AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: ____ — Code: 3

2. COUNTRY/ENTITY: JAMAICA

3. PROJECT NUMBER: 532-0082

4. BUREAU/OFFICE: LAC — 05

5. PROJECT TITLE (maximum 40 characters): Agricultural Education

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 03 DD 31 YY 89

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 84 B. Quarter 4 C. Final FY 87

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	(802)	(-)	(802)	(3000)	(-)	(3,000)
(Loan)	(-)	(258)	(258)	(3494)	(6355)	(9,849)
Other U.S. 1.						
Other U.S. 2.						
Host Country		538	538		5151	5,151
Other Donor(s)						
TOTALS	802	796	1598	6494	11506	18,000

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	632B	631	631	-	-	300	8000	3000	9849
(2)									
(3)									
(4)									
TOTALS						300	8000	3000	9849

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 635

11. SECONDARY PURPOSE CODE:

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	BF	R/AG	XII				
B. Amount		600	2700				

13. PROJECT PURPOSE (maximum 480 characters)

The purpose of this Project is to develop a viable College of Agriculture, which will fill a void in post-secondary agricultural education and improve a secondary agricultural school.

14. SCHEDULED EVALUATIONS
Interim MM 06 YY 86 — MM 01 YY 87 — Final MM 12 YY 89

15. SOURCE/ORIGIN OF GOODS AND SERVICES
G [X] 000 — L [X] 941 — L&G [X] Local — [ ] Other (Specify) ____

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment.)

17. APPROVED BY
Signature: Julius Schlotthauer
Title: Acting Mission Director USAID/Jamaica
Date Signed: MM 06 DD 21 YY 84

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
MM DD YY

AID 1330-4 (8-79)

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PROJECT PAPER (PP)

AGRICULTURAL EDUCATION PROJECT

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List of Acronyms

Acronyms	Definition
The Project	The Agricultural Education Project
COA	College of Agriculture
GOJ	Government of Jamaica
NPA	National Planning Agency
LC	Local Currency
US$	United States Dollars
J$	Jamaican Dollars
JSA	Jamaica School of Agriculture
EOP	End of Project
PGAS	Passley Gardens Agricultural School
MOE	Ministry of Education
MOA	Ministry of Agriculture
NPJ	National Polytechnic of Jamaica
UWI	University of the West Indies
CAST	College of Arts, Science and Technology
BOG	Board of Governors
AID	Agency for International Developoment
USAID/J	United States AID Mission in Jamaica
KAS	Knockalva Agricultural School
ARP	Applied Research Program
EMC	Evaluation Monitoring Committee
JAMAL	Jamaica Movement Advancement Literacy
HEART	Human Employment and Resource Training
A&E	Architectural & Engineering
FX	Foreign Exchange
PSA	Procurement Services Agent
IFB	Invitation for Bid
RFP	Request for Proposal
NDA	National Development Agency
PIU	Project Implementation Unit
HBCU	Historically Black Colleges and Universities
8 (a)	Section 8 (a) of the Small Business Administration Act

I. PROJECT SUMMARY

The overall goal of the proposed Project is to contribute to resuscitation and rejuvenation of the agricultural sector in Jamaica. This is essential if Jamaica is to develop the ability to feed itself, to earn net foreign exchange in the sector, and provide a decent level of income for its citizens who earn their livelihood in agriculture and agriculturally related occupations. In order to reach this goal, it is the intent of this project to strengthen human resources and institutional coordination to support the development and implementation of an island wide program of Agricultural Education involving its 2 agricultural secondary schools and a new College of Agriculture built to serve the immediate post secondary needs.

The Mission recommendations regarding project financing are as follows:

AID Loan	$9,849,000
AID Grant	$3,000,000
GOJ Counterpart	$5,151,000
Total	US$18,000,000
Disbursement Period	5.0 years

The Project is directly related to the manpower needs of the GOJ which have been prioritized as follows: (1) agricultural extension agents with the right mix of knowledge, skills and attitudes to effectively disseminate information and technical know-how to farmers and farm families in order to increase agricultural productivity; (2) teachers of vocational agriculture to provide educational programs for both prospective farmers and those actively engaged in production agriculture; (3) farmers with improved knowledge and skills who can assimilate and practice the requirements for modern agriculture; and (4) agricultural extension research and information specialists (a small number relative to the other categories) to assist in transmitting improved technology to the large cadre of existing extension agents and vocational agriculture teachers who will in turn take such information to farmers and farm managers.

The design of the Project which is perceived to require 5 years for completion and involves approximately 18 million dollars in loan, grant and counterpart funds will employ technical assistance from HBCU and other Land Grant institutions during all developmental phases to include; curriculum coordination and development; an applied research program; an instructional materials center; in-service improvement of faculty capabilities; institutional physical facilities development and improvement; acquisition of additional land for the practical laboratory; and a restructuring of all current courses into an objective-based, activity-oriented format to provide a maximization of the learning principle of self activity, one of the most relevant pedagogical tools for agricultural and extension education.

The major new COA facilities to be build as part of the Project include three classrooms, three dormitories, 18 faculty houses, four laboratories, an engineering workshop, and a maintenance/repair workshop. A variety of new facilities are essential for the school farm, which will have a central role in the practical, hands-on instructional programs of the COA. The major new

ones include two poultry buildings, a piggery, a dairy, an expanded abattoir, completion of the feedmill and hatchery, and facilities for irrigated agriculture on newly acquired land. Various other facilities will receve a degree of upgrading to fit them for their expanded functions, and civil works support, e.g., access roads, utility lines, etc., will be needed to put the complex in full operation.

The major new expansions and improvements at KAS will include six classrooms, five dormitories, five faculty houses, and a multi-purpose building with dining facilities. New improvements at the KAS school farm will include two poultry buildings, an abattoir, a piggery and 30 acres of newly acquired land set up for instructional programs in irrigated agriculture. Certain other civil works will be required to support the foregoing and link them into the existing KAS plant.

The agricultural sector in Jamaica has been identified as the principal and most labor intensive employer in the country. Currently it is producing significantly below its potential, although it is probably the sector in which Jamaica's most important medium to long term comparative economic advantage lies.

The analyses within the Project Paper conclude that the proposed project is technically, socially, economically, and financially feasible. The Implementation Plan is sufficiently developed to begin project implementation. Given that the activities to be undertaken in the project are not directly revenue producing, the standard cost-benefit analysis is not appropriate. An analysis was conducted indicating the social cost/benefit components of the project and their relationship to overall cost effectiveness.

Virtually all foreign exchange purchases will be made in the U.S. However, should small amounts of off-shore procurement be necessary (books, periodicals, equipment) procurement source waivers will be justified and issued on a item-by-item basis by the USAID Director.

Below is an abbreviated summary cost table which shows a breakdown of estimated expenditures at COA and KAS respectively.

Summary Table of Project Costs

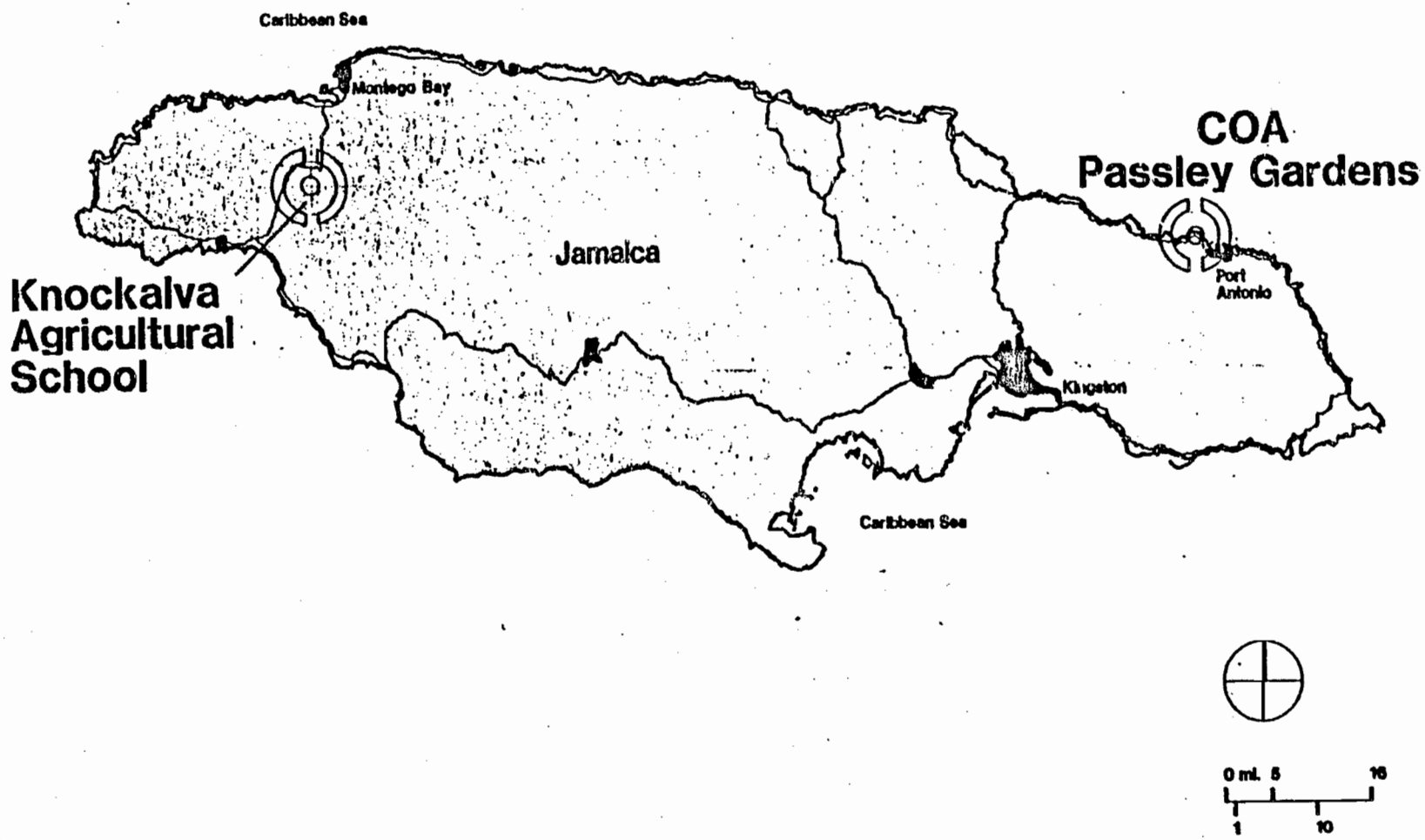
(U.S. $000)

ITEM	COA	KAS	TOTAL
T.A.	2,160	-	2,160
Training	426	540	966
Construction	4,566	1,615	6,181
Equipment	2,358	518	2,876
Faculty	1,161	498	1,659
Land	150	53	203
Other	220	100	320
Contingencies & Infla. (25%)	2,790	845	3,635
Totals	13,831	4,169	18,000

For a complete presentation of the cost involved the reader is referred to page 66. Table V, Summary Cost Estimate and Financial Plan, shows the AID inputs in U.S. dollars and local currency amounts as well as the GOJ contributions to the total project costs.

The maps and drawings on the following pages provide a geographic perspective for the Project and show the two campuses, at COA and KAS, as they are now and how they will be at end of project (EOP).

Location



USAID / GOJ AGRICULTURAL PROJECT

APEC

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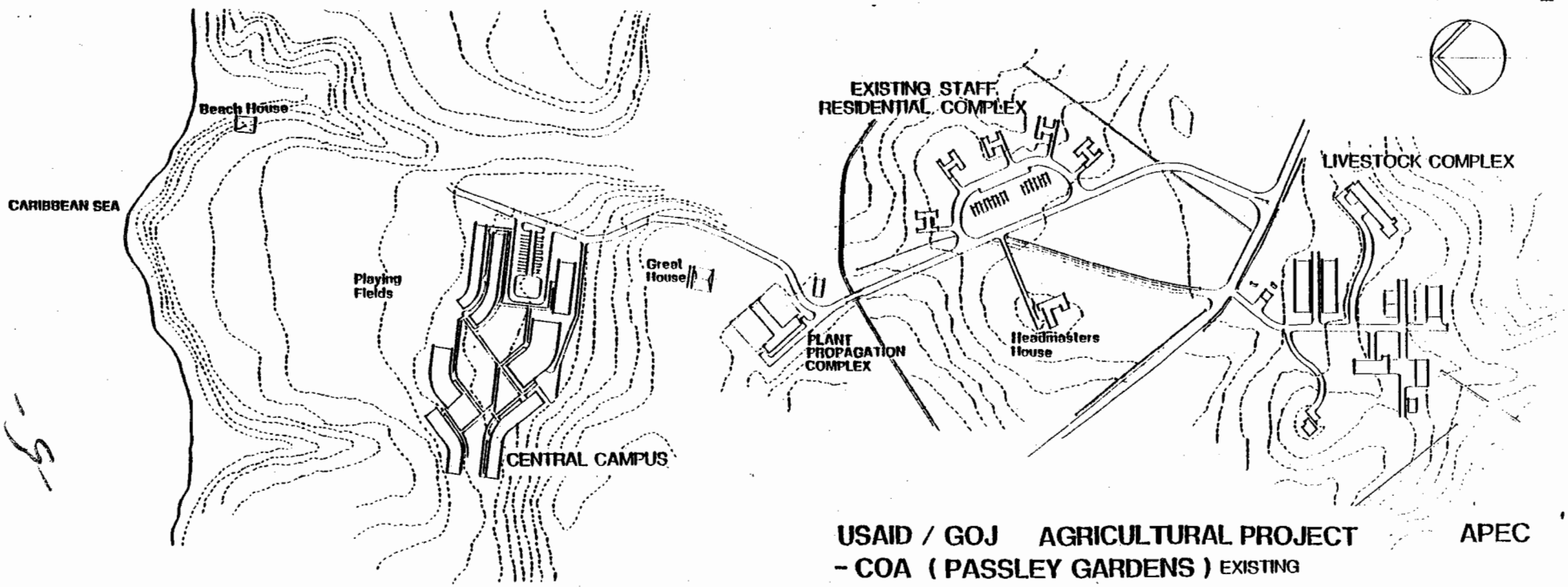
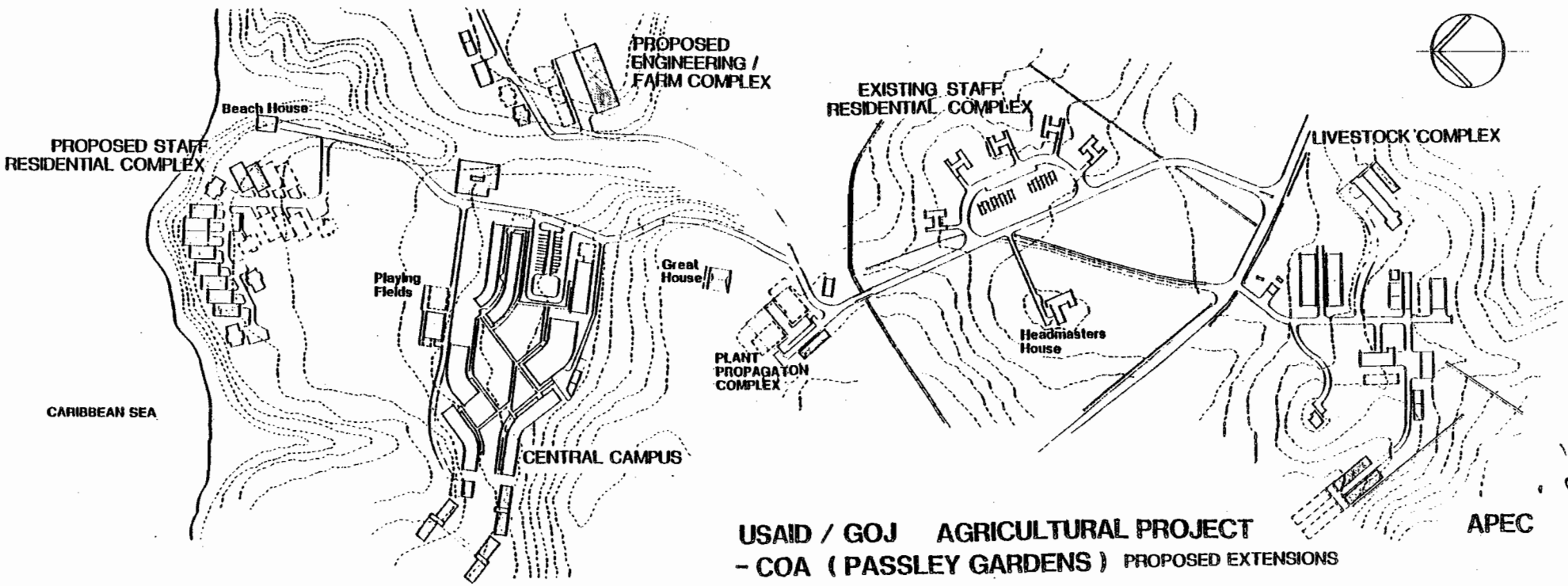


USAID / GOJ AGRICULTURAL PROJECT APEC
- COA (PASSLEY GARDENS) EXISTING



USAID / GOJ AGRICULTURAL PROJECT
- COA (PASSLEY GARDENS) PROPOSED EXTENSIONS

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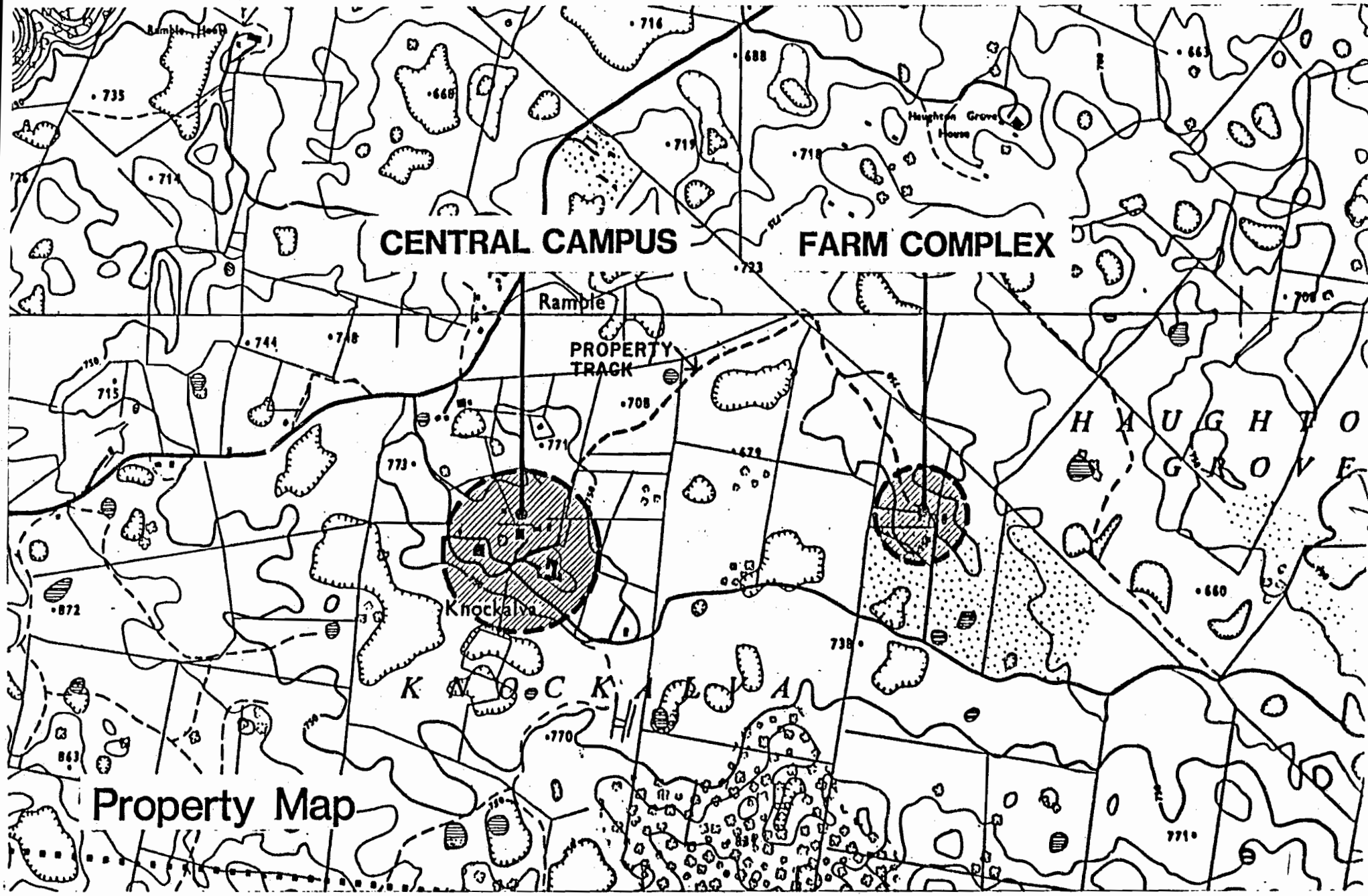
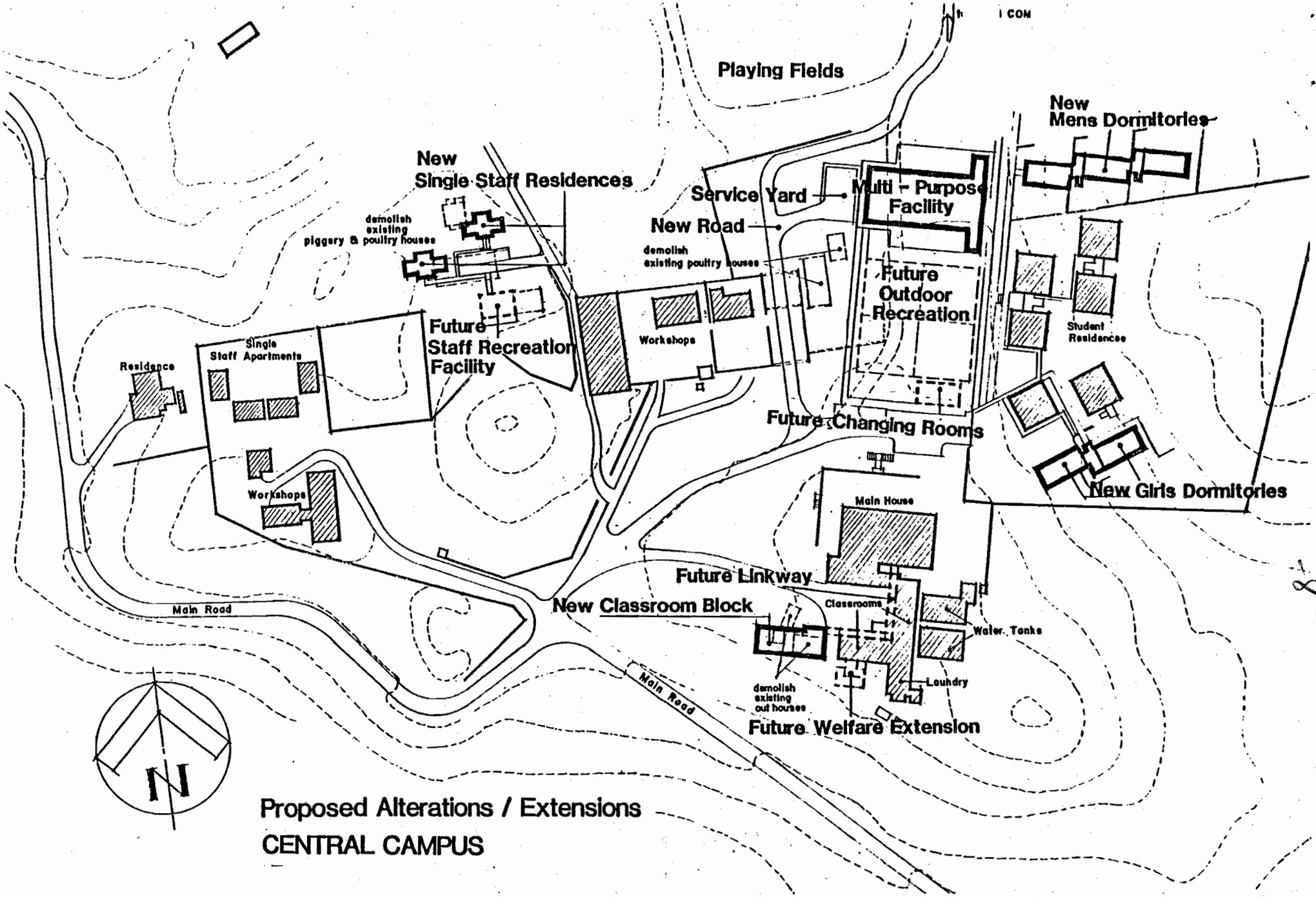


USAID / GOJ AGRICULTURAL PROJECT **APEC**

KAS (KNOCKALVA AGRICULTURAL SCHOOL)



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KAS (KNOCKALVA AGRICULTURAL SCHOOL)

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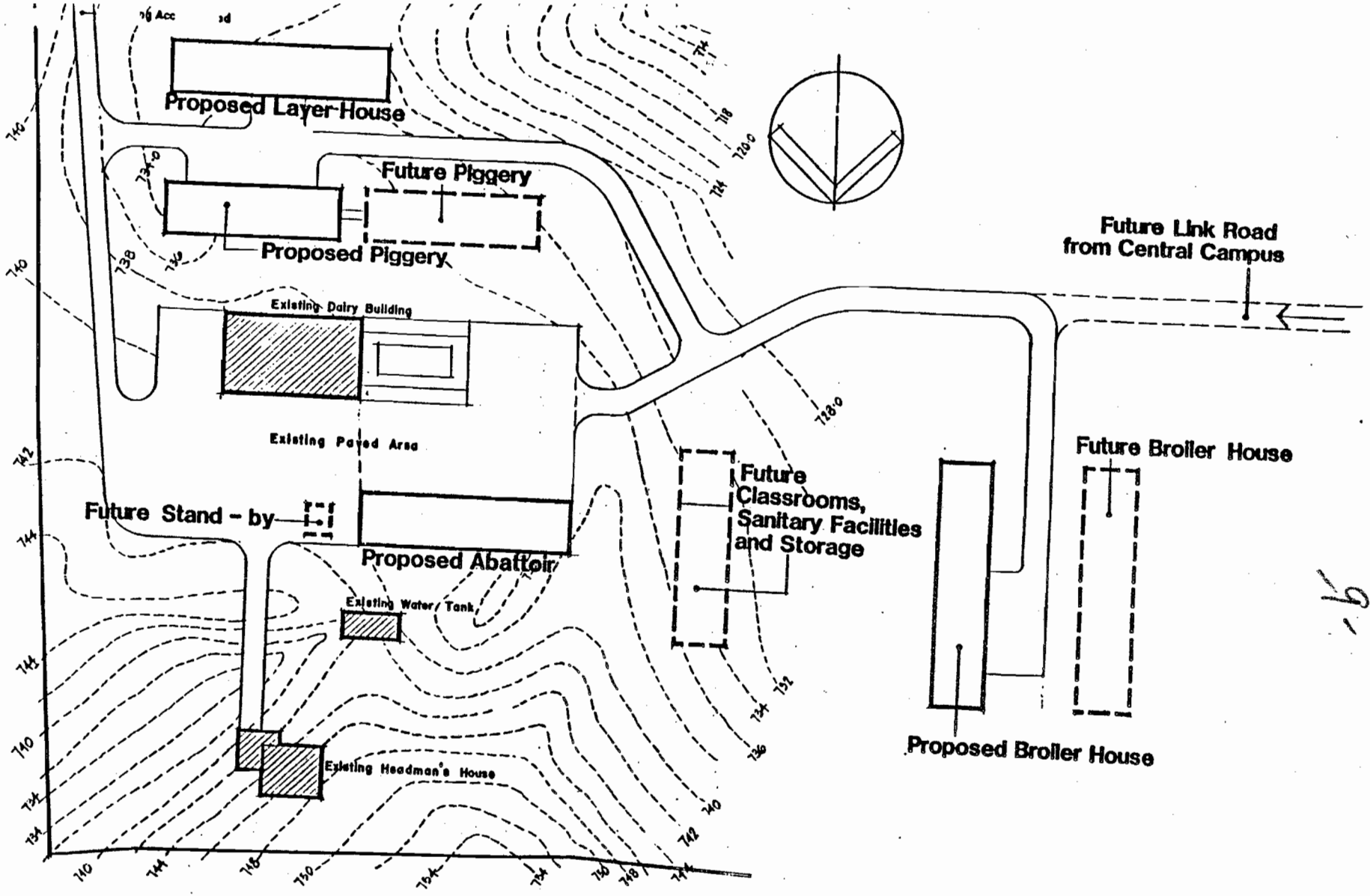

Proposed Extensions
FARM COMPLEX

USAID / GOJ AGRICULTURAL PROJECT
KAS (KNOCKALVA AGRICULTURAL SCHOOL)

APEC

II. BACKGROUND AND JUSTIFICATION

A. Introduction:

Jamaica's agricultural development problems, including its agricultural stagnation and the constraints impeding their resolution have been detailed in a number of Government of Jamaica (GOJ) and AID documents. These documents span a decade of investigative analyses and include the Jamaica Education Sector Survey (1973), A Report on Curriculum Evaluation for the Vocational Agricultural Schools of Jamaica and their Coordination with the Jamaica School of Agriculture (1978), the 1979 Title XII Baseline Study of Agricultural Research, Education, and Extension in Jamaica, and A Follow-up Study of Selected Graduates and their Employers from Three Secondary Agricultural Training Centers in Jamaica (1982). A major and central constraint to development of Jamaican agriculture, and subsequently to the economic growth of the island nation, is the absence of a comprehensive and articulated agricultural education system. The key link in removing this constraint is the development of a viable College of Agriculture which will fill a post-secondary void in agricultural education and serve as a catalyst in furthering the developmental goals of Jamaica.

