968; USAID has provided funds for materials to construct it. The beef unit development will depend on availability of funds and land which G.O.U. will eventually provide.

Poultry and sheep practical work is performed on the Livestock Experiment Station and Animal Health Research Center. USAID provided funds to purchase materials to construct a poultry unit at V.T.I. Students will build it under staff supervision.

Practical work serves a threefold purpose. It provides a first experience in various areas of animal husbandry and farm management for most students. It tests their ability to apply in practice what they learned in theory. Third, it develops leadership and confidence especially since the new system has been initiated. Under this system, third year students supervise the other students. As student supervisors, they are expected to plan and demonstrate the practical work and they are responsible to see it is completed. Staff is available for advice and initiates new programs and ideas.

The results of some of the programs and projects are evident from the following sections. The practical program at V.T.I. has been a successful endeavor.

V.T.I. SMALL HOLDER DAIRY UNIT DEMONSTRATION

A small dairy unit was built at V.T.I. to demonstrate the kind of unit that some Uganda dairy farmers could duplicate. The unit was built from locally purchased materials and provides a practical demonstration in dairy management for students. Problems students face in this project are similar to those they will face in the field.

The unit occupies 2.5 acres which supports four Jersey cows and replacement stock. The dairy stable consists of a 20 X 40-foot pole type shed, with four milking stalls, milk room and feed storage area. There is also a calf shed and calf fold unit.

The four cows were purchased as heifers and have since given birth to calves and have lactated. A record of their production was kept to determine how profitable these cows would be to farmers using good management practices. Milking was done by students who rotated every few weeks. This is not a good management practice and would not be used on a farm but was necessary as a teaching tool.

Two Jersey cows completed their first lactation period with the following results:

1. No. 1 Athena

2. No. 2 Countess

Milk Production - 5720 Lbs. in 288 days		5515 Lbs. - 292 days
Value of milk @ 4/- gallon =	Shs. 2288/-	Shs. 2208/-
Cost of concentrate fed =	Shs. 710/-	Shs. 608/-
Cost of pasture fertilizer per cow =	Shs. 100/-	Shs. 100/-
Return over feed cost	Shs. <u>1478/-</u>	Shs. <u>1500/-</u>

The other two cows are (1 Sh. E.A. = 14¢ U.S.) still in their first lactation period. Their production is:

3. No. 3 Harmony

4. No. 4 Marry Lady

Milk Production - 4,156 Lbs. in 215 days	4,209 Lbs. in 170 days
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These cows are now producing at 18 and 20 pounds per day. Indications are that the average production per cow will be between 550 and 600 gallons in their first lactation. This will provide a return over feed cost of 5,200 to 5,800 shillings from a four-cow herd. All this was produced on a 2.5 acre plot under a good pasture and livestock management program.

A second dairy unit was established at V.T.I. during the year. This unit has five Jersey-Nganda crossbred cows. The purpose of this is to teach the basic principles of feeding and teach milking to second year students. Cows are milked in portable milking bails designed by WVU staff members.

PASTURE AGRONOMY WORK AT V.T.I.

The pasture agronomy program at V.T.I. is 2 years old and is carried out at three locations. The main area of concentration is the dairy unit on campus, but work is also carried out at the A.H.R.C. paddocks and the proposed Danish/FAO Dairy Unit.

V.T.I. Dairy Units

The small holder unit consists of 2.5 acres of pasture land. About 0.5 acre was planted in elephant grass for dry season reserves. The other 2 acres were seeded in a mixture of grasses (Panicum, Chloris and Brachiaria) and a legume (Desmodium uncinatum).

There has been sufficient production to meet the grazing requirements of four Jersey cows in lactation, three young heifers and one young bull. On numerous occasions, the grass was slashed to keep it under control and elephant grass was cut and given to the A.H.R.C. for stall feeding experimental animals.

An electric fencer was used to enable strip grazing on a rotational basis. This improved utilization of the limited pasture area.

Ground limestone, phosphate and potash were applied in 1967 before seeding the area. Nitrogen is applied in small amounts following each grazing, when grazed pastures are clipped. Pasture grass production has been adequate.

Pasture Management on A.H.R.C. Paddocks

V.T.I. assumed responsibility for pasture management of A.H.R.C. paddocks. Students do much of the management work including fertilizing, fence repair and clipping.

Two elephant grass paddocks -- a total of 7 acres -- were established during the year. An additional 30 acres of pasture will be appropriated from the A.H.R.C. to provide grazing for the F.A.O. dairy herd.

The WVU staff from V.T.I. has provided much help in planning the new F.A.O. development. They have helped improve 9 acres and three more acres are ready for seeding.

DAIRY CALF REARING AT V.T.I.

The dairy unit at V.T.I. provides students with experience in pasture and dairy cow management. Another important aspect of this program is rearing calves. There is a high demand for exotic dairy calves which will be used as future replacement stock and for enlarging dairy herds.

It is estimated that 50 - 75% of the exotic grade heifers are reared improperly in Uganda. This results in death before they reach maturity or marked inferior production to their dams. These estimates were made in the F.A.O. East Africa Livestock Survey, Page 148, Volume II.

Information sources on calf rearing in Uganda are limited. Exotic cattle were introduced in the training program at Bukalasa in 1962, at Arapai in 1963, and V.T.I. in 1967. Therefore, most extension field staff have limited practical training in rearing exotic dairy calves. Little or no practical training in calf rearing is provided at G.O.U. experiment stations. Few buildings are properly designed for rearing dairy calves in Uganda. There is little or no written information on calf rearing in East Africa, so initiating a practical calf rearing demonstration at V.T.I. was considered very important.

Young calves at V.T.I. are housed in a 4 X 7 foot portable fold unit. A unit costs only 55 shillings when made of locally purchased material. This type of unit is used on farms in southern U.S.A. and in Kenya.

Calf rearing work at V.T.I. is in its infancy, but results to date are presented here. This information is used in the student training program.

Jersey Heifers

Growth

<u>No. of Animals</u>	<u>Average Birth Weight</u>	<u>Weight at 30 Days</u>	<u>90 Days Weight</u>	<u>180 Days Weight</u>	<u>Average Daily Gain</u>
3	46.5 lbs.	68 lbs.	133 lbs.	160 lbs.	0.63 lbs.

Feed Consumption and Cost for 180 days per calf

<u>Item</u>	<u>Amount</u>	<u>Cost (Shs.)</u>	<u>Total (Shs.)</u>
Milk	76 lbs.	-/40 per lb.	30/40
Milk Replacer	57 lbs.	1/68 per lb.	95/76

Concentrates

Young stock concentrate	91.7 lbs.	-/27 per lb.	24/76
Dairy Cubes	396.0 lbs.	-/24 per lb.	94/45
Average Cost Per Calf			<u>245/37</u>

EXTRA-CURRICULAR ACTIVITIES

Staff members are busy in classroom and practical teaching, but all take part in some extra curricular activities. Many extra activities involve students outside classes and some are for personal relaxation.

Arapai Agricultural College

William B. Easley: Basketball coach for the students. He has begun

a program of showing full length movies to students. Some films are rented by the students and many are borrowed from USIS. Feature films rentals are paid by student-collected funds.

He also has developed an organized system of labelling and checking out audio-visual equipment. Mr. Easley is a golfer and has won several trophies for his expert golfing.

