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THE AGRICULTURAL EDUCATION
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· AGRICULTURAL EDUCATION IN
JAMAICA

A Review and a Proposal for
Development

by

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OUTLINE

1. Introduction
2. Objective of study
3. Method of research
4. Jamaica and a description of its agriculture
5. The Jamaican School System
6. National goals and strategies for education
7. National goals and strategies for agriculture
8. Agricultural education background and development
9. Current institutions, curriculum and programmes in agricultural education
10. Evaluation of trends in the formal and nonformal programmes
11. Areas requiring streamlining
12. Areas requiring collaboration with IICA
13. Recommendations
14. Summary

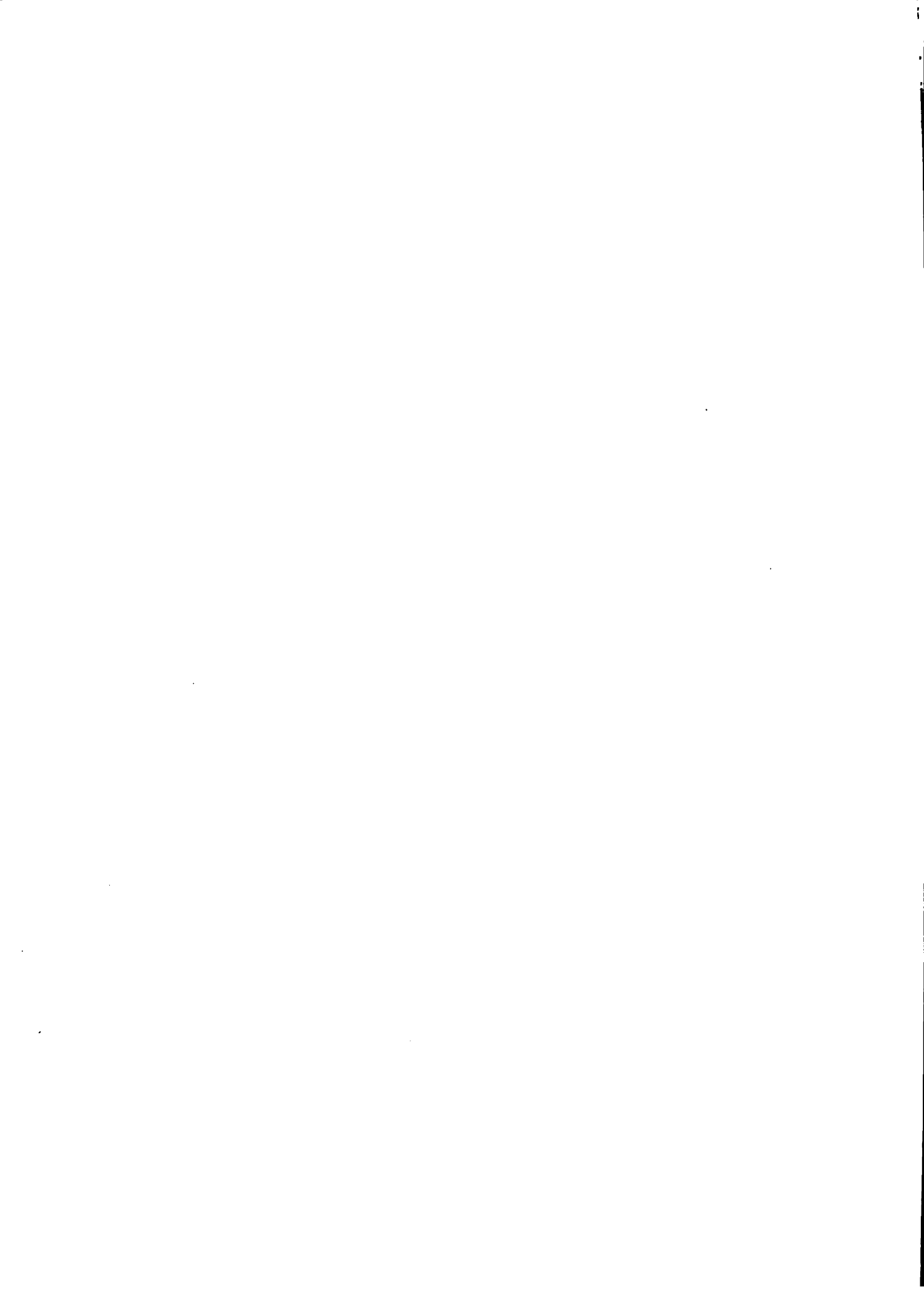


TABLE OF CONTENTS

1. Introduction	2
2. Objective of study	7
3. Method of research	7
4. Description of agriculture	8
5. The Jamaican School System	11
6. National goals and strategies for education	19
7. National goals and strategies for agriculture	29
8. Agricultural education background and development	36
9. Current institutions and programmes in agricultural education	40
10. Evaluation of existing programmes	76
11. Areas requiring streamling	90
12. Areas in which IICA can collaborate	100
13. Summary	102
14. References	104
15. Acknowledgments	105
16. Appendicies	106



INTRODUCTION

Agriculture with its various implications is easily the worlds most essential industry as it forms the pivot for maintaining life as well as a wide range of social and industrial developments. When taken in proper perspective it is a fast changing and progressive industry which should receive much more projection than is given, as in most cases its role in society is taken for granted.

An agricultural occupation means living close to the job, enjoying a wide variety of work experiences, being able to see and take part in the whole productive process, being able while working to exercise both body and mind. Therefore workers in and recruits to the industry are required to have a reasonable level of intelligence plus common sense, the ability to make decisions, a better than average power of observation and a zest for work. In the Jamaican society today there is a critical shortage of such calibre human resources. Such shortages undoubtedly contribute to a large extent to the stagnation of the agricultural industry.

Using 1963 as a bench mark for satisfactory production-consumption ratio, it is anticipated that agricultural productivity will have to increase at least 35% above its current level in order to meet the projected requirements for 1980. It is firmly believed that a greater percentage of the country's food requirement can be met by local production based on past production performance. Likewise, there is the increasing demand by traditional export markets as well as new markets for agricultural products which should be and can be met through increased

production activity. Such a transformation of the sector's productivity is possible through an intensive and extensive agriculture education programme if it is properly conceived and executed.

In retrospect, the many Socio-economic changes in Jamaica since 1962 have not been integrated into the educational system to any significant extent. It is therefore gratifying to note that since the early 1970's there is more deliberate effort to bring about a fundamental change in the educational system, in which education is now conceived as an essential feature in the transformation of the society from an under-developed dependent colony to a truly independent society. Such a transformation cannot come too quickly as the adoption of North American and European standards have imposed pressures which tend to stun an awareness to indigenous peculiar needs. Thus the development of an education programme and philosophy designed to assist personal development and satisfy the functional needs of the society in skills and attitude is welcomed at this stage of our history. It is only within recent years that there is a real appreciation for skill training and craftsmanship, as previously such aspects of human resource development held a degrading status.

The significance of agricultural education as a major contributing factor to development comes into focus when it is realized the very limited available resources to feed an expanding population, and an increasing inability to cope as a nation with a food import situation. Likewise, when it is realized that this limited resource has to provide raw material for agro-industry development and additional employment opportunities since the high expectations of industrialization are not forthcoming.

Agricultural education against such a background may be defined as the means of preparing human resources for entry into the agro-industry as well as to take an existing industry to a higher plane of efficiency and production through the application of science, art and technology. The application of agricultural education within this framework should generate profound changes in government administration, the social structure, land distribution pattern, income distribution and the decision making process in the society.

It is therefore necessary to consider the ultimate aim of rural development and its implications for education in general. A dramatic improvement in agricultural productivity for example may create more problems than it solves. Therefore agricultural productivity can only achieve its objective if it is a means of stimulating many other forms of enterprises which contribute to better living. It is vital to have an interplay between improved agricultural efficiency, increased spending, expanding of industries, trade and commerce all of which should contribute to a better standard of living.

To effect some of the above mentioned changes, human resources constitute a major investment as much human input is required. The prime movers of agricultural education and change involves a type of person who is well trained so as to gain the respect of people among whom he or she works and live. However it is important to realize that agricultural education can have meaning only when it is the right kind of education to fit the peculiar need and particular learner in a given situation, the education programme is executed with efficiency and other pre-conditions are present to ensure the effective utilization of the educational results.

Jamsica is currently involved in establishing its infrastructure facilities to enhance the effectiveness of agricultural education. This is

demonstrated by developments as Project Land Lease, Food Farms, Project Self Help, the long standing commodity organizations and the Agricultural Marketing Corporation, Agricultural Credit Board, the Jamaica Development Bank and many other such institutions.

However the experience of low productivity in Jamaica may be associated with any one of the following factors:

1. content of education becomes obsolete or does not fit the needs of the situation. In such case, people spend time teaching and learning the wrong things,
2. or even if content is appropriate the teaching and subsequent learning is inefficient. This may be associated with the wrong type of "student" or "learner" as their motivation and aspiration may be incompatible with the educational programme. Or inputs as equipment, books, right type of teacher may be missing,
3. content may be right, the process efficient but the results not put to effective use because of the lack of an infrastructure to put into practice the new approach to better management.

Within the context of agricultural education, one is not concerned only with academic programmes and performance but primarily with the performance of the system which is set to achieve objectives. Therefore a constant search should be on for ways to improve the process which influence the efficiency and productivity in achieving national goals. The ultimate criterion by which an education system will be judged is the degree to which it is providing the society with educated and trained human

resources in adequate numbers with the desired attitude towards work, skills and the enterprises necessary to change and develop a rural community.

Agricultural education should also endeavour to meet the needs of young people especially to offer an education for rural living which includes a much wider scope than agriculture alone. This is of significance as the intent will be to relocate as well as maintain youngsters in a rural setting for its development. It is therefore important in this presentation to review the educational system as a whole and specifically agricultural education to gain some understanding of our human resource development through education.

OBJECTIVE OF THE STUDY

The general objective of this study is as follows:

To produce a diagnostic study of the current situation of agricultural education institutions in Jamaica so as to determine the degree which Interamerican Institute of Agricultural Science (IICA) technical cooperation can contribute to the achievement of National objectives in the field of Agricultural Education.

The specific objectives are:

To analyze the current situation and tendencies of the Institutional Systems, Subsystems and Organisms involved in Agricultural Education.

To identify the objectives and strategies of the Government in the field of Agricultural Education.

To identify the key subsystems and organism related to Agricultural Education in Jamaica.

To identify the trends of the formal and informal Agricultural Education.

To identify the areas in which IICA can collaborate.

METHOD OF RESEARCH

Data were collected through personal interviews with Senior Administrators and Technical Officers in the Ministries of Agriculture, Education and Youth and Community Development. As many as possible of the most recent reports on aspects of Agricultural Education in Jamaica were reviewed and the cumulative experiences and data collected while serving as Principal of the Jamaica School of Agriculture are included.

DESCRIPTION OF AGRICULTURE

Background:

Jamaica, from Negril in the West to Morant Point in the East, is about 150 miles; the greatest distance between the Northern and Southern Coasts is about 53 miles. The total land area is approximately 4,500 sq. miles (2.88 million acres). No one section of Jamaica can be regarded as typical as each of the 14 Parishes has a distinctive style. Only 20% of the land area is flat or gently rolling while almost 50% is over 100 feet above sea level and 40 sq. miles rise above 5,000 feet above sea level. From East to West lies a central plateau while on the coastal areas particularly in the Northern and Southern areas of the island are flat.

Climate:

A wide range of climate exists. In the main it is characterized by high temperatures on the lowlands which are modified by elevation. Maximum temperatures on the flat lands range from about 88°F in January to 94°F in July, whereas minimum temperatures range from 53°F to 58°F depending on elevation.

Soil:

There are about 90 soil types which are primarily of limestone origin. These soils include from heavy clays, terra rossa to very sandy ranges of soils. In general, they are of low fertility but respond reasonably well to good management.

Rainfall:

From a low of 25 inches per annum on the Southern plains to 300 inches in the upper areas of the Blue Mountain is experienced. Identifiable rainfall belts are found between 100 inches and over in the Northeast due to the

Northerly rain bearing winds to less than 50 inches in the Southern rain-shadow and coastal areas. Rainy seasons occur between May and June and between September and November with an average annual rainfall of 77 inches. Because of this wide range of climate it is possible to produce a variety of crops and livestock.

Agriculture:

Agriculture incorporates approximately 1.5 million acres or about 55% of the total land area of Jamaica. There were 193,400 farms giving an average of 7.7 acres per farm according to the 1968 Agriculture Census. Farms smaller than 5 acres represent 78% of the number of farms and account for only 15% of the land in farms, while those over 500 acres represent 0.15% of the number of farms and account for as much as 45% of the land in farms.

There are several thousands of small farms most of which are located on steep lands of low fertility. Many of these are too small to generate satisfactory levels of income. However, estimates show that these farmers produce over 90% of the food crops grown for local consumption and to some extent a significant portion of the crops grown for export.

The rural population of Jamaica, which is approximately 66% of the total population, supplies the greater portion of the agricultural labour force and this includes many unskilled workers.

The Jamaican economy has undergone much diversification within recent years which has resulted in the decrease of the total labour force engaged in agriculture. However, the agricultural industry is still the largest single employer of labour. Of the classified employed labour force by industry groups, the labour force in 1968 was 689,890 persons and those involved in agriculture were 233,200 persons or 33.8% of the total labour

force. Very little change has occurred in this status as the range of labour force for 1973-75 is 621,600 to 685,100 and agriculture, forestry and fisheries account for a range of 193,700 to 231,500 persons (Labour Force 1975). The National Physical Plan of Jamaica 1970-1990 estimates "that it is not expected that agriculture will employ and additional persons in the future despite production increases".

On the basis of a policy to develop an efficient agricultural sector, there will be a demand for only skilled people. This is readily expected from the prospects of new requirements to service the processes of agricultural production on the farm as well as the ensuing agro-industry complexes. Thus the education of the current farming community and the youths in the school system appears indispensable to an assured increased productivity.

The urgency for production becomes even more pointed when it is realized that Jamaica imported in 1975 over \$148 million worth of foodstuff which accounted for 12% of total imports. In terms of the gross domestic product, agriculture contributed only \$80.9 million. A review of the traditional agricultural export commodities such as bananas, citrus, coffee, sugar and others showed that they have been suffering severe problems of price fluctuations on the world market. As a result of such situations the net earnings from agricultural exports versus food imports has been very negative. Thus, there must be a definite effort to reduce the dependence on food imports through increased agricultural productivity.

THE JAMAICAN SCHOOL SYSTEM

1. Pre-primary

"Pre-school" or infant education in Jamaica begins at the age of 4 and is offered in both public and private institutions. The Van Leer Foundation in co-operation with the Ministry of Education and the University of the West Indies, have since 1966 assisted the Government in the design and supply of materials for teacher training. In 1971-72, there were 26 infant schools and 9 infant departments within the public sector with an enrolment of 9,705 and 1,983 respectively. There were also 672 basic schools with an estimated enrolment of 20,200 established by communities and religious bodies which were given financial assistance by Government.

2. Primary

At age 6 or 7 children enter public or private primary schools for 6 grades. After age 12 students who do not go on to the new secondary, technical high, or comprehensive high schools continue their education in the usually terminal 7th, 8th and 9th grades of all-age schools.

Children who complete the 6th grade in public and private institutions are eligible to take the Common Entrance Examination (at age 11+) to determine who will gain admission to the government and government-aided high schools, within the public system. In addition each high school also conducts its own admission test to select an allotted approximate 5% of the total school intake at age 11+, and determines its own selection criteria for entrance of these students.

3. First Cycle Secondary

First Cycle Secondary Education consists of grades 7 to 9 and begins at age 11+ and continues through age 14+. Public education at this level is

offered in new secondary, and in the first three grades of comprehensive and high schools. Technical high schools however start at grade 8.

Entry to the new secondary and comprehensive high schools is based on a free transfer from the nearest 'feeder' primary schools. Students who have reached age 13 in all-age and the new secondary schools can take another Common Entrance Examination in order to gain admission to technical high schools. Students may also transfer from high schools to technical high schools.