B. Rationale:

Agriculture is the most vital and promising component of the Jamaican government's economic plan for the 21st Century. Traditionally, bauxite and tourism have provided Jamaica's chief sources of foreign exchange, with agriculture (chiefly sugar and bananas) comprising the third most important revenue source. However, with the decline in world demand for bauxite, as well as cheaper sources from which bauxite multi-nationals can purchase the metal ore, and with the unpredictability of tourism as a stable source of revenue, agriculture is now being looked to as a critical sector for resuscitating the Jamaican economy.

Although Jamaica has thousands of acres of potentially productive land, agriculture has over the decades lagged behind its potential because of several factors. Chief among these has been the low image of agriculture as a profession--a direct result of the mental attitude that links agriculture with the era of slavery. As a result, agriculture has in the past been the activity of peasant farmers working the land by traditional methods; although large farms do exist, as well as government and quasi-government control of crops such as sugar, bananas, citrus, pimento, and coffee, this tradition of old fashioned labor attitudes and outdated farming methods has dominated the agricultural sector.

Another constraint to Jamaican agricultural development has been the lack of trained agriculturalists to update and modernize the agricultural sector. Formal instruction in agriculture in Jamaica began in 1910 with the establishment of the Government Farm School in St. Catherine. This institution was eventually renamed the Jamaica School of Agriculture (JSA) and elevated to post-secondary education level status. Over the years it has been the main source of graduates in agricultural technology for Jamaica, providing middle management personnel and government extension officers.

Unfortunately, over the past two decades the quality of the program deteriorated and the graduates were not adequately prepared to seriously improve the conditions of contemporary Jamaican agriculture. Associated with this deficiency were severe problems of management, training, and output, as well as urban encroachment on the associated farm lands which led to its permanent closure of the JSA in 1981.

A new institution—the College of Agriculture (COA)—was established in 1982 on 600 acres of land near the town of Port Antonio, in eastern Jamaica. The COA is to serve as the catalyst and hub for agricultural education and training for Jamaica in the years ahead. The COA took over the site of the Passley Gardens Agricultural High School which was built under the AID Rural Education Sector Loan (532-004).

In 1983, the Government of Jamaica announced "Agro 21"—an ambitious project designed to transform Jamaican agriculture from its traditional and neglected past into a dynamic and productive sector. Agro 21 is spearheaded by the Prime Minister and has already accepted initiatives and innovations from outside Jamaica. Most notable include inputs from Japan to upgrade the coffee industry, and the introduction of modern technology farming by an Israeli team, which has begun working large tracts of land for the production of winter vegetables, bananas, fish, and horticultural products primarily for North American and European markets.

C. Project Justification:

The Government of Jamaica (GOJ) recognizes the problems and constraints of its agricultural sector as discussed above and in conjunction with AID has developed the initial steps of a program designed to address the constraints. The proposed Agricultural Education Project (the Project) is an essential and major element of this program.

Given the agricultural objectives sought by the Government of Jamaica, the need to upgrade the facilities, faculty, and curriculum at the College of Agriculture (COA) is paramount. The upgrading is needed not only at the COA, but also at its feeder institutions—especially at the Knockalva Agricultural School in Hanover Parish. This institutional upgrading is to enable the COA and the secondary level agricultural education programs to produce highly competent graduates who will be able to service Jamaica agriculture at the business, middle management, and technical levels. The COA, through close coordination with the secondary agricultural schools, the Ministry of Agriculture (MOA), and agricultural firms, will be expected to upgrade the proficiency of agricultural extension personnel, vocational agriculture teachers, farmers, and other agribusiness persons throughout Jamaica. The impact of improved agricultural education islandwide is expected to increase the productivity of Jamaica's agriculture—the sector which currently employs 35% of the labor force, but generates only 9% of the nation's foreign exchange earnings. The potential increase in foreign exchange earnings, local employment, and local food supply is not measurable in precise figures at present. However, the benefits are apparent and can only be achieved if the manpower inputs into agriculture are upgraded through provision of better facilities, faculties, and program services.

1. College of Agriculture:

The demise and closure of the Jamaica School of Agriculture was succeeded by the founding of the COA in October, 1982. The College's 600 acre site is comprised of 90 acres of developed campus; 90 acres of undeveloped campus; 50 acres of cropland; 200 acres of native pastures; 120 acres of bush and weeds; and 50 acres of gullies and wasteland. Rainfall averages 125 inches per year.

The COA is governed by a Board of Governors (BOG), the chairman and members of which are appointed by the Minister of Education. The college admitted its first class of 119 students (19 of which were former JSA students) in January, 1983. An additional 88 students were enrolled in September, 1983. Enrollment is projected to increase to 450 students by 1987. The college currently has a faculty of 18 members and offers a three-year program leading to an Associate in Sciences degree. The curriculum consists of over 60 courses, which cover both theoretical and applied subjects, including a work-study program, a practicum, campus development week activities, and a semester of cooperative education prior to graduation.

2. The Knockalva Agricultural School:

Knockalva (KAS) is Jamaica's oldest secondary agricultural school, established in 1940. The campus is situated on 214 acres at Ramble, 17 miles south of Montego Bay, in Western Jamaica. Enrollment is currently 150 students, 110 are male and 40 are female. Land use is 130 acres of pasture; 2 acres of citrus, 4 acres of vegetables, and 78 acres of campus. Students are selected from those who successfully complete the Grade Nine Achievement Test and choose agriculture as a vocation. The curriculum includes agricultural courses, as well as those subjects which are normally offered by secondary schools in Jamaica, and instructional time is equally divided between theory and practical work.

Upon completion of the infrastructural additions to Knockalva, the school will produce 100 graduates per year, some of which will be eligible to matriculate to the COA. Since improving the quality of applicants to produce the caliber of graduates needed in Jamaican agriculture is a prime purpose, completion of the expansion of Knockalva is viewed as an output within the context of the proposed project. Additionally, upgrading Knockalva faculty who do not currently have the appropriate credentials will in turn provide Knockalva with qualified faculty members. Principals of Knockalva and Elim (the other agricultural secondary school in Jamaica) will work with the COA at the college's Curriculum Development Center and its Applied Research Center on common curricular and technological concerns.

3. Conformity with Recipient Country Program Strategy:

The Agricultural Education Project (the Project) conforms directly with the Government of Jamaica (GOJ) strategy/programs. It is a priority for Jamaica at this time because it addresses the need for more skilled manpower, especially at the middle management and technical levels. The agricultural sector is the principal and most labor intensive employer in the country.

Currently it is producing significantly below its potential, although it is probably the sector in which Jamaica's most important medium to long term comparative economic advantage lies.

The recently launched "Agro 21", a primarily private sector, long term agricultural program, will have need for a large quantity of trained manpower. This program has three distinct emphases:

1. diversification into crops with high foreign exchange earnings or savings potential;
2. commercial viability of agricultural enterprises; and
3. the introduction of improved agricultural technology.

Among the outputs to be achieved during the first four years of Agro 21 are:

1. 90,000 new jobs in agriculture of which a number will require some level of technical training;
2. increases in foreign exchange savings and earnings; and
3. bringing into production up to 250,000 acres of unutilized and underutilized land.

The need for trained agriculturalists, which became evident in the 1970s, became more acute in 1982 when Jamaica found itself without an institution for agricultural education at the post-secondary level. As mentioned earlier, from 1910 to 1981, the trained technical level manpower for agriculture had been provided primarily by the Jamaica School of Agriculture (JSA) near Spanish Town. In 1981, the JSA was phased out and the College of Agriculture (COA) conceived. The COA admitted its first students in January, 1983 and assumed the post-secondary role of the JSA. The development of the COA into a strong institution of agricultural education will provide 100 trained graduates per year for the agricultural sector. In addition, the COA will provide: short courses and workshops for farmers, extension agents, and vocational agricultural teachers; the cooperative development of agricultural curricula for secondary agricultural schools; and will satisfy the need for local training with a strong practical and technological bias to complement educational programs provided by the University of the West Indies (UWI). This need is not currently being satisfied since the UWI College of Agriculture is in Trinidad, 1,200 miles from Jamaica and only a limited number of Jamaicans can afford to attend.

The COA graduates will be needed to fill a substantial number of the new openings for direct and indirect employment in agriculture, and to assist the sector on a long-term basis if the gains in agricultural production to be achieved by Agro 21 are to be realized and maintained.

The opportunity for linkages between the COA and Agro 21 enhances the ability of the project to contribute meaningfully to development of the agricultural sector. Linkages are:

1. by working with Agro 21 officials to design courses related precisely to the training needs for new skills in agriculture created by Agro 21, the COA will have courses which respond to the present needs and future trends of agricultural production in Jamaica;

2. by developing the college's farm in coordination with Agro 21 and the MOA, the COA students and faculty will develop experience in the production of non-traditional export crops;

3. by operating demonstration plots to test various seeds, fertilizers, plant varieties, etc., supplied by Agro 21's participating private firms, the COA faculty will help identify the technologies which work best in Jamaica;

4. by operating a training hatchery, feed mill, abattoir, and food processing facilities, the COA will help develop skills for support of local production and processing;

5. by training students in the latest techniques of extension work, including new technologies of farming, the COA graduates will be able to assist the MOA in the continuous process of upgrading and maintaining the quality of extension services needed to meet the requirements of Agro 21; and

6. by participating in field trips and work experience at Agro 21 production sites, the COA students will be able to learn how the latest farming techniques and technologies are being applied in Jamaica.

Upon its establishment in October 1982, the COA took over the facilities previously occupied by the now non-existent Passley Gardens Agricultural School (PGAS), a secondary agriculture institution. This had the effect of reducing the potential output of secondary agriculture students in Jamaica and subsequently created another problem addressed in the project.

The Ministry of Education (MOE) has therefore requested assistance in expanding the capacity of the Knockalva Agricultural School to compensate for some of the loss of secondary capacity. Knockalva currently receives applications far in excess of the 50 openings per year currently available. Elim, the other secondary agricultural school, has openings for 100 students per year. It also receives applications in excess of this number. Elim, being a relatively new school, is reasonably well endowed with facilities and equipment and can more easily adjust to servicing more students without external assistance. The Project will respond to the need of the MOE by expanding the capacity of Knockalva to accept 50 additional students per year as well as upgrading its facilities. Assistance was not requested for Dinthill or others schools which provide a more limited program in agricultural education, as it was judged that these can currently meet the local demand.

4. Relationship to AID Strategy:

The Agricultural Education Project is in direct relationship to the two AID strategy statements deemed most relevant to the Project. The Jamaican Country Development Strategy Statement (CDSS) for Fiscal Year 1985, and the AID Strategy for Food and Agricultural Development Assistance, an official AID/W sector strategy paper dated November 1983. The exact relationship of the project to these strategy statements is shown below.

CDSS: The 1985 CDSS identifies agriculture as one of four key areas for structural change in Jamaica and specifically mentions the proposed project as a priority for agricultural assistance: "Jamaica's capacity to produce better trained agricultural personnel for the private and public sector at the post-secondary school level will be enhanced by an Agricultural Education Project".

The agricultural sector employs about 35% of the labor force, accounts for approximately 8% of the gross domestic product (GDP) and generates only about 9% of Jamaica's foreign exchange earnings, reflecting its relatively low level of productivity. The value of food imports has exceeded the value of agricultural exports for years. Some 77% of the value of annual agricultural production is presently being directed to domestic consumption, leaving 23% of the value in traditional cash crops for export. It is recognized that the agriculture sector is producing significantly below its potential and that with a major decline in the bauxite industry, it is imperative that the agricultural sector be rejuvenated, expanded, and diversified to play a major role in the economic recovery program of Jamaica.

AID Strategy for Food and Agricultural Development Assistance: This particular strategy statement from AID/W is in direct support of the main thrusts of the proposed project. The lead-off statement under Country Level Problems is, "AID will help to develop strong institutional capacities to identify priority research needs; to train researchers, extension agents, and teachers, to adapt modern technology to local conditions; and to interact with and deliver that appropriate technology to farmers". This statement is supported later in the document to the effect that, "While technology generation and transfer with particular emphasis on research and extension is a central point of AID's strategy to strengthen human resources and institutional capabilities, these activities must be considered within the broader context of total agricultural development. AID will encourage projects designed to overcome major constraints in the food and agricultural system in other areas identified in CDSSs and regional strategies" (in this case the proposed project).

III. PROJECT DESCRIPTION

In response to the concern expressed in the DAEC review of the PID, to the demand for post secondary agricultural training, a detailed survey was carried out involving 75 agribusinesses and agencies in April and May of 1984 (see National Demand Study, supporting document). The demand analysis indicated the planned number of post secondary graduates appears conservative and should be readily absorbed into productive employment within the agricultural sector. With the increased emphasis upon agriculture the outlook for increased employment is positive.

A. Perceived Problem:

The perceived problem is one identified by a team of University of Kentucky researchers in their baseline study of agricultural research, education, and extension in Jamaica (page 188)*:

> "A critical shortage of trained agricultural manpower exists in Jamaica. If the GOJ is to successfully carry out its agricultural development programs as announced in various planning documents, it will first need to give high priority to strengthening its capacity to educate the manpower needed to implement these programs".

This shortage of manpower was formally analyzed in the Jamaica Education Sector Survey**, which projected the demand for trained agriculturalists to be about 2,500 persons over the 10 year period through 1983. To meet this demand, and allow for the probability that not all graduates would take jobs in the agricultural sector, the study concluded that at least 300 graduates from secondary level agricultural schools such as Knockalva and Elim, and 100 from a post-secondary institution would be required annually. It is significant to note that these projections were made before the advent of the Agro 21 program with its ambitious agricultural development goals and subsequent need for a large volume of trained manpower.

The current education system provides for limited general training in agriculture above the sixth grade at a variety of institutions. Practical instruction in agriculture is conducted at technical schools and specialized training in agriculture is provided by Knockalva and Elim, the island's two secondary level agricultural schools. On an annual basis, approximately 150 secondary students graduate with specialized training in agriculture and several hundred others have some exposure to agriculture, primarily home gardening.

However, the majority of farmers continue to finish their formal education much below the ninth grade level and, accordingly, require extensive support from the extension services of the MOA, and other non-formal training opportunities such as short, two-day production

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* Baseline Study of Agricultural Research, Education and Extension in Jamaica, the University of Kentucky, December 15, 1979, Contract No. AID/LAC-C-1331.

** Jamaica Education Sector Survey, Ministry of Education.

oriented, demonstration type courses offered at Knockalva and Elim. The nature and quality of extension services is dictated in part by the low level of education of most farmers and the limited practical training of the extension agents.

Limited training programs are a major factor responsible for poor standards of husbandry. The task ahead for the MOE, with collaboration and cooperation from the MOA, is to develop institutions and programs to ensure that the investments and efforts being made in land reclamation and drainage, hillside contouring, terracing, reforestation, resuscitation of banana, coffee, coconut, citrus, and dairy farms, and the thrust in non-traditional export crops (Agro 21) through investments from private sources, are not eroded through ignorance and inefficiency at the farmer and farm family level. To assure the success of these efforts and to prevent erosion of gains already made, the COA and secondary agricultural schools will have to provide the framework through which the programs can be undertaken.

The training will respond to the needs of both the small farmer and the large scale private farmers and agribusinesses who use modern technologies and produce for export. Both sectors of agriculture, the modern and the traditional, need additional trained manpower. Accordingly, training at the COA and the agricultural schools should be biased toward practical training, including a significant level of "learning by doing".

Graduates of these institutions will serve as vocational agricultural teachers, farmers and farm managers, research assistants, and extension agents. They will need the right mix of knowledge, attitudes, and skills essential for transferring information and presenting technical know-how to students, farmers, and farm families.

B. Project Goal and Purpose:

The goal of the Project is to help resuscitate the agricultural sector. This is essential if Jamaica is to have the ability to be food self reliant to earn a net foreign exchange surplus in the sector, and to provide a decent level of income for its citizens who earn their livelihood in agriculture. The production of suitably trained agriculturalists for employment in agriculture will lead to improved application of knowledge, skills, and practices in the agricultural sector which in turn will lead to increased agricultural production. That these agriculturalists be produced systematically, in predictable numbers, on an annual basis, is appropriate and necessary to ensure future long-term stability and growth. It is this growth and stability that will minimize the need for emergency programs and increase the predictability of opportunity in the agricultural sector.

The purpose of the Project is to develop a viable agricultural training institutions which can effectively contribute to the development goals of Jamaica.

The Project will have achieved its purpose by EOP when the COA reaches the fully operational stage and is graduating at least 100 suitably trained students per year. During the institutional development of the COA over the life of the Project, the attitudes and relationships among the faculty, students, alumni, and farmers will continue to be modified to more effectively respond to each others needs, thereby strengthening the COA as both an educational and a developmental institution.

C. Project Objectives:

Project objectives can be identified as:

1. to provide trained agriculturalists to improve Jamaica's agriculture and economy;

2. to expand the number of graduates from both the COA and Knockalva;

3. to train agricultural instructional staff and to develop agricultural education curricula islandwide;

4. to increase and improve the buildings and technical facilities at COA and Knockalva;

5. to conduct community outreach in agricultural education nationally;

6. to provide high caliber extension officers so that the Ministry of Agriculture can provide improved services to Jamaican agriculture; and

7. to expand curricular and research services in agricultural education nationwide through non-formal education.

D. Expected Achievements/Accomplishments:

The Project will have achieved its purpose when the COA and KAS are fully operational, have relevant quality curriculum, permanent faculties which have been upgraded through short- and long-term training at U.S. institutions, additional facilities, and are each graduating 100 suitably trained students per year.

The Project will also achieve the following:

a. an increase in the size of the total faculty at the COA from 18 to 25 permanent full time faculty equivalents (consistent with a faculty student ratio of 1:18);

b. the up-grading of at least 8 COA and 14 Knockalva faculty members at U.S. Title XII institutions;

c. the up-grading of 27 Knockalva faculty members at the COA;

d. the implementation of applied research activities at the COA in coordination with the MOA and Agro 21; and

e. establishment of a COA based curriculum development center developing relevant curricula, training aids, and training modules in collaboration with the MOE, MOA, Agro 21, Title XII expertise, and the secondary agricultural schools.

The anticipated linkages between the COA and MOA, and Agro 21 can greatly accelerate the applied research process. As a college, the COA is uniquely positioned to carry out, in a well documented and carefully controlled manner, many applied research activities in cooperation with both private and public entities.

E. Project Activities

An integrated and complementary set of activities has been designed to produce the required expansion and quantitive improvement needed to achieve a functioning COA capable of meeting Jamaica's needs for well qualified mid-level agricultural professionals.

In general terms, the COA needs to be transformed from a fledgeling institution with an enrollment of 150 to a fully functioning tertiary level institution with an enrollment of 450 and awarding an Associate of Sciences Degree to 100 well qualified graduates each year. Similar, but smaller in scope, are improvements necessary for the Knockalva Agricultural School (KAS) to properly fill its role as a feeder institution for COA.

An essential element is the physical expansion of the COA to accommodate the increased student body, faculty and staff. Additions to the curriculum and instructional programs are also critical. The justification and planning for the new physical facilities are presented in detail in the technical analysis, engineering analysis, implementation plan, and financial plan.

The major new COA facilities to be built as part of the Project include three classrooms, three dormitories, 18 faculty houses, four laboratories, an engineering workshop, and a maintenance/repair workshop. A variety of new facilities are essential for the school farm, which will have a central role in the practical, hands-on instructional programs of the COA. The major new ones include two poultry buildings, a piggery, a dairy, an expanded abattoir, completion of the feedmill and hatchery, and facilities for irrigated agriculture on newly acquired land. Various other facilities will receive a degree of upgrading to fit them for their expanded functions, and civil works support, e.g., access roads, utility lines, etc., will be needed to put the complex in full operation.

A doubling of the enrollment at KAS is proposed, from 154 to a total of 300 students, which necessitates a corresponding expansion of facilities. Moreover, certain deficiencies in the educational program, as described in the technical analysis, render the graduates frequently less

than fully qualified for the anticipated demands of the new COA. The latter deficiencies result from a composite of faculty capabilities, physical facilities, equipment, etc., but need to be addressed in part through improved physical facilities.

The major new expansions and improvements at KAS will include six classrooms, five dormitories, five faculty houses, and a multi-purpose building with dining facilities. New improvements at the KAS school farm will include two poultry buildings, an abattoir, a piggery and 30 acres of newly acquired land set up for instructional programs in irrigated agriculture. Certain other civil works will be required to support the foregoing and link them into the existing KAS plant.

As indicated in the engineering analysis, it is likely that construction management, including host country contracting, will be carried out by the National Development Agency (NDA) on behalf of the MOE, a standard GOJ practice. Engineering services for final construction design and construction supervision and for actual construction services will be procured under host country contracts.

A substantial quantity of varied equipment is needed by the COA for operations, maintenance and, most importantly, instructional programs for it to properly perform its expanded and upgraded role. The justification, planning, preliminary identification, and cost estimates for this equipment are provided in greater detail in the technical analysis, implementation plan, financial plan sections of the Project Paper.

Additional equipment and instructional materials are required for the reasonable functioning of new and expanded programs at the school farm, the laboratories and, in general, for the expanded COA curriculum, as it moves to a genuine tertiary level. The dormitories, student living and dining areas and administrative support facilities need to be furnished and equipped to deal with the increased school population. Repair and maintenance equipment is essential to assure continued operation of the school's physical facilities at optimum levels.

Equipment and materials for KAS are less extensive than those required for the new educational programs at COA. Essentially, these commodities are needed to equip the new structures. KAS is expected to continue with the same general type of educational offerings which it now provides but to benefit from qualitative improvement, the introduction of a broader scope of instruction and considerable expansion.

As indicated in the implementation plan, it is expected that the procurement of most imported commodities will be carried out by a procurement services agent under contract with the MOE using host country contracting procedures. Procurement officers of the MOE will administer procurement of local commodities.

Proper utilization of structures and equipment at the anticipated levels call for substantial inputs of human resources in the form of closely related and integrated technical assistance and training. The

expansion and upgrading of the COA calls for expert guidance in planning and implementing the higher educational programs, in preparing the expanded faculty to continue the programs over the long term, in utilizing new and improved facilities and in tailoring programs to fit the demand for COA graduates.

The justification, plans, schedules and estimated costs of technical assistance are dealt with in detail in the technical analysis, implementation plan and financial plan.

Principal functions of the technical assistance will be in the following areas:

1. in-service training for COA and KAS faculty;

2. arrangements, processing and administration of overseas participant training for COA and KAS faculty;

3. serving as temporary replacements for COA faculty in long term training;

4. college and departmental administration;

5. curriculum development for COA;

6. implementation of new and upgraded tertiary level education programs, including preparation of course materials, teaching courses, school farm instruction and practicums and applied research instruction.

It is expected that the technical assistance services will be procured with the assistance of BIFAD and provided by a joint venture of an 1862 Title XII institution in joint venture with a Historically Black College or University (HBCU), the latter presumably being an 1890 Title XII institution.

All of the project's interventions are necessary to achieve a functioning tertiary level agricultural educational system, but none is more important than having a motivated, productive and well qualified faculty. The expanded faculties will be responsible for seeing that COA and KAS, as expanded, equipped and improved, will continue to function effectively overtime.

The particular needs of the COA and KAS faculties, in terms of knowledge, teaching skills, motivation, and numbers are discussed in the technical analysis in detail. The plan for upgrading and schedules and estimated costs are also addressed in the implementation and financial plans and in Annex D.

In general, there are three facets to the proposed upgrading:

(1) on-the-job training by technical assistance personnel using direct instruction to their faculty counterparts and training through example;

(2) in-service short courses; and

(3) overseas participant training in degree and non-degree programs.

A need for 22 person years of degree program work is projected. As a result, it is anticipated that six COA faculty members will receive advanced degrees, and two will be raised to the B.Sc level. Ten KAS faculty members should be raised to the B.Sc level. Seven COA instructors and five KAS instructors are projected for overseas non-degree courses in their areas of specialization. All COA faculty and ten KAS faculty will attend formal short courses given by technical assistance personnel at COA.

Substantially all COA faculty will maintain day-to-day working relationships with and receive on-the-job training from technical assistance personnel.

The faculty training programs will be guided and administered by the grant financed Title XII institutions. Trainees sent to the U.S. will be enrolled at a variety of suitable institutions, not only at the home campuses of the Title XII contractors, in order to promote a broader repository of background, experience and approach for the benefit of Jamaican agricultural education.

IV. IMPLEMENTATION PLAN

The implementation of the Project requires careful coordination between MOE, MOA, COA, and USAID/J. The implementation plan described herein will be monitored through a project committee comprised of representatives of MOE, MOA, COA, USAID/J, and Title XII technical assistance.

A. Institutions and Agencies Involved

The various entities within the agricultural sector and the educational system which will participate in the Project are:

1. College of Agriculture (COA):

The COA will expand its enrollment to 450 students and its faculty from 18 to 25 permanent full time faculty equivalent by EOP. An array of approximately 60 courses will comprise the curriculum which will focus on a mix between classroom instruction and applied "hands-on" laboratory and field based training. The curriculum also includes a work-study program, a practicum, a campus development week, and a semester of cooperative education prior to graduation to provide the students with practical work experienced. Later portions of the PP will discuss the infrastructure, personnel, and needs to accomplish this project.

Currently, the COA offers a three-year program leading to an Associate of Science degree. Starting in 1985, following graduation of the first class, the COA will seek accreditation to permit its graduates to receive advance standing in U.S. and othr off-shore universities. Appropriate accreditation from an established agency in the United States, such as the Southern Association of Schools and Colleges will serve as the accreditation authority. Accreditation is important in order for COA graduates to transfer to United States universities and seek baccalaureate degrees.

Approximately, one-third of the students have spouses or other dependents, and several are returning to school after a period of full-time employment. Enrollment capacity at the COA is projected to increase from 220 students to approximately 450 students by the end of 1988. As of September, 1983, the annual operating budget for the school, as proposed for FY 1983/84 was J$1,932,000 for 220 students, or about J$8,800 per student. Jamaican students currently do not pay tuition, consistent with GOJ policy, although it is planned to seek modification of this policy over time. Off-shore students pay their total costs.

Students help defray the college's expenses through participation in work-study programs. Also, the students are required to pay incidental fees of about J$150 per year and to purchase text books costing J$240 - 300 per semester.

The COA will establish a Curriculum Development Center at the College to serve as a coordinating mechanism among institutions of agricultural education, in addition to the development of curricula, course content, and training modules. The Center will seek assistance from representatives of MOE, MOA, private sector, Agro 21, the agricultural schools, and the Title XII advisors to ensure that its work is relevant to the need of the agricultural sector and the education system.

COA will establish an applied research program at the College campus, primarily as a training mechanism. However, it is anticipated that the program will (1) share the results of applied research, conducted in coordination with MOA and Agro 21; (2) conduct short-term training courses for farmers in coordination with MOA and Agro 21; (3) conduct faculty/student practice with farmers; (4) develop and distribute extension type publications, (5) sell to farmers improved animal and plant stock from the college farm; and (6) share information in general.