He is project leader for the W.V.U. team at Arapai.

Gordon Ferguson: Swimming coach at Arapai and a member of the Board of Directors of the Soroti Lions Club, Secretary of Teso Gun Club and a golfing member of the Soroti Social Club.

Bennie Perry: Works with the Soil Science Club and helped coach basketball.

Bukalasa Agricultural College

Dennis Kluver: Patron to the newly-formed photography club. At the bi-weekly meetings students discuss camera selection, photography and developing techniques.

C. Patrick Moore: Project leader for the WVU team at Bukalasa. He is a judo expert and represented Uganda at an International Judo Contest in Nairobi. He has a Black Belt -- the only active one in Uganda.

Charles Sperow: Patron of the Soil Science Club.

S. A. Thies: A hunter who recently shot an elephant. He spends much of his extra time on private study of grasses to determine rate of growth as related to seeding rate, row width and fertilizer treatment. He hopes to use his spare time to develop a thesis from his research results.

Veterinary Training Institute

Jack M. Gay: Advisor on display in the visual aid room, supervises student workshop and helped members of the Hobby Club with projects.

Calvin Merinar: Supervises the grass and legume pasture development. Serves as advisor to the A.H.R.C. on pasture development.

Frank Woodson: Supervised and maintained the audio visual equipment. Patron to the Science Club and supervises the library. Advisor to the A.H.R.C. on pasture and livestock development. In charge of procuring materials and developing livestock facilities at V.T.I.

He is also project leader for the WVU team at V.T.I.

W.V.U. STAFF MEMBER WIVES' PARTICIPATION

Some of the WVU staff members wives contribute to the program and other activities useful to the community.

Mrs. William Easley: Supervised her son and Douglas Ferguson in their school work with the Calvert Home Study Course. She also filled in a vacant staff position at the Tororo Girl's School for several months as a business teacher.

Mrs. Gordon Ferguson: Is secretary for the WVU staff at Arapai. She also helped organize a Sunday School for local children in the Church of Uganda, Soroti. She served on the Board of Directors of the Uganda Horticulture Society of Soroti.

Mrs. Dennis Kluver: Taught at an Afro-Asian nursery school in Kampala for 2 months. She organized a nursery school at Bukalasa which has four American, three African and two Asian children attending.

Mrs. C. Patrick Moore: Secretary for the WVU staff at Bukalasa. She gave a demonstration of the use of electrical household appliances to Bukalasa women students.

Mrs. S. A. Thies: Has taught 10 American children at Bukalasa. She organized a Supervised Calvert class for the staff members' children and conducts the classes in her house.

CONCLUDING REMARKS

Progress has been made in developing the curriculum and facilities of the three diploma level colleges, during the past 5 years. USAID has made a large contribution by providing funds for the WVU staff, plus commodities and facilities.

The Uganda Government has provided an increasingly large budget to provide funds for students' support. G.O.U. has also put a sizeable amount of funds into facility development.

The participant training program has lagged behind the other parts of the program. In 1968, a total of eight participants will be sent to the U.S. for study. Five of these will be at the M.S. level and three at the B.S. level. This portion of project is beginning to catch up with the remainder of the project.

The phase-out began with the elimination of an animal husbandry position at Arapai. When this position was vacated in July 1967, there was a request to have it filled. It remained vacant for several months due to proposed changes in curriculum at Arapai and differences of opinion on staffing between G.O.U. and USAID. WVU nominated a replacement to fill this position, but it was still vacant when a Presidential order eliminated all unfilled positions at the end of 1967. This was action to help counteract the U.S. Balance of Payments deficits.

Two agricultural mechanics positions will be eliminated in June 1969, as part of the phase-out of the project as trained Ugandans return. One such position will be phased out at Bukalasa and one at Arapai. The Ugandans

who returned in June 1968 with B.S. degrees in Agricultural Mechanics will have had a year overlap with the WVU staff member.

Another position which is scheduled to be eliminated due to the Balance of Payments related staff cuts is the Animal Husbandry position at Bukalasa. A Ugandan was assigned to Bukalasa in March 1968, but is scheduled to depart for M.S. level training in the U.S. in August, 1968. The deletion of the WVU Animal Husbandry position will require a Ugandan replacement at Bukalasa.

Elimination of the Chief of Party position in its present form will provide a thinner layer of liaison between USAID, WVU and the ministries and colleges involved in the program. The proposal states that this position will be combined with the Chief of Party for Contract 411 position at Makerere.

Both Chief of Party positions were considered full time jobs when they were included in the contract, but USAID has now changed its views. The combination of the two jobs can be done by one person, but would be more effective under the present set-up. The decision for the change was an indication of the attitude of USAID of the value of both positions.

Long range planning by G.O.U. ministries is still inadequate. This has caused some problems in developing programs and has frustrated staff members at times. Plans for future programs in both colleges have not been announced by G.O.U. In July 1966, the decision was made to change Arapai to a 2-year certificate college. In March 1967, the decision was reversed and the diploma course was continued. WVU staff members who were approved for home leave and return were uncertain of the approval because it was announced to USAID just before their departure for home leave that they were not needed. Letters from the ministry which were necessary to confirm new appointments and second tours were late in coming.

Some planning relative to participant training was done by the WVU Chief of Party and ministry officials. The planning done in this session was carried out as it was agreed upon.