At the end of grade 9, pupils from the new secondary and all-age schools take the Grade Nine Achievement Test which is used to determine admission to second cycle education in high, technical and vocational schools.

4. Second Cycle Secondary

Second cycle secondary education is offered in grades 10-11 at technical and comprehensive high schools and in grades 10-13 of government, government-aided and private high schools. In grade 10, students usually take the Jamaica School Certificate (a local examination). In grade 11, they take the General Certificate of Education Examination at Ordinary Level ("O" level). This is an external examination set by the Cambridge Local Examinations Syndicate and for private candidates the Schools Examinations Department of the University of London. Some are allowed to continue on to grade 13 at the end of which they may sit the General Certificate of Education Examination at Advanced level ("A" level).

5. Vocational

Vocational education apart from that which is offered in technical high schools now takes place in four institutions, admission to which is by passing the Grade Nine Achievement Test. The duration of the vocational course varies

from one to two years depending on the trade or level of skill required. One or two year courses are offered in carpentry, metal-work, plumbing, building, automechanics, home economics and commercial subjects. One Vocational School, Carron Hall, is for girls only and offers training in home economics and related fields. The other Vocational School is Knockalva which offers agricultural training for boys only.

6. Teacher Education

There are 12 teacher training institutions and programmes which include: Bethlehem Teachers College, College of Science and Technology (Technical Education Department), Church Teachers College, Excelsior Community College, Inservice Education Thrust (I.S.E.T.), Jamaica School of Agriculture (Agricultural Education and Teacher Training Department), Mico Teachers College, Moneague Teachers College, Sam Sharpe Teachers College, St. Josephs Teachers College and Shortwood Teachers College. Courses of training for the new secondary school teachers are also provided. The course last for three years of which the last is an internship in a school. In addition, Caenwood Junior Teachers College offers a preliminary twelve week pre-teacher training course. After graduation from Caenwood, students may enter any of the Teacher Colleges or seek employment as an untrained teacher in the primary schools. Teacher training for the secondary level is offered in the School of Education at the University of the West Indies.

In September 1975 enrolment in eleven colleges and I.S.E.T. (excluding Sam Sharpe Teachers College) was 3,897. Approximately 1,200 trained teachers graduate from the colleges annually.

7. Further Education

Further education is offered mainly at eleven teacher training colleges

described above) The Jamaica School of Agriculture (J.S.A.), the College of Arts, Science and Technology (C.A.S.T.) and the University of the West Indies (U.W.I.). In general, successful completion of grade 11 qualifies students for entrance to the J.S.A., teacher training colleges and C.A.S.T.

(a) The Jamaica School of Agriculture

J.S.A. is the main institution responsible for training in Agriculture. This institution shall be discussed in more detail in another section.

(b) The College of Arts, Science and Technology

C.A.S.T. provides training for technicians and middle management personnel to meet the demands of industry and commerce. The College has six departments; mechanical and electrical engineering, building technology, science, business and commerce, institutional management, and teacher training (technical). All courses are offered on a fulltime, part-time or evening classes basis. In September, 1975, enrolment in C.A.S.T. was 2,451; 1,143 fulltime students, 1,095 part-time day and 556 part-time evening.

(c) The University of the West Indies

U.W.I. which is a regional institution with the main campus at Mona, Jamaica, offers education at the baccalaureate and graduate levels. Entrance requirements may vary according to subject. Generally students are required to have successfully completed grade 13 in some subjects and grade 11 in others. Teacher education at university level is offered at the School of Education, for university graduates and experienced graduates

of teacher training colleges.

The faculty of Agriculture of the U.W.I. was established in 1960 as a result of a merger between the University College of the West Indies and the Imperial College of Tropical Agriculture. A general agriculture course leading to the Bachelor of Science Degree is offered by the Faculty. Matriculation requirement to this degree programme requires General Certificate of Education (G.C.E.) passes in five subjects including at least two at the advance level or successful completion of the diploma course at The Jamaica School of Agriculture, The Eastern Caribbean Institute of Agriculture and Forestry, and The Guyana School of Agriculture.

8. Private Schools

There are a number of private schools which offer secondary education. The better known ones are Campion College, Priory School, DeCarteret College, Gaynstead and St. Georges and Excelsior Extension Schools. The West Indies Training College offers both secondary and teacher education courses.

9. Specialized and Non-formal/Continuing Education

Out-of-school education is available from a wide variety of sources, including farmers' training centres, youth camps, trade training centres and specialized institutions.

The extension service of the Ministry of Agriculture is responsible for farmers training programmes and operates a permanent centre at Twickenham Park with three other centres being operated on a temporary basis. The total enrolment for the various weekly courses was over 2,500 in 1975.

The Ministry of Labour operates trade training centres which offer

courses lasting from six to twelve months in such trades as pipefitting, electrical installation, machine fitting, automobile repair, carpentry, and the like. In 1971 there were nine such centres with a total enrolment of 973 students.

The Ministry of Youth and Community Development operates Youth Camps/Centres, enrolling a maximum of 1,700 youths of both sexes, ages 15-19 in five resident camp locations. A wide variety of low level and prevocational skills are taught, with stress on work attitude development. This Ministry is also in the process of establishing several nonresidential Youth Training Centres.

Other specialized training programmes include training for nursing at Kingston Public Hospital, the University of The West Indies, and The West Indies Training College; and the other respective discipline areas are provided by the Dental Auxiliary Training School, Jamaica Hotel School, Jamaica School of Art, and the Jamaica School of Music. Other privately supported special schools include Alpha Commercial College, Jamaica School of Fashion, Kelly Lawson Training School, College of Accounting and Business, Duff's Business College, Jamaica Commercial Institute, Jamaica School of Business, Jamaica Theological Seminary and Kingston Commercial College.

Approved Schools are special schools established by the Government to which juveniles on Approved School Orders from Juvenile Court are sent. Activities in the schools include full-time classroom education for children under fifteen years of age; those over fifteen receive part-time classroom education. There were six approved schools, four for boys with a total accommodation for 325; and two for girls with accommodation for 75.

A literacy programme was established in 1951 and in 1972 it was absorbed into the National Literacy Programme and subsequently into the

Jamal Foundation. There are currently thousands of students of all ages enrolled in literacy classes throughout the island. Radio and television media are used to some extent in literacy teaching.

Many other agencies or institutions are engaged in some kind of non-formal/continuing education and are training a significant number of Jamaica. Without attempting to be exhaustive, the following list covers most of those with the greatest impact; Craft Development Agency, Jamaica Industrial Development Corporation, Jamaica Library Services, Jamaica Youth Corps, National Literacy Board, National Volunteers' Organization, Prisons Department, Jamaica Institute of Management, Sugar Industry Labour Welfare Board and Institute for School Leavers.

10. Examinations

The practice of using formal examinations at fixed points in the educational system is a basic characteristic of the Jamaican education system. A comprehensive list of these examinations is:

- (a) The Common Entrance Examination (age 11+) for pupils from Primary and Private Preparatory Schools for admission to High Schools,
- (b) The Common Entrance Examination (age 13+) for pupils from All-Age, Junior Secondary, High Schools for admission to Technical High Schools,
- (c) The Grade Nine Achievement Test Examination for admission to High Schools, Technical High Schools, and Vocational Schools,
- (d) The Jamaica School Certificate Examination (approximately Grade 10). This is recognized for admission to the Police

Force and Nursing Profession as well as minor private business enterprises,

- (e) The London City and Guilds Examination, The Royal Society of Arts Examination, The Union of Lancashire and Cheshire Institutes Examination, The Associated Examining Board General Certificate of Education. These are all external examinations which are mainly for students of Technical Schools,
- (f) The General Certificate of Education Examination, Ordinary Level ("O" level) for pupils enrolled in Comprehensive, Technical and High Schools,
- (g) The General Certificate of Education Examination Advanced Level ("A" level) for pupils in grade 13 of High Schools.

A Summary of the existing educational levels within the system are presented in Appendix I.

NATIONAL GOALS AND STRATEGIES
FOR EDUCATION

Jamaica is currently engaged in formulating and implementing a more relevant approach to this aspect of our development. Education is seen as a basic personal right and it must be provided in a form designed to promote personal development as well as satisfy the functional needs of the society in skills and attitudes.

Jamaica has decided that all educational facilities provided by the Government from primary to University shall be absolutely free and that higher and further education (scaled to the needs and absorptive capacity of the Socio-economic plan) shall be available on the basis of merit alone.

Education is now seen as an essential feature in our transformation from a dependent under-developed colony to an independent equalitarian society. Manpower and human resources are thus seen as priority areas of development.

Although profound socio-economic changes have been taking place since 1962, these have not been absorbed into the education system to any significant extent. The society is currently dominated by a young adult majority with a new national consciousness and sophistication amidst pressures derived from the traditional acceptance of standards of the North American and European metropolitan countries. Thus the school system largely expresses a counter culture realized in a series of unmanageable situations which are inherited through the adoption of models from metropolitan countries which are essentially alien to the society. Thus the indigenous needs demand the formulation of a new philosophy of education and effective implementation of the same.

In association with a new philosophy of education is the need to devise new management procedures by which plans may be put into action. The progress of this aspect is inhibited by many of the causes which create the need. Of prime interest are the areas of teacher training, teacher supervision and the evaluation and handling of management in the process of reform within the educational system.

Historically there were inherited inadequacies from the educational system of the colonial era. Basically there was an heterogeneous educational pattern whereby private philanthropists and churches undertook to set up schools and colleges with the Government providing minimal budgetary support. During this period preparatory and secondary schools required fee paying and catered to essentially the same age groups as primary schools which experienced a higher pupil:teacher ratio and minimal opportunity for upward movement to high school by entrance examination. Up to 1938, Secondary Schools provided for only about 2% of the children in the age range 11-18 in schools modelled after the English Public and Grammar Schools. Up to the time of Independence in 1962, the Government aided Secondary schools provided for only 18,211 pupils or approximately 4% of the age group. The curriculum was dominated by the syllabus of the General Certificate of Education (G.C.E.) of the University of Cambridge or London University. Up to the Nineteen Fifties the primary (all-age schools) and the secondary schools were academic in orientation placing a premium on the memorization of factual information dominated by alien educational objectives which were irrelevant to the manpower needs of the society and the demand for the development of both human and natural resources. Moreover the lack of integration of primary and secondary schools led to great social divisiveness.

Areas causing much concern from such a system are:

1. Educational elitism and many associated levels of literacy and apparent failures,
2. Lack of provision for apparent failures in the system which cause stress on the human and political situations,
3. Neglect of early childhood education especially when there is evidence of weakness of home influence which tend to undermine the child's ability to benefit from later school experiences,
4. An alien education system conceived for a different socio-economic culture because of an inadequate and irrelevant curriculum. For example, agriculture and woodwork and other technical subjects outside of this curriculum perpetuated the degraded status of such areas of exposure as adjuncts of the slave era.

Long Term Goals:

Innovation has been conceived to deal with the foregoing problems through formulation and implementation of a more relevant approach to this stage of development. These are embodied in the following Long Term Goals in education:

1. To achieve compulsory Universal Primary Education,
2. To provide an adequate teaching force to meet the needs of all levels and types of education,
3. To develop a coordinated educational system which will ensure an even spread of education at all levels,
4. To provide the human resources for a sustained development of the education system and the country,

5. To help develop the cultural and aesthetic values and to foster desirable civic attitudes,
6. To provide non-formal education to meet the needs not only of adults but also of school leavers and drop outs,
7. To expand pre-primary education on a firm and structured basis,
8. To systematically expand medical health and school feeding services,
9. To provide adequate guidance and counselling services for the system,
10. To have a systematic evaluation of all components of the educational system,
11. To expand library facilities throughout the system.

Short Term Goals:

In accord with the foregoing general policy, the Government recognized the need to implement the following short-term objectives with utmost vigour allowed by present limitations of finance, personnel and general administrative capacity:

1. Restructure and strengthen the organization staffing and operation of the Ministry of Education in order to improve its capacity to effect the goals and objectives of the system,
2. Develop a Planning Unit of the Ministry of Education so that it can provide a better basis for decision making at both the policy and operational levels, including research review and evaluation, and sustain educational development,
3. Systematically expand and develop curriculum reform and educational methodology with initial emphasis on the need for primary education,

4. To improve on a planned and structural basis the skills and competence of the untrained teaching force in Primary and Secondary Education by means of a continuing in-service programme,
5. To pay particular attention to the urgent need for the teachers of language, mathematics, science, agriculture and technical subjects,
6. To expand a fully qualified teaching service at all levels,
7. To expand, improve and update the preparation of teacher-trainers and the curriculum of the teacher training institutions,
8. To improve the qualification of professionals and service staff throughout the system,
9. To improve the conditions and amenities for teachers and to provide better incentives and remunerations,
10. To pursue the expansion and development of agricultural technical and vocational education at all levels relevant to the needs of the society and to foster and encourage the agricultural commercial and industrial sectors to cooperate in the provision of skill training,
11. To pursue the development of new patterns of education for post G.C.E. "O" level education, non-formal and continuing education in cooperation with other Government agencies and the private sector,
12. Register and supervise independent schools so that the Government can assume its responsibility to ensure that the quality of education offered is of a satisfactory standard,
13. The renovation and improvement of primary and secondary education facilities so as to improve the quality of education and the conditions of service for teacher,

14. Continue to support the efforts of the community in establishing pre-primary schools and to assist in upgrading teachers and facilities for these schools,
15. To encourage maximum community involvement in the educational process and the use of all schools as centres for continuing education,
16. To foster the development of Jamaican books with special emphasis on textbook writing, illustration, design and production, as well as the need for the expansion and development of audio-visual aids, materials and media with special attention to the use of the ETV and radio as important tools for curriculum development,
17. To foster appreciation and participation of student in the arts for the benefit of the individual and the cultural enrichment of the country,
18. To encourage an appreciation and concern for the country, its beauty and ecology.

Measures of Implementation of Innovation:

1. Budgetary changes:

The Education vote for recurrent and capital expenditure has risen from J\$13.6 million in 1962-63 to J\$110.8 million in 1974-75. This represents a change from 13.3% in 1962-63 to 19.3% in 1974-75 of the total budget which was devoted to education,

2. Early childhood education,

3. Integration of primary school into the educational system.

Measures are being taken to improve the quality of primary training as well as to shape it as an integrated stage of a system that in-

cludes the new Secondary, Comprehensive High Schools and further skill training. Emphasis to be placed on providing functional education and opportunities for personal development.

4. Development and integration of the new Secondary Schools, Comprehensive Schools, and High Schools.

Government has broadened the base of secondary education and assumed complete financial responsibility for all government aided Secondary Schools. The curricula and structures of new Secondary Comprehensive and High School will thus be inter-related and greater emphasis will be placed on prevocational education.

5. Pre-vocational, Vocational Agricultural and Technical Education.

There is an acute socio-economic need and a growing national respect for practical education which have stimulated the development of a variety of new projects at various levels of education represented by the College of Arts, Science and Technology, Knox College and Excelsior Education Centre. It is recognized also that there is a vital need for wider scientifically oriented training in agriculture along with the need to demonstrate the socio-economic value of such training. Progress in this area of education has been slow. The transfer of the Jamaica School of Agriculture to the portfolio of the Ministry of Education is consistent with the recognition of the urgent need to reassess the role of agriculture in the educational and economic life of the country. The introduction of agricultural studies into other institutions has only now been given high priority. Teacher-training in agriculture is equally urgent as it is in other technical areas in order to make functional relevant education a reality at all levels.

6. The Community College.

This is essentially an experimental area based on four areas of interest:

- a) Further specialist studies,
- b) General education,
- c) Community projects,
- d) Vocational studies.

This experimental approach seeks to provide for a range of needs and interest for the young adult group at scholastic levels. The prime aim is flexibility and creative approach to new educational demands. This is done against a background of too narrow, frustrating sixth form course of studies for young adults which result in withdrawal from activities and problems of the Society instead of involvement.