2. Ministry of Education (MOE):

The Ministry of Education (MOE) has administrative authority for education at all levels. Planning responsibilities for agricultural education at the post-secondary level is delegated by the Minister of MOE to the Dean of the COA. Within the technical and vocational education unit of the educational planning division is an agricultural education sector which maintains liaison with COA and other appropriate units (i.e., all-age schools, secondary schools, high schools, technical schools, and secondary agricultural schools).

In addition to the traditional high schools, agricultural secondary and technical schools will provide applicants for admission to the COA. Upon completion of studies at the COA, graduates will have career options in agricultural production, agribusiness, extension, farming, teaching, and other agriculturally related occupations. Those who elect to teach will in turn upgrade the skills of secondary level graduates who go into farming. Also, the principals and staff of Knockalva, Elim, and other schools with agricultural curricula will participate during the summer in activities at the COA's Curriculum Coordination and Development Center.

3. Ministry of Agriculture (MOA):

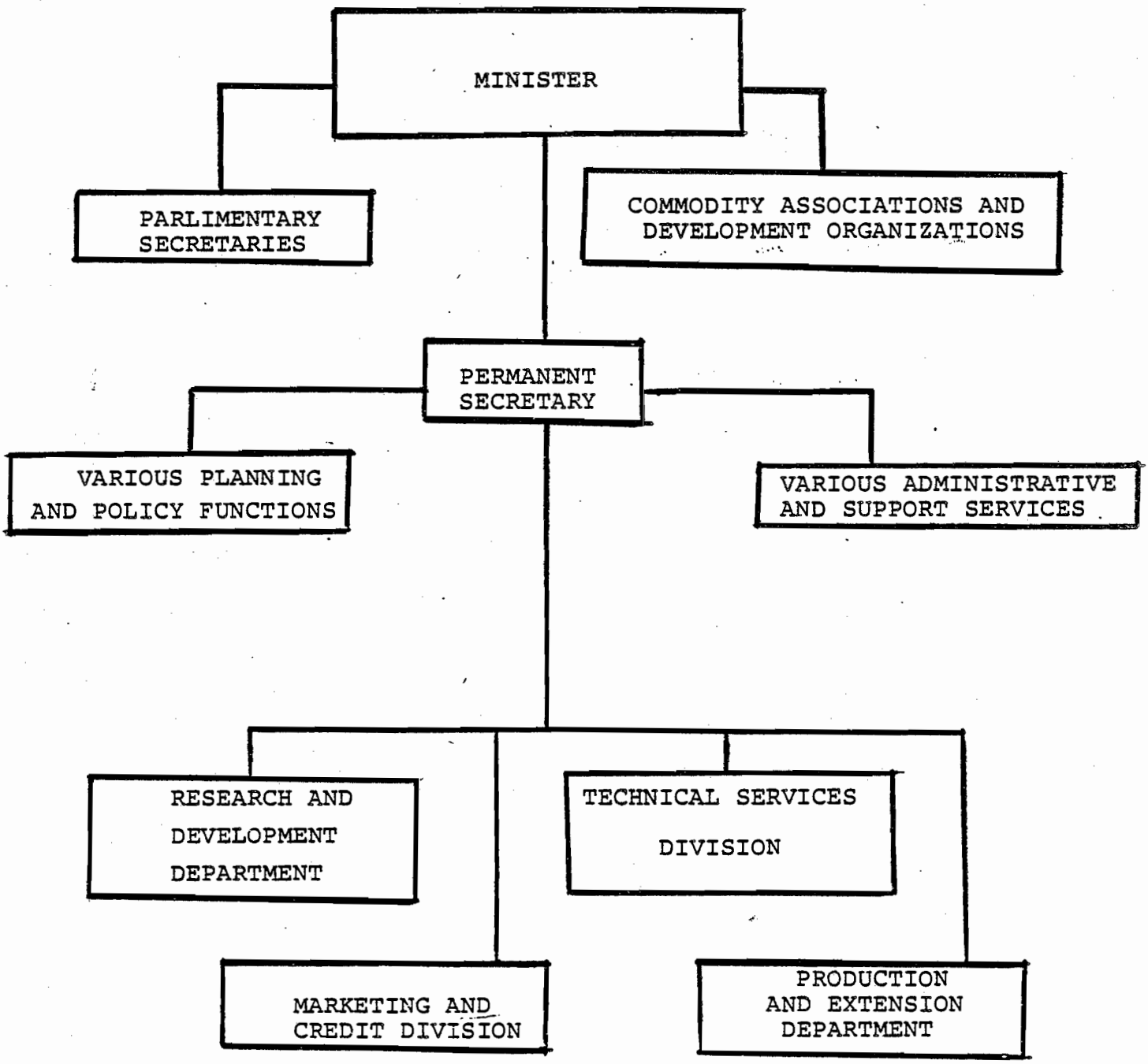
The organization of the MOA, as illustrated in Figure I, includes the research and development departments, the marketing and credit division, the technical services division, and the production and extension department. The MOA also has responsibility for various government commodity boards which play an active role in the marketing and regulation of certain traditional export crops, such as sugar, bananas, coconuts, cocoa, and tobacco. Coordination between the MOA and the MOE takes place at the Permanent Secretary level and the Dean of the COA. For the Project, the MOA will provide assistance in curriculum design, identification of certain applied research

Figure I

Organization Chart

of the

Ministry of Agriculture



activities, and teaching. The MOA will employ graduates of the COA as research assistants, extension agents, and as employees of the commodity boards. Also, the MOA will employ Knockalva and Elim graduates, generally as junior extension agents. In 1983, several of the better performing junior agents from Knockalva were promoted to full extension agents, due to the unavailability of graduates trained in agriculture at a higher level.

4. Knockalva Agricultural School:

Students at Knockalva are selected from those who successfully complete the Grade Nine Achievement Test and choose agriculture as a vocation. The curriculum includes agricultural courses, as well as those subjects which are normally offered by secondary schools in Jamaica. Instructional time is equally divided between theoretical and practical work. In 1979, Knockalva was designated by the MOE for upgrading to an output of 100 graduates per year from the current 50. At the end of project Knockalva will be producing 100 graduates per year from an expanded student body of 300. Finally, the principals of Knockalva and Elim will work with the COA representatives at the Curricula Coordination and Development Center on common curriculum concerns.

5. Title XII Techncial Assistance:

The AID/J Mission and the MOE have agreed that the technical assistance required by the COA should be provided by a Title XII University preferably employing a joint enterprise approach. This mechanism joins a historically black college or university (HBCU) with a strong, well established land grant college which compensates for the weak resources of the latter and thereby enabling it to participate in contract for which it would otherwise be ineligible or disadvantaged because of size. This approach would also address directly the concerns and mandates expressed in the Grey Amendment to the Foreign Assistance Act (FAA).

The Board for International Food and Development (BIFAD) will be used to assist in the selection procedures for the Title XII Assistance to insure that the best available institutions with the most appropriate demonstrated capabilities are contracted. These estimated needs are shown by person/months below.

Technical Assistance Requriements (Title XII)
(Person/Months)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Curriculum Development	-	12	12	12	12	48
Applied Research Development	-	12	12	12	12	48
Agricultural Engineering	-	3	6	-	6	15
Extension Specialist	-	6	-	6	-	12
Ag. Econ/Management	-	6	6	6	-	18
Agronomy	-	9	-	9	-	18
Ag. Education	-	6	6	6	6	24
Integrated Pest Mgt.	-	3	-	3	-	6
Animal Science	-	-	9	-	9	18
Media Specialist	-	6	-	-	3	9
Librarian	-	-	6	-	-	6
College Administration	2	2	2	2	2	10
Evaluation	-	-	2	0	2	4
Institutional Mgt.	2	2	2	2	2	10

Salary, benefits overhead, international travel, and other direct costs will be foreign exchange costs and dollar funded. For planning purposes, $120,000/year is being budgeted for long-term TA and $10,000/month for short-term TA.

In addition, approximately 34 person years of short and long term training at U.S. Title XII institutions is planned for faculty from the COA and Knockalva. The participant training plan showing year and school (COA or KAS) is shown in Annex D.

B. Project Implementation Structure:

The complexity and logistics of this project require that a carefully organized strategy be designed to plan and monitor project implementation. Because of its importance, a C.P. is proposed that will require a formal agreement among all the implementing agencies. In order to facilitate this process, following project paper approval, a pre-implementation workshop funded under Program Development and Support (PD&S) funds will be with the principal implementing agencies and key personnel. The workshop will be modeled after the USAID/Bangkok experience with this type of implementation facilitating activity. Crucial structures to this implementation effort are: the Project Advisory Committee (PAC), Project Implementation Unit (PIU), and the Evaluation Monitoring Committee (EMC) and the USAID Project Committee.

1. Project Advisory Committee:

The MOE and Board of Governors of the COA as well as the Administration of the COA will be responsible for the successful execution of the Project and will maintain direction, policy guidance, and coordination with other GOJ entities involved in the Project. The Dean of the College of Agriculture will serve as Chairman of the Project Advisory Committee (PAC).

Project Advisory Committee (PAC):
Dean, College of Agriculture -- Chairman
Permanent Secretary -- MOE
Permanent Secretary -- MOA
Two members of the Board of Governors -- COA
Principal, Knockalva
Senior faculty member in Engineering -- COA
Consulting Architect/Engineering.
Coordinator of Development -- COA (ex officio member)

2. Project Implementation Unit:

Reporting to the PAC, will be the Project Implementation Unit which will handle the day-to-day coordination of the project as well as related administrative functions.

Project Implementation Unit (PIU):

Coordinator of Development COA -- Chairman
Director of Research and Development -- MOA
Procurement Officer -- MOE
Bursar -- COA
Director of Special Projects -- MOE
Project Officer -- USAID/J
Title XII Representatives

The Chairman of the PIU, or a designee, will devote full time to implementation of the project. Specific duties of the PIU will include:

a. obtaining data and information necessary to expedite the submission of materials to AID in satisfaction of conditions precedent, covenants, and other requirements of the loan;

b. initiating, coordinating, and obtaining GOJ approvals for contracts, procurement, disbursement requests, and other such functions assigned to it under the project; and

c. preparing regular reports, as well as the agenda and documents for the periodic joint AID/GOJ evaluation meetings provided for under the project. The PIU shall be the primary GOJ representative at such meetings.

Final composition of the PIU and the scope of its duties will be determined by the COA in consultation with and approval by AID/J. As presently conceived, however, the members of the PIU will be primarily responsible for the implementation of the various project elements.

Construction funded by AID will be undertaken by private contractors and subject to guidance and approvals provided by the USAID/J Mission Engineer.

3. Evaluation Monitoring Committee (EMC):

The implementation of the evaluation plan for the project will be the responsibility of the EMC. A detailed evaluation plan and EMC committee members is discussed in Section 6 of this project paper.

C. Administrative Plan (COA):

The College of Agriculture is a government owned tertiary educational institution organized under the Ministry of Education and subject to the provisions of the Education Act and the Education Regulation, 1980. It is administered by a Board of Governors of not less than ten nor more than fifteen members appointed by the Minister of Education in the following manner:

a. six members nominated by the Minister, one of whom the Minister appoints as Chairperson;

b. the Dean of the College;

c. four members elected in the following way:
   i. one member by the Faculty
   ii. one member by the administrative and clerical staff
   iii. one member by the ancillary staff;
   iv. one member by the Student Council;

d. two members, one of whom shall be elected by the Alumni Association and the other by a recognized local community group; and

e. two members nominated by the elected Board for their agricultural expertise.

The Coordinator of Personnel of the College serves as Secretary of the Board of Governors. The members of the Board serve for staggered terms of three years with possible re-election for a second or third term.

Presently, in view of the recent development of the College, there is an interim Board of Governors all members of which have been appointed by the Minister of Education. This situation will change in August, 1984 when a Board will be elected with representation as indicated above.

Internally the College's policies and activities are monitored and executed through an administrative structure which includes an Executive Council, an Administrative Council, twenty three College wide committees and an Interim Student Council.

The Executive Council functions as the major advisory body to the Dean. It is made up of seven administrative/faculty officers, serving in a non-representational manner, to consider the issues, problems and opportunities facing the College. The Executive Council is chaired by the Dean and comprises eight members namely the Dean, the Coordinator of Administrative Unit, the Associate Dean of Faculty, the Associate Dean of Student Life, the Coordinator of Development, the Coordinator of Personnel and Support Services, the Registrar and the Chief Fiscal Officer.

The Administrative Council has as its members the persons serving on the Executive Council, the Coordinators of Animal Science, Crop Production (Research, Commercial, Domestic), Ornamental Horticulture, Agricultural Engineering, Curriculum Development, the Property Manager and the Public Relations Officer. The members of the Administrative Council serve in a representational manner and report developments, problems and planning in their areas of responsibility.

Of the twenty three College Committees ten have membership restricted to faculty members and the others invite representation from faculty, staff and students. Each committee reports to the member of the Administrative Council under whose umbrella its activities fall.

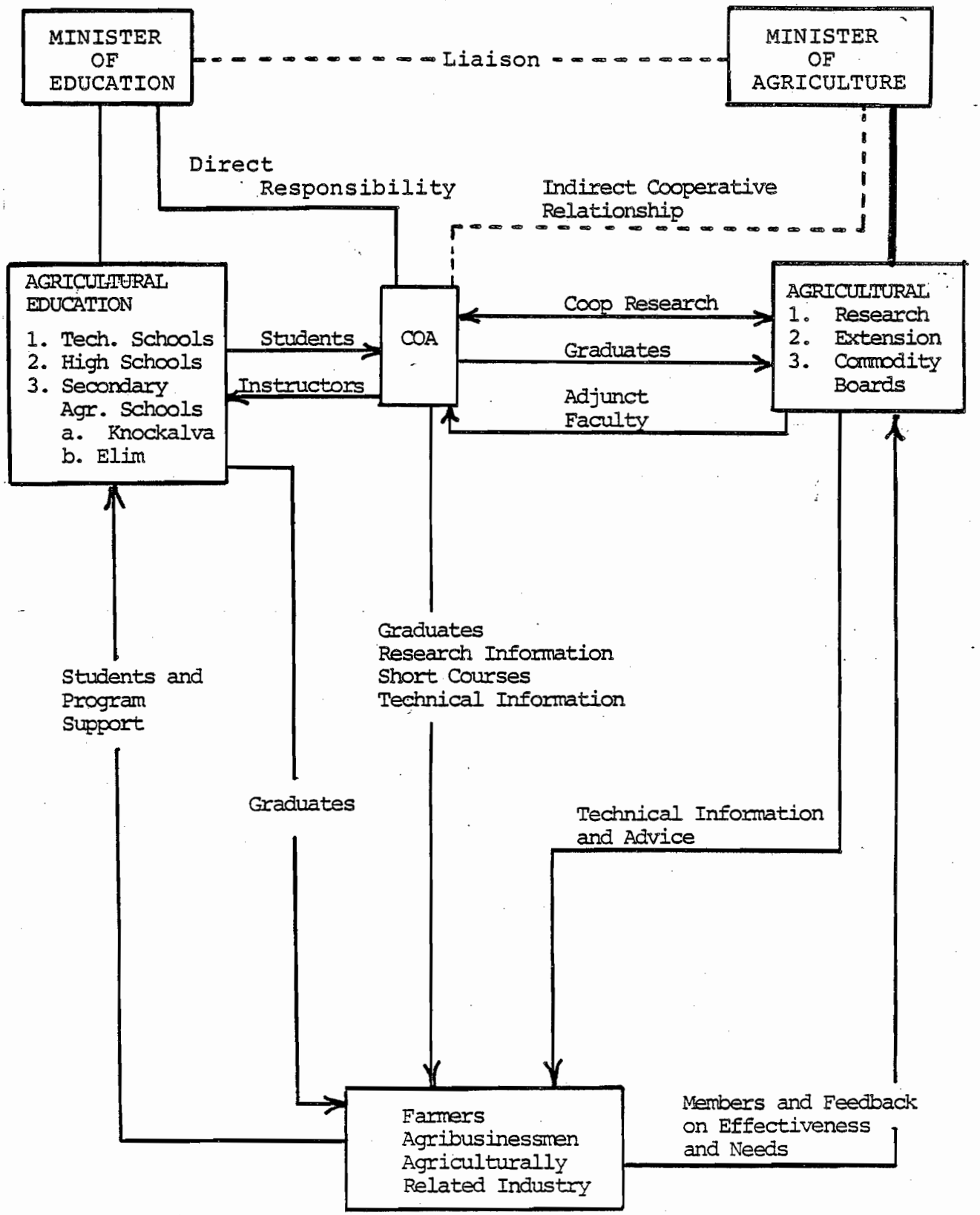
The College of Agriculture Interim Student Council consists of elected student representatives with one Faculty Advisor being elected by the students. The Interim Student Council will be replaced by a fully constituted body no later than August, 1984.

Figure II provides a graphic illustration of the COA administrative relationships with MOE and MOA. Cooperation between these agencies is crucial for the long term development of agricultural as a viable economic force in Jamaica. Formal cooperation links between the MOE and the MOA takes place at the Permanent Secretary level.

In accordance with and to carry forward its stated philosophy and objectives the College strives to employ well qualified, experienced and committed individuals. Applicants for Faculty/Staff positions must meet minimum qualifications before interviews with the appropriate selection committee and representatives of the Board of Governors are granted. A successful applicant is offered provisional or term employment with a probationary period ranging from six to twelve months. Three written appraisals of the employee's performance are submitted and reviewed with the employee during this period. At the end of the probationary period the employee is again interviewed prior to a decision as to his/her future with the College.

Faculty and staff members who may find it necessary to utilize a system of grievance and appeal may do so through a Personnel Committee, made up of: the Dean of the College, two members of the Board of Governors, the Coordinator of Personnel, the Coordinator of the Administrative Unit, one member of the category of employee to which the complaint belongs.

Relationship of the Agricultural Education Project to the Ministries of Agriculture and Education.



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Financing:

Like other tertiary institution in Jamaica the COA is under the purview of the Ministry of Education and has so far been dependent on government financing for both its capital and recurrent expenditure. Since the 1960s, GOJ has taken on increasing responsibility for financing tertiary education in Jamaica and as government's involvement in higher education increased, so did its capital and recurrent budgetary outlays. In turn, these developments have added pressure to the national budget primarily during times of crisis when the economy contracts and revenues decline.

During periods of economic crisis, it is not easy for government to reduce its financial commitment to higher education without facing some very serious socio-economic and political consequences. Such financial limitations could affect the development of a whole generation caught in the maelstrom of significant budgetary cuts during its 3 - 5 year exposure to tertiary education. Thus, it becomes increasingly urgent for higher educational institutions like COA to identify and explore ways in which they can attract the support of new and added sources of finance to assist in their overall development.

College Foundation:

The College Foundation is the instrumentality through which COA seeks to become a vibrant, challenging institution of higher education. It has been founded as an autonomous organization in that it functions separately from the College of Agriculture in spite of its close ties with it. The Foundation is designed to be a non-profit, educational and charitable organization and will be so incorporated under the Laws of Jamaica.

The College Foundation shall be governed by a Board of Trustees consisting of approximately fifteen (15) persons of national prominence who are sympathetic to efforts being made to establish a first rate College of Agriculture in Jamaica. These individuals will have expertise in areas such as agriculture, finance, commerce, law, medicine, education, public relations, journalism, mining, manufacturing and banking. Their service to the Board shall be for staggered terms of three (3) years with possible re-election for a second term.

Since one of the main purposes of the Foundation will be the raising of funds to assist the COA where government's finance is inadequate or non-existent, an aggressive approach to fund raising will be undertaken. Fund raising may be undertaken in various ways and every opportunity will be seized to maximize this activity, including bequests, an approach generally not tapped in Jamaica.

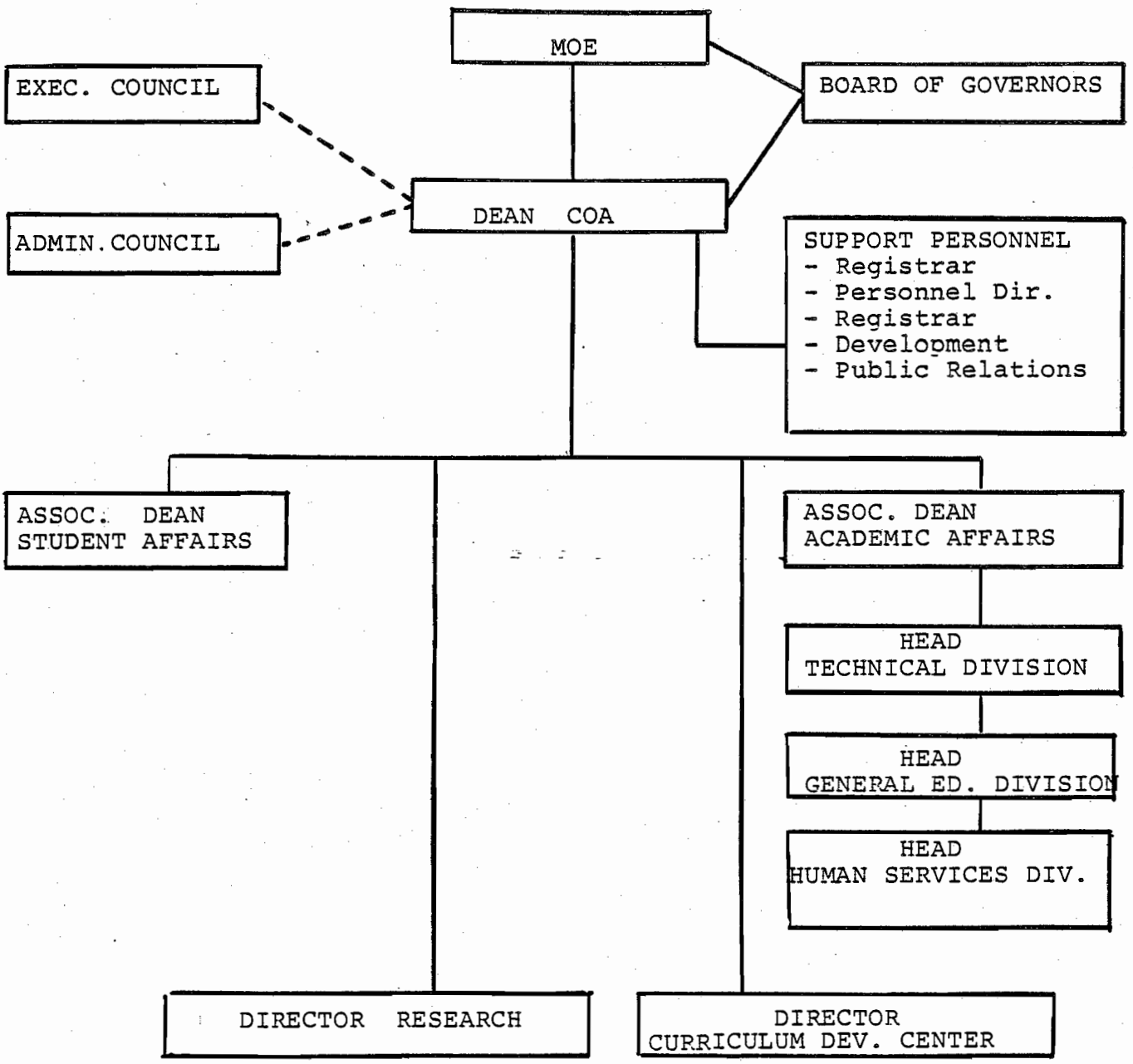
D. Development of an Applied Research Program:

A critical component of the Agricultural Education Project is the development of an Applied Research Program at the College of Agriculture. In order to maximize the utilization of staff expertise, a concerted effort will be made to involve faculty and students in conducting research

FIGURE III

College of Agriculture (COA)

Organizational Chart



and demonstration plots. The Applied Research Center will expand the clientele of the College of Agriculture to farmers throughout Jamaica. It will be sited at the college and open to interested agriculturalists to view new and innovative methods of farming. However, its principal purpose is to serve as an effective learning center for students in the methods of research and dissemination.

1. Staffing:

The program will be under the direction of a Director of Research who will manage and coordinate the program. The Director of Research will also be the individual to assist other less experienced faculty develop their research skills. All faculty are expected to take part in research in their respective area of specialization.

2. Specific Outcomes Expected:

Several outcomes are to be expected: (1) there should be a significant increase in the volume of research being conducted, (2) because the program is an applied research program there will be results available that are directly relevant to farmers, (3) the involvement of students in planning, organizing, and maintenance of the research effort should instill the needed appreciation of research in these future agriculturalists and, (4) the campus of the College of Agriculture will be of greater interest to farmers who will be invited for seminars, demonstrations and short courses using the Applied Research Program activities as the focal point.

3. Costs:

The costs of the program should be minimal as most of them will be shared costs with the academic program. For example students will develop their practical skills by working on research plots, thus two significant concerns get taken care of: (1) students get experiences and (2) the research plots are cared for. In situations where the COA is requested to undertake research trials for an outside entity a cost sharing arrangement will be developed. Where the work is a service function such as laboratory analysis, a fee schedule will be established to ensure costs and maintenance are recovered. These arrangements are reasonable in that the principal objective is training, at least for the foreseeable future.

E. Development of a Curriculum Development Center (CDC):

1. Description:

Appropriate agricultural education requires a balance between theory and practice and must be relevant to the manpower training needs of the nation. Ensuring a good balance in agricultural curricula is an essential and continuing process. In order to accomplish this crucial mission, a Curriculum Development Center (CDC) will be established as a part of the College of Agriculture with the key function of undertaking dynamic and articulated national curriculum development in agricultural education. There currently is no such center or program in Jamaica dealing with agriculture. The CDC will access the most up-to-date information in

agricultural science and technology from a wide variety of sources and package it into instructional programs, modules and materials that are relevant to Jamaican conditions and needs. Like the College of Agriculture, the CDC will serve as a catalyst for agricultural education in Jamaica and provide the hub for curriculum development in agriculture at the primary, secondary, and tertiary levels, islandwide. The CDC will develop materials for use in both formal and non-formal educational settings.

2. Justification and Goals for the CDC:

The following statements serve to justify the establishment of the CDC:

a. The GOJ has established new priorities for agricultural manpower and this demands a reorientation in the curriculum to adequately prepare people of the kind required.

b. The demand for a more scientific and technologically aware labor force require that the curriculum be kept current with advances in science and technology.

c. A greater balance between theory and practice in agricultural education and training is required and must be maintained on a continuing basis.

d. Curriculum development needs to be conducted in a sound and scientific manner.

e. The CDC will be the first and only establishment of its kind in Jamaica. It will undertake to carry out dynamic curriculum research and development in agricultural education and related areas.

Six goals have been established for the CDC. (See Annex C for a list of specific objectives for the CDC). The goals are as follows:

a. To develop and revise agricultural curricula at various levels, namely; post secondary, vocational agricultural schools, secondary and high schools, and primary/all-age schools.

b. To conduct scientific curriculum research and development and to ensure an appropriate balance between theory and practice in agricultural education.

c. To serve as a repository and resource center for agricultural curricula and instructional materials for all levels of education.

d. To promote and develop relevant instructional and learning resource materials.

e. To conduct continuous evaluation of agricultural curricula and instruction in the national education system.

f. To educate teachers and other persons involved in agricultural education regarding the principles and methods of curriculum development and implementation.

3. Operational Structure:

The functions and activities of the Curriculum Development Center fall under the jurisdiction of the College of Agriculture. Inputs from individuals and organizations outside the COA will, however, influence its operations. The CDC will have a Advisory Committte comprised of representatives from various sectors of the College and agricultural community who will do the planning and advisory of the Center. The CDC Director will serve as the coordinator of the Advisory Committee and will be directly responsible to the COA Dean for the day-to-day activities of the Center. The CDC staff will be under the supervision of the CDC Director and will consist of personnel such as the following: secretary, technical assistant or media specialist, editor, and technicians for technical graphic and artistic work.

The CDC will conduct curriculum and instructional materials development in the following areas:

a. Agricultural Economics, Education, and Extension.

b. Agricultural Engineering.

c. Agronomy (including Horticulture, Landscaping, and Forestry).

d. Animal Sciences (including Aquaculture, Fisheries, Wildlife, and Veterinary Sciences).

e. Food Science and Technology.

f. Languages and Social Sciences.

g. Mathematics and Natural Sciences.

h. A mix of the above areas for primary and secondary level agricultural curricula.