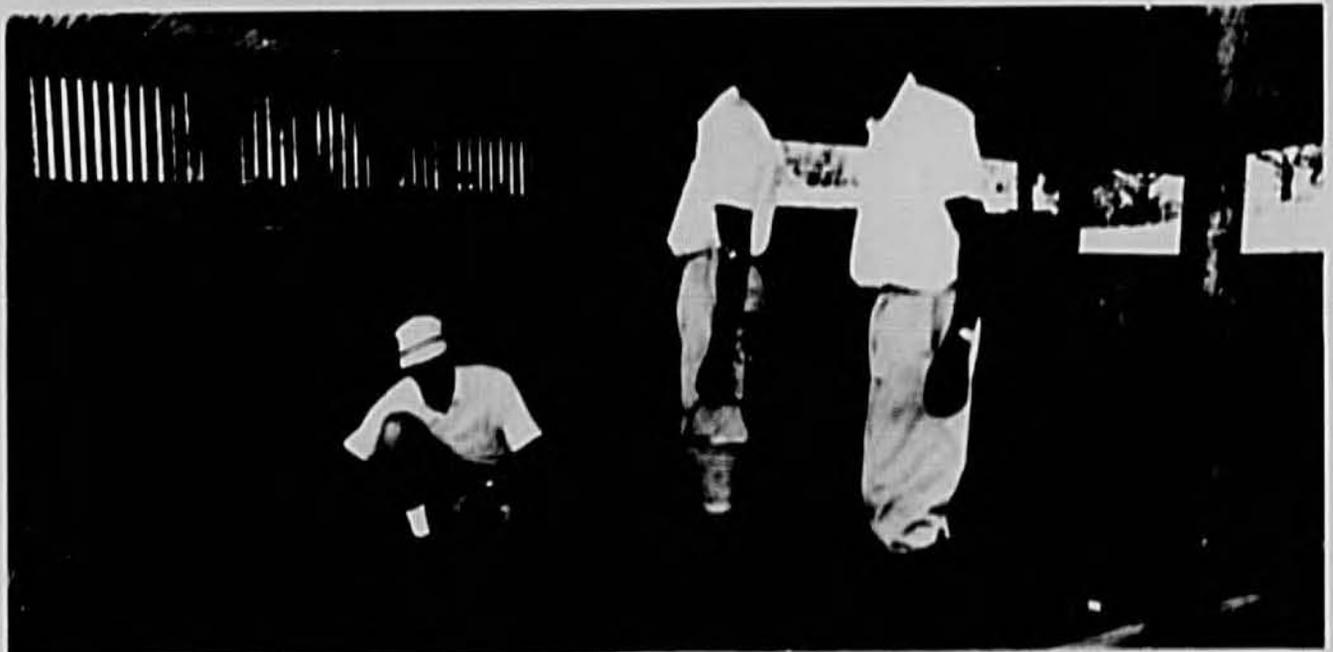
VTI

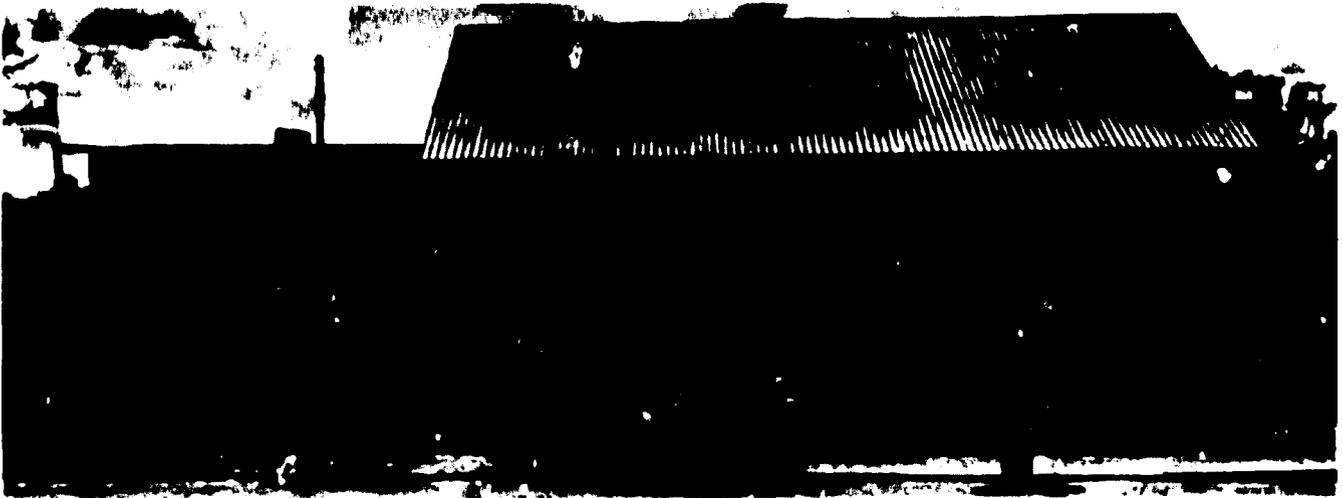


Above: Frank Woodson and students build fence for a newly renovated pasture.

Left: Woodson shows students how to use hand tools.

Below: Jack Gay supervises students as they lay concrete floor of the new milking parlor.





ARAPAI

Above: Student self help commissary under construction.



Above: Classroom.

Left: Interior of soils lab.

Below: Administration Building.



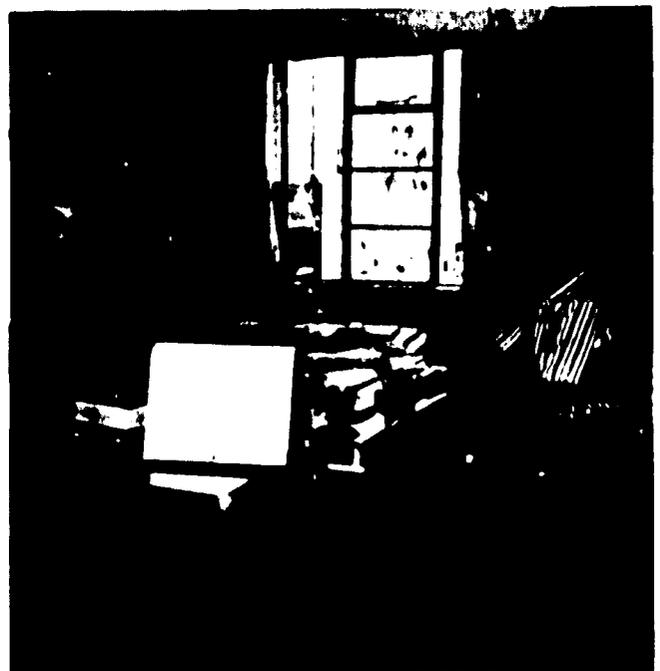


Above: Farm mechanics classroom.



Left: Bill Easley lectures on internal combustion engines.

Below: John Osuban, acting principal and COP Victor Amann.





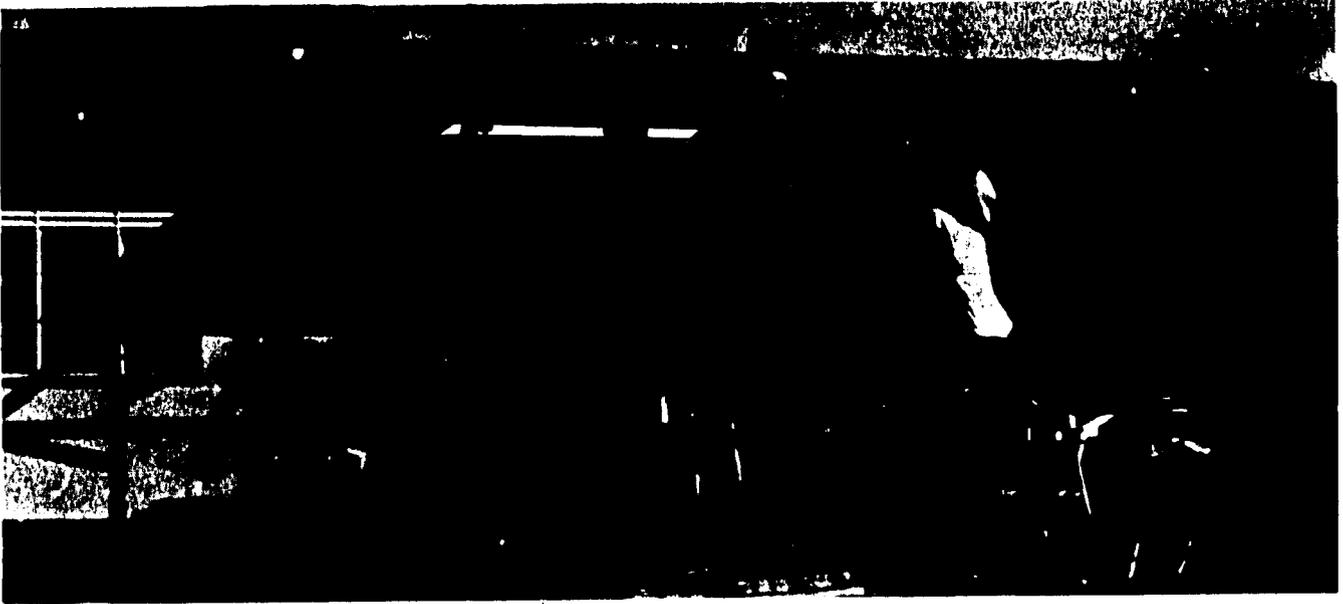
BUKALASA

Above: Peter Sibyetekerwa, Principal, holds class in the equipment yard.