7. Out of School Education.

- a) Continuing education,
- b) Literacy programme,
- c) Adult education foundation,
- d) Complimentary programmes by the Ministry of Youth and Community development.

Because of inadequate education in the past, attention is now being directed to continuing education making the school the focus of intellectual life and skill training for those who have already left it. The anticipations are that a positive cultural growth can develop around the school in town and village. Under these circumstances it is envisioned that programmes may be organized by the school system or by other Ministries concerned with human resources.

Example: The Ministry of Youth and Community Development is undertaking complimentary work in youth camps and skill training centres and vocational training programmes are organized by the Ministry of Labour.

8. Further and Higher Education (Tertiary Stage).

The College of Arts, Science and Technology has developed to provide skills and applied science essential for building the economy. The college is also training teachers and resource personnel needed for the expansion of relevant and functional education of lower levels especially in technical and vocational schools and branches of the Secondary System.

The Jamaica School of Agriculture (to be elaborated on later).

The University of the West Indies has expanded on its three campuses (Jamaica, Barbados and Trinidad) the range of training and education offering through full-time degree courses, part-time evening courses, diploma and certificate courses and its Extra-Mural Department (a new orientation for the society), Social Sciences, Law, Medicine, Agriculture, Engineering Pure Sciences and providing a portion of the new teachers urgently required for expansion in the Secondary Schools.

9. Development of Libraries.

- a) As research centres,
- b) As a great liberalizing force in education,
- c) As centres for continuing education.

In Jamaica the desire for rapid progress towards library centred education which fosters from an early age a spirit of enquiry, simple research and a breath of outlook which remains with the student as a life long asset. This approach is sought to overcome the disadvantages

of past learning methods which included dogmatic rote-learning, formalism and book centred curriculum.

The training of teacher-librarians has been initiated in some institutions involved in teacher training.

10. Integration of education in the arts with general education.

The Government is fostering the development of painting, sculpture, music, drama and dance, and the applied arts and crafts such as ceramics, textile design, jewellery and culinary arts. Schools curricula are now beginning to give these creative arts their proper perspective in the education system.

11. Guidance and Counselling in developing human resources.

There is now the recognition that an effective system of guidance and counselling is a prime necessity in the full development of our human resources. Without such a system students lack vital help and educators lack the knowledge and feedback on which to base new planning.

Perhaps the most critical need in this area is a range of tests which would provide an objective measurement of skills, aptitudes, abilities, attitudes and mental maturity. None of these parameters can be provided by the traditional examination e.g. G.C.E. examinations. Thus there is urgent need to consider the question of types of testing, assessment and evaluation most relevant to the individual and society.

12. National Youth Service to meet the need for skilled manpower.

The reason for the establishment of the National Youth Service is to help in the constructive task of transforming the society.

NATIONAL GOALS AND STRATEGIES
FOR AGRICULTURE

The broad objectives of Agriculture (Forestry and Fisheries) included according to the National Planning Agency for the period 1974-77 are:

1. Use to its fullest potential all agricultural lands.
2. Improve the standards of living of the rural population which implies not only an increase in farm income but also the provision of adequate infrastructure and social amenities.
3. Established appropriate and achievable income targets for existing and potential farmers without which performance in the sector is unlikely to improve.
4. Produce as much food and raw materials for domestic consumption and export as is economically and technologically feasible.
5. Improve the climate within which agriculture operates in order to attract greater and maintain private sector participation.
6. Structure production so as to reduce the growing reliance on imports and reverse the adverse balance in agriculture.
7. Achieve a more equitable distribution of agricultural land consonant with the optimisation of social and economic goals.
8. Improve training, education and skills among agricultural workers and farmers.
9. Expand research activities and improve the extension services and ensure more effective coordination in the provision of these services.
10. Introduce new technologies in some areas and effect wider application of existing and appropriate technologies.
11. Produce non-traditional export crops for markets which exist and which can be exploited e.g. avocados and mangoes.

12. Create a coordinated and efficient credit system capable of rendering the type of services required by the agricultural sector.
13. Improve the organizational structure and staffing of the Ministry of Agriculture.

Strategy to be reflected in the educational system:

In order to reflect the national agricultural goals, the educational system should seek to inculcate the following into the mainstream of society through its students.

1. That the agriculture of Jamaica is a major component of economic social and political structure of the nation; and that it is a basic resource demanding priority attention and development in conjunction with other sectors of national activity.
2. That agriculture (including forestry) constitutes the major means of utilizing the national renewable resources for the support of men. Prudent conservation, development and management of these resources (land, water, and soil), vegetation and climate should be a major concern of government, private industry and business, agricultural associations, and producers of agricultural commodities of the country.
3. That the agricultural activities of Jamaica are highly diverse offering many opportunities for choices of components to make up the farming systems. Hence it is essential that the total agriculture of Jamaica produce commodities directed toward current and future domestic and external market potentials, in the amounts and quantities required to serve the national economy. This includes greater applied research, improved skills and the use of methods and materials adapted to natural environmental conditions, so as to

insure economically viable production units and permit maintenance of long range productivity. Appropriate education of all persons concerned with agriculture is indispensable to the achievement of these national goals.

4. That the diversity of Jamaican agriculture may provide insurance against catastrophic losses by distributing and providing alternative enterprises adapted to environments and markets. The application of science and technology to achieve efficient production, permits and fosters wide choices in types of activities by individual farmers. Great concentration on single commodities should be the exception to the principle of diversity, acceptable only when it does not negate the principle of wide labour employment, generation and distribution of income among the rural population.
5. That on a national scale, agricultural production should be adjusted to environmental potentials on one hand, and to national economic needs on the other. Emphasis on education to implement adjustments by providing suitably trained manpower and education of the consumer population on uses of commodities, should accompany the mapping of resources, and planning of their effective management.
6. National policies and programmes should undertake to halt the decline in agricultural production and to increase productivity to keep pace with an increasing population.
7. That Jamaica should try to produce efficiently some of the foodstuffs now being imported. Those commodities which can be economically produced would replace some imports. Wheat is an exception, but flour from other crops (e.g. cassava) may replace some 20% of wheat flour.

8. That the nation utilize the available resource of land, climate and vegetation more effectively by choice of suitable commodities and improved production system, that provide for general application of modern agricultural science and technology. All land suitable for cropping should be brought into active production and effective use made of other lands for pastures, tree crops, and forestry.
9. That a massive system of non-formal education for farmers and agricultural workers be initiated so that currently available technology can be taught to them. It should plan and implement a parallel system of formal education in agriculture in the school system beginning in the 7th grade and continuing through the secondary and post secondary institutions, to train the coming generations of farmers and supporting rural groups in agricultural production, marketing, processing and utilization of agricultural products.
10. That agricultural development plans should give priority to labour-intensive systems of agriculture (as opposed to capital-intensive systems) as the method of applying modern science and technology to improve net incomes of the great majority of smaller farmers. and achieve better income distribution. Labour-intensive systems that employ modern science and technology in agricultural production are believed capable of supporting national production goals as well as essential social goals of Jamaica.
11. Jamaica should provide for conservation and enhancement of agricultural productivity of all lands on a long-term basis, through government policies and programmes effecting the use of renewable natural resources. The foregoing strategies for agricultural development are proposed to be tackled through a series of actions and studies in the areas of land

reform, comprehensive evaluations and reorganization of existing systems and services.

Land:

The Government has proposed to:

- a) accelerate and extend the settlement of suitable agricultural land. This will include pre-settlement work (s.g. soil conservation) and the provision of adequate rural infrastructure,
- b) introduce an appropriate basis for settlement to include the choice of settlers, the size of farms and the terms of tenure,
- c) take steps to ensure a reduction in the quantity of idle agricultural land, and in this regard extend the powers of the Land Development and Utilization Commission,
- d) take necessary action to develop an appropriate land reform programme to include consideration of cooperative farming where desirable.

It is now a Government policy that where land obtained for settlement purposes, it will be adopting a system of lease-hold rather than free-hold tenure, the tenure to be of long-term nature.

Studies to be carried out:

Since much emphasis will be placed on Extension Services, Research, Cooperative, Credit Marketing, Irrigation and Soil Conservation, the Government will:

1. Initiate immediately a comprehensive study leading to recommendations for
 - a) appropriate functions of the Ministry of Agriculture and

its Statutory Bodies,

b) lines of authority and responsibility and,

c) administrative structure and manpower requirements to enable the Ministry of Agriculture to be effective in promoting agricultural development,

d) coordination with private organizations and other Ministries particularly the Ministry of Mining and Natural Resources with respect to land and water resources.

2. Reorganize research activities within the Ministry of Agriculture and determine measures necessary to improve and restructure its entire research programme.
3. Coordinate and intensify research on sorghum, soya bean, gungo peas, red peas, maize and rice production.
4. Coordinate all extension services in Agriculture with particular emphasis on its administration and operation.
5. Restructure existing subsidy programmes to ensure that they achieve the desired results.
6. Examine the total agricultural training programme and its effects on agriculture generally, and on the Extension Services in particular.
7. Initiate a training programme for an Agricultural Headmen Corps.,
8. Increase facilities for propagating high yield planting material (including those for plants of high protein content) private agencies will be encouraged to participate in this exercise.
9. Rationalize the operations of the Agricultural Development Corporation, improve its storage facilities and encourage greater participation by the private sector in food processing and distribution,

10. Provide the machinery for a closer link between research and extension activities in the interests of farmers.
11. Examine the functions of the commodity boards with particular reference to their marketing activities.
12. Expand and improve the services offered by the Cooperative Department, to place it in a position to encourage the development of cooperative activities among farmers.
13. Establish a soil and water conservation unit in the Ministry of Agriculture.

Services:

The services identified to generate more effective action in developing the industry includes:

1. establishing an autonomous Agricultural Credit Bank, operating through a net-work of branches, to provide a full range of banking services to farmers,
2. financing through the Ministry of Agriculture all agricultural research with the exception of sugar,
3. concentrating extension services on the development of viable farm units while maintaining a general extension service,
4. developing extension services for sugarcane cultivation with emphasis on schemes to promote group action in replanting, irrigation and the use of services and equipment,
5. establishing more vocational schools on the pattern of Knockalva,
6. establishing a Milk Industry Board with functions to include the control of quality, pricing and the sale of raw milk.

AGRICULTURAL EDUCATION BACKGROUND AND
DEVELOPMENT

In Jamaica as well as the other former British colonies, the first exposure to land utilization by the majority of the population was in the capacity of slaves under the plantation system. In general the people engaged in agriculture during that period were either slaves or planters. Neither group could be said to be real farmers as they both lacked knowledge in the technical practice of agriculture. Higher education in agriculture was virtually lacking, research was neglected and locally trained agricultural technicians were not yet available to the industry.

After the abolition of slavery in 1838, there sprung up a category of small hillsides farmers and agricultural wage earners on and around the plantations and sugar estates. Their main production activities were centred around sugarcane, bananas and cattle.

Because of the foregoing, the Jamaican and English speaking Caribbean Nations', agriculture lacked the long tradition of real farming as characterized by the temperate region countries. This situation however commenced to change during the latter half of the nineteenth century into the first three decades of the twentieth century.

As early as 1867 under the colonial Governor of Jamaica, Sir John Peter Grant formal agricultural education had its origin. This occurred through the inclusion of agriculture in the industrial education curriculum of the elementary schools. Even at this early stage of development there were factions in the society who felt that the inclusion of agricultural education would limit the educational mobility of the peasantry. Agriculture undoubtedly carried a stigma of servitude to the colonial system which stymied the efforts

to promote agricultural education even in those early times.

In the 1890's the demand for agriculturally trained personnel and other technical expertise was great. This situation gained the attention and support of the British Government through a system of Imperial Grants. As such, agricultural education was supported through a series of short courses to elementary school teachers. However, there were limitations to the teaching of practical agriculture in the schools since there was very little of a farming tradition among the population.

Two significant agricultural education developments occurred in the early 1900's namely the establishment of the Jamaica School of Agriculture (Farm School) in 1910 under the Ministry of Agriculture and the establishment of the Imperial School of Tropical Agriculture in 1922 at St. Augustine, Trinidad. These developments may be regarded as the first serious attempts to offer formal training of a technical nature to young men desirous of pursuing careers in agriculture. The then diploma programme at the Jamaica School of Agriculture placed emphasis on applied sciences and farm practices which provided training in technical agriculture at the pre-university or intermediary level.

During the nineteen thirties, the Government of Jamaica through the Department of Education founded three vocational agricultural schools then called Practical Training Centres. These schools were Holmwood in the Parish of Manchester (1936), Dinthill in St. Catherine (1938) and Knockslive in Hanover (1940). The objectives of these centres were: to provide agricultural and technical training for 15-17 year old youngsters who did not have much chance for further training, to provide the nucleus for the farming community to agriculturally orient students, to train agricultural leaders who would in turn train students and farmers to practise improved agricultural techniques.

The vocational schools served three very important functions namely:

1. Graduates served as agricultural headmen on large farms as well as technical support staff for the Agricultural Extension Services.
2. Some graduates gained entrance to the Jamaica School of Agriculture from where they graduated to work as higher level technicians and as middle managers.
3. Some graduates went directly into farming operations.

Unfortunately over the last twenty years, two of the three schools were transformed into other types of schools leaving only Knockalva in Western Jamaica to function. This situation has resulted in a decline of trained manpower at that level.

To encourage agriculture in the schools an annual agricultural competition was initiated in 1938 on a parish, regional and all-island basis. There has been much inconsistency in putting on these competitions. However, for those which were successfully carried out, they accomplished the aims which were to stimulate interest in agriculture among pupils and teachers in primary schools and to create a healthy appreciative public opinion of agricultural education.

In 1958 agricultural science was included as a compulsory subject in All-Age Schools throughout the island. The scope of training offered in such schools was dependent on location and facilities available. Training in some schools ranged from potted and boxed plant culture, flower borders through to demonstration plots of 1 sq. chain up to 5-acres demonstrating production agriculture in both crops and livestock enterprises. In Appendix II are presented data on the distribution and sizes of agricultural plots within the school system on a Parish basis.

As a result of the blatant need for serious inputs in formal agricultural education an in-depth study was authorized by the Minister of Education in 1959 to examine the relationships between education and rural life. One of the more significant outcomes of this study was the recommendation to develop an agricultural science teacher training programme at the Jamaica School of Agriculture.

In 1963, due to the appointment of agricultural education officers to supervise and evaluate agricultural education the programmes improved in most schools. Subsequent evaluations revealed that there was very little coordination between the agricultural teaching laboratory, the school garden and academic subjects within the school. This was attributed to improper organization within such schools, inadequate staff, lack of facilities and interest, the inability to properly teach agricultural subjects. Other factors contributing to lack of fulfilment of the programmes were preedial larceny and destruction of crops and livestock and the poor siting of school plots and facilities.

CURRENT INSTITUTIONS & PROGRAMMES IN
AGRICULTURAL EDUCATION

A review of the key organizations involved in agricultural education and training in Jamaica may be subdivided as follows:

A. Formal Education

1. Secondary School System:

a) All-Age Schools	Grades 7 - 9
b) High Schools	" 7 - 11
c) Technical High Schools	" 7 - 11
d) New Secondary Schools	" 7 - 11
e) Vocational Agricultural High School	" 9 - 11

2. Post-Secondary School System:

a) Jamaica School of Agriculture - Diploma and Associate in Science Degree	Short Courses
b) University of the West Indies - Graduate Degree Faculty of Agriculture	Short Courses
	Agricultural Extension Department

B. Semi-Formal Education

1. Ministry of Youth and Community Development:

- a) 4-H Clubs - school residential and non-residential courses and skill training
- b) Youth Camps - residential skill training

2. Ministry of Agriculture:

- a) Farmers Training - short courses residential
- b) Extension workers - residential and non-residential short courses

C. Informal Education

1. Ministry of Agriculture:

- e) Farmers Training via - on the farm discussion Extension Service
- * b) Commodity Agencies - on the farm field days and information service
- c) Jamaica Agricultural Society - information service

2. Ministry of Industry:

- a) Jamaica Industrial Development Corp. - in service training Agro-Industry Short Courses

D. Supporting Specialized Services

1. Ministry of Agriculture Veterinary - in service training for Division Animal Health Assistants
 2. Farm Machinery Division - in service training for farm machine operators
 3. Forestry - in service training short courses
 4. Fisheries - in service training short courses
- * Commodity Agencies include Banana, Coffee, Cocoa, Citrus, Coconut, Spices and Sugarcane

As of 1969, agricultural education was extended to include the then Junior Secondary Schools, Technical High Schools and some High Schools. As such, there was a well established grades 7 to 9 programme (Appendix III). This development assisted in strengthening the thrust of agricultural education in the system. Since then there has been a steady growth of the number of schools offering the grades 7 to 9 programme as reflected in Table 1. However, the development of a true vocational aspect to the syllabus did not occur until the expansion of the Junior Secondary Schools into the new Secondary Schools. At this stage a more structured presentation of agricultural education was in evidence.