4. Curriculum Design:

The CDC will design curricula for the College of Agriculture, other colleges conducting agricultural programs, all categories of secondary and vocational schools (including Elim and Knockalva), and primary and all-age schools. The design and development will be done in conjunction with personnel from these institutions (including the Vocational Training Development Institute--VTDI and the Human Employment and Resource Training--HEART institutions). The approach will be to first examine existing curricular and instructional materials and technologies to determine relevance and appropriateness for national needs.

From this examination, adoption of materials will be made for the COA programs as well as for other institutions. The second step will be to build on the existing materials through the incorporation of scientific and technological advancements that are available locally. The third step will be to identify and incorporate new information from abroad into the curriculum. The fourth step is to conduct continuing research in conjunction with the schools and other organizations to update the curriculum so as to ensure its relevance for the various groups it serves and to guide its direction in achieving national goals and individual aspirations.

The practical and vocational aspects of the curriculum will be designed along the lines of competency based education to allow for thorough skill development. The curriculum will be geared to accommodate the heavy enrollment of both male and female students. All curriculum development functions will be undertaken by the Center's staff working in conjunction with the special advisors and with representatives of the groups served.

5. Relationship of the CDC with Agro 21:

Being the only tertiary institution for agricultural education in the country, the College of Agriculture should be able to provide all of the management and technical manpower needed by Agro 21 and private sector enterprises. The CDC constitutes one of the main means through which the COA will relate to Agro 21 and private sector organizations. It will do this through its curriculum development efforts to access information, methods, and procedures that are devised or developed on their projects. CDC personnel will work closely with Agro 21 and private sector personnel to achieve this transfer of science and technology. Agro 21 personnel will serve on the CDC Advisory Committee.

Agro 21 and private sector organizations will benefit from research done at the COA, and in fact the COA can conduct research specifically geared to problems experienced by Agro 21 and the private sector. The COA will benefit from these groups through the placement of its students on their projects for work experience (cooperative education) and employment.

6. Development of Instructional Materials:

A primary aim of the CDC is to promote instructional materials development. The Center will seek ways and means to encourage Jamaican nationals to write and share information from the workplace through the printed page or other media. One approach to this is for the Center to encourage the establishment of professional organizations among agriculturalists and agricultural educators through which the sharing of information can be fostered. The Center will encourage the COA faculty to write and will undertake editorial and publishing work where necessary.

The CDC will collect instructional materials that are already available both locally and abroad and evaluate them for use in the COA and other agricultural institutions. Where necessary and feasible, (clearance of copyright) modifications will be made to render the material relevant for use in the educational system. Non-written instructional materials on cassette and videotapes, slides, filmstrips, charts, posters, etc., will be developed from local projects and other information sources. The Center's staff as well as personnel from schools and colleges islandwide will be involved in various phases of this operation.

All materials developed by the CDC will be geared toward some level of competency based education. Secondary and terminal tertiary programs in particular will embody this type of education.

The Center will undertake the compilation, packaging, and distribution of instructional materials to schools and colleges in cooperation with the Ministry of Education. It will also conduct seminars and workshops on using those materials. The CDC will develop and distribute a regular newsletter through which the Center's activities and publications can be made known and through which information can be shared among individuals and organizations.

7. The Learning Center (LC) as Part of the CDC:

The Learning Center is a special area in the CDC set aside for learning activities conducted primarily through the use of audiovisual activities at varying hours. Through the Learning Center, students, agricultural teachers, and other groups can take advantage of special topics not covered in the classroom which are of particular interest to them. This will be achieved mainly through the use of individual audio- and videotapes and slide features. Special programs can be conducted during non-class time for students by using movie projectors and other media equipment. Instructors can benefit from the use of the LC to update themselves from information available in audiovisual form. The LC will be staffed by a trained audiovisual technician under the supervision of the CDC Director.

8. CDC Research:

The CDC will conduct research in curriculum development and in curriculum implementation. The types of research will include:

a. Literary and scientific research to determine appropriate design and content for college, secondary, and primary curricula in agriculture.

b. Determination of the relevance of curriculum objectives and content to meet needs and stated goals.

c. Analysis of scientific and technological information to identify content items.

d. Analysis of jobs and job functions to identify content and teaching procedures.

e. Determination of the appropriateness of instructional strategies to achieve the curriculum goals.

f. The conduct of curriculum evaluation and the evaluation of instructional strategies to determine the impact of the curriculum and instructional materials on students learning and achievements.

g. The conduct of follow-up studies to determine the performance of graduates and to analyze graduate performance for use in curriculum revision.

9. Curriculum and Program Evaluation:

The CDC will conduct curriculum and program evaluation as an integral part of its operations. It will evaluate on a regular basis: (a) the relevance of the curriculum structure at the various levels of education to meet the established goals; (b) the curriculum implementation strategies used to achieve the intended outcomes; and (c) the performance of the COA graduates. The CDC will also assist other agricultural institutions to conduct similar evaluations in order to determine the ultimate effect of the curricula.

10. Staff Development:

The technical staff of the CDC will need to undergo periodic training in media service and the management, operation, and maintenance of the equipment and materials used by the Center. This kind of training is most available abroad and therefore such funds will have to be made available to undertake this exercise in staff developoment. Provision for the development of three (3) technical staff should therefore be made in the project for the expansion and development of the CDC.

F. Knockalva Agricultural School (KAS):

There are two secondary level agricultural schools operated by the MOE, Knockalva and Elim. The Ministry of Education (MOE) has also requested assistance in expanding the capacity of the Knockalva Agricultural School (KAS) to compensate for some of the loss of secondary capacity. Knockalva currently receives applications far in excess of the 50 openings per year currently available. Elim, the other secondary agricultural school has openings for 100 students per year and although it also receives applications in excess of this number, the demand for space is less than at Knockalva. Elim, being a relatively new school, is reasonably well endowed with facilities and equipment. The Project will expand the capacity of KAS to accept 50 additional students per year as well as upgrade its facilities. Assistance was not requested for Dinthill or others schools which provide a more limited program in agricultural education as it was judged that these can currently meet the local demand.

The physical facilities now available at KAS are limited and because of that the program cannot develop to meet the training needs of the students. The curriculum developed by the Ministry of Education could not be implemented in its entirety because of inadequate facilities such as classrooms and laboratories. It should be recognized that a seventeenth century great house, the main academic structure housing the school, cannot adequately provide facilities for the educational program. The house and supplementary buildings were designed for one large family, not to serve the purpose of an education institution.

Even though there was an expansion project at the school which was a joint undertaking of the Jamaica and Netherlands Governments, not all the facilities needed could be provided because of financial constraints at the time. At present there is dormitory space for only 150 students, only three classrooms and no laboratory space or recreational space.

The demand for training in agriculture exceeds the capacity of present available facilities. Knockalva offers an ideal environment for training future farmers. Serious efforts will be made to utilize whatever facilities are available and provide those facilities that are not available at the moment. It should be noted that western Jamaica has large areas of undeveloped and underdeveloped farm lands, some of which are being used under the GOJ's land reform program. A major agricultural institution in this region can offer new directions and vitalize Jamaica's agriculture by encouraging young men and women to farm.

In addition, KAS students will become a vital input into the COA which will add to a more completely trained cadre of trained agriculturalists in Jamaica.

The intent of the Project in relation to KAS is to:

1. Add infrastructure to the existing plant allowing the school to expand its capacity to matriculate 100 students per year.

2. Upgrade the equipment needed to tend the existing student population and to serve the additional students.

3. Upgrade the faculty at KAS by sending faculty to U.S. Title XII institutions for additional training.

4. Upgrade the faculty at Knockalva by sending KAS faculty to COA to receive short term training.

5. Provide KAS the capacity and potential to matriculate its best students to COA for Associate of Science degree training.

6. Allow KAS the opportunity to interact and participate in the curriculum development efforts of the COA Curriculum Development Center.

1. KAS Infrastructure and Equipment Needs:

The Project as proposed will provide dormitory space for 120 students, 6 classrooms, 6 laboratories, 5 housing units for faculty and senior staff, a multi-purpose building, swine and poultry buildings, and other small service additions.

Equipment to be purchased for KAS includes two tractors, a diesel truck, one car, spare parts, a stand-by generator, laboratory equipment, two overhead projectors, and books for the library.

2. KAS Land Needs:

The KAS school is located on 214 acres, 17 miles from Montego Bay (Knockalva is a 4 hour drive by car from COA). Land purchases by GOJ for this project will include 30 acres of land near KAS. This land is suitable for introducing irrigation farming into the training program.

3. KAS Faculty Upgrading:

Currently there are 17 faculty at KAS. During the course of this project the faculty is expected to increase to 24 faculty. The academic background of the faculty is as follows:

8 diplomas
4 certificate - trained teacher
2 B. S. degree
1 M. S. training (principal)
2 technical certificate.

KAS will utilize two methods of upgrading the current and projected faculty: (1) U. S. institutions for short and long term training, and (2) COA for short term training. The project plans to send 10 faculty to U. S. institutions to upgrade their credentials. Additionally, 6 faculty will be given short-term training (workshops and seminars) at COA.

4. KAS Students:

Student enrollment at KAS will double from 150 to 300 students during the Project. Currently, the enrollment consists of 110 male and 40 female students. The KAS program is expected to be a "feeder" school for COA and the top students who meet COA entrance requirements will be encouraged to continue their formal education at COA. Because improving the quality of applicants to COA improves the ability of the institution to produce qualified graduates, thereby helping achieve the purpose of the project, completion of the expansion of KAS is viewed as an output, within the text of the project.

V. PROCUREMENT PLAN:

General:

The proposed project anticipates approximately $4,646,000 of off-shore procurement and $806,000 of local procurement of both goods and services. The off-shore procurement can be broken down into technical assistance services and commodities consisting of vehicles, equipment and materials. Local procurement will include some technical and professional services, construction services, some equipment and materials, furnishings, etc. in addition to land and livestock.

It is contemplated that all procurement except Title XII technical assistance will be by the host country contracting (AID Handbook 11) method. The Project Implementation Unit will have as one of its members a procurement officer from the Ministry of Education. The PIU procurement officer will be in charge of management and implementation of the procurement program and he will be assisted by the USAID Project Officer, Mission Contract Officer and the Mission Engineer as needed. A Pre-Implementation Workshop will be conducted in the early stages of the Project for the benefit of concerned members of the PIU and of the Ministry of Education and will cover in detail the rules, guidance and procedures appliable to the types of procurement contemplated under the Project.

Detailed procurement planning will precede all procurement actions except for the early technical assistance that is programmed. Such TA will be procured by the PIU procurement officer with close coordination and assistance of USAID personnel. The PIU procurement officer will then be assisted in the detailed procurement planning by the TA contractors. Although a list of equipment, materials and other goods has been prepared, it is not definitive and the final list respecting academic types materials will depend in part upon the curriculum development program and will be developed the first year of the Project.

Categories of Goods to be Procured:

Farm equipment
Abattoir equipment
Poultry, swine and dairy equipment
Laboratory equipment
Teaching and Audio-visual Aides
Computer equipment
Office equipment
Library equipment
Appliances
House, office and dormitory furnishings
Livestock

Procurement Services Agents:

Due to the magnitude and variety of items to be procured coupled with the lack of bureaucratic staff capability of the PIU to carry out the procurement directly, it is planned to engage the services of one or

possibly two 8(a) procurement services agents (PSA) to assist in procurement of imported items. Procurement of PSA services will be carried out by the PIU, with USAID assistance, by competitive selection procedure in accordance with Chapter 1 of AID Handbook 11, and as provided in Chapter 4, "Use of Procurement Agents", AID Handbook 15. To minimize the cost of such services and to ensure the most effective procurement, it is contemplated that PSA services will be confined to the area of expertise of the PSA firm. More than one PSA contract is therefore indicated from the variety of categories of items to be procured.

TABLE II

IMPLEMENTATION SCHEDULE

Activity	YEAR 1 (2 4 6 8 10 12) · YEAR 2 (2 4 6 8 10 12) · YEAR 3 (2 4 6 8 10 12) · YEAR 4 (2 4 6 8 10 12) · YEAR 5 (2 4 6 8 10 12)
Initial CP Compliance	XXX
Establish PIU	XX
Pre-Imp. W/shop	X
Procure Title XII TA Contract	XXXXXXX
Curr. Dev., Teaching & Applied Research	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Procure A/E Services	XXXXXXX
IFB Prep. & Const. Contract Awards	XXXXXXXXXXXXXXXXXXXXX
Supervision of Const.	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Const. Contract No. 1	XXXXXXXXXXXXXXXXXXXXX (Staff Housing COA)
Const. Contract No. 2	(All Other Fac. COA)XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Const. Contract No. 3	(All Facilities KAS) XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Equip. Proc. Planning	XXXXXXXXXXXXXXXXXXX
Procure PSA Services	XXXX XXXX
Procure Equip. & Mats.	XXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Recruit Add. Fac. & Staff	XX XXXXX XXXXXX XXXXX XXXXX
Land Purchase	XXXX
Part. Trng. (U.S.)	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Part. Trng. (In Count)	XXX XXX XXX XXX
Evaluations	X XX XXX

VI. EVALUATION PLAN

The determination of efficiency and effectiveness is an important aspect of The Project. The evaluation plan must begin with the inception of the project and be integrated into all steps of the project. The evaluation plan outlined below assumes that evaluation is a continuing ongoing process which is based on the objectives of the project. The evaluation plan must reflect both efficiency (process) indicators and effectiveness (product) indicators. Three evaluations are scheduled during the life of the project as indicated in Table II, IMPLEMENTATION SCHEDULE.

A. Evaluation Monitoring Committee:

The evaluation system will focus on the three missions of COA, namely, instruction, research, and service. The monitoring of the overall evaluation effort shall be the designated responsibility of an Evaluation Monitoring Committee (EMC). The EMC should include the following members:

Evaluation Monitoring Committee:

Academic Assoc. Dean - COA (Chair)
MOE official appointed by Minister MOE
MOA official appointed by Minister MOA
USAID/J Mission representative
Agro 21 staff member
Knockalva faculty member - Appointed by Principal Knockalva
COA faculty member - Appointed by Dean COA.

The functions of the EMC will be to:

1. provide overall direction to the project evaluation effort;

2. provide detailed requests for data usable to determine project efficiency and effectiveness;

3. consult with USAID/J monitoring officer to ascertain technical evaluative needs;

4. issue periodic reports detailing project progress;

5. serve as sounding board for Title XII external evaluators who will be invited to conduct periodic site visits; and
6. assist College Officers responsible for established program areas in conducting evaluation of their respective units progress toward achieving project objectives.

B. Evaluation Site Visits:

In addition to continuous ongoing internal evaluation activities two external evaluations will be made involving 4 person months of technical assistance; and scheduled by PAC in concert with EMC, USAID/J and MOE. In addition to Title XII evaluative assistance other external evaluative help will be sought to include Jamaican officials, USAID/J mission personnel, USAID Washington personnel, and others as deemed necessary.

C. Process and Product Indicators:

In this evaluation plan a sampling of process and product indicators will be outlined for EMC consideration. The EMC will be charged with the ongoing review of process/product indicators and make modifications as necessary. The indicators noted below are focused on (1) instruction, (2) research and demonstration, and (3) curriculum development center. Where feasible established evaluation instruments such as the evaluation package of the Southern Association of Schools and colleges in the United States will be utilized.

1. Instruction (COA and KAS):

The process indicators for the instructional components of COA involve an examination of budgets, facilities, faculty, students, and administration. A faculty evaluation system will be established by COA. This system should include review of faculty productivity in teaching, curriculum development, and when applicable contribution to the Applied Research Program. Some formal system to evaluate courses and instructors by students will also be developed.

The product indicators include such items as: percentage of students who graduate; percentage of graduates placed in Jamaican agriculture; and percentage of students who transfer to four year institutions to obtain bachelor degrees; etc.

2. Applied Research Program:

The process evaluation criteria for the research and demonstration Program include such items as: numbers of people or agency visiting the COA; number of plots and/or projects in operation; number of dollars in external funding; and percentage of COA faculty conducting research. The product criteria include such items as: scope of research activities underway at the COA; adoption rates by farmers; quality of research being conducted; and relationships with MOA and Agro 21.

3. Curriculum Development Center:

The process indicators for the Curriculum Development Center include items such as: the number of schools/teachers/extension agents using CDC services. The degree of articulation evidenced among agricultural education curricula at the secondary and post-secondary levels in Jamaican schools. The number of teachers, extension agents, and other persons involved in agricultural education who use contemporary principles and methods of curriculum development; the variety of teaching methods demonstrated by teachers and extension agents; and the use of audio visual equipment and teaching aids to enhance instruction.

The product indicators include items such as: quality of curriculum materials developed and/or provided by the CDC to schools/teachers/extension agents; the number and variety appropriate to Jamaica of curricular and instructional materials available at the CDC; the degree of relevance of CDC instructional materials to Agro 21 and related contemporary agricultural activities in Jamaica; the amount and quality of research to identify new and emerging agricultural jobs in the workplace; the degree of balance between theory and practice in the curriculum; and the extent of involvement and support of the MOA and MOE in using and disseminating CDC materials islandwide.

VII. MONITORING PLAN

USAID/J will provide a project officer to provide monitoring activities for this proejct. The project officer will be provided to USAID/J by AID/W, under the recently instituted joint career corps program between participating universities and AID. The project officer will spend full time monitoring the project dividing time between COA, KAS, and USAID/J's Kingston headquarters.

In addition to monitoring responsibilities, the project officer and other USAID/J representatives as appropriate, will assist departments and agencies of the MOE in the execution of the Project. Also, the project officer will be assisted by other USAID/J staff, in particular the Mission Engineer, and other selected officers from AID/W and by USAID's Controller and Contracting Officer as needed.

AID/W, working through BIFAD, will assist USAID/J and the COA in identifying Title XII institutions to provide technical assistance for the project. From the short list of Title XII institutions identified by USAID/J and AID/W, USAID/J and the host country representatives will select the appropriate institutional combination based upon the evaluation of proposals and the result of direct discussions with the Title XII institutions. USAID/J will be responsible for contracting with the selected Title XII institution.

VIII. CONDITIONS PRECEDENT AND COVENANTS

The Conditions Precedent and Covenants are detailed in the Draft Project Authorization, Annex J. This Section is provided to explain why selected CPs and Covenants were included.

1. Conditions Precedent

a. An acceptable executed Memorandum of Understanding (MOU) among the Ministry of Education, the Ministry of Agriculture, the College of Agriculture, Knockalva and Elim.

This C P was included to ensure that a mutual understanding was developed and recorded on the part of each participating entity that defines the relationships and areas of cooperation and responsibilities of each. All the identified entities play a role in achieving the objectives of the project. All must participate at varying degrees in developing a curriculum that is relevant to training agricultural teachers and extension personnel that are equipped and oriented to servicing the needs of farm youth and adult farmers if improved and relevant technology is to be extended. There is a need for close cooperation between the MOA and the COA in identifying applied research priorities that are in harmony with the national priorities for achieving food self reliance and increased exports of non-traditional products. Close cooperation will facilitate replication of field trials in different agro-climatic zones to accelerate obtaining field results. Some applied field studies may also

be undertaken at Knockalva and Elim where their soil and climatic resources are more appropriate. Because these interrelationships are deemed necessary to achieve the planned results and to provide accountability of actions, the C P is included

b. The C P that an agreement with an acceptable A & E firm or the National Development Agency to provide the necessary engineering management of construction is to ensure that the implementing agency does not assume they or the MOE are qualified to do the job and that they are sensitive to what represents an acceptable procedure to AID.

c. The C P requiring a detailed list and specifications of all commodity procurement is to encourage the COA and KAS to give substantial thought to evaluating their needs in view of the limited funding as well as to accelerate the procurement process and avoid unnecessary delays due to the lack of planning.

d. The C P requiring a list of identified candidates to receive international training and a plan in the form of a schedule will compel both the COA and KAS to seriously plan their training activity which is essential to planning substitute teachers, staff work loads, obtaining acceptance of candidates and budgeting. It will also help avoid delays and changes at a later date.

2. Covenants

a. That the COA will remain a three (3) year post secondary institution during the life of the project is deemed advisable in order to encourage the continuation of a strong orientation to learning by doing, an acknowledged weakness in the academic university system.

b. That the Board of Directors will be appointed on staggered three (3) year terms and a sizable number represent the private sector is to ensure continuity of thought, to minimize the impact of political change and to ensure that the thinking of the private sector is included in the decision making process.

c. That the COA will pursue a student faculty ratio of 15:1 and actively seek a more cost effective level of 18:1 is deemed appropriate in view of the austere budgets necessary at this time. There is also a tendency to expand subject offerings that although desirable cannot be included in a cost effective manner without eroding the quality of the core program which must be avoided during the initial years of the institution.

d. That the GOJ will, within twelve (12) months following execution of the Project Agreement, complete a study directed at identifying revenue generation and/or cost reductions applicable at both the COA and KAS as well as a plan for implementation of appropriate findings. This covenant is advisable to encourage the Borrower/Grantee to recognize that training beyond the secondary level has a value that should be shared with recipients as well as seeking ways to reduce costs during a period of austere funding.

e. That the Cooperating Country will provide its planned project funding levels as well as the necessary funding to sustain the project following completion has been inserted to highlight this critical need early on and to make it known that if necessary, AID expects them to meet their commitment from PL-480 generations. This emphasis is considered appropriate at this time of economic constraints.

f. That the Cooperating Country will take the necessary steps to assure that project financed participants will return and provide two years service for each year or major fraction thereof of training received is essential to avoid the loss of the investment. The procedure will be through bonding of participants and a careful screening process of candidates.

IX. PROJECT ANALYSES

A. Technical Analysis:

Background:

That the lack of well trained personnel is a serious impediment to developing a viable self-sustaining, science based agriculture has been identified by many authorities, both individuals and groups. The U. S. National Academy of Science Task Force, involving contributions from approximately 1,500 scientists and administrators, recommended that the shortage of well trained technical personnel should receive explicit recognition to ensure that an adequate cadre of technical people be trained to sustain agricultural development. The list of authorities and studies recognizing the serious shortage of trained people could be greatly amplified but all of them acknowledge that development is fundamentally the development of people. People determine policies, people plan, teach, and research, and produce or fail to produce food and fibre. If developing countries are to become food self reliant they must develop an in-country capacity to develop, adapt and extend improved technology as well as an indigenous capacity to train those that can sustain the system.

Relative to the situation in Jamaica, the economic constraints and how they came about have been well documented in the FY 1985 CDSS and other studies and analyses. Jamaica enjoyed strong aggregate growth for approximately three decades with growth concentrated in bauxite, tourism, bananas and sugar. Unfortunately, the surpluses generated were not used to develop a broader, more dynamic economic base, especially in agriculture. Meanwhile, an increasing level of resources was siphoned away to pay for expanded food imports. With the decline in effective demand for sugar and bauxite coupled with increased oil prices and declining tourism, Jamaica has been compelled to address the structural weaknesses in their system. They have opted to revitalize the agricultural sector in order to decrease food imports, expand exports and increase employment. In support of that objective, they have initiated several new activities in agriculture. Among others, these are a five-year agricultural development plan, a food self-sufficiency plan in selected enterprises and Agro 21. Unfortunately, as a result of years of neglect, they do not have the numbers of trained people to adequately support a major thrust in agriculture at this time nor are they currently equipped to produce the trained personnel necessary to support and sustain revitalization of the sector.

It is within the context of the background cited above that AID proposes to assist with development of the three year agricultural college and one supporting vocational agricultural secondary school at the request of the Government of Jamaica. Alternative solutions for training the necessary people were evaluated and found unacceptable. An updated demand analysis indicated the planned number of graduates was conservative and to train them off-shore would be more costly as well as contributing little to building an indigenous capacity to sustain development. Experience from many parts of the world has amply demonstrated that the effectiveness of agricultural development efforts can rise no higher than the supply of trained indigenous workers available to generate and extend improved technology adaptable to

local conditions. Training within the culture and environment in which graduates will work also minimizes the need for readjustment and makes the training more immediately applicable to local problems. Also, the training needed and envisioned is oriented to include a strong element of "hands on" experience, an element that is weak in off-shore academically oriented programs. In brief, developing a local capability to meet their training needs is appropriate and in harmony with the objectives of both the GOJ and AID.

The essential questions regarding the technical components of the project fall into two major areas, namely, physical facilities and educational considerations. The technical feasibility of both major aspects of the Project are examined in the following subsections.

1. Technical Analysis of Architectual and Engineering Inputs:

General:

The proposed project includes a large component of new physical facilities and improvements to exisiting facilities estimated to cost approximately J$17,585,000 ($4.6 million equivalent) at the COA, and J$6,377,000 ($1.6 million equivalent) at KAS. These facilities are considered the minimum required to support the goal and purpose of the project. Planning of the physical facilities included consideration of various alternative solutions to satisfy the projected enrollment, scope of curricula, faculty-student ratios, etc. What proved to be a liberal preliminary plan was trimmed back to essential needs with a good deal of exchange and debate among the planners.

The preliminary designs of proposed facilities were carried out by a Jamaican A/E firm (APEC Consultants) whose contract Terms of Reference and Statement of Work are included in a supporting document. The level of planning completed was adequate to support reasonably firm estimates of cost pursuant to fulfillment of the requirements of FAA Section 611(a)1.

College of Agriculture:

Infrastructural inputs at COA are summarized below. Detailed plans are contained in the accompanying A/E report.

- 3 new dormitories and improvements to the two existing dormitories to accommodate a total of 450 students
- a new student laundry building
- improvements to the existing library
- a new building providing 3 new classrooms and 4 laboratories
- a new partial second level added to the administration building including improvements to the existing building
- conversion of the existing Great House to residential guest quarters
- improvements to the existing multi-purpose building
- 10 new 3 bedroom staff residences
- 8 new 2 bedroom staff residences

- new plant propagation laboratory and classroom building including terracing for shaded plant propagation areas
- alterations to existing poultry facilities and 2 new poultry buildings
- a new piggery building
- a new dairy building
- conversion of existing engineering building to an animal science laboratory and central storage
- expansion of the existing abattoir including a new refrigeration facility
- completion of the partially completed feedmill building
- completion of the partially completed hatchery building
- improvements to an existing partially completed workers welfare and storage building
- a new engineering workshop
- a new maintenance and repair workshop
- a new farm store
- a duplex residence for ancillary staff
- 1180 feet of access road to engineering complex site
- a 189,000 gallon storage tank, booster pump and piping
- civil works and utility services in support of the above

Foundation conditions at all COA building sites as determined by APEC Consultants are expected to be favorable based on analysis of borings prior to and in conjunction with construction of the existing facilities. Electric power is provided by the Jamaica Public Service Company and will be provided to the new facilities by either extension of the high voltage system and transformers as necessary or, increasing the transformers capacity and extending low voltage lines depending on the locations served.

The COA campus receives its water supply from the 6" Portland Parish Council water main which is supported by 36,000 gallons of on-campus storage. This source is inadequate to service the expanded human and animal needs of the proposed project. Occasional interruptions of pressure of less than 24 hours duration have been experienced in the past when cruise ships call at nearby Port Antonio. APEC consultants advise that any such interruption of service would be compensated for by the addition of 189,000 gallons of new storage. The proposed improvements to the on-campus water supply system will include a booster pump and chlorination system. Irrigation is not contemplated from this metered supply. Because irrigation needs at COA are only marginal, no irrigation facilities are planned in the project. At such time as irrigation needs are further developed, there is ample surface water available for diversion from Clear Creek bordering the east boundry of the campus.

Sewage disposal at COA is accommodated by septic tanks and "soak away pits". The soak away pits are a means of septic tank effluent disposal similar to absorption fields common in the U.S. Highly pervious soil and substrata of COA render this system very effective. No problems have been encountered with this system which is widely used in Jamaica.

Second level additions are contemplated for the administration building mainly because of the lack of satisfactory site conditions for horizontal expansion. The existing building was not designed for vertical expansion and thus supplementary structural systems will be necessary. There is no threat to the feasibility of this approach and proper allowances have been made in the cost estimates. A more detailed discussion of all the design considerations of the proposed new facilities is included in the APEC consultants supporting report.