Right: Dennis Kluver in the classroom.

Below: S.A. Thies and (R) C.P. Moore in their offices.





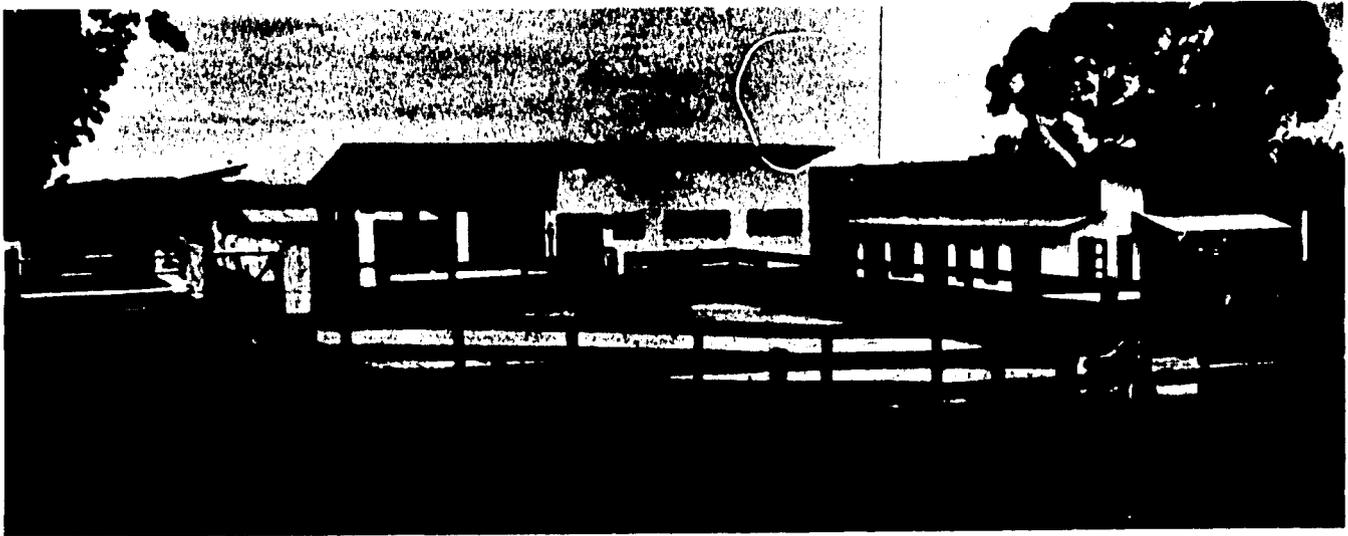
Above: Thies and Moore putting a roof on Thies' porch before enclosing the area for a dependent's school.



Left: Arlene Thies teaching in the completed school area.

Below: Morning tea for faculty.

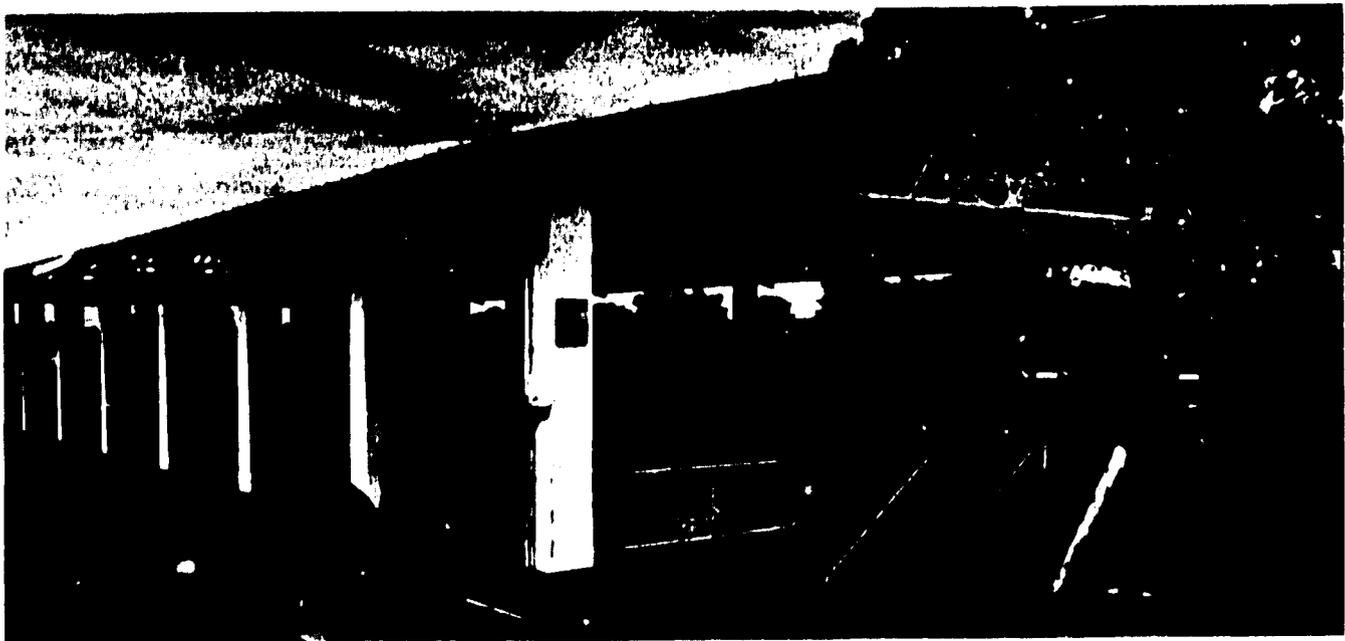




Above: Livestock area.

Right: Quonset hut dormitories.

Below: Livestock teaching arena.





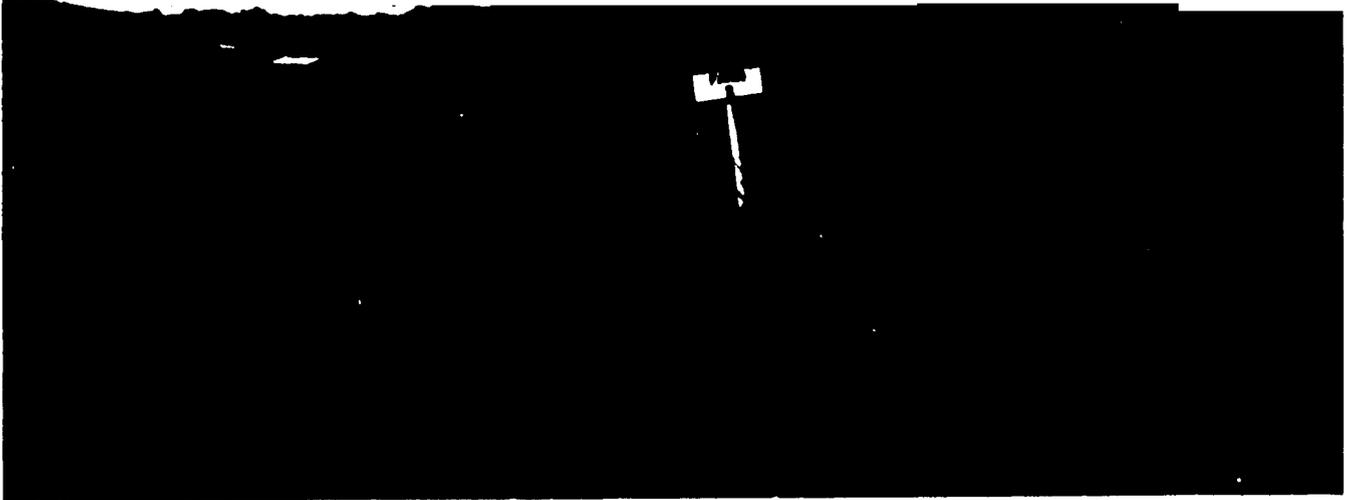
Above: Moore and M.R. McClung, Chairman Animal Industry and Veterinary Science, WVU, inspect silage in pit.