TABLE 1

TYPES AND NUMBERS OF SCHOOLS WITH
AGRICULTURAL EDUCATION CURRICULUM 1969-75

Types of Schools

<u>Year</u>	<u>All-Age</u>	<u>J.S.S.</u>	<u>Tech.</u>	<u>Comp.</u>	<u>Grammar</u>	<u>Total</u>
1969-70	2	15	4	1	2	24
1970-71	6	26	4	1	2	39
1971-72	14	29	4	1	2	50
1972-73	14	23	4	1	2	54
1973-74	12	40	4	1	5	62
1974-75	20	43	4	1	8	76

Definitions:

- All-Age - All-Age School
 J.S.S. - Junior Secondary School (New Secondary School)
 Tech. - Technical High School
 Comp. - Comprehensive High School
 Gram. - Grammar School/High School

FORMAL EDUCATION

A synopsis of the various levels of training shall be discussed in the form of a brief presentation of the programmes offered by the New Secondary Schools' Grades 10-11, The Knockalva Vocational Agricultural School, The New Vocational Agricultural Schools, The Jamaica School of Agriculture, 4-H Clubs, Youth Camps, Jamaica Agricultural Society, Ministry of Agriculture Extension Service and other divisions.

The New Secondary Education

The New Secondary Education started by the addition of Grade 10 in 1974 and Grade 11 in 1975 to the old Junior Secondary School.

In general the aims for the addition of these grades to create the new secondary education system are:

- a) that students who qualify shall reach the standard of further education, to proceed to Teachers College Nursing Schools; College of Art, Science and Technology; Jamaica School of Agriculture; the new Community Colleges and the Schools of Art, Music, Drama and Dance
- b) that all other students shall reach the highest level possible to them in a vocational skill so that they are competent to earn their living in that occupation when they leave school at 17 years of age.

The average student spends sixteen periods a week on vocational education in any one of the following vocational studies:

- | | |
|------------------------------|--------------------------|
| Agriculture | Catering Services |
| Auto Mechanic | Child Care |
| Business Education | Clothing Construction |
| Building Construction | Drafting |
| Carpentry and Cabinet Making | Electrical Installation |
| Crafts | Machine Shop and Welding |
| | Plumbing |

During these two years of vocational exposure, students will be assessed for levels of competence in each skill and finally evaluated for accumulated competence in their chosen vocation. The new Division of the Technical and Vocational Education in the Ministry of Education has the responsibility to develop this aspect of the new Secondary Education.

Of special interest is the agricultural education curriculum of the new Secondary School since it forms the basis of formal education for subsequent post-secondary levels.

At the end of grade 11 it is anticipated that the student's exposure and achievements will be of such that they will be able to:

- a) make a living as a self-employed farmer given adequate land and capital,
- b) make a living by employment in agriculture or allied services,
- c) appreciate the need for further training to improve his or her knowledge and skills and be able to enter institutions of further education in agriculture.

The objectives of the respective discipline areas and course coverages are as per Appendix IV.

Since 1973 there has been an associated increase in student numbers taking agricultural courses in the school system. In like manner there has been an increase in the number of agricultural science teachers although grossly inadequate according to the 1975 data in Table 2.

Knockalva Vocational Agricultural School

Vocational Agricultural training at the Secondary School level is minimal at the present time. The only vocational agricultural secondary school is Knockalva in the Parish of Hanover in Western Jamaica. This

TABLE 2
STUDENT AND STAFF POPULATION IN
AGRICULTURAL EDUCATION

	<u>Students</u>	<u>Staff</u>	<u>Ratio Teachers/Students</u>
1973	23,623	84	1 : 281
1974	30,594	95	1 : 322
1975	35,974	119	1 : 303

institution has one classroom in an old plantation mansion. Some efforts have been made to upgrade this school to overcome constraints of academic quality of students, management of the school, accommodation and skilled staff. Because of the above mentioned limitations the school produces approximately 50 graduates per annum who are not all qualified for direct entry to the Jamaica School of Agriculture without remedial training. The traditional curriculum pursued at Knockalva is presented in Appendix V. Graduates of this institution are employed at the medium technician level in the agricultural production enterprises as a result of a reasonable level of exposure operational skills.

The staff consists of a Superintendent, Assistant Superintendent, a graduate teacher and two instructors resulting in a staff/student ratio in the region of 1 : 40. There is a relatively high turn over rate among staff who seek employment with more attractive terms of service.

The New Vocational Agriculture and Home Economics High Schools

Implementation plans are underway for the construction of three new Vocational Agricultural High Schools as part of Rural Education Sector Loan Programmes supported by the United States International Development Agency.

The general objectives of this programme is to improve the agricultural potential and capability of the rural communities in Jamaica through skill training in the areas of agriculture and home economics. The institutions will also serve as Regional Development Centres for Continuing Education.

The specific Objectives are:

1. to produce skilled Secondary School graduates at a level who will be able to fill the demand in agricultural agencies, teaching, food processing, agri-business, agricultural mechanics and extension services,
2. to produce replacement farmers,
3. to prepare graduates for further training at the J.S.A., and
4. to produce graduates who will contribute to a more rounded development of rural communities.

The proposed curriculum is "competency-based", Appendix VI, and is designed to prepare the graduate for entry into the productive sector of the economy or to continue studies in specialized areas. Accordingly, a student will spend approximately one half of each school day (8 hour day) in the classroom or laboratories and the other half learning the various skills in agriculture, home economics and community development. The course content shall therefore include: a) knowledge and skills in animal, plant and soil sciences; business management of agricultural production and agricultural mechanization; b) leadership and civic responsibilities; and c) employment possibilities and responsibilities on a farm, agency or organization.

An integral area of pursuit as a prerequisite for the successful implementation of this programme is the training of staff in special skills. This training includes full time degree courses for professional staff as well as short courses and workshops on other areas of operations of the schools.

In order to provide the upgrading of current agricultural science teachers who are not trained teachers, the Ministry of Education is contemplating in service training opportunities. It is suggested that the Jamaica School of Agriculture, Agricultural Education Department provide short course summer programmes for credit, workshops and conferences for teachers. Much technical support are required for such undertakings as massive efforts are needed to upgrade teaching competence in critical areas which include:

- a) Teaching exceptional children - fast and slow learners,
- b) Methods of teaching and management in vocational agriculture,
- c) Mastering skills on the farm and farm workshop,
- d) Development and use of visual aids and models,
- e) Planning community activities in agricultural education,
- f) Organizing agricultural activities for rural groups,
- g) Psychology of adolescence, and
- h) Leadership concepts.

Jamaica School of Agriculture (J.S.A.)

The J.S.A. was established in 1910 as the major post-secondary institution for agricultural education. It is located at Twickenham Park, Spanish Town in the Parish of St. Catherine on approximately 650 acres of land 12 miles West of Kingston. The basic objectives of the institution were to train agricultural technicians at the Diploma in Agriculture level for employment by the Ministry of Agriculture, agri-industry businesses as farm operators and as farmers.

The facilities of the School were expanded in 1957 and 1968 with a view of producing more trained personnel at the technician level. In the latter expansion a two-tier system of training was established namely, courses leading to the Diploma and the Associate Degree in Science awards. The

Associate Degree in Science curriculum was developed in order to provide professional agriculturists to serve the needs of Jamaican agriculture since there were insufficient Jamaicans graduating at the Bachelor of Science (Agriculture) level. The course of studies were therefore geared to produce graduates with a strong background in both the science and technology of production agriculture and consumer education. Graduates with such qualifications attain advance credit standing in pursuit of the Baccalaureate Degree. The Diploma programme produce graduates for the technical level.

To service these programmes the academic departments and their respective subject matter coverages are:

1. Natural Science Departments:

Mathematics

Botany

Physics

Zoology

Chemistry

Genetics

Microbiology

Plant Pathology

2. Agronomy Department:

Principles of Crop Production

Vegetable Crops

Fruit Crops

Field and Forage Crops

Ornamental Horticulture

Forestry

Soil Science

Soil and Water Management

3. Animal Science Department:

Principles of Livestock Production

Animal Physiology and Breeding

Veterinary Science

Dairy, Beef, Swine, Sheep and Goat Production

Poultry Production

4. Agricultural Engineering Department:

Farm Machinery and Equipment

Agricultural Surveying

Irrigation, Drainage and Farm Water Supply

Farm Building and Engineering Drawing

Farm Workshop Practice Including Metal Work and Woodwork

Tractor

Farm Machinery Operation

5. Agricultural Education Department:

English

Psychology

Foundation of Education

Methods of Teaching (General and Technical)

Visual Aids

Practice Teaching

Communications

Extension Methods

Curriculum Development

6. Agricultural Economics Department:

Principles of Agricultural Economics

Farm Management

Farm Accounts and Records

Agricultural Marketing

Family Economics

Sociology

7. Household Science Department:

Food Science and Technology

Human Health and Nutrition

Meats Evaluation

Art and Crafts

Family Studies

Child Care and Development

Clothing and Textile

Household Equipment

House and Environment Design

Community Health and Nutrition

Home Management

The awards and duration of the respective academic programmes are as follows:

- a) Associate Degree in Science (Agriculture) - Three Year Course
- b) Associate Degree in Science (Consumer Education) - Three Year Course
- c) Associate Degree in Science (Agricultural Science Teacher) - Four Year Course
- d) Diploma (Agriculture) - Two Year Course
- e) Diploma (Household Science) - Two Year Course
- f) Diploma (Agricultural Science Teacher) - Three Year Course

General Admission:

Candidates for both the Diploma and Associate Degree in Science Courses are required to sit the School's Entrance Examination and must have passed one of the following examinations or have equivalent qualifications:

1. The Jamaica School Certificate:

Subjects should include English, Mathematics and either Chemistry, Biology, Agriculture or Agricultural Science.

2. The General Certificate of Education:

Ordinary level in English, Mathematics and either Biology, Chemistry or Physics.

Admission to the Diploma and Associate Degree programmes is determined by a combination of evaluation, a) Secondary School records, b) Qualifying Entrance Examination, and c) Performance in the first Semester or Prerequisite Semester at the School. Admission is open to male and female applicants from sixteen years of age upwards.

N.B. For the Associate Degree Course, unless under special circumstances G.C.E., "O" level or equivalent in English and any three of Mathematics, Physics, Chemistry and Biology will be minimum requirement.

The Jamaica School of Agriculture operates on a three term basis. In a year there are three 13 week terms for classroom and practical instructions. Because of the varied academic back-grounds of students enrolling at the School, all students are exposed to a period of upgrading known as the prerequisite semester which is of 20 weeks duration. During this period students are upgraded in subjects as Mathematics, English, Chemistry and Biology.

Exemptions in the "presemester" are granted to students entering the School with G.C.E., "A" level passes in any of the following subjects: Mathematics, Physics, Chemistry, Biology, Botany or Zoology, as they will not

be required to sit examinations in that subject. Because of the agricultural flavour of the above mentioned courses offered at the J.S.A., the student will be required to audit such subjects.

Students pursuing the Agricultural Science Teacher Programme will undergo the same academic and technical training as the Diploma or Associate Degree graduate in Agriculture. However to provide training in pedagogy the following additional courses are given:

- a) One extra course in English
- b) One course in Psychology
- c) One course in Foundations of Education
- d) Two courses in Methods (general and agricultural)
- e) One course in Visual Aids
- f) One course in Curriculum Development
- g) Practice Teaching.

Those entering the School with a Teaching Certificate from another institution will be allowed exemptions in English, Foundation in Education and Methods (general).

A graduate who successfully completes the programme will be given in addition to the Diploma or Associate in Science Degree in Agriculture, a certificate in Agricultural Teacher Education. This certificate is granted in association with the Joint Board of Teacher Education. The granting of the certificate is based on:

- a) Satisfactory completion of the agricultural component of training before practice teaching,
- b) Completion of a study (thesis) consonant with his individual interest,
- c) Passing a comprehensive written examination in education, and
- d) Perform satisfactorily the practice of teaching.

The curricula for the respective programmes are presented in Appendix VII.

Critique on the current J.S.A. Programme:

The J.S.A.'s academic programme is currently weighted in the basic sciences because of the serious weakness in science subjects among recruits from the Primary and Secondary Schools. This situation has resulted in approximately 30% of academic effort being spent in upgrading students before they proceed to the professional production courses. Thus, there is essentially very little time for real assimilation of subject matter as well as practical experience in the current two-year programme. Coupled with the general weak background of students is the combined shortages of teaching staff, land and physical facilities. The situation has essentially worsened since 1975 due to low staff recruitment and increased student numbers (appendix VII Ia, VII Ib).

The Land Situation:

The current acreage available to the J.S.A. for the teaching and production programmes for an average population of 350 students is 90 acres distributed as follows:

70 acres - pastures,

16 acres - museum plots and areas for agronomic practices,

4 acres - buildings.

This situation is due to the fact that the greater portion of the J.S.A. lands are not arable because of its rugged terrain in an extremely poor rainfall area. Furthermore, 189 acres of flat lands were released for the new Jose Marti Secondary School.

The J.S.A. minimum requirements for the practical training programmes commensurate with the student enrolment is as follows:

Animal Science Teaching Unit	150 Acres
Agricultural Engineering Teaching Unit	45 "
Agronomy Teaching Unit	<u>210 "</u>
TOTAL	405 Acres

The 405 acres is therefore the minimum required for functional teaching units for up to a total of 450 students. The scope for commercial or large scale production of either plant or animal products is very restrictive on 405 acres. As such, it is imperative that in terms of providing the needed commercial production experience with all its ramifications for students, a more extensive acreage is required. It is therefore recommended that 750 to 1,000 acres be obtained for such purposes.

It is therefore envisioned that the whole concept of agricultural production education at the J.S.A. level could be put on a sounder footing should a "Hillside Station" be made available in view of the following historical and current conditions:

- a) The J.S.A. has not experienced to date the full complement of physical facilities to support a modern agricultural technological exposure. This is due to the incomplete expansion of laboratory facilities under the World Bank Loan of 1968-71, namely; Machinery and Produce Storage Facilities, Feed Store Room, Sheep and Goat Unit, Slaughter House and Meats Laboratory, Dairy and Food Processing Unit, and Cold and Smoke Rooms.
- b) The current J.S.A. facilities are limited to some applications of technology to flat land farming since the bringing in of the

- surrounding hillside lands into agricultural production would prove too expensive.
- c) Based on items (a) and (b) a "Hillside Station/Branch" could provide a cross section of land terrain which would be more representative of rural Jamaica as well as the support systems for the handling activities of animal and plant products through to marketing.

The Jamaica School of Agriculture Short Courses:

In response to many requests in recent times to hold evening classes in several areas of applied agriculture, the J.S.A. started an Evening Division as of September 1975. Initially, the courses were given by the Department of Agronomy. Five courses are given.

The courses are summarized as follows:

1. Plant Propagation

Plant Propagation will cover practical exercise in budding, grafting, circumposing; selection, preparation and rooting of cuttings; sowing seeds and seedlings; care, the establishing and maintenance of lawns; identification of lawn grasses; construction and use of a home-made propagator; soils identification, and the use of manures and fertilizers; propagation tools, and their use.