Knockalva Agricultural School:

The infrastructural inputs at KAS involve addition of new facilities and the demolition of existing livestock facilities environmentally unsuited in their current locations to the proposed improvements. Replacement livestock facilities will be sited in the farm complex area remote from human habitation areas. The new facilities planned for KAS are as follows:

- 2 dormitories to accommodate 48 female students
- 3 dormitories to accommodate 72 male students
- a multi-purpose building which will include dining facilities
- a new classroom building providing 6 classrooms
- 4 two bedroom staff residences
- 1 three bedroon staff residence
- 2 poultry buildings
- 1 abattoir building
- 1 piggery building
- civil works and utility services in support of the above facilities.

Foundation conditions are not as favorable at KAS as they are at COA. Borings taken during construction in 1978 reveal a layer of thick silty clay over dense sand and gravel which may be typical for the area. Further foundation investigations will be necessary prior to final designs but for the purposes of the PP preliminary design, bored piles through the clay layer have been figured into the cost estimate while also allowing a contingency factor to compensate for uncertain foundation conditions.

Sewage disposal at KAS is accommodated by septic tank systems similar to that of COA except that clay soil conditions constraining effluent absorption must be by-passed to more pervious levels below. New facilities will be similarly accommodated.

A more detailed discussion of design considerations is included in the APEC Consultants report.

Rationale for Proposed Facilities:

The proposed improvements to existing facilities and construction of new facilities are deemed to be essential to assure the accomplishment of project training objectives. Aside from those facilities that fall into the category of support for the academic program, the balance of facilities are necessary to support the viability of the institutions by providing productive capability and capacity to augment the limited

financial support the institutions can expect from the central government. Both COA and KAS presently endeavor to feed themselves and to augment the budget with sales of produce to the surrounding community. This capability must be upgraded and expanded to assure a higher measure of reliability that project objectives can be accomplished.

Construction:

The type of construction proposed for new facilities under the project, i.e. reinforced concrete or pile foundation systems, load bearing concrete block walls within reinforced concrete structural frame; or, structural steel truss and columns with concrete block walls; or, concrete block load bearing walls with reinforced belt beams supporting steel or wood roof trusses, are all common and predominant types of building construction in Jamaica. This recognizes that wood is an expensive, imported building material that is also vulnerable to termite damage common in the tropics, and that cement is a local product produced in abundance for both the local and an export market. Reinforcing steel is also locally produced. Certain construction inputs such as structural steel, certain electrical and plumbing hardware, door hardware, air conditioning equipment, etc. will be imported. Prime contractors do their own importing of these types of items on large contracts but procure them from local supplier/importers for the smaller contracts. Discretion in the choice of imported vs. lower quality locally produced construction inputs rests with the A/E firm. A cost-effective approach will be maintained as a basis for the A/E scope of work to control such discretion and for approval of IFB documents.

Project Management of Engineering & Construction:

The Ministry of Education's Director of Special Projects will have Project Mangement authority for the proposed project and will exercise such authority through an agreement with the National Development Agency (NDA). NDA, established in 1974, is a limited liability company wholly owned by the GOJ and functions as implementor of public sector projects for GOJ entities that do not have staff capability for the purpose. NDA performed the project management function for the AID financed Rural Education Sector Project and thus has appropriate experience applicable to the proposed project. However, in this project, NDA's involvement will be confined to the engineering and construction aspects.

NDA's responsibilities on behalf of the MOE will include the procurement of A/E and construction services, oversight and coordination of the production of IFB documents for submittal to approving authorities, construction supervision, and processing of payments to contractors. NDA's own in-house staff includes architects, engineers, quantity surveyors and para-professionals in these disciplines although NDA does not undertake design services with its own staff. NDA's role is primarily project management and administration. Because of the magnitude of engineering and construction aspects of the proposed project and our experiences with GOJ ministries as B/G on other similar projects, we look forward to NDA's involvement in the proposed project.

Contracting:

Contracting for A/E and construction services will be carried out by NDA under host country contracting procedure in accordance with rules and guidance in AID Handbook 11. It was considered, at the time of contracting for A/E services to carry out preliminary designs for PP preparation, that it would be an economy and an expedient to utilize the investment in the pre-authorization A/E contract and the concomitant experience of the A/E firm in the final design work, IFB preparation, and construction supervision provided that the preliminary design services were satisfactory. Accordingly, the solicitation for preliminary A/E design services duly noted that follow-on work may be contracted without further competition as provided in AID Handbook 11. Should NDA exercise this option, an early initiation of implementation of infrastructural inputs could be achieved. There is an urgent need for staff housing at COA and the early availability of on-campus housing would facilitate the accommodation of technical assistance contractors.

Jamaica has ample professional capability to provide the necessary A/E services and therefore the competition if utilized, will be conducted locally. Expatriate A/E services were not considered in the cost estimates.

It is anticipated that construction services will be procured through three prime contracts with prequalification of bidders determined for each contract. The first such contract will cover staff housing and renovation of the Great House at COA. All other facilities at COA will be under a single prime construction contract. Likewise, all facilities at KAS will be under a single prime constuction contract. Although U.S. and Code 941 contractors will be eligible to bid, advertising will be in Jamaica only as U.S. contractors are judged to be uninteresed in the expected size of the jobs ($1.6 to 2.3 million). Therefore it is contemplated that competition will be confined to Jamaican-based contractors. There is adequate capacity and capability in the Jamaican private sector construction industry to provide adequate competition as well as to carry out these contracts.

Cost Estimates:

The estimated costs of construction inputs are representative of the costs of materials and labor as of May, 1984. Actual bid prices on other recent contracts for similar construction were updated and adjusted for site conditions for the contemplated construction prior to application. All costs were estimated in Jamaican dollars and converted to U.S. dollars, for the purposes of this project paper, at the rate of J$4.00 to U.S.$1.00.

The contingency item in the construction cost estimates is to cover physical contingencies. A general contingency factor for all line items in the budget of approximately 5% is in addition to construction contingencies. The inflation contingency is estimated separately.

2. Educational Considerations:

a. Faculty Training and Expansion:

When the Jamaica School of Agriculture was closed and the College of Agriculture established, there was no movement of staff from the old institution to the new. The staff at Passley Gardens Agricultural School could not be absorbed into the College of Agriculture because they were not suitably qualified to teach at the post secondary level. This difficulty in obtaining the required staff locally led to the recruitment of personnel from overseas.

Currently there are eighteen well qualified members, thirteen of whom are Jamaicans. Most of the faculty who work at the College are under short-term to two year contracts. The plan is to increase the faculty from eighteen to approximately 25 permanent full time faculty equivalents to achieve a study faculty ratio of 18:1. The difficulty experienced in staffing the College initially indicates that a few of the present and many of the additional staff to be acquired will need additional training in specialized areas of agriculture.

The participant training component of the project is aimed at increasing the capacity of the COA and KAS to plan, coordinate and undertake improved and expanded training programs to prepare graduates qualified to participate in efforts aimed at increasing agricultural production and productivity in both private and public entities. It also aims to improve the applied research capacity of the staff, the direct beneficiaries of the participant training, which will significantly enhance their ability to introduce their students to the fundamental principles and practices of applied research.

The 34 person months of participant training will involve both long and short term training in U.S. agricultural institutions under the following anticipated schedules:

	COA	KAS
degree training (person years)	8	14
short term training (person years)	7	5

Level of entry will vary for degree candidates with those seeking to complete B.S. degrees entering at an advanced level. It is anticipated that some of the degree training, especially at the M. S. level, may be phased so as to permit the participant to do his/her research in Jamaica. Some of the short term training will be arranged so the participant can accumulate college credits for the work in order to encourage upward mobility of staff.

An appropriate bonding arrangement will be used to insure the individuals return to Jamaica upon completion of the training program.

In addition to the off-shore training, in-service training, both short courses and on-the-job, will be provided utilizing Title XII and other sources of expertise.

b. Curriculum Design:

The curricula at Knockalva and the College of Agriculture will prepare graduates to respond at different levels of experience, education, and competence to the needs of both the small farmer and the large-scale private farmer and agribusinesses who use modern technologies and produce for export. There should therefore be an appropriate balance between the theoretical and experiential components of the curricula, particularly at the tertiary level of preparation.

Currently at the College of Agriculture, well trained short term faculty members teach topics in accordance with their previous background as adjusted to local conditions. The curriculum, although limited in scope, is well balanced in theory, laboratory, and farm practice experiences. In order to instill in students a positive attitude toward agriculture it is important that they have carefully supervised farm practice experiences.

The COA curriculum is presently being designed for the full time study of agriculture and related areas to prepare students for careers in agriculture. The curriculum will provide for a three year course of study leading to an Associate of Science degree in Agriculture (A. Sc. in Agriculture). The curriculum is being tailored to the needs of the agricultural sector in Jamaica. Experiential programs such as farm practice, work-study, and cooperative education are being incorporated into the curriculum to meet the needs for acquiring useful agricultural skills and developing positive work attitudes toward agriculture. Third year students will be placed for work experience under cooperative education arrangements with various farms and agricultural establishments for twelve (12) to fourteen (14) weeks of the second semester.

Although both the Knockalva Agricultural School and the Elim Agricultural School are striving toward a common, balanced curriculum, it is necessary that the College of Agriculture in conjunction with the Ministry of Education and the Ministry of Agriculture coordinate the development and improvement of the curriculum for agricultural secondary schools. This will enable these institutions to better contribute toward meeting the manpower needs of the agricultural sector.

c. Curriculum Development Center:

The COA based Curriculum Development Center (CDC) will undertake dynamic national curriculum development as there currently is no such center in Jamaica. The CDC is to function as a mechanism for the rationalization, coordination, and articulation of curricula among agricultural education institutions and in concert with the needs of the agricultural sector. The CDC concept appears to be very feasible and essential if optimum curricula relevant to the needs of the agricultural sector and an agricultural education system appropriate to Jamaica are to be attained. (See the Implementation Plan for a fuller discussion of the CDC).

d. Applied Research Program:

The Applied Research Program at the College of Agriculture, which is fundamentally a training function, will also serve as a mechanism for strengthening a national agricultural research program in collaboration with the Ministry of Agriculture, the Scientific Research Council, and Agro 21. The anticipated linkages between these organizations and the College of Agriculture will enhance the exchange of information and closer cooperation in identifying research priorities and appropriate participation of each.

It is anticipated that each of the technical agricultural faculty of the COA will devote a portion of their time to undertaking applied research and will involve their students in the conduct of the studies. By this procedure, students will gain an understanding of basic field plot design, feeding trials, supporting laboratory analyses, data collection and appropriate basic statistical analyses of data. It is also anticipated that the concept and principles of farming systems and agro forestry researach will be introduced and at a later time, be extended to small farmer holdings in the community.

Financial support for applied research will be minimal in the early stages since the studies will principally involve variables such as plant population, levels and kinds of fertilizers (including organic), root stocks, varieties, prunning methods, tillage practices and integrated pest management practices. Most of the inputs not needed for applied trials and not available at the school can be obtained from interested suppliers. The other needs will already exist as part of the instructional program and the products produced will be used to meet a portion of food and feed requirements of the school. As they become prepared to undertake field trials and farming systems studies off the school farm, other sources of assistance will be sought such as small grants currently available from a variety of international sources. Some thought has also been given by USAID to negotiate a small PL-480 counterpart generated fund to support priority efforts in applied research and this possibility will be pursued.

e. Technical Assistance - Title XII:

An estimated 247 person months of technical assistance will be provided under a Title XII arrangement, envisioned to be a joint enterprise involving a Historically Black College or University (HBCU) with a strong 1862 Land Grant Institution. The procedure for procuring such services is addressed in the implementation section of this document.

The need for external technical assistance is deemed justified on the basis of the proposed magnitude of development to be undertaken and the limited experience of the locally recruited staff, many of which will need additional training. Two long term positions (96 person months) filled by highly experienced personnel will be recruited to assist with the curriculum development and applied research efforts. These people must have indepth technical knowledge and experience in more than single areas of agriculture since they must be prepared to assist the COA to plan and implement a holistic approach in support of the stated objectives of

the program. They shall assist in a variety of ways by advising, teaching, planning, and counseling in the areas of curriculum development and research as well as other pertinent activities. In addition, an estimated 151 person months of technical assistance in a variety of specialized technical areas will be made available for periods of time varying from one or two months up to a full academic year. These people will be schduled as needed to teach when resident faculty are abroad for training and for providing in-service training and assistance in establishment of specific courses and supporting teaching facilities. Some will also participate in evaluation, procurement, planning and development of operational systems. The scheduling of technical assistance will be jointly developed by the Dean of the COA and the long term advisor who will be designated as Chief of Party or Coordinator for the participating Land Grant Institutions. The physical proximity of Jamaica to the U.S. makes this suggested arrangement feasible.

Although the short term technical assistance will predominantly represent highly specialized technical agricultural areas, limited assistance will also be provided in areas such as library science, college administration, communications media, etc. One of the initial consultants will be a specialist in laboratory and other specialized equipment in order to facilitate commodity procurement. A tentative list and schedule of technical assistance is provided in the implementation plan.

The level of technical assistance planned is believed to be realistic relative to the need to avoid delay in the implementation of this critically needed activity. In addition to helping accelerate development, the participation of experienced personnel from U.S. institutions will contribute to building a professional relationship that should continue long after completion of the proposed project. Jamaica, the COA and the U.S. institutions stand to benefit greatly through the exchange of information and ideas over the future years if a solid, professional relationship is developed.

In summary, the technical components supported in part by the proposal will contribute to finding both near and long term solutions to Jamaica's pressing development problems in agriculture and food production.

B. Economic Analysis (Summary):

The complete Economic Analysis for this Project is included in Annex I. Included below are a summary and conclusion of the analysis.

1. Summary and Conclusions:

In this paper, an attempt was made to use cost-benefit analysis in evaluating the social costs and social benefits of the three-year educational program at COA. On the cost side, only direct recurrent costs and the opportunity cost of the students' time, as measured by the shadow price of their labor were included. On the benefits side, ex ante benefits were estimated on the basis of future earnings of graduates at current market prices.

The major conclusions are as follows:

a. The direct unit cost (i.e. per student enrolled) of COA education from the society's stand point will rise steeply in the 1986-87 academic year, and continues to rise, but less steeply thereafter.

b. Opportunity cost of COA education, from the students' stand point will also rise, but less steeply than the social unit cost. This implies that at current prices for educational goods and services, COA may have to be more heavily subsidized by the Jamaican Government, or the private cost increased to deal with future financial constraints on its operations.

c. The COA administration should keep a watchful eye on fluctuations in employment conditions of the labor market to avoid either underinvestment or overinvestment in COA. Between 1987 and 1989 the demand for trained agricultural graduates may rise above its present level. However, between 1989 and 1990 the demand may begin to decline, but rises only slowly thereafter.

d. Nevertheless, COA appears to be a good cost saving alternative for the economy compared to training Jamaican agricultural personnel in United States-based Colleges of Agriculture.

e. It appears that the Jamaican society will derive positively robust rates of return in the area of 50 - 80% in the short run and sound qualitative social benefits as well in the long run from an upgrading and development of COA into a viable undergraduate educational institution providing quality training to Jamaican citizens.

The overall conclusion is that the project is economically justified by all relevant tests.

C. Financial Analysis:

1. Overview:

The total cost of the Agricultural Education Project is estimated at $18.0 million. The AID contribution will consist of a $9.849 million loan and a $3.0 million grant. The balance of $5.151 million will be provided as counterpart contribution by the Government of Jamaica. The loan input will be obligated over a period of two years - $8.0 million in FY 1984 and the remainder in FY 1985. The grant input will be obligated over a period of four years - $0.3 million in FY 1984, $0.8 million in FY 1985, $0.9 million in FY 1986, and $1.0 million in FY 1987.

2. Funding:

AID is to provide funds for the Agricultural Education Project by means of a loan of $9,849,000 and a grant of $3.0 million. The loan funds will be used for training, commodities, construction, and evaluation while

the grant funds will be used for technical assistance. The Government of Jamaica will provide $5,151,000. These funds will be used to provide the host country inputs of land, personnel, construction, and commodities. In addition, the GOJ will provide annual recurrent funds to meet operational and maintenance costs estimated at approximately $1,600,000 per year.

3. Cost Summary:

Table III is a projection of expenditures by fiscal year. The expenditures for FY 1985 are extremely low due to the time necessary to arrange for training and construction of the desired facilities. After project completion, approximately J$1,325,000 (or US$325,000) a year will be necessary to continue payment of the additional faculty salaries and maintenance of the additional facilities and equipment provided under the project.

Table V is a summary of cost estimate and financial plan by component. A further breakdown is shown in Table IV where the total project costs are shown by component by fiscal year.

Table VI shows a costing of the project outputs and inputs. The project inputs are listed in the left hand column and their costs are apportioned to the project outputs listed in the Logical Framework. There are four project outputs shown from left to right as follows:

1. Curriculum completed and tested.
2. Personnel trained.
3. Personnel hired/salaries.
4. Facilities completed.

The curriculum will cost approximately $276,000 to develop and test. The training of the faculty and staff will cost $3.9 million while the salaries of the personnel involved will cost $2.2 million. The construction and stocking of the new facilities will cost $11.6 million. Thus the total cost of the project will be approximately $18.0 million.

4. Financial Support:

Expansion and up-grading of Knockalva and the COA will increase recurrent annual costs by an estimated J$1,325,000 (or US$325,000) of which J$950,000 is for COA and J$350,000 is for Knockalva. See Table VII for proposed budget for COA, with and without the project.

An evaluation of the former Jamaican School of Agriculture in 1978 indicated the physical plant, equipment, and level of practical training had greatly deteriorated and a recommendation was made to increase the annual support by at least 63%. Awareness of that situation and the level of inflation that has and is likely to occur by 1987 indicates the proposed recurrent costs appear reasonable.

Budgetary support in the form of capital and recurrent costs including increases due to the project are shown in Table VII. Year one is the past year and shows actual amount budgeted. Year two is the anticipated first year of the project and J$2.2 million has been budgeted to date with a supplementary amount anticipated later in the fiscal year.

It is not anticipated that the COA will be able to generate large revenues as this is not a major objective of the college or the project for that matter. Table VII shows the anticipated revenues generated by the COA without the project. As is clearly shown, the amounts are very low. It is assumed that for the most part the produce grown on the college farms will be used to feed the students and staff. Of course, the revenue generated from the tuition charged off-shore students and from any fees derived from applied research will be to cover their costs only. If it is determined in the future that revenue generation has become a necessity for the survival of COA, high revenue producing crops could be introduced on the college farms. Though Jamaican students currently do not pay tuition, consistent with GOJ policy, it is planned to seek modification of this policy over time with the additional revenue helping to off-set costs. As of September, 1983, the annual operating budget for the COA translated to approximately J$8,800 per student with students' participation in work study programs helping to defray COA's expenses.

5. Methods of Financing:

All commodity procurements (equipment) for this project will be the responsibility of the Ministry of Education. The requisite in-house ability of the Ministry to successfully procure commodities under USAID regulatory guidelines has been demonstrated under previous loans. Technical assistance and advice in procurement matters will be furnished by USAID personnel as needed. Payments to suppliers of off-shore commidities will be provided for by AID Direct Letters of Commitment whenever possible. No major commodity procurement waivers are anticipated for project purchases at this time. If operational at the time of procurement, USAID/Jamaica will consider taking advantage of IQCs with a procurement agent to effect the necessary purchases.

USAID/Jamaica and the MOE have agreed that most of the technical assistance and training required by the COA should be provided by Title XII Institutions. Total Title XII funds will not exceed $3.0 million over the five year period and these services will be obtained under a direct contract with AID.

Construction will be undertaken by private contractors. The preliminary designs of proposed facilities was carried out by a Jamaican A&E firm called APEC Consultants. Final designs and preparation of bidding documents will be prepared under a host country contract for technical and professional services. Direct reimbursement procedures will be used in financing the cost of construction.

Table III Projection of Expenditures by Fiscal Year

(U.S. $000)

	AID			GOJ	TOTAL
Fiscal Year	FX	LC	Total	LC	(In US$)
FY 1985	639	206	845	430	1,275
FY 1986	1431	1143	2574	683	3,257
FY 1987	1557	1298	2855	967	3,822
FY 1988	1246	1375	2621	1195	3,816
FY 1989	303	1046	1349	846	2,195
Inflation & Conting. Factor (25%)	1318	1287	2605	1030	3,635
TOTALS	6,494	6355	12,849	5151	18,000

ESTIMATED TOTAL PROJECT COST BY COMPONENT BY YEAR (U.S. $ 000)

TABLE IV

	FY 1985			FY 1986			FY 1987			FY 1988			FY 1989			FY 85-89
	AID		GOJ	AID		GOJ	AID		GOJ	AID		GOJ	AID		GOJ	
	FX	LC	LC	FX	LC	LC	FX	LC	LC	FX	LC	LC	FX	LC	LC	TOTALS
Faculty	0	0	138	0	0	308	0	0	363	0	0	484	0	0	367	1659
Title XII TA	236	0	0	494	0	0	670	0	0	630	0	0	130	0	0	2160
Training US	0	0	0	85	0	24	165	0	47	180	0	60	100	0	30	691
Training COA	0	0	0	0	0	0	0	14	63	0	13	86	0	12	86	275
Facilities	0	195	0	0	1143	235	0	1279	328	0	1362	352	0	1029	258	6181
Equipment	341	0	71	790	0	99	642	0	142	430	0	213	47	0	101	2876
CDC	56	0	18	56	0	18	54	0	18	0	0	0	0	0	0	220
Other TA	6	11	0	6	0	0	6	0	0	6	0	0	6	0	0	41
Land	0	0	203	0	0	0	0	0	0	0	0	0	0	0	0	203
Evaluations	0	0	0	0	0	0	20	5	6	0	0	0	20	4	4	59
Subtotals	639	206	430	1431	1143	683	1157	1298	967	1246	1375	1195	303	1046	846	14365
Contingency & Inflat. (25%)	163	52	108	365	290	171	396	330	241	317	349	299	77	266	211	3635
TOTALS	802	258	538	1796	1433	854	1953	1628	1208	1563	1724	1494	380	1312	1057	18000
TOTALS PER YEAR	1598			4083			4789			4781			2749			18000

Table V Summary Cost Estimate and Financial Plan

(U.S. $000)

USE	AID FX	AID LC	AID TOTAL	GOJ LC	TOTAL
Faculty	0	0	0	1659	1659
Title XII T.A. 1/	2160	0	2160	0	2160
Training in U.S.	530	0	530	161	691
Training at COA	0	40	40	235	275
Facilities	0	5008	5008	1173	6181
(COA) 2/	0	(3583)	(3583)	(983)	(4566)
(Knockalva)	0	(1425)	(1425)	(190)	(1615)
Equipment	2250*	0	2250	626	2876
(COA) 2/	(1850)	0	(1850)	(508)	(2358)
(Knockalva)	(400)	0	(400)	(118)	(518)
CDC	166	0	166	54	220
Other TA	30**	11	41	0	41
Land	0	0	0	203	203
(COA)	0	0	0	(150)	(150)
(Knockalva)	0	0	0	(53)	(53)
Evaluations	40	9	49	10	59
Subtotals	5176	5068	10244	4121	14365
Contingency & Infl. (25%)	1318	1287	2605	1030	3635
TOTALS	6494	6355	12849	5151	18000

1/ Grant Element (will not exceed U.S. $3.0 million
2/ ( ) indicates non-add item.
* Two vehicles are reserved for TA and JCC Project Officer.
** JCC person to serve as AID Liaison for project.

Table VI Costing of Project Outputs/Inputs

(U.S. $000)

Project Inputs/Outputs *	#1	#2	#3	#4	TOTAL
AID					
Title XII T.A.	-	2,160		-	2,160
Other TA (JCC)	-	30	11	-	41
Training - U.S. & COA	-	570	-	-	570
Facilities (construction)	-	-	-	5,008	5,008
Equipment (commodities)	-	-	-	2,250	2,250
Curriculum Design Center	166	-	-	-	166
Evaluations	-	-	49	-	49
Subtotal	166	2,760	60	7,258	10,244
Contingency & Inflation	42	694	15	1.846	2,605
TOTAL	208	3,454	75	9,104	12,849
Host Country					
Land				203	203
Personnel			1,659		1,659
Training - U.S. & COA		396			396
Facilities (construction)				1,173	1,173
Equipment (commodities)				626	626
Curriculum Design Center	54				54
Evaluations			10		10
Subtotal	54	396	1,669	2,002	4,121
Contingency & Infl. (25%)	14	99	417	500	1,030
TOTAL	68	495	2,086	2,502	5,151
GRAND TOTAL	276	3,949	2,161	11,606	18,000

* List of Project Outputs:

#1 Curriculum completed and tested.
#2 Personnel trained
#3 Personnel hired/salaries
#4 Facilities completed.

TABLE VII
PROPOSED BUDGET-YEAR 2 - 6 1/
COLLEGE OF AGRICULTURE ($J 000) 2/

	1	2	3	4	5	6
	83/84	84/85	85/86	86/87	87/88	88/89
Personal Emoluments	960	1,335	1,712	2,055	2,132	2,345
Travel & Subsistence	55	145	191	211	232	255
Supplies & Materials	236	501	601	727	800	870
Utilities	96	119	143	171	188	206
Operations & Maintenance	148	275	330	387	438	481
Grant, Contribution & Subscriptions	22	82	98	118	131	142
Equipment	28	124	149	178	196	216
Livestock	29	42	50	61	67	73
Boarding	169	382	512	580	636	773
Expended	1,742					
Outstanding Commitments	190					
Budgets Request	1,932	3,005	3,786	4,488	4,820	5,321
Budgeted to Date	1,742	2,200*	-	-	-	-
W/O Proposed Project			3,304	3,634	3,997	4,396
Budget Difference			482	854	823	925
Revenues W/O Project		27	29	33	35	39

1/ Based on actual for year 1 - FY runs 4/1 to 3/31.

2/ U.S. $.00 = J$4 - Exchange Rate as of May 17, 1984.

* Announced in Kingston "Daily Gleaner" May 15, 1984.

D. Social Soundness Analysis:

1. Social Context:

Jamaica has a long history of agricultural training. Formal instruction was first offered to 26 students in 1910 at a newly established farm school. By 1959 the school, then known as the Jamaican School of Agriculture (JSA), had 542 enrolled and over the years had been the principal source of middle management agricultural personnel. However, despite the long tradition, by 1979 the budgetary support of JSA had declined relative to that for general education, and the quality of training had deteriorated, especially in the area of developing practical hands-on skills on which its earlier reputation had been built. The school farm had been reduced to 20 acres through encroachment of urban sprawl and facilities and equipment had deteriorated to where they were given a composite rating of 4 on a declining scale of 1 to 5 by an external evaluation team. Interviews and reports indicate the decline in practical training was the reason for the school's decline. It was phased out in 1981.

With the sharp decline in bauxite revenue, the GOJ has turned to the agricultural sector as a major force to power economic recovery. Unfortunately, years of increasing direct participation by the Government have eroded individual incentives to produce and increased the dependency, especially of small farmers, on government subsidies and interventions. With limited resources, support for training, extension, research, and other basic services necessary to support a productive agriculture were neglected and productivity declined.

It must be recognized that Jamaica faces severe difficulties in developing a viable, productive agricultural sector. It is poorly endowed with good agricultural land and if it is to succeed in increasing production for export and import substitution, it must be able to effectively influence farmers, especially the small ones, with programs and technologies that encourage them to produce without undue dependency upon costly government subsidies. To support such an approach, small farmers must be reached which will require properly trained and oriented personnel that can develop and extend to them improved practices and programs. The approach is basically one of education which is the purpose of the proposed project; i.e., to train those that can effectively assist in the difficult intermediate to long-term task of rebuilding the agricultural sector.

In assessing the probability for success, key factors will be the quality and orientation of the graduates from the COA and secondary agricultural schools and their ability to relate to farmers, especially the small ones who are the principal producers of food crops such as vegetables and roots as well as of a substantial portion of the coffee, cocoa, bananas, and pimento.

Although the small farmers in Jamaica are, compared to many other developing countries, relatively well educated, (90.5 percent with some primary education) their average age is reported to be over 50 years, a constraint to change. Women comprise an estimated 28% of the agricultural work force and many participate in the marketing process. Overall, the small

farmers can be described as less educated, poorer, and older than the average for the national labor force. Migration to urban areas has been substantial with rural population reported as dropping about .6% per year. This translates into an increasing urban demand for food while having a smaller labor force to produce it.