Left: Flail chopper preparing corn for the pit silo.

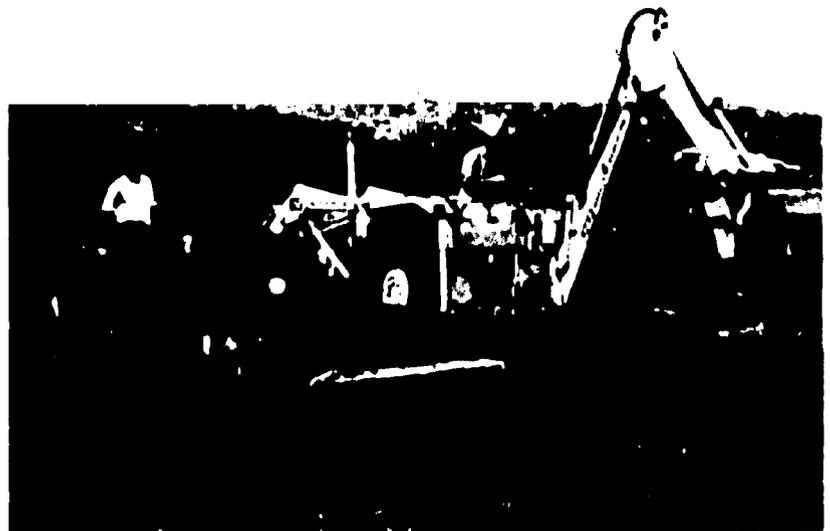
Below: Moore discusses a poultry problem with worker.





Above: Student farm area.

Above: Moore moving the feed mixer he and Kluver built.



Right: Moore uses a back hoe to remove a termite mound.

Appendix A: W.V.U. Staffing of the Agricultural Colleges and Veterinary
Training Institute 1963-1968.

Arapai Agricultural College

	<u>Arrival</u>	<u>Departure</u>	<u>Position</u>	<u>Length of Tenure</u>
Ambrester, P.V.	10- 1-63	6- 3-65	Animal Husbandry Changed to Soils and Farm Bldg.	21 Mo.
Vande Linde, O.V.	10- 1-63	9-25-65	Extension Methods	24 Mo.
Bennett, F.W.	3- 8-64	7-15-66	Agr. Mechanics	24 Mo.
Myers, Galen S.	3- 8-64	9- 2-65	Extension Methods	15 Mo.
Gay, Robert L.	9-16-64	7- 3-67	Animal Husbandry	35 Mo.
Perry, Bennie A.	9-12-65	exp. 1- 1-70 ^{1/}	Soil Chemistry	52 Mo.
Easley, W.B.	2-21-66	5-27-68 ^{2/}	Farm Mechanics ^{2/}	-
Ferguson, G.E.	1-27-67	- -	Agr. Engineering ^{3/}	-

1/ Second tour approved.

2/ Will return as Instructor of Extension Methods.

3/ Position to be phased out at end of this tour,
replaced by Ugandan.

Bukalasa Agricultural College

Casto, Gene	10- 1-63	7- 6-65 ^{1/}	Extension Methods	21 Mo.
Gay, Jack M.	2- 9-64	8-16-66 ^{1/}	Animal Husbandry	31 Mo.
Holmes, F.P.	9-17-64	12-13-66	Voc. Agriculture	27 Mo.
Scholton, A.G.	1-21-65	1- 1-67 ^{2/}	Agr. Chemistry	24 Mo.
Thies, S.A.	7-26-66	8-19-68 ^{3/}	Voc. Agriculture	-
Moore, C.P.	9- 7-66	12-10-68 ^{3/}	Animal Husbandry	27 Mo.
Sperow, C.B.	1-27-67	- - ^{4/}	Soil Chemistry	-
Kluver, D.E.	3-15-67	6- 1-69 ^{4/}	Agr. Mechanics	-

1/ Second tour at V.T.I.

2/ Voluntary termination -- position retained.

3/ Position to be phased out by AID due to staff cuts.

4/ Position will be phased out and filled by a Ugandan.

Veterinary Training Institute

Welch, J.A.	10- 1-63	3-20-66 ^{1/}	Animal Husbandry	30 Mo.
Woodson, F.E.	10- 1-63	H.L. 3-31-68 ^{2/}	Vet. Medicine	-
Merinar, C.C.	4-26-65	- - ^{2/}	Dairy Husbandry	-
Gay, Jack M.	11-18-66	6- 1-69 ^{2/}	Animal Husbandry	-

1/ On home leave at time of this report and will return for third tour.
He has spent 56 months in W.V.U., Uganda staff through May, 1968.

2/ Position phased out and filled by Ugandan.

Appendix B: Uganda Staff Teaching Tenure by Institution, 1968

Arapai Agricultural College

<u>Senior Teaching Staff</u>	<u>Position</u>	<u>Time at Institution</u>
Galukande, E.B.	Principal	8 Months
Irigiei, Robert	Animal Husbandry	3 Years
Okot, M.W.	Animal Husbandry	3 Months
Waibale, John	Crop Husbandry	3 Years
Osuban, A.K.	Agr. Economics	3 Years
Kiwuwa, B.	Agr. Mechanics	1½ Years
Mukacha, A.S.N.	Agr. Mechanics	1 Month

Junior Staff or Demonstrators

Akishule, A.K.	Animal Husbandry	2½ Years
Ecodu, N.A.	Animal Husbandry	4 Months
Sakira, D.	Crop Husbandry	15 Months
Nsereko, J.	Farm Mechanization	15 Months
Ngura Akiiki, C.	Agr. Chemistry	15 Months

Bukalasa Agricultural College

Senior Teaching Staff

Sibyetekerwa, P.E.K.	Principal	3 Years
Kyagaba, E.K.	Crop Husbandry	11 Years
Odhuba, E.K.	Animal Husbandry	2½ Years
Mwoga, V.N.	Agric. Chemistry	1½ Years
Nyankori, J.C.O.	Agric. Economics	3 Months
Ruvwa, R.U.A.	Animal Husbandry	3 Months
Olum, Z.	Agr. Mechanics	1 Month

Junior Staff or Demonstrators

Kasenge, V.	Crop Husbandry	1½ Years
Isyabirye, J.L.K.	Farm Manager	3 Years
Mutonyi, Mary	Horticulture	10 Months

Veterinary Training Institute

Nondo, S.	Principal	2 Years
Kamoga, M.H.	Biologist	9 Months
Kiiza, K.K.	Animal Husbandry	10 Months