The course is designed for farmers, gardeners, nurserymen, members of 4-H Clubs, and Horticultural Societies, and any other interested persons.

2. Vegetable Production

Vegetable Production will include selection of varieties, spacing, time, and methods of planting; weed, disease, and insect

control; harvesting, handling, storage and marketing, as well as special problems associated with the growing, of some selected vegetables.

This course will consist of both practical and theory and will be geared for farmers, 4-H Club Members, or anybody who requires a good background in the production of vegetables.

3. Backyard Gardening

This course will cover the production of fruits, flowers and vegetables in a garden situation. The economic use of space and facilities will be emphasized. Special attention will be paid to companion cropping, low maintenance gardening, as well as garden sanitation. The basic aim of the course is to increase home gardening production to satisfy home needs.

This course is designed for all home gardeners.

4. Container Gardening

The basic aim of the course is to teach the efficient production of flowers, fruits, and vegetables in containers. The growing of plants in containers for household purposes; Horticultural Shows will also be emphasized.

The course is designed for all persons interested in container gardening, especially those living on limited land areas.

5. The Efficient Use Of Fertilizers And Manures

This course covers the principles underlying fertilizer use, functions, and methods of application. Purchasing, mixing, and storing fertilizers will be included.

The course is designed for estate managers, farmers, fertilizer salesmen, and all other persons who buy, use, or advise on the use

of fertilizers.

The courses have been very well received by the public and should be continued.

The University of the West Indies (U.W.I.) Faculty of Agriculture

The Faculty of Agriculture of the U.W.I. was created in 1960 as a result of merging the former Imperial College of Tropical Agriculture and the then University College of the West Indies. The Imperial College of Tropical Agriculture as indicated earlier was established in 1922. It was then regarded as the West Indian Agricultural College with the objectives of providing instruction to tropical agriculture and in the cultivation and preparation for market of tropical produce of any kind. In 1924, the name of the Institution was changed to the Imperial College of Tropical Agriculture which has since received recognition as a world renowned institution for education and research in tropical agriculture.

As of 1960, the Faculty offers a Bachelor of Science Degree, general agriculture course. Admission to this programme requires candidates to possess G.C.E. passes in five subjects of which at least two must be at the Advanced "A" level. Special requirements include "O" level passes in English and Mathematics and "A" level passes in Chemistry and Biology. Admission to a preparatory pre-agriculture year is permitted to candidates who possess five G.C.E., "O" levels which include English Language and Elementary Mathematics. Graduates of the J.S.A., Guyana School of Agriculture and the Eastern Caribbean Institute of Agriculture and Forestry in Trinidad may matriculate into the first year degree programme.

Further graduate training are also offered at the Master of Science and

Doctor of Philosophy levels in various Departments of the Faculty, namely; Crop Science, Livestock Science, Soil Science, Agricultural Economics, Agricultural Extension and Biological Science. Plans are now being completed for the offering of a B.Sc. Degree in Agricultural Engineering by the Faculty.

The Department of Agricultural Extension of the Faculty organizes a series of short courses on an annual basis for the Windward and Leeward Islands. The venue for these courses is rotated from island to island within the respective groupings.

SEMI-FORMAL EDUCATION

4-H Clubs:

The Jamsican 4-H Club is an educational movement designed to increase the attractiveness of rural life by generating a responsiveness to improved practices in agriculture and home craft. The organization caters to young people between 10 and 21 years of age. Top priority is given to programmes of vocational education in agriculture for the development of the right attitude to farming and other agricultural practices. The education process is organized to provide a standard equivalent to grade 6.

Accordingly, the programme is divided into three components or phases.

Phase 1.

Provoation, which focuses on preparation, discipline, work habits, record keeping, leadership, competitions, achievement and team work. From the agricultural standpoint, training is done in one day sessions, short courses and field trips to provide:

- a) general information for awareness,
- b) method demonstration to support interest,
- c) projects, and
- d) results evaluation.

Phase 2.

Emphasises knowledge and skill in agricultural enterprises and related skills associated with dairying, small stock management, vegetable production, tractor operation, farm mechanics, farm carpentry, home making activities, cooperative education and agricultural apprenticeship opportunities.

Such training activities are done in 10 - 40 weeks residential courses at any one of the 10 training centres supplemented by field trips and audiovisual aids.

Phase 3.

Marketing is emphasized in this phase. Effort is also made to provide opportunities for self employment or wage earning.

The 4-H Clubs organization is not terminal in performing the function of furnishing trained manpower for the employment field. However, it currently influences an adolescent group in excess of 6,000 senior boys and girls who may be regarded as having marketable skills. These members have been bringing their economic and career problems to the Organization. The Organization, in turn, has been expanding its projects in aspects of agricultural education to improve skills in vocational interests.

4-H Club Training Centres:

Training Centres were established under both Government (Ministry of Agriculture) and private sponsorship, where possible to serve as the focal point of agricultural education activities for a particular geographic area. These centres (Table 3) form permanent teaching projects in Agriculture and Home Economics and make possible the continuity of programmes through periodic residential training.

JAMAICA 4-H CLUBS TRAINING CENTRES

Centres	Location	Acres	Accommodation	Programme & Major Enterprises	Residential	Non Residential
Denbigh	May Pen P.O. Clarendon	2	80	2 x 20 Weeks Course In: a) Farm Mechanics Farm Carpentry Metal Fabrication b) Production of Citrus Plants	15 15 15	100 100 50 100
Salisbury Plain	Salisbury Plain P.A. St. Andrew	2½	40	2 x 20 Weeks Courses In: a) Cottage Industries b) Rabbit Production	15 10	100 100
Arminster	Myersville P.O. St. Elizabeth	22	30	2 x 20 Weeks Courses In: a) Small Livestock Husbandry b) Goat Production	8 8	200 200
Anne Douglas Dillon	Jericho P.O. Hanover	20	30	2 x 20 Weeks Courses In: a) Small Farm Operations b) Domestic Food Production	15 -	100 100
Charlottenburgh	Hyhgate P.O. St. Mary	6	30	2 x 20 Weeks Courses In: a) Home Management b) Cocoa Production	15 -	100 100
Vernemfield	New Yarmouth P.A. Clarendon	50½		Short Courses In: a) Dairy Husbandry and Management b) Milk Production	15	200
Roehampton	Roehampton P.A. St. James	19	30	Short Courses In: a) Home Management b) Production of Pimento	10	200 50

JAMAICA 4-H CLUBS TRAINING CENTRES (Cont)

Centres	Location	Acres	Accommodation	Programme & Major Enterprises	Residential	Non Residential
New Forest	Duenvale P.O. Trelawny	35	30	Short Courses In: a) Small Farm Operations b) Meat Cutting c) Production of Beef Cattle and Plantains	10	100
Rose Hall	Linstead P.O. St. Catherine	10%	40	a) Home Management b) Plant Production c) Fish Farming		150 150 50
Thatchfield	Surge Town P.O. St. Ann	26	16	Apprenticeship Farming (Contemplated)		
Bog	Darliston P.O. Westmoreland	26	12	Apprenticeship Farming (Contemplated)		
TOTAL 11		219%	338		151	2,350

Centres are used for both boys and girls to provide training in home economics, woodwork, vegetable food and orchard crops and livestock rearing. Courses range in duration from a one day training exercise up to 20 weeks in residence.

Constraints of the 4-H Clubs are:

- a) dependence on volunteer workers due to insufficient established positions on its staff,
- b) lack of clerical assistance,
- c) lack of home economics personnel to administer the programme,
- d) lack of coordination between agencies within the Ministry of Youth and Community Development in presenting programmes,
- e) lack of financial support to assist economically viable projects,
- f) inadequately qualified and experienced staff cause the organization to be plagued with rapid staff turnover, and
- g) termination of club life at 21 years of age.

There are agencies with similar functions of the 4-H Clubs. Moreover the 4-H Clubs are basically dependent on the Ministry of Agriculture for trained agricultural personnel to assist in manning their programmes.

The Youth Development Agency (Youth Community Training Centres) has members belonging to 4-H Clubs. Both agencies offer training in agriculture and home making skills but their personnel are not shared. Therefore closer coordination between agencies could result in better utilization of the available manpower.

Failures experienced by the organization include: senior clubs cannot be expanded readily to maintain continuous contact, viable economic projects

can only be done by senior members, and the organization cannot satisfactorily place people trained in skill.

Criticism levied at the 4-H Club programme points out clearly that in order to effectively fulfill the prescribed role this organization required strengthening in staff, finances and physical facilities. It is apparent that the existing training centres are underutilized therefore should be considered for continuous use as intensive residential skilled training centres. There could also be a senior arm of the organization to encourage the development of clubites into full fledged farmers.

Youth Clubs: (Youth Community Training Centres/Camps)

In 1965 youth clubs were established with agriculture as the major activity. The objective of the agricultural programmes in the Youth Community Training Centre is two fold:

- a) to provide trainees with information on the importance and scope of agriculture, in order to create an awareness of and an appreciation for the subject, and
- b) to equip trainees with farming skills which enable them to become efficient producers or to provide specialized services to the farming community.

Three of the former Youth Camps have been selected to offer training in agriculture to youngsters 16-19 years of age. The three centres with their respective programmes are as follows:

1. Cobhla

- a) Livestock - Dairy Husbandry, Pig Husbandry and Meat Cutting and Processing,

- b) Crops - Irish Potatoes, Roots and Tubers, and Grains and Legumes,
- c) Farm Mechanics - Tractor Servicing, Tractor Operating, and Small Motor Repairs.

2. Chestervale

- a) Crops - Coffee, Horticulture (vegetable and flowers),
- b) Special Projects - Forestry and Lumberjacking.

3. Cape Clear (Residential)

- a) Livestock - Poultry Rearing (broilers) and Small Stock,
- b) Crops - Horticulture, Orchard Crops.

Where possible projects are operated on commercial lines, thereby introducing a business element in the operations and at the same time providing revenue for the centre.

Training Programmes:

The programmes are organized into two phases:

a) Orientation Period:

During the first six months of the programme trainees are involved in areas of Family Life Education, Recreation and Cultural Exposure and Academic Improvement. This period is also utilized to offer a background course in Agriculture which is designed to create an awareness of the importance of agriculture and its scope.

b) Skill Training:

At the end of the six months it is anticipated that the trainees will have decided on an agricultural career and thus be ready for skill training. The aim is to produce a trainee



with particular skill whether in livestock, crops or farm machinery. The period of training is provisionally one year but can vary dependent on the skill being taught.

Staffing:

Staffing is on basis of 1 instructor for every 25 trainees. Senior Instructors will head each department with Instructors (paid or volunteers) responsible for training. Projects with commercial inputs are staffed with "Attendants", to be remunerated from profits. As programmes develop it is envisaged that senior trainees will be employed in these capacities. Resource Personnel from Local Land Authorities are asked to assist in the teaching programme.

Community Involvements:

Plans are being made for trainee farmers from the centres to get exposure to actual conditions in farming through field trips and placement on successful farms in the area. Farmers will also be invited to visit the centres and field days will be organized for the mutual benefit of trainees and farmers.

Recruitment of Trainees:

The area of recruitment is crucial to the success of the programme. Recruits are obtained from Youth Clubs, unemployed youngsters, 4-H Clubites, who have achieved up to grade 9 qualification or require minimal up grading to that level.

At present not many youngsters wish to pursue agriculture as a vocation. The view has been expressed, however, that given the right incentives and the opportunities, many of our young people would enter the agricultural field willingly.

In the first instance, recruitment for agriculture will have to be selected

island-wide and close co-operation with the Land Authorities in this area through referrals is anticipated.

Women in Agriculture:

The entire programme in agriculture is designed to cater to both sexes. However, it is recognized that certain activities have been traditionally regarded as male domain, in terms of job opportunities. The Jamaican woman has played an important role in Jamaican Agriculture and it is hoped that any apparent discrimination will be removed.

Notwithstanding the foregoing, the woman with agricultural training has a role to play as a support and consultant to her male counterpart even though she may not herself be engaged in actual production.

Placement of Graduates:

As mentioned previously the programme aims at producing a new breed of farmers and farm employees. Note is taken of Government's programme in developing new dimensions in agriculture of which the Youth Centres must be an integral part in providing the human resources. It is anticipated that graduates from the agricultural centres will be incorporated in the overall Agricultural Programme and assisted with capital to set up business.

Co-operative Projects:

It has long been established that it is necessary for the private enterprise to collaborate with Government in the development of the Agricultural Sector. The Youth Development Agency in recognition of this fact have embarked on a programme of collaboration with the Commodity Associations and other bodies in developing its agricultural programme. Basically, the policy is to invite these other bodies to establish training projects (in the centre or outside) where trainees are involved in a learning/earning process.

Successful trainees are placed in production or employment situations either individually or as co-operative.

The Lumberjack Project at Chestervale and the Tobacco Project at Woodleigh (involving trainees from Cobble) are two examples of Government, Commodity Associations and Private Enterprise working together for the common good.

This co-operation has also extended to the International field. The Future Farmers of America (F.F.A.) have donated 10 pure-breed breeding gilts to Youth Development Agency to start a Pig-chain Project among interested trainees. This project is now being established at Cobble in conjunction with the Ministry of Agriculture (Swine Research Division).

Collaboration with the Ministry of Agriculture:

The programme of agricultural training in the Youth Community Centres must form an integral part of the Agricultural Programme for Jamaica. Trainees from the Centres must be equipped to enter into the programmes of the Ministry of Agriculture. It is essential, therefore, that the closest co-operation should be established with this Ministry and contacts have already been established with Senior officials in the Ministry with a view to promoting this co-operation.

Of particular interest are in the following:

- a) Recruitment of Trainees,
- b) Resource personnel for the training programme,
- c) Collaboration with the local Land Authorities, and
- d) Placement of Trainees and follow-up

Expansion:

It is anticipated that the centres will cater to over 1,700 students

per annum at a cost of \$1,000/Student. The expansion of the Youth Community Centre programme envisages the establishment of additional Agricultural Centres. Serious consideration is being given to the establishment of "Settlement" Centres. Trainees will be recruited from existing Agricultural Centres and placed in allotted farm holdings. They will be assisted in the development of a farmstead housing, farm buildings and other capital costs. The co-operative principle will also be introduced.

Agri-Business:

There are various possibilities in this field including processing, sales and service and related industries. This could be an area for absorbing many who either lack the desire or skill to go into production. Also it is an area where private enterprise could play an important role in helping the industry to develop.

General Comment:

Youth Camps have been fairly successful in being self-sufficient but have had failures in producing farmers. This has been attributed to limited staff, financing and land. Lack of job opportunities for graduates in agriculture and the greater attraction for technical skills of another nature.

As far as agricultural education is concerned the general observation is that ex-campers have only minimal knowledge of modern agricultural production. Other basic ingredients missing are lack of skill, low level of literacy and cooperative mindedness. This situation is being remedied by an up grading of the curriculum. See Appendix IX.

Jamaica Agricultural Society

The Jamaica Agricultural Society came into existence as early as 1895.

(See Appendix JAS). The service performed by this Agency include:

- a) organization of marketing,
- b) representation of farmers, (Farmer - Govt. - Farmer),
- c) information and education, and
- d) farm supply service:

All agricultural information as they pertain to extension activities, including Government programmes, are commuted by way of pamphlets and verbally to farmers through the Branches of the Society. The JAS also has used the medium of Agricultural Shows as a means of public education in things related to the agricultural industry. There are also unique agricultural education programmes via the commodity associations training and field days. From the foregoing, it is evident that the main target is the farming public.

Structure:

The section associated with agricultural education and information has 12 personnel whereas farmers representation has 5; agricultural organization and marketing has 82. There are shortages of staff as project officers and technical advisers. These shortages are due primarily to inadequate salaries offered for the respective grades at the level of qualification required.

Problems, Constraints and Defects affecting performance of the Jamaica Agricultural Society:

The J.A.S. up until 1951, operated as the sole agricultural extension agency and served with other agencies as a full-fledged arm of the Coordinated Extension Services between 1951 and 1962. Between 1962-72, the J.A.S. did not function as a part of the Coordinated Extension Service but operated on an independent basis in which case all government programmes were channelled

through the Ministry of Agriculture and the Ministry of Rural Land Development Extension Services. Further reduction in effectiveness of J.A.S. Extension Services was brought about by the introduction of the Land Authorities in the later 1960's.