Despite the relatively small size of many farms, most of them utilize some hired labor during portions of the year and farmers complain of the scarcity and cost of labor even though there is a high level of unemployment, particularly in urban areas. Although many of the larger farms are mechanized, they are less so than in most developing countries. It is an explicit government policy to encourage use of labor in order to reduce unemployment and the result is more intensive use of labor and higher unit costs of production than similar operations in other countries.

At a time when the Government of Jamaica is according top priority to agricultural development--as is evident from recent policy announcements as well as statements of civic leaders, the importance of building up a post-secondary institution for agricultural education cannot be emphasized enough. The need for such an institution becomes all the more urgent in light of Agro 21 which further signifies the GOJ's concern for the development of agriculture. Agricultural development canot take-off merely with the input of infrastructural facilities, which is what constitutes the main concern of Agro 21. Agricultural development also requires informed, motivated, and trained manpower. In order to provide such trained agricultural manpower, Jamaica needs a post-secondary educational institution in the field of agriculture.

2. Beneficiaries:

The direct beneficiaries of the Project will be the students of the COA and KAS. The benefits will be manifested immediately in their improved technical agricultural skills and, later, in overall work performance as they assume positions of responsibility in farming, agribusiness, academia, or government service. Other direct benefits will be the building of the COA as an institution, including having an improved agricultural curriculum firmly established and operating, as well as longer term benefits which may be derived from its close relationship with a U. S. Title XII university and from the private sector ties provided through Agro 21.

GOJ agricultural agencies and the private sector will benefit from the Project by having access to more highly trained agriculture graduates as potential employees. Future graduates will understand both the theory and practice of agriculture and have a clearer understanding than their predecessors of the social, political, and economic forces operating in the rural areas. Graduates employed in the private sector are likely to be involved in farm management, where a knowledge of agriculture from the farmer's perspective should better prepare them to handle the full range of farm management problems.

Small farmers, especially those in the areas near Knockalva, and the COA where the field practicum will be established, will be the indirect beneficiaries of the Project, as soon as the practicum is implemented. There is considerable potential for a worthwhile and sustained interchange among faculty and students and area farmers which could lead to still further

training program modifications beyond the life of the project. Any such changes which result from close farmer/faculty/student collaboration are positive benefits, and consistent with the basic objectives of the Project. Also, small farmers will benefit indirectly from improved research and extension and directly by participation in non-formal training programs at the COA, Knockalva, Elim, and other agricultural schools.

3. Participation:

The students, both present and future, are the direct beneficiaries of the Project and the Project intends to involve them in the development of the COA through (a) a strong orientation program for incoming students, (b) creation of a student council, (c) more senior students providing guidance and leadership for younger students, (d) student evaluation of courses and teachers, and (e) student participation in development and operation of the educational farm through application of the fundamental principle of "learning by doing". Other forms of participation included the close collaboration of several GOJ entities in the design of the PID and their subsequent participation in the project design at the PP stage, especially in the implementation plan. Less direct but participatory will be the other schools of agriculture that will become involved in and benefit from the work of the Curriculum Development Center. The COA will encourage participation of local farmers through field practica, short courses, and applied research trials.

4. Socio-cultural Feasibility:

The following facts make for not only the socio-cultural feasibility of the Project but also its socio-cultural desirability.

a. Nearly 50% of Jamaica's population lives in rural areas.

b. About two-thirds of Jamaica's rural population is engaged in agriculture.

c. A majority of those in the agricultural sector (roughly 60%) are small farmers who are little educated, poor, and older than the average age for the national labor force.

d. Jamaican farmers need proper motivation, functional information, and cooperative mobilization to produce more without undue dependency upon costly government subsidies.

e. Jamaican farmers need to be exposed to development communication which requires properly trained and oriented personnel.

f. The younger generation needs to be attracted to agriculture if agriculture is to become a source not only of feeding the nation but also of earning foreign exchange.

g. All of the above are precisely the rationale for, and the purpose of, the proposed project, i.e., to train a substantial number of young people who can effectively assist in the long-term task of rejuvenating the agricultural sector.

A large majority of students enrolled at the College of Agriculture are drawn from rural and small farming backgrounds. Once trained, many of them will go back to their rural areas to revitalize agriculture without causing social disruption. This will help to reverse the tide of migration from rural to urban areas. Thus the existing social structure can be gainfully used to promote the desired developmental change.

5. Spread Effect:

The manifest purpose of the Project is to produce professionally trained personnel to resuscitate the agricultural sector. Some of these trained youth will select agriculture as a vocation and grow into self-employed, enlightened farmers. Others will become middle level farm managers, agricultural extension agents, rural development personnel, teachers of vocational agriculture, and agricultural extension reseach and information specialists.

These trained personnel will be changed agents for agricultural development. Through these trained functionaries the project will have its spread effect. The farm managers and technical experts may help the larger farmers to turn their farming into a more profitable enterprise. The extension agents will serve the smaller as well as larger farmers by acting as agents for the diffusion of innovations. The applied research specialists will translate and transfer research results to improve the efficiency of agricultural production operations as well as of agro-industries. Thus, the Project will generate a spread effect and promote social mobility of various sections of society.

The spread effect from the Project is not going to be confined to the agricultural sector only. The surplus income produced in the agricultural sector may be diverted to the manufacturing and industrial sector. Thus, the Project is going to have long-term consequences for the socio economic development of Jamaica.

6. Social Consequences and Benefit Incidence:

The intended as well as spread effects will flow directly into social consequences all of which are likely to be positive. Some of the expected social consequences of the Project are listed below.

a. It will provide opportunities for self-employment to those trainees who own some land.

b. It will open up new avenues of employment in the agricultural sector for those without land.

c. It will arrest the trend of rural youth migration into urban areas.

d. It will promote positive life changes for small farmers.

e. It will promote upward social mobility of all sections of society engaged in agriculture.

f. It will help remove socio-cultural constraints to development in general and agricultural development in particular.

Besides the above advantages, the Project holds promise of immense benefits to all categories of farmers through its applied reseach activities. For example, rural community development specialists may want to probe into critical problems like the following:

a. Why has agriculture remained a neglected sector all of these years?

b. What are some of the socio-cultural constraints to agricultural development in the Caribbean region?

c. What are the effects of land reform on agricultural development?

d. Who has gained most from the rural development programs and why?

e. How can small farmers gain from rural and agricultural development programs?

f. How can the benefits of development be extended to the landless laborers?

g. What factors, particularly social structure, account for the migration of rural youth to urban areas?

h. How can youth participation in rural and agricultural development programs be generated?

Research into such problems as these are likely to yield important insights into the effects of existing social structure on agricultural development and agricultural development, in turn, on the existing patterns of social stratification, mobility, and change. These insights can be gainfully used to promote agricultural development as well as to extend the gains of development to small and marginal farmers and to landless laborers. Similarly, research in other branches of agricultural science are likely to produce innovations which will have far-reaching socio-cultural consequences.

7. Impact Summary:

The Project meets AID's primary objective of helping people in Jamaica to meet their basic human needs through equitable sustainable growth by (a) increasing the availability of persons with the skills needed to improve farming techniques and (b) by improving the skills of the COA, Knockalva, and Elim students, both male and female, so that they are better qualified for jobs.

The application of improved farming techniques will increase production, thereby benefiting farmers through greater farm income, and the consumers through a greater availability of agricultural commodities at lower prices. The majority of both beneficiaries, farmers and consumers, will be persons in the lower income strata.

In view of its emphasis on agriculture, the GOJ is expected to continue support for the COA and Knockalva after the Project ends.

E. Environmental Analysis:

The Initial Environmental Examination (IEE) prepared at the PID stage of the Project called for a Negative Determination based on few, if any, identifiable adverse effects on the natural and human environments. The DAEC review, however, suggested that an Environmental Assessment (EA) be prepared since there will be considerable on-site construction activities which could, in theory, foster adverse impacts. The DAEC further recommended that a pesticide analysis be performed which would make recommendations on usage conforming to U.S. regulations in these matters. On this latter issue, the Regional Environmental Management Specialist/Caribbean recommended core curricula addition and further training in pest management and pesticide usage in the EA. Because direct project funds would not be used to procure or use pesticides, it was decided that a full pesticide analysis was unwarranted at this moment. Concern over pesticide usage will be addressed as recommended above by the Curriculum Developoment Center at COA and KAS.

The EA prepared by REMS/C identified construction-related potential impacts and suggested mitigative measures to reduce such impacts. The Summary and Recommendation of the EA are found in Annex F. General concerns over sewage disposal and road building impacts will be mitigated by careful construction controls to prevent soil erosion and appropriate septic system design. A land use plan is recommended for the COA which would make best use of those lands suitable for pasture and crops and any future facility siting and perhaps establish a forest protection zone on steep slope areas. The problem of soil erosion are not as severe at KAS due to moderately rolling topography and less intensive use of land resource since the school is only a secondary education institution, not a college/research center.

ACTION: AID-7 INFO: AMB DCM RF/10

Annex A

VZCZCKG0076
RR RUEHKG
DE RUEHC #4953/01 0741149
ZNR UUUUU ZZH
R 140727Z MAR 84
FM SECSTATE WASHDC
TO AMEMBASSY KINGSTON 2825
BT
UNCLAS STATE 074953

14-MAR-84
TOR: 16:24
CN: 05718
CHRG: AID
DIST: AID

AIDAC

E. O. 12356: N/A
SUBJ: JAMAICA AGRICULTURAL EDUCATION PROJECT (532-0082)

1. THE BUREAU REVIEWED AND APPROVED SUBJECT PID ON FEBRUARY 14, 1984. THE MISSION IS AUTHORIZED TO PROCEED TO PP DEVELOPMENT, SUBJECT TO THE GUIDANCE PROVIDED BELOW. SINCE THE PROJECT IS DOLS 2 MILLION OVER THE MISSION'S AUTHORITY TO APPROVE PROJECTS IN THE FIELD AND SUBSTANTIAL ANALYTICAL WORK REMAINS TO BE DONE PRIOR TO FINAL PROJECT DESIGN, THE MISSION IS ASKED TO SUBMIT THE PROJECT PAPER TO AID/W FOR APPROVAL.

2. DEMAND ANALYSIS: SERIOUS CONCERN WAS EXPRESSED AT THE DAEC AS TO THE DEMAND FOR POST-SECONDARY TRAINING IN AGRICULTURE. IN ORDER TO DOCUMENT THE NEED FOR AN INSTITUTION SUCH AS THE COA, AND TO IDENTIFY THE APPROPRIATE SCALE AND CONTENT OF SUCH TRAINING, THE MISSION IS ASKED TO UNDERTAKE THE FOLLOWING:
--(A) FIRST, THE MISSION SHOULD UNDERTAKE A DEMAND ANALYSIS OF THE NEED FOR THE VARIOUS TYPES OF MANPOWER THAT WILL BE TRAINED BY THE COA, AS WELL AS LOOKING AT THE GROWTH OF AGRO-INDUSTRIESAND THECHANGES IN THE AGRICULTURAL SECTOR TO ANTICIPATE FUTURE DEMAND IN THESE AREAS. THE PP SHOULD DISCUSS WHAT THE HIGHEST PRIORITIES ARE IN THE AGRICULTURAL SECTOR FOR MANPOWER, AND HOW THE COA WILL MEET THESE REQUIREMENTS. THE CURRICULUM OF THE COA SHOULD REFLECT THE SKILLS MIX NECESSARY TO CARRY OUT THE NEW DIRECTIONS IN-AGRICULTURAL DEVELOPMENT IN JAMAICA.
--(B) THE BUREAU IS ESPECIALLY CONCERNED AS TO THE ABSORPTIVE CAPACITY OF THIS SECTOR FOR TRAINED MANPOWER AND THE HIGH TURNOVER RATE AMONG PARA-PROFESSIONALS AND PROFESSIONALS IN THE AGRICULTURAL SECTOR. INTHIS REGARD, THE MISSION IS ASKED TO UNDERTAKE ATRACER STUDY TO ESTIMATE THE PERCENTAGE OF JAMAICAN SCHOOL OF-AGRICULTURE (JSA) GRADUATES WHO WERE ABSORBED INTO THE AGRICULTURAL SECTOR, AND THE PERCENTAGE WHICH REMAINED IN THE SECTOR FOR VARIOUS TIME PERIODS (E.G., E, 5, 10,-20 YEARS FOLLOWING GRADUATION).
--(C) FINALLY, THE DEMAND ANALYSIS SHOULD JUSTIFY AND EVALUATE THE NEED FOR POST-SECONDARY EDUCATION FOR THE ANPOWER NEEDS WHICH ARE IDENTIFIED, RATHER THAN OTHER ALTERNATIVES SUCH AS NON-FORMAL TRAINING OR A SECONDARY LEVEL EDUCATION, PARTICULARLY WITH RFGARD TO AGRICULTUPAL

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EXTENSION AGENTS.

Resonse:
2A. A national demand study was designed and conducted by the Economic Section of the AID Mission which addresses areas of concern. See supporting document B.

B. Absorption capacity was addressed in the demand study. A tracer study of the JSA graduates was attempted but abandoned due to lack of data. JSA closed down in 1980 and there are no follow-up records on graduates to indicate their present positions.

C. Alternatives are addressed in the demand study and in the PP and were rejected in favour of a COA.

3. INFRASTRUCTURE COST ESTIMATES: THE PROJECT HAS A SUBSTANTIAL BUDGET (DOLS 3.194 MILLION) DEDICATED TO CONSTRUCTION OF 70 BUILDINGS WITH DOLS 2.250 MILLION SET ASIDE FOR EQUIPMENT. THE PID IS UNCLEAR AS TO HOW THESE COST ESTIMATES WERE MADE. DURING PP DEVELOPMENT THE MISSION SHOULD UNDERTAKE A SOLID PRE-FEASIBILITY ANALYSIS OF CONSTRUCTION COSTS, INCLUDING SITE PLANNING IN CONFORMANCE WITH A MASTER PLAN. SITE PLANNING SHOULD TAKE INTO CONSIDERATION ROADS, WATER, SEWER, AND LANDSCAPING, AND IRRIGATION AS WELL AS ENVIRONMENTAL PROBLEMS WHICH MAY ARISE CONSIDERING DIFFICULT TOPOGRAPHY OF PROPOSED SITE. GIVEN CURRENT AND PROJECTED WORKLOAD OF MISSION ENGINEER, THESE ANALYSES MAY REQUIRE THE SERVICES OF A PSC ENGINEER. THE PP SHOULD INCLUDE ALL COST AND DESIGN INFORMATION NEEDED TO COMPLY WITH SEC?104 611 (A).

Response:
3. The PP addresses all costs and design information needed to comply with Section 104, 611(a) of the FAA. See supporting document A. An environmental assessment was also conducted in accord with these expressed concerns. See supporting document C

4. COA FINANCING: THE QUESTION OF CONTINUING GOJ BUDGETARY SUPPORT FOR THE COA AND THE POTENTIAL FOR REVENUE GENERATION BY THE COLLEGE WAS RAISED. ON THE REVENUE SIDE, IT WAS DETERMINED THAT ONE OF THE FUNDAMENTAL PRINCIPLES WHICH SHOULD BE ACCEPTED BY THE GOJ AS A CONDITION OF THE PROJECT IS THAT ANY REVENUE GENERATED BY THE COLLEGE SHOULD BE RETURNED TO THE COA. THE PP SHOULD DISCUSS THE POTENTIAL CASH FLOW FROM SUCH SOURCES AS THE COLLEGE FARMS, TUITION, AND RESEARCH. WHILE WE ACCEPT THE CONCEPT THAT THE PRODUCTIVE FARMS OPERATED BY THE COA SHOULD BE PRINCIPALLY FOR TRAINING OF STUDENTS, THE PP SHOULD EVALUATE WHETHER ANY PROFITS

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COULD BE GENERATED. IN TERMS OF RESEARCH, THE COA SHOULD ESTABLISH THE PRINCIPLE OF CHARGING USER FEES-OR OTHER - COST-SHARING MECHANISMS FOR AGRO-21 AND PRIVATE SECTOR FIRMS FOR WHOM THEY UNDERTAKE APPLIED RESEARCH-PROGRAMS. FOR ANY OTHER SERVICES PROVIDED TO THE PRIVATE SECTOR; THE PP SHOULD LAY OUT THE POLICY THAT THE COA WILL RECOVER THE COSTS OF PROVIDING THOSE SERVICES.

Response:
4. A covenant has been included in the draft Project Authorization to conduct a study and implement the results as practical, of possible revenue generating activities. It is anticipated, however, that the opportunities for this will be minimal because of traditional educational policies of GOJ.

5. BASED ON THIS ANALYSIS OF POTENTIAL REVENUES, AND A DETAILED PROJECTION OF THE RECURRING OPERATING -COSTS OF THE COA, THE MISSION SHOULD FORECAST THE FUTURE REQUIREMENTS FOR GOJ BUDGETARY TRANSFERS TO COA, AND ANALYZE THE IMPACT OF THESE REQUIREMENTS ON GOJ'S PUBLIC SECTOR BUDGET. AS A SHORT-TERM MEASURE, THE POSSIBILITY AND DESIRABILITY OF USING PL 480 COUNTERPART GENERATIONS COULD BE CONSIDERED IN THIS CONTEXT. TO LIGHTEN-THE BURDEN OF ABSORBING THESE RECURRING COSTS, THE MISSION MAY WISH TO CONSIDER PHASING THE PROJECT WITH AN INITIAL TECHNICAL ASSISTANCE COMPONENT TO START THIS FISCAL YEAR- TO BE FOLLOWED BY A MULTI-YEAR PROGRAM FOR CONSTRUCTION OF INFRASTRUCTURE. IF NECESSARY, THE MISSION SHOULD ACQUIRE THE SERVICES OF A FINANCIAL ANALYST DURING PP DEVELOPMENT TO ASSIST IN PREPARING THESE FINANCIAL PROJECTIONS. IF TDY ASSISTANCE DESIRED FOR THIS PURPOSE, PLEASE ADVISE.

Response:
5. Future requirements for GOJ budgetary transfers to both COA and KAS have been established and documented in the B/G request document. The use of PL-480 counterpart generations has been discussed and included in both covenants and the B/G request.

6. CURRICULUM DESIGN: THE CURRICULUM DEVELOPMENT OF THE COA SHOULD DRAW ON, TO EXTENT POSSIBLE, THE-VOCATIONAL - DEVELOPMENT TRAINING INSTITUTE (VDTI) UNDER THE SKILLS TRAINING PROJECT, AND EVERY EFFORT SHOULD-BE MADE TO SURVEY EXISTING INSTRUCTIONAL TECHNOLOGIES WHICH-MAY BE SUITABLE FOR COA. WHERE NECESSARY TO ASSIST IN THE - DEVELOPMENT OF SPECIALIST COURSES, THE MIXOF TECHNICAL ASSISTANCE SHOULD INCLUDE A SUBSTANTIAL NUMBER OF SHORT-TERM ADVISORS WITH EXPERTISE IN SPECIFIC TECHNICAL SUBJECTS TO AUGMENT A SMALL NUMBER (I.E.,,1-2) OF - LONG-TERM ADVISORS PROVIDING CONTINUITY TO CURRICULUM

Response:
6. The design of the CDC has addressed all concerns expressed in this area. The CDC will draw heavily on materials and methodology developed by (VDTI) and will utilize TA on a continuing basis throughout LOP.

Best Available Document

7. COA MANAGEMENT STRUCTURE: SINCE THE OBJECTIVE OF PROJECT IS TO LAY GROUNDWORK FOR COA TO DEVELOP INTO FIRST-CLASS TRAINING INSTITUTION, PP SHOULD ADDRESS HOW COA ADMINISTRATION WILL BE STRUCTURED TO ASSURE PROFESSIONAL, APOLITICAL OPERATION OF COA. TO THIS END, CONSIDERATION SHOULD BE GIVEN TO REFORMING STRUCTURE OF COA BOARD OF DIRECTORS PROVIDING FOR BOARD ACCOUNTABILITY AND CONTINUITY OF TENURE (E.G. VIA FIXED AND STAGGERED TERMS).

Response:
7. The COA will become a part of the "University College of Jamaica" a concept announced recently by the P.M. TA was employed to develop an administrative plan contained in the PP. The structure of the BOG is specified in GOJ Educational Law. A CP has been included in the draft Project Authorization to ensure 50 percent private sector participation on the BOG and staggered terms.

8. RELATIONSHIP WITH AGRO 21: THE PP SHOULD DISCUSS THOROUGHLY THE RELATIONSHIP BETWEEN AGRO 21 AND THE COA. TO FACILITATE THE TRANSFER OF KNOWLEDGE BETWEEN THESE TWO ENTITIES, THE MISSION MIGHT WANT TO CONSIDER THE ESTABLISHMENT OF A MINI-CAMPUS AT A LOCATION CENTRAL TO AGRO 21 ACTIVITIES ON THE SOUTH COAST. IN THIS REGARD, THE COA SHOULD DEVELOP MEANS OF CLOSE COLLABORATION WITH PRIVATE SECTOR PRODUCERS WHO WILL ULTIMATELY SERVE AS THE FUTURE EMPLOYERS OF COA GRADUATES AND USERS OF POTENTIAL RESEARCH RESULTS.

Response:
8. The COA will provide the manpower element for the ambitious objectives of Agro 21. The idea of a mini-campus was rejected on the basis of a low cost/benefit ratio.

9. POLICY DIALOGUE: SINCE JUSTIFICATION OF THE PROJECT IS BASED ON ASSUMPTION THAT AG SECTOR WILL CONSTITUTE IMPORTANT SOURCE OF EMPLOYMENT, FOOD PRODUCTION, AND EXPORT EARNINGS, THE PP SHOULD ALSO CONTAIN A DISCUSSION OF THE POLICY CHANGES NEEDED IN THE AGRICULTURAL SECTOR TO INCREASE PRODUCTION AND FARM INCOME, AND HOW THESE POLICY CHANGES ARE BEING DEALT WITH BY THE MISSION AND THE GOJ. OF PARTICULAR RELEVANCE TO THIS PROJECT WOULD BE AN EXAMINATION OF INCENTIVES FOR AGRICULTURALISTS AT ALL LEVELS TO REMAIN IN THE SECTOR.

Response:
9. GOJ is placing major emphasis on agriculture to help contribute to economic recovery. Bauxite and tourism have not proven dependable sources of foreign exchange in the last 3 to 4 years. Major incentives are being established in the form of land access, marketing cooperatives and production credit to encourage persons to engage in progressive, export agriculture.

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10. RESEARCH: THE PP SHOULD INCLUDE SOME OUTLINE AS TO THE TYPE OF RESEARCH THAT THE COA WILL UNDERTAKE, AND HOW THEY WILL BE FINANCED.

Response:
10. An applied research program will be established at COA which will be an integral part of the institutional program. Little revenue is anticipated from contract research during LOP and little special financing beyond what it will take to produce crops and livestock in the first place will be required to conduct the program. The COA will have an opportunity to respond to various RFPs from international foundations and organizations which will provide financial support for their research.

11. ENVIRONMENTAL ISSUES: IN VIEW OF THE FACT THAT PESTICIDES ARE LIKELY TO BE USED AND THERE IS A LARGE INFRASTRUCTURE COMPONENT, IT WAS DETERMINED AT THE DAEC THAT A FULL ENVIRONMENTAL ASSESSMENT BE DONE DURING PP DESIGN, THIS SHOULD INCLUDE INTER ALIA, A PESTICIDE ANALYSIS WHICH SHOULD MAKE RECOMMENDATIONS ON USAGE WHICH WOULD CONFORM TO U.S. REGS. BUREAU FURTHER SUGGESTS THAT. IN DESIGNING COA CURRICULUM, MISSION AND GOJ SHOULD INCORPORATE MATERIAL ON INTEGRATED PEST MANAGEMENT. IN EFFORT TO MITIGATE RELIANCE OVER MEDIUM/LONG-TERM ON COSTLY AND DANGEROUS CHEMICAL PESTICIDES. THE SECOND PART OF THE E.A. WOULD CLOSELY RELATE TO THE BUILDING ASPECTS OF THE PROJECT AND ENGINEERING WORK -OUTLINED IN PARAGRAPH 3. THIS COMPONENT WOULD DETERMINE THE IMPACT OF THE CONSTRUCTION, POSSIBLE INCREASED EROSION, SANITARY WASTE DISPOSAL, ETC. AND RECOMMEND SPECIFIC MITIGATIVE MEASURES. RECOMMEND PESTICIDE WORK BE DONE THROUGH EXISTING ST/AGR CONTRACT WITH CONSORTIUM FOR INTERNATIONAL CROP PROTECTION (ONE PERSON FOR 2 WEEKS) AND CONSTRUCTION ELEMENT BE DONE JOINTLY BY REGIONAL ENVIRONMENTAL MANAGEMENT SPECIALIST JAMES TALBOT WHO IS BASED IN HAITI, AND PP TEAM ENGINEER. MISSION FUNDS WOULD BE NECESSARY FOR PESTICIDE PERSON BUT TALBOT WOULD BE NO COST.

Response:
11. An environmental assessment was completed by REMS/C (see supporting document C) and addressed environmental issues and concerns in detail.

12. REGIONAL ACCESS TO COA: DAEC DISCUSSED WHAT KIND OF STUDENT BODY COA WOULD SEEK, AND ASKED FOR ASSURANCE OF GOJ CONTINUING CURRENT PRACTICE OF PROVIDING REASONABLE NUMBER OF POSTIONS TO STUDENTS FROM OTHER CARIBBEAN COUNTRIES, AT FULL TUITION.

Response:
12. The number of off-island students at present is relatively small (3 to 4). This number is expected to increase as the COA develops into a fully functional institution and some reputation for excellence is gained. A reasonable number of spaces is assured since these persons will pay all of their expenses direct to the COA in some form of foreign exchange.

13. ACCESS FOR WOMEN: IN PLANNING ADMISSIONS CRITERIA, CURRICULUM, AND PHYSICAL INFRASTRUCTURE OF COA, MISSION/GOJ SHOULD ENSURE THAT QUALIFIED WOMEN WILL BE AFFORDED EQUAL ACCESS TO ADVANCED AGRICULTURAL TRAINING OFFERED UNDER THE PROJECT, AND THAT THERE WOULD BE NO UNNECESSARY OR UNINTENDED BARRIERS (E.G. INADEQUATE DORM SPACE) TO FAIR REPRESENTATION OF WOMEN AT COA. CURRICULUM DESIGNERS SHOULD TAKE INTO ACCOUNT THE ROLE OF WOMEN IN AGRICULTURE IN PREPARING INSTRUCTIONAL MATERIALS. THE OBJECTIVE OF THIS WILL BE TO CREATE A CADRE OF TRAINED AGRICULTURALISTS CAPABLE OF RECOGNIZING AND REACHING ALL POPULATION GROUPS ACTIVE IN THE AGRICULTURAL SECTOR.