Appendix C: Teaching Tenure of Expatriate Staff, other than WVU, by Institute, 1968

Arapai Agricultural College

	<u>Position</u>	<u>Time at Institution</u>
Ker, A.D.A.	Crop Husbandry	5 Years
Tuck, N.G.	Farm Mechanization	7 Years
Tucker, G.G.	Biology	4 Years

Bukalasa Agricultural College

Dunbar, A.R.	Crop Husbandry	4 Years
Lewis, J.D.	Survey, Farm Mechanization, Estate Manager	4 Years
Goode, Miss P.M.	Biology	1½ Years
Beaver, Miss K.S.	Biology	2 Years
Male, Miss C.A.	Home Economics	2 Years

Veterinary Training Institute

Leger, C.F.M.	Biochemistry (Officer in charge, Tannery Section)	2 Years
Westergaard, J.M.	F.A.O. Dairy Course	2 Years
Glistrup, J.	F.A.O. Dairy Course	1 Year

Appendix D: Academic Training of Staff Members, Agricultural Diploma Level Colleges, Uganda, May 1968.

Arapai Agricultural College

<u>Principal</u>	Galunkande, E.B.	Diploma in Agric. (E.A.) Cert. of Merit in Agric. (Houghall) B.Sc. Agric. (Univ. of Durham) M.Sc. Agric. (Univ. of Durham)
<u>Agr. Biology</u>	Tucker, G.G.	B.Sc. (Whales)
<u>Agr. Chemistry</u>	Perry, B.A.	B.S. (Va. State College) M.S. (Mich. State Univ.) Ph.D. (in progress, WVU)
<u>Agr. Economics</u>	Osuban, A.K.	B.Sc. Agric. (Edin.) N.C.A. M.S. Agric. (WVU)
<u>Animal Husbandry</u>	Irigiei, R.A.	Dip. Agric. (E.A.) N.C.A. B.Sc. Agric. M.Sc. Animal Hus. (WVU)
<u>Animal Husbandry</u>	Okot, M.W.	Dip. Agric. (Bukalasa) E.A.D.A. (Univ. E.A.) B.S. Animal Hus. (WVU)
<u>Crop Husbandry</u>	Ker, A.D.A.	B.A. (Cantab.) D.T.A. (Unov. W.I.)
<u>Crop Husbandry</u>	Waibale, J.	B.Sc. Agric. (London) M.S. Agronomy (WVU)
<u>Farm Mechanization</u>	Easley, W.B.	B.S. (Va. State College) M.S. (Va. State College)
<u>Farm Mechanization</u>	Ferguson, G.E.	B.S. (Univ. of North Dakota) M.S. (Univ. of Minn.)
<u>Farm Mechanization</u>	Kiwiwa, B.L.	B.Sc. Agric. M.Sc. (in progress, Makerere)
<u>Farm Mechanization</u>	Tuck, N.G.	Dip. Agric. C.D.A.; N.D.A.

Junior Staff Demonstrators - (Arapai Agricultural College)

Akishule, A.K.	Dip. Agric. (Nova Scotia)
Ecodu, N.A.	N.D.A. Suttleworth Cert. in Animal Sc. (Oregon)
Ngura, Akiiki, C.	Dip. Agric. (Arapai)
Nsereko, J.	Dip. in Agric. (Arapai) E.A.D.A. (Univ. E.A.)
Sakira, D.	Dip. in Agric. (Arapai) E.A.D.A. (Univ. E.A.)

Bukalasa Agricultural College

<u>Principal</u>	Sibytekerwa, P.E.K.	E.A.D.A. (Makerere) N.C.A. (Durban Agr. Inst.) B.Sc. (Durban Univ.)
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Bukalasa Agricultural College - (continued)

<u>Agr. Biology</u>	Goode, Miss P.M.	B.Sc. (U.K.) M.Sc. Agric. (Univ. of Birmingham)
<u>Agr. Chemistry</u>	Mwoga, V.N.	B.Sc. Chem. (Makerere) M.Sc. Agric. (WVU)
<u>Agr. Chemistry</u>	Sperow, C.B.	B.S. Agric. (WVU) M.S. Soils (WVU)
<u>Animal Husbandry</u>	Moore, C.P.	B.S. (V.P.I.) M.S. An. Hus. (Univ. of Tenn.)
<u>Animal Husbandry</u>	Odhuba, E.K.	B.Sc. Agric. (Makerere) M.S. An. Husb. (WVU)
<u>Animal Husbandry</u>	Ruvwa, R.U.A.	B.Sc. Agric. (Makerere)
<u>Agr. Economics</u>	Nyankori, J.C.O.	B.Sc. Agric. (Makerere)
<u>Crop Husbandry</u>	Dunbar, A.R.	Dip. Agric. (Trinidad) Dip. Tropical Agric. (Trinidad) M.A. (Cambridge)
<u>Crop Husbandry</u>	Kyagaba, E.K.	Dip. Agric. (Makerere)
<u>Estate Manager</u>	Lewis, J.D.	Dip. Agric. (Scotland College of Agric.)
<u>Farm Mechanics</u>	Kluver, D.E.	B.S. (Univ. of Minn.)
<u>Home Economics</u>	Male, Miss' C.A.	Certificate (U.K.)
<u>Vocational Agr.</u>	Thies, S.A.	B.S. (Okla State Univ.) M.S. (Okla State Univ.)

Junior Staff Demonstrators - (Bukalasa Agricultural College)

<u>Horticulture</u>	Mutonyi, Miss Mary	Cert. Agric. (Bukalasa) Diploma Agr. (U.K.)
<u>Crop Husbandry</u>	Kasenge, V.	Diploma Agr. (Bukalasa) E.A.D.A.
<u>Farm Manager</u>	Isabirye, J.L.K.	Diploma Agr. (Bukalasa)

Veterinary Training Institute

<u>Principal</u>	Nondo, S.B (E.A.)	Dip. V. Sc. (E.A.); B.V. Sc. (E.A.)
<u>Animal Husbandry</u>	Gay, J.M.	B.S. (Agr.) W.V.U. M.S. An. Husb. (Univ. of Kentucky)
<u>Animal Husbandry</u>	Kiiza, K.K.	Diploma Agric. (E.A.)
<u>Biologist</u>	Kamoga, M.H.K.	Dip. Educ. (E.A.); B.Sc. Zoology (E.A.)
<u>Dairy Husbandry</u>	Merinar, C.C.	B.S. Agric. (WVU) M.S. Agric. (WVU)
<u>Veterinarian</u>	Woodson, F.E.	B.S. (WVU); D.V.M. (Ohio State Univ.)
<u>Tannery Section</u>	Leger, G.F.M.	M.A. (Chem.); Dr. (Biochem.); I.L.O. Expert
<u>F.A.O. Dairy Courses</u>	Glistrup, J.	- -
<u>F.A.O. Dairy Courses</u>	Westergaard, J.M.	- -

Appendix E: Commodities Received at Three Diploma Colleges, June 1, 1967 to June 1, 1968 (Items costing \$25.00 or more included)