The services of agricultural information and education are also being carried out by the Agricultural Information Service (A.I.S.) of the Ministry of Agriculture, A.M.C., Youth and Community Development and Social Welfare Commission. The J.A.S. was always recognized as the sole agency sponsoring shows and fairs at the district, parish and all-island levels. However, during recent years other agencies have also been sponsoring shows and fairs.

Over the past 12 years the Society has been of service to 83,000 Branch Members including those from its commodity associations. The views of farmers are expressed from the level of the Branch Society. By this means farmers' views are at all times used in influencing the scope and execution of services offered by the Society.

Young staff members on entering the J.A.S. organization are exposed to a 3 month pre-service training programme. Periodically members of the staff are offered travel scholarships to attend Agricultural Extension Conferences in various countries.

Short term extension courses and seminars have been offered at the U.W.I. U.S.A. and in Central America under the sponsorship of the USAID programme for the staff. The Society hopes to continue as the recognized body sponsoring agricultural fairs and shows both at the local and national levels. It also anticipates continued service along with the AIS of the Ministry of Agriculture in disseminating all agricultural information through the Branch Societies and Parish Associations. To effectively provide this service the Society is proposing to reorganize on a regional basis.

Ministry of Agriculture - Extension Services

The purposes of an agricultural extension service are:

- a) To ascertain the national food requirements for domestic and export trade and to mobilize farmers and other agencies to meet production targets.
- b) To teach farmers to improve their methods of production (crops or livestock) to effect economic returns.
- c) In conjunction with other agencies, to improve the quality of life of the rural community.

The extension services have a potential of a half a million farm visits, 150,000 demonstrations as well as influencing over 50,000 farm families in 5,000 field days per annum. Residential training is also arranged to supplement the on-the-farm and in-the-home training. The content of such programmes are in accordance with developments planned for the respective communities.

Staff Training:

This is subdivided into pre-service training, induction training, in service training, graduate training and short courses.

Briefly, pre-service training is incorporated in the curriculum of the J.S.A. extension methods courses. This has been since the early 1950's as a means of preparing graduates for entry to the Extension Services in support of the Government's thrust in agricultural production.

Induction training is planned for all recruits to the service through lectures, discussions, workshops and tours. The exposure is geared to bringing the recruits up-to-date with Government policies and schemes and the methods of execution.

In Service training is designed to keep the staff ahead of the farmers

with regards to development of techniques and innovations in production agriculture.

Graduate training in Extension Methods and Education is encouraged. Candidates are selected from the professional staff to pursue studies at a reputable University.

Short courses, recruits from the professional staff are granted fellowships under various International Agencies to pursue courses up to one year in duration at an overseas institution. Such courses are usually designed to keep the staff abreast of recent developments in Extension Services for agricultural and home economics.

The Ministry of Agriculture and its agencies are the principal employer of an agricultural extension staff. Currently they experience shortages of qualified staff both at the technician and professional levels. The J.S.A. supplies personnel who serve at the Agricultural Area Officer level whereas professionals are graduates with at least a first degree who serve as extension specialists. The shortage of this latter group is even more severe than the former. Although the U.W.I. Faculty of Agriculture has been producing graduates in agriculture for a number of years, up to 1975 only two of their graduates opted to service in the Extension Services. As a result of such a situation there are serious shortages of professional extension specialists.

The predicted additional requirement for agricultural extension officers between 1975-1980 was as follows: Extension Specialists - 10, additional Area Extension Officers - 175, District Extension Assistants - 175, and Agricultural Credit Officers - 20.

Animal Health Assistants:

The available trained manpower is inadequate to protect the human and animal health in Jamaica with ambitious livestock development programmes.

supported financially by the World Bank, the USAID and the Government of Jamaica.

There exists a great void in the services to the producer of animal protein and the public health services in general for the control of diseases of animals transmissible to man. Along with the public hazard, serious economic losses and demunition of animal protein take place. Therefore the control and prevention activities directly associated with zoonosis control and food hygiene are essential.

Academic or technical training in veterinary medicine or animal health has only recently been introduced in the Caribbean Region (1974). This occurred as a result of the Ministers of Agriculture at the IV Inter-American Meeting of Foot and Mouth Disease and Zoonosis Control adopting a resolution on human resources in animal health resources in veterinary medicine and subsequent development of training programmes in Jamaica and Guyana.

Jamaica needs to train 120 animal health and veterinary public health assistants. Because of the urgency of such need, a 10 month crash course was mounted by the Ministry of Agriculture Veterinary Division in association with the Pan American Health Organization to produce animal health assistance. This however is an interim measure as a Regional Training Centre was established in Guyana in 1975 to implement a two year course in animal health.

Farmers Training Centres:

These are operated by the Ministry of Agriculture Extension Services Centres and are located at Twickenham Park, Spanish Town, Eltham, along with three other training centres which are temporary (Werminister, Goshen, and Knockelva). These residential centres are supplements to the on-the-farm and in-the-home training.

Specialist Training Activities:

Dairy Training Programme:

Two training centres are in operation. Goshen (419 acres) and Rhymesbury (265 acres) equipped with dairy barn milk house and commercial herds, dormitory, kitchen facilities for trainees and staff houses. The training is basically one to develop skills in dairying and calf rearing and instruction is given by visiting specialists.

Forestry Education:

A programme of afforestation is vital to the development of Jamaica's hillside land when it is recognized that only 30-33% of the total land area is suitable for intensive crop and livestock production.

The Forestry Department is the only unit which carries out a programme of forestry education to produce the trained manpower to work as foresters, wardens, forest extension agents or work in soil conservation, saw milling, logging, land use or mapping. The Jamaica School of Agriculture offers only an orientation course in forestry as an option to students interested in such a career.

The Forestry Department has proposed up to 1974, the need for the following categories of workers as well as duration of courses required:

- a) Foresters - 40 trainees for a 4-6 months course of which 50% should be of a practical nature,
- b) Wardens - 40 trainees for a 3 months course of which 50% should be of a practical nature,
- c) Forest Extension Officers - 2 trainees for a 1-2 months course,
- d) Soil Conservation - 10 trainees for a 4 week course of which 50% should be of a practical nature,

- e) Sawmilling - 4 trainees for a 2 week course,
- f) Logging - 6 trainees for a 2 week course,
- g) Road Construction - 6 trainees for a 4 week course, and
- h) Land Use and Mapping - 5 trainees for a 2 week course.

The practical aspect of the courses are carried out in the field in association with activities at two centres.

In view of the limited teaching facilities within the Forestry Department it would seem rational to recommend that they utilize some of the facilities at the Jamaica School of Agriculture or The Farmers Training Centre for the respective training programme. To meet the continuing needs of this department because of staff turn-over, it is necessary at this time to implement a more formal and economic training programme to produce manpower in view of the very small number of trainees.

EVALUATION OF EXISTING PROGRAMMES

At the end of what may be classified as Primary Education, examination results in technical subjects at the Jamaica School Certificate level in 1975 (Table 4) revealed a very high percentage failure in agriculture and agricultural science. This was consistent with the general poor performance in technical subjects, although performance in the agricultural subjects was among the poorest.

A review of the vocational subjects offered in the Technical High School (Grades 7-11) in 1975 showed that agricultural science ranked third out of 21 options (Table 5). The across-the-board participation reflected general interest in agriculture and compare favourably with popular subjects such as technical drawing, art and craft, cookery and metal work. However, there was a decline in interest or participation at the grades 10 and 11 levels. In the Secondary Schools (Table 6) at the grade 10 level, agriculture as a choice was also low in rank.

Of special interest are the results of a vocational tracer study, by the Research Section of the Ministry of Education, of the 1976 New Secondary School graduates' response to vocational training and job expectations. It indicated that 10,432 out of 14,736 students or 70% expressed the desire to immediately enter the work force after leaving school and the remainder continue with further education. Eighty two per cent of this potential work force (8,598) were pursuing a vocational course which provided some practical exposure for 16 periods per week. It was further observed that 26% of the students in vocational courses planned to continue their education at a post-secondary institution such as J.S.A., C.A.S.T., Teachers' College and others.

A sample survey showed a pattern of job popularity by choice which was

TABLE 4

JAMAICA SCHOOL CERTIFICATE EXAMINATION RESULTS (1975)
(TECHNICAL SUBJECTS)

Subjects	No. Sitting	% Passing
Agriculture	1,002	18.5
Agricultural Science	417	22.1
Art	508	65.7
Art and Craft	100	73.0
Auto Mechanics	180	27.8
Commercial Practice	660	35.0
Cookery and Nutrition	929	47.9
Electrical Installation	929	18.5
Home Management	278	45.0
Metal Work	156	32.0
Needle Work and Dress Making	220	45.0
Plumbing	45	28.9
Technical Drawing	319	23.5
Wood Work	114	20.2
Accounting Principles	934	22.8

TABLE 5
VOCATIONAL SUBJECTS TAKEN IN
TECHNICAL HIGH SCHOOLS (1975)

Subjects	No. of Students in Grades					Total
	7	8	9	10	11	
Agricultural Science	148	478	474	90	46	1,236
Music	148	147	-	-	-	295
Drama	-	217	207	-	-	424
Art & Craft	148	821	691	50	68	1,778
Wood Work	-	294	226	35	42	597
Metal Work	-	348	284	112	86	830
Auto Mechanic	-	54	86	104	82	326
Engineering Science	-	-	41	280	229	550
Building Science	-	-	81	81	57	219
Surveying	-	-	58	55	26	139
Technical Drawing	-	291	435	285	236	1,247
Electronics	-	-	17	21	15	53
Electrical Installation	-	-	59	75	24	158
General Work Shop	43	113	44	-	-	200
Welding	-	10	36	30	5	81
Plumbing	-	-	25	-	-	25
Cookery	-	265	336	199	186	986
House Craft	-	373	128	35	25	561
Home Economics	104	118	157	-	-	379
Commerce	-	-	72	107	152	331
Principles of Accounts	-	-	100	340	321	761

TABLE 6

VOCATIONAL TRAINING IN SECONDARY SCHOOL

GRADE 10 (1975)

<u>Subjects</u>	<u>Enrolment</u>
Agriculture	663
Typing & Office Practice	1,811
Clerk & Salesmanship	698
Catering Services	58
Child Care	739
Dress Making	1,494
Food & Nutrition	911
Hotel Service	927
Crafts	838
Auto Mechanic	129
Carpentry	1,383
Electrical Installation	1,737
Drafting	41
Machine Shop & Welding	928
Plumbing	19

as follows:

Agriculture	- 4.5%	Auto Mechanics	- 3.3%
Business Education	- 27.1%	Carpentry	- 4.0%
Food and Nutrition	- 8.6%	Electrical Installation	- 8.9%
Child Care	- 14.1%	Drafting	- 6.1%
Clothing and Textile	- 2.8%	Machine Shop	- 4.9%
Craft	- 1.8%	Plumbing	- 0.2%
		Miscellaneous	- 19.4%

These results are typical of the traditional low ranking choice of agriculture. As pointed out in the study, the availability of vocational guidance, the numbers of students who can be accommodated in a subject, and the quality and job orientation of instructions given, are factors influencing the pattern of choice.

Diagnosis of Attitude Toward Agriculture:

As a result of interviews from sample surveys among High School and secondary School students in urban and rural settings, there has been a consensus of opinion that agriculture should be a compulsory subject in the school system. There was however the feeling that the student should have the right to decide on the careers of his or her choice. The same group of students expressed that in terms of national importance agriculture ranked first as an occupation which should receive serious thought. However their interest in pursuing agriculture as a career was on the provision that it could provide a "decent living". This attitude reflects the major concern by the individual to pursue a career wherein there is an assurance of a "reasonable economic return" for his or her input irrespective of national

importance or personal likeness of pursuits for a livelihood.

A further examination of attitudes of students towards agriculture as a career indicate that they evaluate the economic rewards obtained by their's as well as other parents and so tend to avoid the dilemma of those who do not seek out a satisfactory level of existence. As a result of the persistent low returns from agricultural occupations versus others, many parents in rural areas encourage their children to seek careers outside of farming. This is especially so because of factors associated with the size farm holding, the number of children in the family as well as the viability of the farming enterprise pursued. A fairly high percentage of rural families have an average of six children on holdings under 5 acres. The general advise given to such children is to get an education, a good job and not follow the footsteps of their father or the farming "bread winner" of the family. Along with the foregoing is the attitude that to be "somebody" an urban job and association is essential. This type of thinking undoubtedly promote further rejection of a rural life style especially when the urban centres provide ammenities or access to essential services which include piped water, electricity, satisfactory roads, transport systems and medical services. By the same token there is a consistent disdain by the urban population for rural living because of the lack of such facilities. Such attitudes create a type of social elitism and a condensation to rural life and farming pursuits. On the other hand there are rural families who have been traditional farmers with varied size farming units which are economically viable. Such families encourage at least one of their children to acquire knowledge of the enterprise through formal education or otherwise so as to ultimately take over the management in time. Usually in such families a good attitude towards work is well established

and the language and requirements of production agriculture are fairly well understood. Access to some types of social amenities do not pose a problem e.g. piped water, electricity and transportation as these are fundamental to the satisfactory economical state of the business.

The rapid urbanization process occurring in the Jamaican Society based primarily on non-agricultural industries, trading rather than agro-industry and productivity assist in retaining the traditional low esteem of agriculture. Fortunately there are a few attempts by the Government within recent years to encourage agro-industry complex development in rural areas. Example of such effort include the starch factory, the Cornwall and Shettlewood dairy schemes, the Northeast Clarendon Project. These and other such projects give meaning to agricultural occupation as farmers can see end points of production target in terms of an assured market for products.

As a result of the stability of some major industries e.g. the bauxite industry, rural townships have developed and agricultural productivity has been converse to the degree of urbanization. On close scrutiny however, a dicotomy exist wherein workers in the major industry do farm on a scale to meet their domestic requirements. Simultaneously the farmers in the out-lying areas do provide a major support system for more staple produce.

The foregoing situations demonstrate quite readily the existing model within which levels of agricultural education requirements are to be provided and to whom it is to be directed within the private sector. On the overall it can be concluded that agricultural education is required by:

- a) personnel up to the professional level who service public and private sector production programmes,
- b) the professional farmer in the respective discipline areas
- c) that sector of the community desirous of maintaining an element of

domestic self-sufficiency,

- d) the general public for appreciation of agriculture as a major industry necessary for our very physical survival.

It is estimated that the under 15 year-old group of youngsters in the less developed regions of the world exceeds 40% of the population in comparison to less than 25% in the more developed regions. This means that the poorer nations of the world (including Jamaica) have to shoulder a very heavy burden in social services such as schools. There is great need in the Jamaican Society to knot together the needs of the young and the illiterate adult generation if an education for development is to motivate people for such development. Within this context whatever rural development policies are to be adopted the responsibility for their implementation cannot be limited to one Ministry of Government, e.g. the Ministry of Agriculture or Education. Success depends on the simultaneous involvement of a large part of the government agencies including the Ministries concerned with roads, water supplies, housing and electricity, health and community development. Such an approach permits for a more satisfactory interplay of three fundamental factors in behavioural change namely; 1) ideology - value orientation, 2) technology - the use of material resources to improve the quality of life, and 3) organization - the getting together of people for social order.

For agricultural education to have meaning it must act as a catalyst for behavioral modification for immediate impact on national agricultural goals. From the very onset of exposure to agriculture there seem to be the need for a type of understanding for the technology which should be used to alter the feeling of low esteem and helplessness.

On examination of the curricula (formal and informal) used in the past as well as what is proposed for implementation there is no doubt about the

input of technology. However, in the absence of very clear political and social goals the technological policies and inputs have tended to dissipate as new technologies for its own sake. Thus agricultural education and technology should be regarded as interactive or interdependent components with the political considerations related to the intent for change or national goals.