14. CONTRACTING MODE: DAEC DISCUSSED ALTERNATIVE APPROACHES TO CONTRACTING TA FOR PROJECT DESIGN AND IMPLEMENTATION, AND CONCLUDED THAT THE COLLABORATIVE MODE, WHILE OFFERING ATTRACTIVE CONTINUITY OF PERSONNEL BETWEEN DESIGN AND IMPLEMENTATION PHASES, WOULD NOT PERMIT FY 84 OBLIGATION. (A) PROJECT DESIGN - IF THEREFORE, MISSION AIMS AT OBLIGATING THIS PROJECT THIS FISCAL YEAR, FOR PP DEVELOPMENT WORK THE MISSION MAY WISH TO UTILIZE THE SERVICES OF MUCIA WHICH ARE AVAILABLE UNDER A TECHNICAL-SERVICES-TO-MISSIONS (TSM) AGREEMENT UNDER RDO/C. THE TSM MECHANISM, LIKE THE IQC, DOES NOT REQUIRE ADVERTISING OR COMPETITION, AND PERSONNEL COULD THEREFORE BE RECRUITED RIGHT AWAY FOR PP DEVELOPMENT. TO ARRANGE THIS, MISSION MAY CONTACT MR. WM. FLYNN, MUCIA EXECUTIVE DIRECTOR, PHONE (614) 422-2755. JOHN SHIELDS (BIFAD) HAS CONTACTED MUCIA RE THIS POSSIBILITY. (B) PROJECT IMPLEMENTATION - DURING THE PROJECT REVIEW IT WAS SUGGESTED THAT THIS PROJECT MAY BE SUITABLE FOR CONTRACTING TA UNDER A STANDARD UNIVERSITY CONTRACT USING A JOINT ENTERPRISE BETWEEN HISTORICALLY BLACK LAND-GRANT COLLEGE AND A 1862 LAND-GRANT INSTITUTION. AS MISSION IS AWARE, THIS WOULD BE IN SUPPORT OF THE AGENCY'S GOALS FOR MINORITY CONTRACTING IN CONFORMANCE WITH THE GRAY AMENDMENT. SHULTZ
BT
#4953

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project
from FY 84 to FY 89
Total U.S. Funding: $12.849M
Date Prepared: 6/9/84

Agricultural Education Project (532-0082)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS & VERIFICATION	IMPORTANT ASSUMPTIONS
PROGRAM OR SECTOR GOAL	MEASURES OF GOAL ACHIEVEMENT		ASSUMPTIONS FOR ACHIEVING GOAL TARGETS
To support a significant increase in agriculture's contribution to the Jamaican economy.	Significant increases (estimate 10%) in agricultural production, profitability, exports, FX earnings, gross sales and in farmer real income and in absolute value of agriculture's contribution to GDP.	Economic statistics	No decline below present real levels of inputs, investment, markets and infrastructure. Appropriate utilization of trained agricultural professionals by farmers, agro-industry and public sector. Continuation of current trends toward removal of disincentives and counterproductive effects of public policy. Proper and effective administration and use of extension service. Increased availability of of well trained agriculturists available for employment in the sector

ANNEX B

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTION
PROJECT PURPOSE:	CONDITIONS THAT WILL INDICATE PURPOSE HAS BEEN ACHIEVED: END OF PROJECT STATUS		ASSUMPTIONS FOR DELIVERY PURPOSE:
Fully viable and functional COA, with appropriate facilities, equipment, faculty and curriculum, capable of substantially meeting Jamaica's needs for mid level agricultural professionals.	(a) Total COA enrollment increased from 150 to 450. (b) 100 Assoc. of Science graduates per year. (c) COA Faculty/student ratio 1:18. (d) First COA class graduated having completed new curriculum including applied research instruction. (e) 20% of annual graduates of KAS feeder institution enroll at COA. (f) KAS total enrollment increased from 154 to 300 with 95 graduates per year. (g) KAS faculty/student ratio of 1:20. (h) Capability of COA program evidenced by 15% of EOP graduating class entering extension service or public sector ag. support, 15% of EOP graduating class become voc. ag. instructors, 15% of EOP graduating class enroll in B.S. or advanced degree programs, 40% of EOP graduating class enter private agriculture or agribusiness.	KAS records and reports COA " " " COA follow up records Placement records Alumni records	Proper and effective administration of COA Quality of COA education and graduates appropriate base for advanced education Existing private sector demand continues Quality of KAS education and graduates suitable for enrollment at COA.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTION
OUTPUTS	MAGNITUDE OF OUTPUTS		ASSUMPTIONS FOR ACHIEVING OUTPUTS
COA expanded and improved in following areas:			
Classrooms	3 new classrooms	Reports and inspections	Timely and effective technical assistance, construction, commodity procurement and training
Dormitories	3 new dormitories (total 450 students) 2 existing dormitories improved		
Faculty housing	18 new faculty homes		
Library	Library volumes increased from 5,000 to 10,000, and library alterations		
Curriculum	Courses increased from 35 to 60 and new curriculum completed. Faculty w/B. Sc.degree increased from 2 to 4, Faculty w/adv. degrees increased from 18 to 25.		
Allied research program	Research instructional program for each student and research instructional program fully staffed and equipped and 10 Applied Research reports produced.		MOA cooperation with COA on applied research. MOE cooperation with CDC on curriculum development center.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTION
OUTPUTS	MAGNITUDE OF OUTPUTS		ASSUMPTIONS FOR ACHIEVING OUTPUTS
School farm	School acreage increased from 450 to 700 with 350 added for irrigation agriculture and school farm fully equipped		
	2 new poultry bldgs. Existing poultry facilities altered.		
	new piggery		
	new dairy		
	expansion of abattoir and new refrigeration facility		
	completion of feedmill		
	completion of hatchery		
	new farm store		
Laboratories	4 new labs, conversion of eng. bldg. to animal science lab and central storage		
	New plant propagation lab and classroom bldg. with terracing for shaded plant propagation.		

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTION
OUTPUTS	MAGNITUDE OF OUTPUTS		ASSUMPTIONS FOR ACHIEVING OUTPUTS
Staff housing	Duplex for ancillary staff		
Administration	New partial second level to admin. bldg. and improvements to existing bldg. New laundry Improvements to multi-purpose bldg. conversion of guest quarters Improvements to workers welfare and storage bldg.		
Engineering	New engineering workshop and 1,180 foot access road		
Maintenance	New maintainance and repair workshop and 189,000 gal. storage tank Civil works support for all above.		

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTION
OUTPUTS	MAGNITUDE OF OUTPUTS		ASSUMPTIONS FOR ACHIEVING OUTPUTS
KAS feeder institution expanded and improved in following areas:	KAS:	Same as COA	Same as COA
Classrooms	New bldg. with 6 classrooms		
Dormitories	5 new dormitories (for total 120 students)		
Faculty housing	5 new faculty houses		
Library	Library volumes increased from 1,000 to 5,000,		
Faculty upgrading	Faculty w/B. Sc. increased from 2 to 12, Faculty with COA upgrading 10.		
School farm	School acreage increased from 214 acres to 244 acres with 30 added for irrigation agriculture. School farm fully equipped and operational.		
	2 new poultry bldgs.		
	new abattoir		
	new piggery		
Administration	New multipurpose bldg. with dining facilities		
	Civil works in support of		

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTION
INPUTS	IMPLEMENTATION TARGET		ASSUMPTIONS FOR PROVIDING INPUTS
Engineering Services	Design, construction, management and supervision (NDA) $857,500. (and private firms)	RFP documents, contract awards, inspections and quarterly reports.	Timely preparation of RFPs and award of contracts.
Construction and renovation services and materials	AID / GOJ COA 3,564,750 / 878,000 KAS 1,443,250 / 169,000 5,008,000 / 1,047,000	Contracting Process, quarterly reports and inspections.	Adequate funding for GOJ contributions, timely preparation of IFBs and award of contracts.
Land	For school farm irrigation programs. GOJ will purchase 350 acres additional land for COA and 30 acres for KAS.	Inspection and quarterly reports.	Timely purchase, no transfer of ownership problems
Increased Faculty and Staff	COA: ___ faculty and ___ staff hired KAS: ___ faculty and ___ staff hired	Quarterly Reports.	Qualified faculty available and funds available for competitive salaries.
Institutional and agricultural equipment and supplies	AID / GOJ COA 1,850,000 / 454,000 KAS 400,000 / 105,000	Quarterly reports, inspections and procurement process	Timely preparation of procurement documents and placement of orders.
Curriculum Development Center	AID $166,000 GOJ $48,000		
Commodity procurement services	Estimated 10% of commodity costs or $280,000.	Contracting Process	Timely contracting with procurement services agent.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTION
INPUTS	IMPLEMENTATION TARGET		ASSUMPTIONS FOR PROVIDING INPUTS
Faculty training	Degree programs: See Appendix H. COA: eight person years KAS: twelve person years Nondegree Programs: COA: seven person years KAS: five person years	Quarterly reports, participant training process	Adequate number of qualified with release time for training TA replacements for trainees i position. Timely completion o training plans and processing trainees.
Technical Assistance (COA)	Title XII Technical Assistance (person months). Curriculum Development 36 PM Applied Research Development 48 PM Pedagogic and in-service Faculty training 132 PM* * Appox. 20% short term.	Contracting and assignment process, quarterly reports and inspection.	Timely preparation of procurement documents and contract awards.
Student Enrollments	COA: Continue entering enrollment at 100 per year until 450 final capacity is reached. KAS: Enroll 50 additional students per year until 300 final capacity is reached.	Quarterly reports enrollment reports and records	Adequate funding for maintenan and operations.

SPECIFIC OBJECTIVES OF THE CURRICULUM

DEVELOPMENT CENTER

1. To determine appropriate courses of study to comprise the curriculum leading to the Associate of Science degree (A. Sc.) in Agriculture.

2. To develop syllabi for the courses identified which are relevant and appropriate for Jamaican and Caribbean education and training in agriculture.

3. To develop a more comprehensive, relevant, and meaningful agricultural education curriculum for all types of secondary schools.

4. To develop a basic curriculum to properly introduce youngsters in primary and all-age schools to the study of agriculture.

5. To identify trends in the Jamaican society and in the international community, and to translate them into curricular ideas and content.

6. To conduct on-going research to identify new jobs in the workplace and to analyze these with the intent of incorporating those functions that are relevant to the nation's needs for agricultural education into appropriate tertiary and secondary level courses.

7. To conduct a regular review of both the tertiary and secondary curricula to ensure that the colleges and schools keep pace with advancement in science and technology, the philosophies and planning of the national Government, and with employers' needs for a qualified workforce.

8. To ensure that continuity and a satisfactory balance of theory and practice exist in the agricultural education program from the primary to the tertiary levels.

9. To serve as a collecting, sorting, modifying, and distribution center for curriculum and instructional materials that may be avaliable from local and foreign sources.

10. To encourge college faculty and other local professionals to develop instructional materials for use in the various levels of the educational system.

11. To provide editing, graphic, artist, and duplicating service in the development and modification of curricular and instructional materials.

12. To organize and conduct seminars, workshops and consortia to provide education and training for college faculty and teachers of agriculture regarding the development and use of curriculum and instructional materials.

13. To provide a summer vacation service to teachers of agriculture to update their knowledge or to acquire new knowledge in special topics in agriculture, primarily through individualized audiovisual programs.

14. To assist foreign faculty to adapt their theoretical and technical knowledges to the local needs and conditions so that they can make the best possible contribution to the College of Agriculture. Foreign faculty will continue to be a feature of the College of Agriculture for a long time and as such the "adjustment assistance" function of the Curriculum Development Center will be significant in helping foreign personnel to achieve a satisfactory level of relevance in their teaching and in other areas of contribution.

15. To encourage college faculty and other teachers of agriculture in the use of educational technology and other useful aids to enhance their instruction.

16. To encourage a shift in teaching styles to lay greater emphasis on class discussion, seminars, workshops, and techniques other than lecturing.

17. To operate an auxillary learning unit through which students can be exposed to the use of audiovisual aids for learning, and through which they can develop individualized study attitudes and a more organized approach to work and the use of time.

18. To provide a means through which students can have access to information that could not be covered in the regular class time, but is of value to their education development.

ANNEX D

PARTICIPANT TRAINING PLAN BY YEAR AND AGENCY

Person/Years

TRAINING PROGRAM	YEAR 1 COA	YEAR 1 KAS	YEAR 2 COA	YEAR 2 KAS	YEAR 3 COA	YEAR 3 KAS	YEAR 4 COA	YEAR 4 KAS	YEAR 5 COA	YEAR 5 KAS	TOTAL
1. Master Studies	2	2	2	2	2						10
2. Bachelors Studies		2	2	2		2		2		2	12
3. Non-Degree Studies	1	1	2	1	2	1	1	1	1	1	12
											34 (PY)

Specific Fields or Description to be Attended by Participants to Training Program.

I. Degree Programs:

A. Masters Program:

1. Animal Science
2. Agronomy
3. Agriculture Engineer
4. Soil Science
5. Ag. and Extension Education
6. Ag. Research Administration
7. Ag. Instructional
7. Materials Development

B. Bachelors Program:

1. Animal Science
2. Agronomy
3. Ag. Engineer
4. Ag. and Extension Education
5. Soil Science

C. Non-Degree Training

1. Ag. Extension
2. Research Management
3. Farming Systems
4. Dairy Goat Husbandry
5. Soil Fertility
6. Poultry Management
7. Swine Raising and Management
8. Cattle Raising and Management
9. Vegetable Production, Processing, Utilizing and Management
10. Fruit/Orchard Management
11. Water Management
12. Root Crops
13. Fertilizer and Pesticides
14. Multiple Cropping
15. Methods of Teaching

ANNEX E

5C(2) PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A. includes criteria applicable to all projects. Part B. applies to projects funded from specific sources only: B.1. applies to all projects funded with Development Assistance Funds, B.2. applies to projects funded with Development Assistance loans, and B.3. applies to projects funded from ESF.

CROSS REFERENCES:	IS COUNTRY CHECKLIST UP TO DATE?	YES
	HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?	YES

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

   (a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that amount)?

   Congress has been notified in accordance with routine AID procedures.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,00, will there be

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(a) engineering, financial or other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	(a) Yes (b) Yes
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	No further legislative action is required.
4. FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? (See AID Handbook 3 for new guidelines.)	N/A
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?	Yes. See Mission Director's certification in Project Paper.

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6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	The Project cannot be executed as part of a regional project.
7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; and (c) encourage development and use of cooperatives, and credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	(a) Yes; through increased agricultural production of export crop. (b) Yes; through training of private sector farm manager and agri. production personnel. (c) Yes; through increased use of agri. cooperatives and need for production credit. (d) Yes; by encouraging free enterprise in agri. production and marketing. (e) Yes; by providing middle management and technical personnel; (f) Very little effect on labor unions.
8. FAA Sec. 601(b). Information and conclusions on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	(1) Expand agricultural productio and encourage joint ventures, private sector investment in agri. related enterprises. (2) Equipment will be procured from U.S. private sector firms.

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9.	FAA Sec. 612(b), 636(h); FY 1982 Appropriation Act Sec. 507. Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized in lieu of dollars.	The loan agreement will require that counterpart contributions will be used.
10.	FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	There is no excess, U.S. owned local currency available for this project.
11.	FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes
12.	FY 1982 Appropriation Act Sec. 521. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	This project will not directly produce any commodity for export.
13.	FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16? Does	Yes

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the project or program take into consideration the problem of the destruction of tropical forests?	Yes
14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?	N/A

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(b), 111, 113, 281(a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and	(a) By training agricultural personnel to more effectively manage public sector programs aimed at the poor and private sector programs to create employment. Development and utilization of agricultural cooperatives will be part of the curriculum of the institutions being aided.

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otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?	(c) Upgrading the local management capabilities. (d) Encourage women's role in agriculture at all levels within the sector. (e) N/A
b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?	Yes
c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?	Yes; improved agricultural technology is taught at both institutions and appropriate technology will be built into the curriculum.
d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activitiy with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?	Yes

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e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than $100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character.

The Project does not include any grant capital assistance.

f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

Yes; the project will provide the manpower element for the improved agricultural sector. This is a priority for Jamaica at this time.

g. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage

This project will improve a college and a secondary school to provide manpower for the agricultural sector. Inidviduals needs and a democratic society are parts of the curriculum.

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institutional development; and supports civil education and training in skills required for effective participation in governmental processes esential to self-government.

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest. — B/G letter of request in Project Paper.

b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan? — N/A

c. ISDCA of 1981, Sec. 724 (c) and (d). If for Nicaragua, does the loan agreement require that the funds be used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624(g)? — N/A

3. Economic Support Fund Project Criteria

a. FAA Sec. 531(a). Will this assistance promote economic or political — Yes.

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stability? To the extent possible, does it reflect the policy directions of FAA Section 102?	Yes
b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?	No
c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives?	N/A
d. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?	N/A

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I. SUMMARY AND RECOMMENDATIONS OF THE EA:

The Agricultural Education Project is designed to improve the capabilities of two training institutions to produce more and better qualified agriculturalists. The project is a priority for Jamaica because it addresses the need for skilled manpower at the technical and middle management levels. Infrastructure improvement will be made at the Knockalva Agricultural School (secondary) and the College of Agriculture (post-secondary) involving road building, facility renovation and new construction, water resources improvements, and installation of additional sewage disposal systems.

A. Direct Impacts:

Direct impacts are associated with construction activities, highly limited in area and usually temporary in nature, and consume certain amounts of energy and materials.

1. Major Unavoidable Impacts Include:
   a. Soil loss from construction
   b. Terrestrial habitat disturbance
   c. Loss of campus lands to facility siting.

2. Unavoidable Minor Effects Include:
   a. Disruption of traffic pattern
   b. Air and noise pollution
   c. Energy consumption

3. Mitigative Measures Proposed to Eliminate or reduce adverse direct impacts include the following:
   a. Use of sound construction practices to reduce noise, safety and traffic hazards
   b. Scheduled maintenance of equipment and vehicles to reduce energy consumption
   c. Employment of ground cover protection measures to reduce soil loss on bare/exposed soil.

B. Indirect Impacts:

Such impacts result from facility operation or activities carried out on the premises. Effects are observable over the longer term, mostly localized in nature and scope, and may not be reversible if safeguards are not taken during project design and implementation.

1. Major Effects:

   a. Positive economic and technical benefits associated with upgraded curricula and professional/managerial agricultural workforce

b. Potential adverse effects if sewage disposal system not properly designed

c. Positive and negative effects of increased water resources on campus

d. Land use changes on each site

e. Potential increase in research-related pesticide usage

f. Positive impacts associated with biogas usage.

2. Mitigative Measures:

a. Design of appropriate soil drainage and septic system (Appendix 3)
b. Preparation of a water resources development plan
c. Formulation of a land use plan for COA
d. Pesticide training
e. Design of biogas-generating facilities for animal wastes.

C. Special Actions Recommended:

The following measures should be incorporated into the Project Agreement to be implemented as conditions precedent for disbursement of project funds:

1. Preparation of a land use plan for the COA that is responsive to land use capability and staff research priority topics; a forest reserve should be included as an element of this plan.

2. The Curriculum Development Center of COA should consider pesticide training as a priority area for implementation of a core program focused on pest management; the KAS should teach one core course in safe handling, use, storage and disposal of pesticide to all students.

II. PURPOSE OF THE ENVIRONMENTAL ASSESSMENT:

The purpose of the EA is to examine the foreseeable impacts of the facilities construction aspects of the Agricultural Education Project on the human/natural environment in accordance with AID's Environmental Procedures (22 CFR Part 216). Environmental assessment deals with the identification, measurement, interpretation and/or communication of impacts to information

users. A "scoping of issues" was accomplished in early April 1984 by REMS/C and a memo (Appendix 1) outlining the key environmental concerns was circulated in USAID/Kingston's ARDO office. Site visits were also made in early April with the Project Officer, James Scanlon, and interviews were held with COA and Knockalva personnel and with the Architect-Engineering firm of APEC Consultants, the group responsible for design of facilities and general site planning for USAID. REMS/C discussed with APEC general topographic and soils information, utility services, such as roads and sewage, civil works such as building construction, water resources development issues and land use plans for each site.

ANNEX H

FOREIGN ASSISTANCE ACT* SECTION 611(e) CERTIFICATION

Subject: Jamaica - Agricultural Education Project.

I, Lewis P. Reade, as Director of the United States Mission to Jamaica, having taken into account among other things, the maintenance and utilization of projects in Jamaica previously financed or assisted by the United States, do hereby certify that, in my judgement, Jamaica has the capability, both financial and human resources, to effectively maintain and utilize the Agricultural Education Project.

This judgement is based upon the record of implementation of AID-financed projects in Jamaica and the results of the consultation undertaken during review of this new project.

L. P. Reade, Director

11 June 1984

Date

* of 1961 as Amended

ECONOMIC ANALYSIS OF THE AGRICULTURAL EDUCATION PROJECT

The primary objective of the Agricultural Education Project is to produce the supply of professionally-trained labor input required for the efficient production and distribution of agricultural products and services. Criteria for assessing costs and benefits associated with this project should be formulated in terms of this objective. The benefits of a given project must measure its contribution to its objective, and costs must measure the true opportunity costs of the resources invested in the project. The presumption here, of course, is that adequate data are available to accurately calculate the total costs and benefits associated with the project's objective. At the present, such data do not exist. Consequently, this analysis is based on the wage data in the demand study and estimates of costs relating to the College of Agriculture.

The Social Costs Components of the Agricultural Education Project

The direct social costs of the project consist of fixed investment and the recurrent costs of the College of Agriculture (COA). There are also the associated indirect social costs, the most important of which are the students' own investments in the program. Ideally, all these costs should be factored into the analysis to arrive at an accurate estimate of total costs and returns. However, the available cost data do not lend themselves easily to inclusion of all these costs into the analysis. Consequently, only the recurrent social costs and the indirect social costs incurred by students are factored into the analysis.

While the annual recurrent costs can be easily estimated from the GOJ annual budgetory allocation to the project, the indirect social costs of the students' own investment are not so easily estimated. Indirect social costs represent the opportunity cost of the student's time; that is, his "foregone earnings" while attending COA for three years. Although no actual outlay is involved, unrealized earnings represent a heavy cost to the student; this reflects the shadow price of the student's labor.

The basic difficulty of measuring indirect social costs is that foregone earnings are a social cost only if they represent the true social opportunity cost of the foregone output. It might be argued that under current employment conditions in Jamaca, the marginal withdrawal of some students from the workforce would not result in a fall in output as measured by their foregone earnings, but would create jobs for others in the pool of the educated unemployed. Though there is some merit to this argument, it is doubtful that it can be forcefully applied to the student group with which the COA project is concerned. Consequently, the values of the earnings the COA student gives up over the three years of his training can be imputed from the earnings of the high school graduate who is employed in an agricultural job.

Estimates of Social Costs

Table 1 (below) presents an analysis of the recurrent social costs and the indirect social costs of training at COA. The recurrent social cost estimates are based on the budgeted requests of the COA administration to the GOJ for the years 1983/84 - 1988/89. They therefore reflect the estimated annual recurrent social costs for operating COA over the six year period. These costs include expenditures on personnel salaries, and institutional resource, student welfare, physical facilities, maintenance expenditures, as well as miscellaneous expenditures relating to the training of students.

Table 1: Estimates of Recurrent, Student Foregone Earnings, and Per Student Enrollment Costs for COA, 1983/84 - 1988/89

	1	2	3	4
Year	Total Recurrent Costs (J$M)	Foregone Earnings (J$M)	Student Enrollment	Per Student Enrolled Cost (Cols. 1 + 2/Col. 3)
1983/84	$1.9	$2.0	300	JA$ 13,000
1984/85	3.0	3.1	450	13,555
1985/86	3.8	4.4	600	13,666
1986/87	4.5	3.4	450	17,555
1987/88	4.8	3.6	450	18,666
1988/89	5.3	3.8	450	20,222
TOTAL	23.3	20.3	2700	-

The estimates of foregone earnings reported in Column 2 of Table 1 (above) are based on data collected for the demand study and are foregone earnings inclusive of tax. Annual average earnings of high school graduates employed in the agricultural sector was JA$6,600. This estimate was annually adjusted upward at a constant inflation rate of five percent. The low adjustment factor implies that foregone earnings for each year is considerably underestimated. However, it should be borne in mind that the inflation rate usually rises faster than wage increases. Also, the estimates of the earnings the COA student foregoes while attending the college are based on the assumption that the employment alternative for each COA student is full-time employment in the Agricultural Sector.

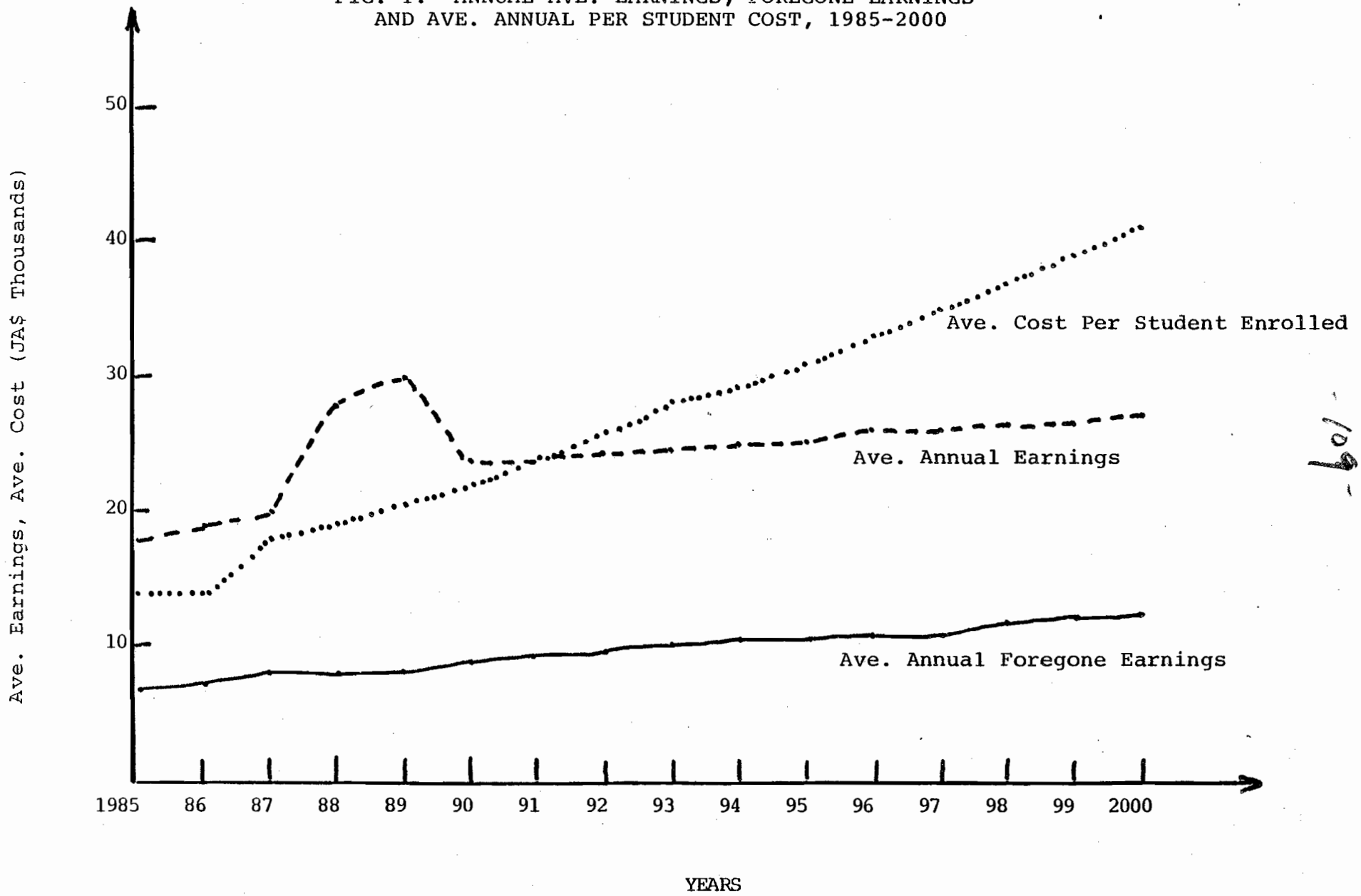
Comparison of the recurrent cost estimates in Column 1 with the foregone earnings estimates in Column 2, suggests that the earnings COA students will forego while attending the College will make up a substantial portion of the social costs. In the 1983/84 academic year just completed, foregone earnings comprised 51.3 percent of total social (excluding capital costs) costs; in 1984/84 foregone earnings will be 50.8 percent of social costs, and in 1985/86, foregone earnings will be 53.7 percent of total social costs, (excluding capital costs).

However, in the years following the 1985/86 academic year, as recurrent social cost increases, foregone earnings will comprise the smaller share of social costs (if capital costs are excluded). In the 1986/87 academic year, foregone earnings of students attending COA will be 43.9 percent of social costs; in the 1987/88 academic year, foregone earnings will decrease to 42.9 percent, and in the 1988/89 academic year foregone earnings will further decrease to about 41.8 percent of the social investment costs of COA. Assuming that government would be able to collect the income tax from foregone earnings, withdrawal of some individuals from the work force for training at COA may result in a greater fall in output, and consequently, in the amount of income tax collected in the early years of the life of COA, than in its later years. If foregone earnings decline over the later years in the life of COA, while other costs rapidly increase, one consideration may be to reduce private direct costs in the early years and gradually increase these costs over the later years.

The estimates of social unit costs reported in Column 4 were arrived at by summing across each pair of values in Columns 1 and 2 and then dividing by each of the corresponding values in Column 3. These estimates indicate that per unit social cost will progressively increase between 1983/84 and 1988/89. Further calculation suggests that per unit social cost at COA will increase at an average of JA$1,833 annually over the next five academic years. If per unit social cost of training at COA will progressively increase, while average foregone earnings rise, but at a very much slower rate in future years, the private monetary yields to the training could be quite high. If this assumption is correct, then it further supports a consideration for some increase in the private direct costs of training in the later years. Such an increase would probably not seriously affect the demand for COA education in future years.