Arapai Agricultural College

1 set Hot Branding Irons
1 Animal Clipper
1 Sheep Shearing Head
1 Hammermill and V-Belt Drive
1 Three-Phase Electric Motor
1 400 Egg Incubator
2 Balances
1 Centrifuge
1 Furnace Muffler (electric)
1 Furnace Rheostat
1 Hot-Plate 230 Volt
1 Water Bath 230 Volt
1 Soil Solid Tester
1 Extraction Apparatus
1 Liquid Limit Soil Tester
1 Battery Charger
1 Cell Tester
1 Spark Plug Cleaner & Tester
1 Rotor Kit
1 Metal Cutting Band Saw
1 Ranger Cattle Chut (Transferred to Bukalasa)
1 Rotary Tiller
1 Calorimeter
1 Egg Washer
1 Electric Dehorner
4 18 inch Fans for the Quonset Huts
202 Books on Agriculture
766 Bulletins on Agriculture

Bukalasa Agricultural College

1 set Sochet Wrenches, 3/4 inch drive
1 Anvil, 100 Lbs.
3 Machinists Vises
1 Bolt Cutter
1 Tap and Die set National Course
1 Tap and Die set National Fine
Variety of small Plumbing Tools
Variety of small Hand Tools,
Wrenches, Hammers and Chisels
Sheet Metal Hand Tools
Wood Working Hand Tools
Small Cement and Masonary Tools
1 Tool Cabinet with Compartments
2 6 Foot Ladders
2 8 Foot Ladders
1 3 H.P. Vertical Shaft Gasoline
Engine

Bukalasa Agricultural College - (continued)

2 2½ H.P. Briggs & Stratton Engines
1 Portable Ramp
1 Debeaker
1 Seed Cleaner Treater
1 Ammeter AC-DC
1 Box and Pan Brake
1 Slip Rools 42" X 2"
1 Cement Mixer W/3 H.P. Gasoline
Engine
1 Cement Block Maker
1 Spray Finishing Outfit
1 Corn Sheller
1 600 Egg Incubator, 220 Volt,
50 Cycle
1 5 Deck Chick Starting Battery
1 A.C. Arc Welder 230 Volt
1 Portable Electric Grinder
1 Planer with 42" Head
1 Saber Saw
1 Jointer - Planer
2 Portable Electric Drills
1 Drill Press - Floor Model
1 Portable Sander, Belt Type
1 Grindstone
1 Wood Lathe
5 Film Strips
1 Grindstone, Foot Powered
1 Stake Blowhorn
374 Books on Agriculture
600 Bulletins on Agriculture

Veterinary Training Institute

11 Transparencies for Overhead Projector
13 Filmstrips
12 Slide Sets
Materials for making Visual Aids
5 Tool Kits
Assortment of Small Hand Tools
1 Cement Mixer
2 Ratchet Braces
1 Foot Treadle Grindstone
1 Dairy Scale
1 Steam Sterilizer
Cattle Tags
1 Cutter for Shearmanster
1 Cutter for Clipper
1 Shearing Machine Hand Piece
1 Stainless Steel Bath
1 case Stain Tent Reagent and Test Measure
Various Hand Tools for Shop Teaching
Hand Tools for Fencing and Cattle Handling

Veterinary Training Institute - (continued)

1 Soil Testing Outfit
2 Office Steel Cabinets
2 Models of Livestock
333 Books on Agriculture
590 Bulletins on Agriculture

Appendix F: Program of Practical Work for V.T.I. Students and Staff

<u>Practical</u>	<u>Time</u>	<u>Purpose</u>
1. Advanced Dairy Cattle Management (Merinar)	6:30 - 7:15 A.M. 4:30 - 5:30 P.M.	To give practical experience in milking, feeding, recording, and management of high producing dairy cattle.
2. Beginning Dairy Management (K. Kiiza)	6:30 - 7:15 A.M.	Teach students how to milk and manage crossbred Jersey-Nganda cows. This is done at a portable milking bail constructed in March of 1968.
3. Dairy Calf Rearing (Gay)	6:30 - 7:15 A.M.	Teach students how to properly feed and manage calves from birth to four months of age. Present result and costings.
4. Management of Dairy Heifers (K. Kiiza)	6:30 - 7:15 A.M.	Carry out the feeding and management of dairy heifers from 4 months till first lactations.
5. Pasture Management (Merinar)	4:30 - 5:30 P.M. Mon. thru Fri.	Students are responsible for slashing, fertilization, weeding of farm pastures and maintenance of paddock fences.
6. Rabbit Husbandry (Kamoga & Woodson)	6:30 - 7:15 A.M. 4:30 - 5:30 P.M.	Students are responsible for the feeding, breeding, and general management of 10 does and their litters. One of the added advantages of having rabbits is the convenience of being able to show the basic mendelian principles of breeding and selection.
7. Sheep Husbandry (Woodson)	6:30 - 7:15 A.M. 4:30 - 5:30 P.M.	Carry out the feeding, breeding and management of a flock of 25 woolled sheep. Students also receive considerable experience in the control of internal and external parasites which are a constant problem in sheep located in this area of Uganda.
8. Poultry Husbandry (Kirembwe & Gay)	6:30 - 7:15 A.M. 4:30 - 5:30 P.M.	To give practical experience in the feeding and management of leghorns, dual purpose breeds, and broilers.
9. Construction Techniques (Gay)	4:30 - 5:30 P.M. Mon. thru Fri.	To gain experience in the identification, handling, use, and maintenance of tools; identification, character and use of different types of farm construction materials, construction of feed troughs, mineral boxes, gate doors, fold units, and etc.; and maintenance of repairment of building facilities and farm equipment.
10. Outside Clinic Work (Woodson)	As Necessary	Assist Veterinarian in the investigation, diagnosis, and treatment of reported sicknesses in livestock on farms near the Veterinary Training Institute.

Appendix G: A Basis of Evaluation of the Diploma in Agriculture Earned in East Africa for Entry into an Agricultural College of a U.S. University

Dr. Newton M. Baughman
and
Dr. Victor F. Amann

Five schools or colleges in East Africa provide 3 years' study, post school certificate in Agriculture and confer a Diploma in Agriculture on the candidate successfully passing comprehensive examinations covering the 3 years' work. These are Morogoro Agricultural College, Tanzania; Egerton College, Kenya; Bukalasa, Arapai and the Veterinary Training Institute, Uganda.

Entrance requirements for entering these schools, as indicated above, is the School Certificate, or the General Certificate of Education. An entering student must also have passed examinations in one or more specific subjects, mainly the sciences, chemistry, biology and mathematics, in the school certificate examination.

To receive a School Certificate, a student should have attended secondary school for 4 years, studied a variety of subjects and passed a minimum of six examinations in subjects. The examinations are, at present, prepared by the Cambridge Examination Syndicate and are uniform for all secondary schools in East Africa.

The term of the secondary school runs from January to November and is divided into three terms 10-12 weeks long. A typical weekly schedule would be as follows:

<u>Subject</u>	<u>Periods[†] Per Week</u>			
	<u>1st Year</u>	<u>2nd Year</u>	<u>3rd Year</u>	<u>4th Year</u>
English Grammar	6	6	6	6
English Literature	3	3	4	3
Mathematics	7	7	7	7
Biology	3	3	3	3
Chemistry	2	2	3	3
Physics	2	2	3	3
History	3	3	3	3
Geography		3	3	3
Swahili	3	3	3	3
Physical Ed.	2	2	2	2
Bible Knowledge	-	-	-	2
Agriculture**	5	5	-	-
Library	1	1	2	2

* Class Periods are 45-50 minutes duration.