In 1970-71 it became policy for the agricultural sector to be geared to feed the nation. Many excellent people-oriented innovations were brought on stream since 1972 which include projects as Operation Grow, Project Land Lease, Project Food Farm, Project Self-help; as well as new thrusts in the sugar, banana, food crops, citrus, coffee, cocoa and livestock industries.

Invariably the projected responses have not met predicted targets. Among the factors associated with agricultural education which contribute to such status are:

- a) low level of skills, know how and managerial ability,
- b) labour shortages associated with the low esteem for agricultural work at most levels,
- c) inadequacy of research for development of improved varieties of plants and lines of animals and systems of management within the local environment as well as not following technical advice,
- d) inadequate development of group activities among farmers who could benefit from reduced capital and recurrent expenditure through organized cooperative effort, and
- e) inadequate training facilities to up grade the skills of farmers and workers.

Such observation would suggest that developments have occurred with very little testing or evaluation before large scale implementation. It is quite

likely that there is a requirement for more indepth study of community and individual needs for self dignity, housing and living conditions and alterations in the socio-economic structure to accommodate the expectations of the individuals involved.

Financial Support for Agricultural Education

It is difficult to make a discrete assessment of the financial support to promote agricultural education at the respective levels. However, a synopsis of the direction of support in human resource developments may give some indications.

The result of a UNESCO study in 1964 laid the foundation for major external assistance programmes. In 1966 the IBRD (International Bank for Rural Development) project began to establish 50 Junior Secondary Schools and to provide some teacher education, agricultural, industrial and commercial training. This was supported by US \$9.5 million loan. In 1971, a second loan was made by IBRD, US \$13.5 million for similar intent. Likewise, CIDA (Canadian International Development Agency) made a loan of US \$1.35 million to assist with the renovation or construction of primary schools.

Technical assistance has also been given in the form of Scholarships and Fellowships to Jamaicans to study in the United Kingdom, Canada, Mexico, Venezuela, Israel, Denmark, France and Germany in various aspects of education. The OAS (Organization of American States) is also involved in granting Fellowships to Jamaicans for upgrading in the fields of elementary education testing and agricultural education.

Between 1970 and 1971, the IDB (International Development Bank) made loans totalling US \$9.2 million for projects designed to provide financial and technical assistance to farmers operating farms 5 - 25 acres. Subsequently

a loan of US \$7.9 million was proposed to assist in providing working capital for farms less than 5 acres as well as over 5 acres. The UNDP (United Nations Development Programme) has made major grants and technical assistance in the area of forestry, water shed management and plant diseases. In 1973, USAID complemented this programme with a loan of US \$4.4 million for forestry development.

In terms of local spending the development of agricultural education in the schools is of significance. Estimates of expenditure for programmes and projects excluding staff support between the period 1969 - 1974 are presented in Table 7. Because of the low numbers and high turn over rate of agricultural teachers, it was difficult to assess costs in this area. However, the data obtained irrespective of the degree of accuracy, strongly suggest that High Schools received priority attention.

In 1974-75, schools in which a commercial farm unit was introduced received allocations of up to JA \$20,000 to meet the costs of structures, equipment and fencing. In other cases grants of JA \$3,600 per annum were made to set up tutorial farms. However, these grants were made only to schools which had an agricultural science teacher on its staff to ensure proper supervision. It may be readily assumed on the foregoing that the shortage of agricultural science teachers restricted in a serious way expenditure on agricultural education in the school system.

The estimated recurrent cost for student at the Knockalva Vocational Agricultural School was JA \$600 per annum, 1973-74; whereas for the proposed Vocational Agricultural High Schools, the annual recurrent is estimated at JA \$1,250 per student to include teaching administrative and maintenance costs.

A more detailed account is available for the J.S.A. and is presented in Table 8. It will be observed that over the period 1968-76, the student

TABLE 7

NUMBER OF STUDENTS TAKING AGRICULTURE IN
SCHOOLS AND ESTIMATED EXPENDITURE

	1969-70	1970-71	Year 1971-72	1972-73	1973-74
<u>All-Age Schools</u>					
No. of Students	572	620	870	1,065	1,888
Expenditure \$ JA	391	123	1,237	2,079	N.A. *
Cost/Student \$ JA	0.68	0.20	1.42	1.95	N.A. *
<u>Junior Secondary Schools</u>					
No. of Students	6,772	12,897	14,316	19,699	25,564
Expenditure \$ JA	12,886	10,289	37,102	33,580	N.A. *
Cost/Student \$ JA	1.90	0.80	2.59	1.70	N.A. *
<u>High Schools</u>					
No. of Students	883	1,040	2,191	2,859	3,142
Expenditure \$ JA	3,289	7,767	18,004	25,628	N.A. *
Cost/Student \$ JA	3.72	7.46	8.22	8.96	N.A. *

* N.A. - Data Not Available

TABLE 8

ANNUAL RECURRENT EXPENDITURE AT THE JSA

(1968 - 1976)

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
Recurrent Expenditure JA\$								
a) Personal Emoluments	149,740	166,918	252,990	344,960	396,383	430,123	562,652	619,057
b) Other Charges	82,180	145,720	172,964	244,676	297,315	298,987	367,280	467,523
Total Recurrent	<u>231,920</u>	<u>312,638</u>	<u>425,954</u>	<u>589,636</u>	<u>693,698</u>	<u>729,110</u>	<u>929,932</u>	<u>1,086,580</u>
Total No. of Students	251	149	213	248	300	322	388	498
Cost per Student	924	2,098	2,000	2,377	2,312	2,264	2,396	2,182

enrolment essentially doubled (251 to 498) and the recurrent costs per student with the exception of 1968-69 ranged between JA \$2,000 - \$2,377 per annum. The increasing student population undoubtedly functioned in maintaining the consistent cost range.

In the case of institutions representing the semi-formal education programme (skill training) the Youth Clubs estimated a recurrent cost per student per annum of JA \$1,000 in 1975.

From the profile of estimates presented for the school system through to the JSA and semi-formal training, there is a marked increase in expenditure per student as the level of vocational training became more intensive.

AREAS REQUIRING STREAMLING

Formal Agricultural Education

All formal agricultural education should be placed under one Ministry of Government and administered by an integrated committee* representing all the Ministries and or agencies involved in rural reconstruction and education. The Committee should be responsible for the development of policy directions to be administered at the respective levels of training in the total education system via Boards of Management or Governors.

The proposed grades 7 - 11 agricultural programmes (Appendices III & IV) if well executed is adequate for the levels of exposure desired. It is however recommended that the educational programme of all Secondary Schools incorporate a work-study approach for one or two intensive agricultural projects amenable to the respective locations. This would assist in minimizing involvements in many small meaningless projects and so create more deliberate and manageable projects.

Because of the content of the grades 10 - 11 curricula, the Knockalva and other Vocational Agricultural Schools may better serve as Diploma granting institutions in production agricultural skills. Thus the proposed Vocational Agricultural School should be used to produce highly skilled graduates in specialized areas of agriculture, household science and teacher training. This proposal is made against a background of scarce technical resource, material and personnel, in the High Schools and Vocational Schools to service programmes which essentially have similar objectives. It would therefore now

* Representatives (for example) from:

Ministry of Agriculture
 Ministry of Education
 Ministry of Youth & Community Development
 Ministry of Natural Resources

Ministry of Labour
 Ministry of Mobilization
 Members of the Farming
 Community

seem more possible to establish distinct lines of demarkation between the levels of vocational pursuit and avoid duplication of effort.

On this basis it is recommended that students proceed through the High School programme before extensive spending on vocational skill training. This approach would assist in rationalizing expenditure for equipment and other resources in accordance with the progressive change in emphasis of the respective curriculum to achieve a desirable element of technical proficiency. Thus students aspiring to a farming or agricultural technology career would come through the recognized high school system. Furthermore, subsequent training in agriculture would be based on satisfactory proficiency in skills and academics at the High School level and or passing through the Vocational Agricultural High Schools. The need to emphasize the professional process is important for the development of both competence and confidence as well as to disipate the traditional stigma associated with agriculture.

Based on the foregoing structure the Jamaica School of Agriculture would provide the upper limit of training in agricultural production technology with degree granting status at the Baculaurate level. The JSA can readily accommodate this upgrading since it already has on stream the Associate Degree in Science programmes in agriculture and consumer education.

Accordingly, the proposed scheme for formal training of human resources pursuing careers in production agriculture are presented in Table 9.

N.B.

- A) Exceptional students in the High School programmes who show strong academic and skill proficiencies may be allowed to proceed to the JSA.
- B) Students who develop attitude toward the sciences and research while in the Vocational Agricultural School may be encouraged to proceed to the UWI vs the JSA. Other-wise students would normally pass through High School to Vocational Agricultural School to the JSA or UWI for the Baculaurate Degree.

TABLE 9

PROPOSED SCHEME FOR FORMAL TRAINING IN AGRICULTURE

<u>Institutions</u>	<u>Age Group</u>	<u>Programmes</u>	<u>Level of Emolvement</u>
All-Age Schools Secondary Technical High	10 - 16	Agricultural Science Grades 7 - 11 with work-study base.	Apprentices or lower level Services in the Agro-industry complex.
Vocational Agricultural High Schools	16 - 18 or over	Two-year programme in Specialized skill training in agricultural technology leading to Diploma in Agriculture. In case of teacher training an additional year is required.	Entry in farming, agro- industry, agriculture extension and teaching.
Jamaica School of Agriculture	18 - over	Three-year Bachelor of a) Agricultural Technology Animal Production Crop Production Farm Mechanization Agri-business and Farm Management b) Agricultural Education c) Household Science d) Food Technology	Professional Services Farm Operations Agri-business Teaching
University of West Indies	18 - over	Three-year Bachelor of Science Degree in Basic Agricultural Science Graduate Degree at Master of Science level in Agric. Technology as a new programme.	Professional Research oriented programme.

In addition to the above recommendations, it is important that implementation should occur within the following philosophical frame work.

In all Secondary and High Schools, agricultural science must be supported by a strong science programme and work-study activities to ensure the development of desirable attitudes toward a disciplined manipulation of biological and mechanical systems for production agriculture. Thus the atmosphere should be one which allows for creativity and productivity. It is therefore important that there be adequate financial and physical support with concise evaluation at the end of each production project. Production in the context ^{is} is to be concerned with the rate at which work is done as well as the quantity required to achieve the target of goods and services.

Within the vocational agricultural high schools along with skill training a wide range of extracurricular programmes be encouraged so as to ensure a strong emphasis on personality development.

At the Jamaica School of Agriculture emphasis be placed on specialization studies to mature students who are destined to service specific national programmes or private production operations. Courses to be more relevant to the Jamaican economy and agricultural needs than the generalities of subject matter. It is conceived that programmes centred around case studies and recommendations could prove more meaningful in the final year than straight academic pursuits. Such an approach would encourage a wider range of participation in or exposure to national programmes requiring immediate service and problem solution. It would also assist in dissipating the usual frustrations of uninvolved by an impetuous adolescent group.

JSA expansion should therefore incorporate the following considerations:

1. A review of the current curriculum to include studies in the humanities and business, and a work experience to qualify for graduation.

2. A higher level of attainment of students in science subjects before entering into the School.
3. More qualified and experienced staff to offer a wider range of practical courses to students in residence as well as off campus.
4. Areas of specialist training be developed within the existing production departments; namely Agronomy, Animal Science, Farm Mechanization and Agricultural Economics with teacher training in Agriculture and Household Science.

Draft Proposal For a New Agriculture Degree Programme

Within this context, the programme is designed to prepare students for a career in agricultural technology. Because of the immediate and foreseeable requirements of the industry, as well as the varied interests of students, the proposed programme introduces a number of specialized areas of studies. This approach is accommodated through core course requirements within an area of studies and options within the area. This is demonstrated as follows:

1. Agriculture General:
 - With Options In:
 - Animal Science,
 - Crop Science,
 - Ornamental Horticulture,
 - Teacher Education.
2. Agricultural Mechanization:
 - With Options In:
 - Irrigation and Drainage,
 - Diesel and Hydraulic Equipment,
 - Farm Structures.

3. Agricultural Business: General.
4. Household Science: With Options In:
 Foods,
 Arts & Craft,
 Clothing,
 Teacher Education.

Because of the very strong technology based programme of studies, it would seem advisable to round out all students through a series of elective course requirements. These may include the following:

Life Studies A - 5 Credit Hours:

An interdisciplinary course embracing (1) social science and humanities to assist the students to better understand themselves and the world around them, and (2) to instruct the students in the fundamental of communication skills through practical writing experiences in which there should be an exploration of community, politics, race and Caribbean history. The course should assist students in knowing or identifying themselves in the society.

Life Studies B - 5 Credit Hours: Prerequisite A.

Main emphasis around rights in conflict in the West Indian system. This course should examine the meaning of freedom and the conflicts of the exercise of civil liberties. Communication skills are constantly enforced, and the contributions made to the human experience in the areas of humanities stressed.

Life Studies C - 5 Credit Hours: Prerequisite B.

Centres around the theme of change in which there is an examination of the role of technology in creating change and examines the probable impact

of change upon value systems, institutions and the individuals. Emphasis is also placed upon independent problem solving as it relates to the student's particular career. In this course, communications skills are directed towards emphasizing the responsibility to write and speak precisely.

All Department Requirement - 5 Credit Hours: Cooperative work experience.

Students are placed in a work situation selected by academic advisor in cooperation with a production unit. (Public or private sector). The educational objectives to be outlined to both student and cooperating employer.

Adult Education - 5 Credit Hours: Family Relations.

A study of the problems and adjustments confronting young people both before and after marriage.

Agricultural Education - 5 Credit Hours: Introduction to Afro-West Indian culture.

Survey of history, sociology, politics and culture of Afro-West Indian and contribution to current society. This course is designed to provide a basis on which the student can better understand all or most of the factors which contribute to the development of the nation.

Agricultural Economics - 5 Credit Hours: Business organization and management.

A study of various business organization patterns with emphasis on the functions and responsibilities of the divisions, locations, layout, lines of promotion and authority and problems of organization and expansion.

Agricultural Economics - 5 Credit Hours: Personnel Management.

Designed to introduce a workable pattern for dealing with personnel problems and human relations problems to help students develop high ethical standards, leadership qualities and techniques he will need as a supervisor.

Therefore, to include techniques of supervision, training, interviewing, work organization and testing techniques.

Agricultural Economics - 5 Credit Hours: Introduction to Business.

Basic principles of management, ownership, accounting, marketing, transportation, personnel finance, insurance, law and international trade as they affect the operations of the Jamaican and West Indian agricultural business and industry.

In principle, the three years of training should be programmed to accomplish:

Year I Strengthening in the Basic Sciences for a better appreciation of ways and means to solve problems as well as to ensure sound planning and implementations of appropriate technology.

On this basis the JSA could accommodate part-time day students in Year I.

Year II Upgrading to professional status the technology courses in production agriculture using the vocational agriculture curriculum as the base. Students in Year II to be residential at the JSA.

Year III For agricultural students, attachments be made for practical work experiences at a Hillside Station, Land Authority or production enterprise whereas household science and teacher trainees be attached to community agencies. The final award of the Degree be heavily weighted on satisfactory completion of the required work exposure.

Informal Education

Under the traditional circumstances of underexposure to formal agricultural education in the society, a strong continuing education related to agriculture seems most practical. This programme should be directed to those who failed to continue in the formal education process and are about to enter the labour force. It is estimated that between 74,000 and 76,000 persons between 15 and 24 years of age within any given year up to 1980 should be getting an orientation in production agriculture so as to provide an effective replacement for the aging farmers. As such, this segment of the population may be readily divided as follows: 15 - 19 years of age, and 19 - 24 years of age who require special attention along with adults already engaged in farming.

For satisfactory contemporary development of the 15 - 19 age group with their colleagues who pursued formal training, it would seem appropriate that a remedial programme up to grade 9 level be pursued. In addition to this is the systematic intensive teaching of skills in production agriculture and household science. Such an exercise may be best carried out through the Ministry of Youth and Community Development Agencies (Youth Clubs and 4-H Clubs) centres which are already established.