Figure 1 (below) illustrates the average annual per student social cost profile and the foregone earnings profile for students who will attend COA from 1985 to the year 2000. The average annual per student enrolled social cost profile suggests that there will be a secular trend or gradual growth in social cost per student over the 15 year period. A number of cyclical or irregular factors might cause deviations from the trend, however. An increase in the price of education, or a sudden demand for agricultural education are two such factors.

FIG. 1: ANNUAL AVE. EARNINGS, FOREGONE EARNINGS AND AVE. ANNUAL PER STUDENT COST, 1985-2000



The Economic Returns on Investment in COA

Ordinarily, in assessing the returns to investment in education, equal prominance is given to the social and private returns. However, since the relevant authorities are more concerned with rational resource allocation on the basis of profitability than with private educational investment decision making, the relevant returns are the social returns, rather than the private ones.

Analytically, the annual returns (R_{st}) generated by the COA educational program are the sum of the private returns accruing to the graduates (R_{pt}) and the extra returns which accrue to the society at large (R_{dt}):

$$R_{st} = R_{pt} + R_{dt} \qquad (1)$$

Both R_{pt} and R_{dt}, in turn, can be split into their monetary and non-monetary components. Alternatively, R_{st} may be split into a monetary(R'_{st})and a non-monetary (R''_{st}) component:

$$R_{st} = R'_{st} + R''_{st} \qquad (2)$$

Whereas R'_{st}, is the quantifiable component of the annual returns to a COA educational program, R''_{st} is the qualitative component. The elments of this component must be evaluated along with the monetary component (R'_{st}) to obtain a complete statement of the social returns to a COA educational program. It is impossible, however, in our present state of knowledge, to merge the two in any single measure. Neither is it possible to assign relative weights to these different categories of returns without introducing subjective value judgements. A description of the non-monetary returns will be presented first, in order to get these qualitative benefits out of the way.

1. The Social Non-Monetary Returns

COA will generate two categories of non-monetary returns which cannot be directly captured by either its primary beneficiaries or any one individual. These returns, which may be thought of as joint products acquired at no extra cost to society, are of two distinct types: (a) those associated with COA graduates and (b) those associated with the COA organization per se.

(a) Direct "External" Returns:

In addition to his job in the firm, business establishment, or agency that employes him, the COA graduate will also play a role in the larger community within which he lives and works. To the extent that the community benefits from his planning and organizing skills, knowledge, and practical capabilities, acquired and developed at COA, part of the credit for his public service should go to his COA education. Education, in general, generates this type of external benefit by improving the quality of social life. While employers may gain from such applications of practical skills in that their

community relationships may be improved by the social contributions of their employees, they can expect to capture only a part of this contribution and are therefore reluctant to provide full remuneration for such public service. Thus, any such benefits become a part of the social non-monetary returns to COA education.

(b) Indirect "External" Benefits:

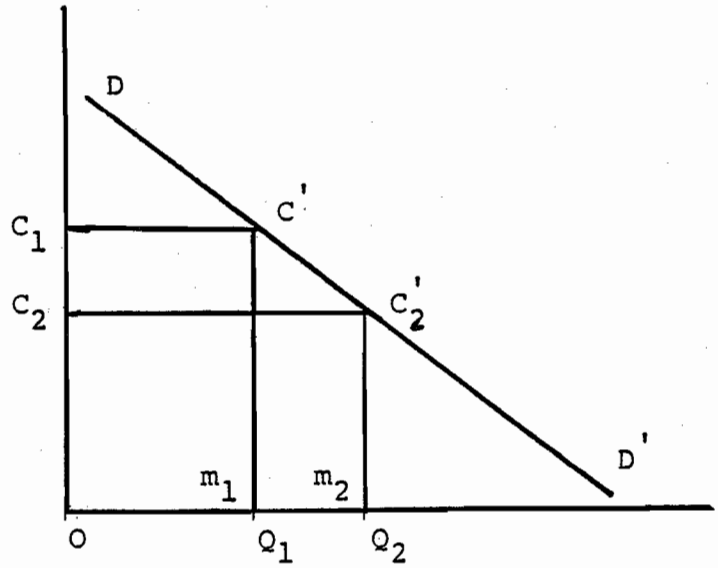
The "indirect" benefits of COA, are those returns which are not generated by the primary COA output, but are incidentally generated by the assembled faculty resources. In addition to their normal educational activities, faculty members are available for consultation on local and national problems. To the extent that such services are rendered without pay, they constitute incremental returns to society. While some individual faculty members would in any case perform some such services, the project's contribution is in bringing them together and motivating them to work in concert, generating in the process new sets of skills and insights of considerable social value.

2. Social Monetary Returns

The basic service to be provided by a COA education is to increase the supply of trained agricultural personnel available to the economy. In a developing country such as Jamaica, COA is likely to provide a substitute for foreign training so that agricultural professional personnel are trained in the country rather than abroad. Insofar as the resource cost of local training per graduate is lower than that of foreign training per graduate, the demand for training in the country will increase unless the market demand for the product is completely price elastic. The output of the COA may, therefore, be divided into two parts. One part is attributable to the import substitution effect and the other to the increased market demand for the product due to a reduction in price.

In figure 2, DD' represents the demand for graduates. At a cost of OC_1, a student can be trained abroad; C_1C', is the long-run supply curve of the foreign-trained product. COA reduces the direct cost of training the student from OC_1 to OC_2. In effect, therefore, the long-run supply curve is shifted downward by (OC_1 OC_2). As a result, the output of graduates demanded increases from OQ_1 to OQ_2. We can denote OQ_1 by m_1 and (OQ_2 - OQ_1) by m_2.

Figure 2



In order to compute R'_{st}, we would need estimates of m_1 and m_2 separately. The total output of COA graduates will give us a direct estimate of OQ_2. Given OQ_2, m_1 can be estimated provided the price elasticity of demand for graduates (n) and the percentage reduction in training costs $[k = (OC_1 - OC_2) / OC_1]$ are known:

$$OQ_2 = m_1(1 + nk)$$

Hence

$$m_1 = \frac{OQ_2}{(1 + nk)} \qquad (3)$$

We shall now disaggregate R'_{st} into two parts based on the division of COA output into m_1 and m_2. First, the returns associated with m_1 are in the nature of cost savings made possible by import substitution. Second, m_2 representing the addition to the supply of graduates in the economy as a result of the setting up of COA generates returns which can be measured by the incremental national income contribution associated with m_2. Different methods of estimation need to be employed in order to measure the social returns generated by these two components of output.

Taking the m_1 component first. Since the direct social cost of a student's training in COA is OC_2, and the cost of acquiring an equivalent training abroad is OC_1, $(OC_1 - OC_2)$ can be attributed to the investment in COA. (This assumes that the training abroad and the training at home are of the same quality resulting in products of comparable quality. The final test, however, is in the assessment by the employer of the market worth of the product).

Since only a part of the output of COA, that is m_1, results from import substitution, the annual returns by way of cost savings to the economy made possible by the COA is m_1 $(OC_1 - OC_2)$. The first component of the social monetary returns is thus given by the series of annual cost savings due to import substitution summed over the lifetime of COA.

Conceptually, the estimation of the social monetary returns corresponding to the second component of the COA output is more difficult. The quantity m_2 represents the annual marginal addition to the supply of graduates available in the economy. A measure of the incremental national income contribution created by m_2 may be obtained by subtracting from the gross value of the life time labor income, of the OCA graduate, the income gross of tax he would have earned had he not undergone this training. From the student's point of view, the appropriate measure of the private monetary gains to his COA training is the additional income net of tax he is able to earn during his working life after graduation over and above what he would have earned net of tax, had he not obtained COA training. However, from the society's point of view, taxes are included in these estimates. Presumably, all income taxes are used for the benefit of society as a whole. Thus, society gains not only from the higher earnings of the COA graduate which are assumed to be equated with greater production as a result of his training, but in addition from the public goods and services which his higher taxes can buy.

We may define the graduate's gross income differential in annual terms as

$$Y_t = Y_t' - Y_t'' \qquad (4)$$

where, Y_t is the gross income differential of the student in year t after graduation, Y_t' is his gross income after graduation, and Y_t'' is a measure of the gross income he would have earned without the training. The above equation becomes

$$Y_t = \sum_{t=1}^{n} (Y_t' - Y_t'') = \sum_{t=1}^{n} Y_t' - \sum_{t=1}^{n} Y_t'' \qquad (5)$$

The hypothesis underlying the definition of Y_t is that Y_t remains constant over the working life of the graduate; that is, he maintains the same absolute gap in earnings between himself and otherwise comparable persons without the training. In figure 1, a comparison of the COA graduate's annual gross earnings profile with the annual gross earnings profile of comparable persons without the training suggests that this hypothesis does not exaggerate the benefits of a COA education.

The present value of the COA graduate's gross income differential may be given as:

$$PV(Y_t) = \sum_{t=1}^{n} \frac{(Y_t - Y_t)}{(1 + d)^t} \qquad (6)$$

where d = discount rate

The preceding framework refers to an estimation of the cost savings due to the import substitution effect of the training to be provided at COA, and to an estimation of the gross income differential of the COA student after graduation.

We will now turn to an estimation of the net social benefits due to the setting up of the COA. The society will invest an amount of money to produce graduates whose intended occupational destination is presumed to be the agricultural sector. The graduates will be employed to produce and distribute agricultural goods and services efficiently, for which they will receive payment. This, in turn, will be equal to the maximum that employers are willing to pay for the graduates' skills and knowledge acquired at COA. In a competitive situation, the market wage paid to the graduate for his labor services reflect his marginal productivity to his employer because it is in the employer's interest to increase the use of the trained agricultural labor input until the price he pays for an extra unit of it equals the value of its marginal product.

There is a conceptual difficulty, however, in assigning the wage the COA graduate receives for his labor entirely to his COA training. We do not yet know how much of the graduate's marginal product, as measured by the wages he is paid is due only to his COA education and how much is due to earlier education and/or native ability. Consequently, the wages he is paid may overstate the contribution of his COA education to national income growth, hence biasing upward the social monetary returns. One will therefore have to make the generous assumption, that the wages the COA graduate will receive is due entirely to his COA education.

Given the social costs of the graduate's training previously discussed, and assuming employment after graduation, the social monetary returns to a COA education can be estimated at wages paid gross of tax. The present value of the net social benefits due to COA education can be given as,

$$NPV = \sum_{t=1}^{n} \frac{B_t - C_t}{(1 + d)^t} \qquad (7)$$

The present value criterion requires that the present value of a future stream of gross benefits must be greater than the present value of future costs. Alternatively the equation could be rewritten as

$$\sum_{t=1}^{n} \frac{b_t}{(1 + d)^t} > \sum_{t=1}^{n} \frac{c_t}{(1 + d)^t} \qquad (8)$$

There is a methodological problem in using the NPV criteria, however. It is the determination of the appropriate discount rate. Low discount rates favor investment in general, especially investments that offer long-term payoffs over 10 - 15 years or more. High discount rates favor current consumption and investments offering short-term returns. The

greater the discount rate used to calculate the present values, and the further it is in the future before the amount is realized, the smaller the present values of a given amount to be realized in the future. There is no consensus among economists on an appropriate discount rate (or rates). However, in evaluating educational investment projects, a simple rule of thumb is to set the discount rate equal to the interest rate at which government borrows from commercial banks or the rate at which government borrows money to finance social projects.

Finally, although the social monetary returns to the education provided at COA will be measured by the graduates' gross earnings, the social returns will be underestimated. Social returns should legitimately include a portion of the indirect taxes which fall on the goods and services for the production of which the trained agricultural labor inputs have been used. Excise and sales taxes which are imposed on most manufactured products are included in the market prices paid by the consumer. Since social returns are measured by gross wage contribution to national income estimated at market prices, it would be legitimate to allocate a share of these indirect taxes among the factors of production. However, data limitation and other difficulties prevented the inclusion of these taxes in the estimates of the social returns associated with COA.

Empirical Estimates of Social Returns

A cost-benefit analysis of the three-year undergraduate program being offered by COA as of September 1983, will be attempted within the conceptual framework developed above. COA is the only producer of post-secondary agricultural graduates in Jamaica. In September 1983, COA enrolled its first 300 students, and expects to graduate its first batch of output in 1986.

1. The Data

Whereas, the cost data on which the estimates below are based represent the direct and indirect costs of training at COA, the earnings data represent the market wage currently being offered to agricultural graduates of the type to be produced at COA, and the wage being paid to high-school graduates currently employed in the agricultural sector. Whereas the direct cost data were obtained from the budgeted estimates at COA and the indirect costs are imputed costs, the earnings data are data collected in the survey of employers' demand for trained agricultural labor. These data have been adjusted upward by a constant amount, and projected to the year 2000.

A third set of data used in this analysis are derived from current estimates of the necessary expenses, based on the 1982-83 academic year for in-state single students at the University of Arkansas' College of Agriculture and Home Economics for two semesters. These cost data include registration fee, student activity fee, books and supplies, room and board in University resident halls, and personal expenses and travel, and maybe regarded as the "shadow prices" of these items.

2. Cost Savings Attributable to the Import-Substitution Effect of COA

Current estimates of the shadow price of agricultural education per student per academic year at the University of Arkansas are the basis for the derivation of the cost-savings estimates due to the import substitution effect of COA. In interpreting these estimates, one must be aware of their internal limitations. The University of Arkansas cost data, refer to students who are residents of the State of Arkansas. Since the cost of education in USA is usually higher on the average for foreign students than for the US citizen, there will be a downward bias in the cost-saving estimates associated with COA. Second, the educational costs for foreign students in the USA vary by institutions and by region. Hence, the cost of education for a foreign student at the University of Arkansas may not be typical.

Table 2: Series of Annual Cost Per Student of Agricultural Science in USA and in Jamaica (Thousands of $) (US$1.00 = J$4.00)

	(1)	(2)	(3)	(4)	
				Savings	
Year	USA	(J$ Equiv.)	Jamaica	J$	US$ Foreign Exchange
	OC_1	(OC_1)	OC_2	OC_1-OC_2	(OC_1-OC_2)
1983-84	4.3	17.2	13.0	4.2	1.1
1984-85	4.7	18.8	13.6	5.2	1.3
1985-86	5.0	20.0	13.7	6.3	1.6
1986-87	5.4	21.6	17.6	4.0	1.0
1987-88	5.9	23.6	18.7	4.9	1.2
1988-89	6.4	25.6	20.2	5.4	1.3
1989-90	6.9	27.6	22.1	5.5	1.4
1990-91	7.4	29.6	23.9	5.7	1.4
1991-92	8.0	32.0	25.7	6.3	1.6
1992-93	8.6	34.4	27.5	6.9	1.7
1993-94	9.3	37.2	29.3	7.9	2.0
1994-95	10.1	40.4	31.1	9.3	2.3
1995-96	10.9	43.6	32.9	10.7	2.7
1996-97	11.8	47.2	34.7	12.5	3.1
1997-98	12.7	50.8	36.5	14.3	3.6
1998-99	13.7	54.8	38.3	16.5	4.1
1999-2000	14.8	59.2	40.1	19.1	4.8
TOTAL	145.9	583.6	438.9	144.7	36.2
	US$141.6 / 16	JA$566.4 / 16	JS$425.9 / 16	JA$140.5 / 16	US$35.1 / 16
	=US$8.9	=$35.5	=$26.6	=$8.8	=$2.2

Table 2 compares estimates of the annual costs per agricultural science student at the University of Arkansas and at COA, and shows the savings in both Jamaican Dollars and the foreign exchange equivalent that would accrue to the Jamaican economy as a result of COA. The estimates in Column (1) were arrived at by an 8 percent upward adjustment from the 1983-84 base year figure.

The values in Column (4) $OC_1 - OC_2$ and $(OC_1 - OC_2)$ become our estimates of the savings in local and foreign currency per student per year that would accrue to the Jamaican economy due to the import substitution effect of COA. At the present official exchange rate of approximately US$1 to JA$4, if there were no COA, and the Jamaican Government were to begin sending students to study agricultural science in USA as from the 1984-85 academic year, ceteris paribus by the year 2000 it would cost the economy approximately US$141.600 or JA$566.400 to train one student at an average of US$8,900 or JA$35.400 per academic year.

On the other hand, if there is a COA capable of producing the well-trained agricultural personnel that are currently in demand (see the Demand Study), at the shadow rate of JA$4 per US dollar, the savings per graduate that would accrue to the Jamaica economy $[(OC_1) - OC_2)]$ by the year 2000 as a result of COA, would be approximately JA$8.800 or US$2.200 per year.

This would be a real benefit to the Jamaican economy. Furthermore, the market price for the indigenously-trained product, could be much lower than the market price for the foreign-trained product resulting in lower production cost for employers of such labor, with the consumer being the ultimate beneficiary.

3. Gross Earnings Differential of COA Graduates

Analysis of the adjusted wage data indicates that the average starting salary for COA graduates in 1986 will be approximately JA$19,000 annually, at current market prices. In addition, it was assumed that the average COA student would be earning about JA$7000 - JA$8000 per year by the end of the third year of his training, had he opted for full-time employment in the agricultural sector, rather than for the training.

To measure the gross earnings differential for the COA student after graduation, earnings profiles for both COA graduates and high school graduates currently employed in agricultural or agriculture-related occupations were constructed and compared (see Figure 1 above). On the basis of these profiles, it was assumed, that ceteris paribus, the COA graduate will maintain a gross earnings differential of abour J$3,000 - JA$3,500 on the average, up to the year 2000, thus imparting greater tax benefits to the society.

Table 3 (below) presents the calculated results of the present value of the gross earnings differential attributable to the graduates' COA education. A range of different discount rates was subjectively chosen to arrive at the discounted values. The discounted values refer to the present value of the COA graduates stream of gross earnings differential over a 15 year period ending in the year 2000.

Table 3: Present Value of Net Earnings Differential

Assumption	Discount Rates (%)	Present Value	Implicit Rate of Return (%)
N = 200	5	JA$107,700	45.8
N = 200	10	51,164	21.8
N = 200	15	25,123	10.7
N = 200	20	12,716	5.4
N = 200	25	6,617	2.8

4. The Social Returns

Tables 4 and 5 (below) present the present value of net social returns. The difference between the data in these two tables is in the discount rates used to calculate the present values. Whereas the discount rate of 14 percent used to calculate the discount factors in Table 4 reflects the Government's opportunity cost of funds in the Jamaican private sector, the rate of 15 percent used to calculate the discount factors in Table 5 is the rate used for financing social projects and reflects the cost of funds to the Jamaican Government.

Table 4: Present Value of Net Benefits (JA$
(Discount Factor = 14%)

Items	1984	1985	1986	1987	1988	1989	1990	1991
Ave. Earnings of COA Graduate	0	0	19000	20000	28000	30000	24000	24000
Ave. Cost of COA Education	13000	14000	14000	18000	19000	20000	22000	24000
Net Benefits	-13000	-14000	+5000	+2000	+9000	+10000	+2000	0
Net Present Value	-13000	-14000	+4400	+1500	6000	+5900	+1000	0
Implicit Rate of Return (%)	-	-	80.0	75.0	66.0	59.0	50.0	0
Assumption N = 200								

Table 5: Present Value of Net Benefits (JA$)
(Discount Factor = 15%)

Items	1984	1985	1986	1987	1988	1989	1990	1991
Ave. Earnings of COA Graduates	0	0	19000	20000	28000	30000	24000	24000
Ave. Cost of COA Education	13000	14000	14000	18000	19000	20000	22000	24000
Net Benefits	-13000	-14000	+5000	+2000	+9000	+10000	+2000	0
Net Present Value	-13000	-14000	+3,800	1500	+5900	+5700	+994	0
Implicit Rate of Return (%)	-	-	76.0	75.0	65.5	57.0	49.7	0

Assumption N = 200

The results presented in both Tables are generally the same. Examining the results in both Tables, social returns on investment in COA will be higher in the earlier years, than in the later years. In the earlier years, the implicit social rate of return may be as high as 76 percent. Social rate of return may become less and less over the life of the project. These results may suggest that in the short to medium term, COA will be a good investment from the society's point of view. However, it is doubtful that in the longer run, that COA will maintain its status as a good social investment.

The relatively high social rates of return that seem to characterize COA in its early years may be the result of a demand effect, which would have implications for timing and scale of operations. Using the results in Tables 4 and 5 together with the information graphically displayed in Figure 1 (above), one could make the inference that the high social rates of return that will be associated with COA between 1986 and 1990 may be a reflection of the critical demand for trained agricultural labor found in the survey of employers' current and future demand for this type of trained labor.

Between 1986 and 1990, the demand for COA graduates may exceed the supply to be produced by this College, thereby increasing the market price for such labor. However, after 1990, demand may begin to fall off gradually as more and more graduates enter the market. Consequently, the COA administration should keep a watchful eye on the prevailing market conditions through time, and adjust the enrollment of the college accordingly. Failure to do this could result in either underinvestment or overinvestment which have inevitable consequences for economic growth.

5. Summary and Conclusions

In this paper, an attempt was made to use cost-benefit analysis in evaluating the social costs and social benefits of the three-year educational program at COA. On the cost side, only direct recurrent costs and the opportunity cost of the students' time, as measured by the shadow price of their labor were included. On the benefits side, *ex ante* benefits were estimated on the basis of future earnings of graduates at current market prices.

The major conclusions are as follows:

1. The direct unit cost (i.e. per student enrolled) of COA education from the society's stand point will rise steeply in the 1986-87 academic year, and continues to rise, but less steeply thereafter.

2. Opportunity cost of COA education, from the students' stand point will also rise, but far less steeply than the social unit cost. This implies that at current prices for educational goods and services, COA may have to be more heavily subsidized by the Jamaican Government, or the private cost increased to deal with future financial constraints on its operations.

3. The COA administration should keep a watchful eye on fluctuations in employment conditions of the labor market to avoid either underinvestment or overinvestment in COA. Between 1987 and 1989 the demand for trained agricultural graduates may rise above its present level. However between 1989 and 1990 the demand may decline, but rises only slowly thereafter.

4. Nevertheless, COA appears to be a good cost saving alternative for the economy compared to training Jamaican agricultural personnel in United States-based Colleges of Agriculture.*

5. It appears that the Jamaican society will derive positively robust rates of return in the area of 50 - 80 percent in the short-run and sound qualitative social benefits as well in the long-run from an up-grading and development of COA into a viable undergraduate educational institution providing quality training to Jamaican citizens.

* The future cost of training at the University of the West Indies was excluded, since the future of this institution as a regional body is in doubt.

ANNEX J

DRAFT PROJECT AUTHORIZATION

Name of Country: Jamaica

Name of Project: Agricultural Education Project
Number of Project: 532-0082
Number of Loan: _____

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Agricultural Education Project for Jamaica involving planned obligations of not to exceed $9,849,000 in loan funds and $3,000,000 in grant funds over a four year period from date of authorization, subject to the availability of funds in accordance with the AID OYB/Allotment process to help in financing foreign exchange and local currency costs for the project. The planned life of the Project is five years from the date of initial obligation.

2. The Project consists of assistance to expand the agricultural education program in Jamaica and will include upgrading and expanding a three year post-secondary school (the College of Agriculture) and a secondary vocational agricultural school (Knockalva Agricultural School). The Project will finance facilities, the purchase of equipment, the training of instructors, and the provision of technical assistance.

3. The Project Agreement which may be negotiated and executed by the officer to whom such authority is delegated in accordance with AID Regulations and Delegations of Authority shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as AID may deem appropriate.

   A. Interest Rate and Terms of Repayment:

   The Borrower shall repay the Loan to AID in United States Dollars within twenty-five (25) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Borrower shall pay to AID in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

   B. Source and Origin of Commodities, Nationality of Services - Grant Funded:

   Commodities financed by AID under the Project with grant funds shall have their source and origin in the U.S., and Jamaica, except as AID may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the U.S. and Jamaica as their place of nationality except as AID may otherwise agree in writing. Ocean shipping financed by AID under the Project shall, except as AID may otherwise agree in writing, be financed only on flag vessels of the United States.

C. Source and Origin of Commodities, Nationality of Services - Loan Funded:

Commodities financed by AID under the Project with loan funds shall have their source and origin in countries included in AID Geographic Code 941, and Jamaica, except as AID may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have countries included in AID Geographic Code 941, and Jamaica as their place of nationality except as AID may otherwise agree in writing. Ocean shipping financed by AID under the Project shall except as AID may otherwise agree in writing, be financed only on flag vessels of the United States, other countries included in AID Code 941, and Jamaica.

D. Conditions Precedent to Disbursement:

1. Conditions Precedent to First Disbursement

Prior to the first disbursement under the Grant and Loan or to the issuance by AID of documentation pursuant to which disbursement will be made, the Cooperating Country will, except as AID may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

a. An opinion of counsel acceptable to AID that this Agreement has been duly authorized and/or ratified by the Cooperating Country and that it constitutes a valid and legally binding obligation of the Cooperating Country in accordance with all of its terms;

b. A statement of the name of the principal officers of the Cooperating Country and of any additional representatives empowered to act on behalf of the Cooperating Country together with a specimen signature of each person specified in such statement;

c. An acceptable executed Memorandum of Understanding (MOU) among the Ministry of Education, the Ministry of Agriculture, the College of Agriculture and the two secondary agricultural schools (Knockalva and Elim) which defines the relationships and areas of cooperation and responsibilities of each, including specifically areas of cooperative research and curriculum development to be carried out under the Project.

d. Evidence that the Board of Directors of the College of Agriculture has been appointed for three year terms under a staggered arrangement so that one-third are appointed annually and that one-half of the positions will be filled by representatives of the private sector.

2. Condition Precedent to Disbursement for Construction Management Services:

Prior to disbursement or issuance by AID of documentation pursuant to which disbursement of funds will be made for construction services, the Cooperating Country shall, except as AID may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID, an executed agreement with an acceptable A & E firm or the National Development Agency to provide the design and construction management service.

3. Conditions Precedent to Disbursement for the Procurement of Commodities

Prior to any disbursement or to the issuance of by AID of documentation pursuant to which disbursement of funds will be made for the procurement of commodities, the Cooperating Country will, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, a detailed list and specifications of laboratory, field, research, vehicles, shop, teaching, library and office equipment necessary to carry out the project.

4. Conditions Precedent to International Training

E. Covenants:

The Cooperating Country shall covenant that, except as AID may otherwise agree in writing:

a. The College of Agriculture will, become and remain a three (3) year post secondary institution offering the Associate of Science degree;

b. The student to faculty ratio will, be 15 or more students per full time faculty equivalent with every effort to be made by the Cooperating Country to seek a more cost effective level on the order of 18:1;

c. Funds earned by the College of Agriculture and the Knockalva School of Agriculture from sale of produce, training, research, etc., will be retained by the institution for appropriate uses.

d. Within 12 months following execution of the Project Agreement, the Cooperating Country will complete a study (and implement the results as practical) directed at identifying revenue generation and/or cost reductions applicable to the College of Agriculture and Knockalva Agricultural School that reduce the budgetary burden but which will not erode the quality of technical training received by the graduates. The study will include, among others, treatment and considerations of the following measures:

- increasing level of tuition and fees;
- sale of products and services with revenues returning directly to support operational costs; and
  student loans with a forgiveness clause for specific periods of public service following graduation.

4. Conditions Precedent to Disbursement for the Procurement of International Training:

Prior to any disbursement or to the issuance of by AID of documentation pursuant to which disbursement of funds will be made for international training, the Cooperating Country will, except as AID may otherwise agree in writing, furnish to AID, in form and substance satisfactory to AID, a list identifying candidates approved for permanent staff positions who are to receive international training support together with a training plan in the form of a schedule showing the length of training of each participant and the area of specialization.

E. The Cooperating Country will provide adequate financial support from the Government budget for the College of Agriculture and the Knockalva Agricultural School to cover the annual recurrent and capital costs required by these institutions to achieve the purpose of the Project during the life of the Project, and, for ten years following the end of the Project, will provide annually an amount in Jamaican dollars equivalent to not less than US$1.7 million, with funding to be drawn from PL-480 Title I generations to the extent such funds are available.

F. The Cooperating Country, will take all reasonable and necessary steps to assure that project financed participants will return to work and assist in the Project by requiring two years of service in their institution for each year or major fraction thereof of training received. For those receiving short term training of less than six months duration, the obligation will be twice the length of the training period.