** Agriculture has only recently been introduced in a few schools as an examinable subject.

Examinations are taken at the end of 4 years' study and are, in the main, the only criterion of the students' work for the time devoted to school. Grades are given, ranging from 9 failure; 8-7 pass; 6-3 credit; and 2-1 distinction. The Certificate will be named Pass, Credit or Distinction, depending on the major marks received on the several examinations taken. A student not passing English Grammar may be given a General Certificate of Education, GCE, if his marks in other subjects are acceptable. The School Certificate is, in many ways, similar to the American High School Diploma.

To enter a university course, the student must possess a "Higher School Certificate" sometimes called "A levels" which is granted for passing examinations in two or three subjects studied for an additional 2 years. Usually chemistry and biology or botany or zoology for biology are required for entry into an agricultural course leading to the B.S. degree. The level of attainment would be similar to that of a student having 8-10 semester hours of credit for the same subject in an American university.

The "Diploma College" is supposed to produce a technician well versed in the practical aspects of the subject; the university graduate is considered to be the theoretician who becomes the teacher or researcher and is not expected to "dirty his hands" with the practical application of the subject.

Grading systems vary within American colleges and universities. There is, however, a vast difference between the American system and that of the European schools and their African counterparts.

A general comparison would be as follows:

U.S.A.		Africa	
<u>Letter</u>	<u>Numerical</u>	<u>Name</u>	<u>Mark**</u>
A	90 - 100	Distinction	75% and above*
B	83 - 90	Credit	60 - 74%
C	75 - 83	Pass	50 - 59%
D	65 - 75	Fail	below 50%
F	below 65		

* Marks above 75 are so rare as to be essentially nonexistent.

** These marks vary slightly with schools. In some instances, the pass mark is 50 with a resultant readjustment of other marks.

A further differentiation exists. In the US, grades are given in each subject. The success of the academic program depends on the average of all grades with some "D's" possible. The student in an American school will have examinations in a large number of subjects or "courses" measured in semester or quarter hours with each semester hour representing 15-18 contact hours. A year's work would be measured or evaluated in 10-15 subjects with a grade in each. A failure in one subject merely means a repeat of that individual subject.

In the African school, a student studies for a complete academic year

and then sits examinations in five or six subjects. He must pass all the examinations to proceed on to the next year's work. In certain situations he may resit an examination in one subject if his marks are between 35 - 40. Failure in two or more examinations or marks below 35 in one examination require that he either repeat the entire year's work or be dismissed.

To properly assess the work done in an African college or university, you must have a good knowledge of the subject matter presented and examined and then compare this with subject matter presented in a variety of courses in an American university.

The African agricultural colleges award diplomas at three levels: Distinction, Grade II, and Pass. The Distinction Diploma is awarded to students with grades averaging 75 or better. Grades at this bend are so rare they indicate the student is a near-genius. Grade II Diplomas are awarded to students with average marks between 60 and 74. The remaining students who are awarded Diplomas, but have grades below 64, are given a Pass Diploma. A grade of 50 is failing.

Egerton College in Kenya can be taken as a typical college providing a 3-year course leading to a diploma in Agriculture. The subjects presented and the times allocated are essentially as follows:

Subject	Contact Hours (Periods are 50 minutes duration)		Subjects covered
	Lecture	Lab.	
Chemistry	140	60	Inorganic, Organic, Nutrition, Soils, Fertilizers
Biology	175	130	Zoology, Botany, Ecology, Genetics, Entomology, Plant Pathology, Physiology (Plant)
Engineering	200	200	Workshop, Surveying, Engines Drawing, Machinery, Soil Conservation, Structures
Crop Science	240	380*	Introduction and Principles, Forages, Cereals, Horticulture, Tree crops, Vegetables
Animal Science	120	140**	Introduction, Dairy, Pigs, Poultry, Ruminants, Health Nutrition
Economics	180	90	Introduction, Marketing Management, Accounts, Extension

* Includes Seminar - an additional 90 hours is spent on farm visits.

** Farm discussions that may be included here are included in crop science above.

If it is assumed that 15 contact hours of lecture or 30 contact hours of laboratory are equivalent to one semester hour credit in an American university,

the Egerton Diplomat would have the equivalent of:

Chemistry	11	Semester Hours
Engineering	20	
Biology	15	
Crop Science	28	
Animal Science	13	
Economics	15	
	<hr/>	
Total	102	Semester Hours

Courses from the 1967-68 Catalog of West Virginia University that could substitute for the subjects taken above are:

Chemistry	Chem. 11 & 12 or Chem. 15 & 16 and Agron. 2 A total of 12 semester hours
Biology	Biology 1 & 2, Genetics 171 & 172 A total of 12 semester hours
Agricultural Mechanics	Ag. Mech. 152, Ag. Mech. 275 and Ag. Eng. 10 Perhaps Ag. Mech. 253 A total of 12 semester hours
Crop Science	Agriculture 11 & 12 and 52, Agron. 252 and 254, Horticulture 107. A total of 16 semester hours Perhaps Plant Path. 201 making 20
Animal Science	AIVS 51, 101, 123, and 102 A total of 13 semester hours
Economics	Ag. Econ. 104 & 131, Econ. 51 and Agri. Education 238 A total of 11 semester hours

The student transferring from Egerton to an American university could be given transfer credit for up to 80 semester hours credit. In some instances, the material covered in Africa does not quite cover the subject matter taught in the American course. In other instances, there is a wider coverage in the African course than in the American equivalent. For example, the chemistry taught in the African course is directed to preparing a student for the agricultural courses to follow and does not include much of the commercial application found in many American courses in the subject. On the other hand, it will include a comprehensive course in Introductory Soil Science that goes beyond the material as presented in many American courses in the subject.

There are, in addition, many areas where no direct relationship between courses given in the African school and the American school can be made. This, in part, accounts for the difference in the allocation of the contact hours.

There are minor variations in the subject matter presented in the various African schools. Some obvious exceptions will be noted later. However, the Council for Agricultural Education for East Africa has sponsored the development of a uniform examination to be administered at the conclusion of the three year course in all schools that require the syllabus for courses in the various schools be comparable.

The curriculum used here as an example is that currently being offered

at Egerton College. Successful completion of this curriculum qualifies the student for the Diploma in Agriculture of Egerton College. Similar courses leading to the same qualification are offered at Morogoro, Arapai and Bukalasa. The course at Arapai, however, places a slightly greater emphasis on agricultural mechanics than the others. The course at the Veterinary Training Institute leads to the qualification of a Diploma in Animal Husbandry. It, therefore, has reduced emphasis in crop science and agricultural mechanics. The chemistry offered there is not as complete as that offered at the other schools. Egerton offers other qualifications. There are courses leading to Diplomas in Animal Husbandry, Agricultural Mechanics, Range Management, Dairy Manufacture and Forestry. Some variation in transfer credit from that suggested herein must be made for students offering one of these qualifications as a basis for entering an American university.

A few students being sent to the United States possess the Diploma in Agriculture offered by the Faculty of Agriculture, Makerere University College. This course was discontinued in 1961 and changed into the degree course. It was a course of 3 years long. The entering student also had 2 years of science subjects following school certificate before entering the diploma course. Transfer credit for students possessing this qualification should be substantially higher than those possessing Diplomas from the schools discussed in this paper.