These centres may better serve their respective communities as skill training centres if they are used for both day and evening sessions in view of a potentially larger group of community participants. The duration of this training exercise should be two years, after which participants will be eligible for employment as an apprentice or a lower level technician in the agro-industry complex. As such, participants could equate with the regular All-Age School, Secondary and Technical School graduate in terms of skill training. It is anticipated that the more academically capable participants

may achieve up to grades 10 and 11 standards if they so desire through the continuing education programme of the Secondary Schools.

The adult group between 19 - 24 years of age is expected to be more interested in the practical areas of agriculture and household science. Accordingly, the skill training programmes offered by the Youth Clubs and the 4-H Clubs should be the level of exposure. In this regard the centres which are scattered over the island could be better utilized throughout the year. Participants in the group may also avail themselves of continuing education if they so desire in the Secondary Schools and also have access to higher education at the Vocational Agricultural Schools.

For the practising farmers beyond 24 years of age, many options should be opened to them. They may take advantage of the skill training programmes in the Youth and 4-H Clubs or participate in the exercises put on by the Ministry of Agriculture Extension Services or other Agencies according to their particular interest.

AREAS IN WHICH IICA CAN COLLABORATE

1. To assist in formulating and developing curricula for the respective levels of skill training in formal and informal education processes.
2. To assist and encourage the development of a core of Jamaican or West Indian writers of agricultural texts and work books for the various areas and levels of agricultural education.
3. To support the development of a professional unit which would oversee agricultural education curriculum development, the review of text books and other teaching materials including audio-visual aids; the upgrading of unqualified teachers in the system and keeping administrators and teachers abreast of developments in agricultural education.
4. To offer suggestions to the Joint Board of Teacher Education regarding a refinement of the pedagogy content and methods of skill training within the work-study context for the agricultural science teacher training programme.
5. To assist in developing a stronger programme of agricultural mechanization and work simplification in agricultural education so as to minimize the drudgery of production agriculture.
6. To propose a system of communication within communities which would glean and feedback the immediate and long-term needs and capabilities of the community in contributing to the national agricultural production target. By this process continuing agricultural education could assume more relevance at the local level.
7. To support greater participation in non-formal agricultural education as part of continuing education activities through grants

for evening classes at the JSA, the Vocational Agricultural High School or Secondary Schools with adequate facilities.

8. To assist in developing grading standards for agricultural products for both teaching and consumer education.
9. To assist in determining manpower requirements for the respective levels of formal education output.
10. To assist in developing a profile of attributes or characteristics which may assist in evaluating the suitability of an individual for admission to agricultural studies.

SUMMARY

The Ministries of Government (Agriculture, Education, Youth and Community Development) are to be complemented for their determined effort to make more widespread ^{the availability of} formal agricultural education ~~available~~ through its various agencies to dispell the stigma attached to agriculture. Moreso, is the recognition of the many policies and institutional developments which have been generated within recent years to nurture a sound agricultural production programme. However the inertia of the agricultural industry today may be attributed to the lack of ability to implement and carry out jobs to completion with appropriate evaluations. Of particular interest is the effort to instill an objective attitude towards work through a formal work-study programme at an early age within the school system wherein agricultural activities will form the core of the programme. This is exemplified at the Jose Marti Secondary School, the most recent boarding Secondary School in Jamaica. It will be of utmost importance that this exercise be managed with great care to ensure that agriculture falls into proper perspective of survival of the individual and the community as well as the dignity of labour in productive activities.

The process of meeting national agricultural production goals must hinge heavily on the level of agricultural education and technology available to the society. This is moreso true as a requirement for a society which is committed to maintain labour-intensive operations because of population and socio-economic problems. Accordingly there must be teachers to train human resources in the rudiments of production agriculture; highly skilled managers and operators at all levels for the various production areas; and finally, an ideological factor as a motivating force within the various sectors and

communities whereby all persons interested in production agriculture can understand their respective role and pursue it with responsibility. Undoubtedly a broad-based economically viable production agricultural sector can be achieved if there are continuous evaluations and upgrading of infra-structural supports for the existing and proposed developments in agricultural education.



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A. S. Wood

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APPENDICES

- I. Existing Educational Units
- II. Distribution and Size of School Plots
- III. Grade 7 - 9 Curriculum
- IV. Grades 10 - 11 Curriculum
- V. Knockalva Agricultural Training Programmes
- VI. New Agricultural High School
- VII. J.S.A. Academic Programmes
- VIIIa. J.S.A. Student Intake
- VIIIb. J.S.A. Student Population
- IX. Youth Club Programmes

APPENDIX I

EXISTING EDUCATIONAL UNITS

Levels	Ages	Grades	Institutions
1. Pre-Primary	4 - 5+	-	Basic Schools Infant Schools Infant Depts. of High School
2. Primary	6 - 11	1 - 6	Primary Schools
All-Age	6 - 14+	1 - 9	All-Age Schools
Preparatory	6 - 11+		Junior Depts. of High School
	6 - 14+	1 - 9	Other Special Schools (handicapped)
3. First	12 - 14+	7 - 9	Secondary Schools
Cycle	12 - 14+	7 - 9	Comprehensive High Schools
Secondary	12 - 14+	7 - 9	High Schools
	13 - 15	8 - 9	Technical High Schools
4. Second	15 - 19	10 - 11	Secondary Schools
Cycle	15 - 19+	10 - 13	High Schools
Secondary	15 - 19+	10 - 11	Technical High Schools
	15 - 17+	10 - 11	Comprehensive High Schools
5. Vocational	15+ - 17+		Vocational Schools
Education	15+ - 17+		Trade Training Centres
6. Teacher	17+ -		Teacher Training Colleges
Training	15+ -	Pre-teacher training 12 week course	Caenwood Junior College
7. Higher	17+ -		College of Arts, Sci. & Techn
Education	17+ -		Jamaica School of Agriculture
	17+ -		Nursing & Dental Tech. Traini
	17+ -		University of the West Indies
8. Supplementary			National Literacy Campaign
& Specialist			Ministry of Youth & Community
Education			Development training projec
			Jamaica Hotel School
			Extra-mural Dept., U.W.I.
			Community College (Exed)
			Schools of Art & Music
			Industrial Programmes (private)

APPENDIX II

DISTRIBUTION AND SIZE OF SCHOOL PLOTS (1975)

Parishes	No. of School Plots	Total Acreage	Mean Acreage Per School
Clarendon	31	19.7	0.63
Hanover	12	8.8	0.74
Portland	22	11.5	0.52
Manchester	21	28.5	1.30
St. Andrew	12	6.8	0.56
St. Ann	26	22.4	0.86
St. Catherine	27	23.4	0.86
St. Elizabeth	23	16.0	0.69
St. James	12	8.3	0.69
St. Mary	24	24.4	1.02
St. Thomas	10	9.0	0.90
Trelawney	7	3.8	0.55
Westmoreland	16	13.2	0.83

APPENDIX III
GRADE 7 - 9 CURRICULUM

Grade 7
Plant Study

Term I

- 1) Seed Collection
- 2) Observation and classification on basis of dispersal mechanism, colour, size and shape
- 3) Seed structure
- 4) Requirements for germination: water, air and warmth
- 5) Growth factors

Term II

- 1) Seed box and seed bed
- 2) Sowing, shading and watering
- 3) Transplanting and proper care of seedlings
- 4) Collection and classification of weeds
 - a) Poisonous, parasitic and competitive
 - b) Method of spread
 - c) Broad leaf, narrow leaf
- 5) Weed control
 - a) Mechanical
 - b) Chemical
 - c) Other methods e.g. mulching
- 6) Pests and disease control

Term III

- 1) Observation and classification of plant organs, root system and leaves
- 2) Functions of organs demonstrated via experiments

GRADE 7 - 9 CURRICULUM (cont)

Grade 7

Soil Study

Term I

- 1) Collection of soils
- 2) Observation and classification
- 3) Physical composition
- 4) Soil formation factors
- 5) Top soil, sub-soil

Term II

- 1) Soil and water relations
 - a) How water moves through different soil types
 - b) How different soil types hold water

Term III

- 1) Tillage
- 2) Purpose of tillage
- 3) How it is done - demonstrations

Animal Study

Term I

- 1) Classes and types of animals
- 2) Collection and observation of feeding stuffs
- 3) Feeding capacity of ruminants and non-ruminants

GRADE 7 - 9 CURRICULUM (cont)

Grade 7

Animal StudyTerm II

- 1) Poultry Breeds
 - a) Egg type breeds
 - b) Meat type breeds
 - c) Dual type breeds
- 2) Housing and equipment
 - a) Selection of site
 - b) Building
 - c) Roofing
 - d) Litter
 - e) Roosts, waterers, feeders, laying boxes
- 3) Brooding and rearing

Term III

- 1) Poultry production
 - a) Feeds - starter, grower and layer rations
 - b) Importance of sanitation and disease prevention
 - c) Marketing of poultry products

GRADE 7 - 9 CURRICULUM (cont)

Grade 8

Plant StudyTerm I

- 1) Collection and classification of plant parts of value to man
- 2) Presence of starch determinations
 - a) Seeds
 - b) Roots
 - c) Stems
 - d) Underground stems
 - e) Fruits
 - f) Leaves

Term II

- 1) Flowers
 - a) Collection and observation of flowers on the basis of male, female and hermaphrodite
 - b) Pollination and agents; wind, birds and insects
 - c) Fertilization
- 2) Plant Husbandry
 - a) Methods of Propagation; vegetative propagation, cuttings, underground stems, budding, grafting, layering, and circumposing

Term III

- 1) Leaves
 - a) Functions; Photosynthesis, respiration and transpiration with associated demonstrations
- 2) Permanent crops including banana, sugarcane, cacao, coconut, citrus, pimento, mangoes, guava, pineapple, pawpaw and others
 - a) Select one or two crops for location and climatic conditions
 - b) Study of selected crops; varieties, propagation and planting, management, weed control, pruning, fertilizing, pest and disease control

GRADE 7 - 9 CURRICULUM (cont)

Grade 8

Soil StudyTerm I

- 1) Functions of the soil - nutrients, anchorage
- 2) Soil erosion, causes and effects
- 3) Prevention of soil erosion
- 4) Farming and land capability
 - a) Selection of appropriate crops
 - b) Contouring
 - c) Use of barriers and or trenches to control water movement
 - d) Maintenance of vegetative cover
- 5) Altering land capability
 - a) Terracing

Animal StudyTerm I

- 1) Reproduction in mammals
 - a) Male and female organs
 - b) Fertilization of the egg
 - c) Gestation

Term II

- 1) Reproduction (cont'd)
 - a) Artificial insemination
 - b) Birth and lactation
 - c) Care of the young

GRADE 7 - 9 CURRICULUM (cont)

Grade 8

Animal StudyTerm III

- 1) Mammal project (pigs, goats, cows)
- 2) Breeds; study of better known breeds of chosen animals
- 3) Care of the young animal continued
- 4) Judging of animals

Grade 9

Plant and SoilTerm I

- 1) Elements necessary for plant growth with particular reference to the functions and benefits of nitrogen, phosphorus, potash, and calcium where relevant
 - a) Field projects to observe response to fertilizers
 - b) Records of observation; weight of plant at weekly intervals and weight of products at harvest
 - c) Interpretation of results; yield in relation to elements supplied, yield in relation to cost of nutrients and cost versus benefits
- 2) Fertilizers
 - a) Effects of lime application
 - b) Comparison of organic and inorganic fertilizer application
 - c) Fertilizers: straight use versus mixture
 - d) Fertilizer application in relation to soil type and crop
 - e) Organic manures and the use of mulch

GRADE 7 - 9 CURRICULUM (cont)

Grade 9

Plant and SoilTerm II

- 1) Factors affecting farming in the locality
 - a) Slope categories
 - b) Elevation
 - c) Rainfall
 - d) Land distribution
 - e) Soil type
 - f) Erosion hazards

Term III

- 1) Simple accounts
- 2) Planning for profit
- 3) Introduction to agricultural organizations and programmes

Animal StudyTerm I

- 1) Housing
 - a) Design
 - b) Construction
 - c) Maintenance
- 2) Pastures
 - a) Identification of pasture forages
 - b) Comparative nutritional value of forages
 - c) Weed control
 - d) Fertilizer treatments
 - e) Irrigation
 - f) Rotational grazing

APPENDIX IV

AGRICULTURAL EDUCATION IN GRADES 10-11(VOCATIONAL PROGRAMME)Overall Goals

At the end of Grade 11, the student will:

1. Be able to make a living as a self-employed farmer, given adequate land and capital;
2. Be able to make a living employed in agriculture or allied services;
3. Appreciate the need for further training to improve his or her knowledge and skills, and (for outstanding students) be able to enter an institute of further education in agriculture.

EconomicsGeneral Objectives

The student will:

1. Understand the function of Jamaican agriculture as a source of food, raw materials, employment, income and foreign exchange.
2. Be able to select a viable farm enterprise of his own.
3. Know the resources required for a successful enterprise (finance, labour, advice) and where to obtain them.
4. Be able to manage a small-scale farming enterprise as regards buying, running and selling produce.
5. Be able to keep accurate records of financial transactions and assess the profitability of the enterprise.

AGRICULTURAL EDUCATION IN GRADES 10-11 (cont)Courses in EconomicsProject

Agriculture in the National Economy

Accounting

Agricultural Development

The Social Environment

Farm Characteristics

Agricultural Measurement

Aspects of Management

Records and Accounts

Agricultural Finance

Marketing

SoilsGeneral Objectives

The student will:

1. Be able to relate texture and structure of soil to its fertility.
2. Be able to use soil survey maps to determine the potential of soil for crops and animals.
3. Be able to use simple methods to determine the need for irrigation or drainage.
4. Be able to detect soil loss by erosion and to use appropriate conservation methods.
5. Be able to relate land preparation and tillage to the slope of the land and the nature of the soil.

AGRICULTURAL EDUCATION IN GRADES 10-11 (cont)Courses in Soils

Soil Texture, Structure and Fertility

Soil Survey

Maps & Profiles

Irrigation & Drainage

Conservation

Tillage

Land Preparation

Projects

Soil Conservation

Contouring

CropsGeneral Objectives

The student will:

1. Be able to recognize, identify and classify the major crops grown in Jamaica.
2. Understand the principles of crop nutrition, rotation and the proper use of fertilizers and irrigation.
3. Be able to establish from seed or vegetative propagation of a number of crops and maintain them to harvest.
4. Understand the principles and practices of crop protection.
5. Be able to harvest, handle, store and market crop produce.

Courses in Crops

Recognition of plants

Seed Propagation

Vegetative Propagation Techniques

Nursery Operations

Projects

Leafy Vegetables

Bulbs & Root Tubers

Fruits & Vegetables

Legumes

AGRICULTURAL EDUCATION IN GRADES 10-11 (cont)Courses in Crops

Planting Techniques
 Maintenance of Crops (1)
 Maintenance of Crops (2)
 Harvesting, Grading & Pecking

Projects

Vine or Herb Legumes
 Pasture and Silage
 Grain Crop
 Orchard Fruit
 Food Tree Crops
 Export Crop (1)
 Export Crop (2)
 Flowers & Ornementals

AnimalsGeneral Objectives

The student will:

1. Possess a caring attitude towards livestock.
2. Be able to select the type of livestock enterprise suitable for a particular environment.
3. Be able to undertake the care and maintenance of a number of livestock animals.
4. Be able to manage a livestock operation.
5. Be able to keep livestock records and market livestock products.

Courses in Animals

Anatomy and Physiology
 Breeding and Reproduction
 Development of Young Animals
 Feeding and Management

Projects

Dairy Cow (1)
 Dairy Cow (2)
 Beef Cattle
 Care of Young Cattle

AGRICULTURAL EDUCATION IN GRADES 10-11 (cont)Courses in Animals

Milking
Slaughtering
Care of Sick Animals
Animal Buildings

Projects

Sheep or Goats
Laying Chickens (1)
Laying Chickens (2)
Broiler Chickens
Rabbits or Guinea Pigs
Pigs (1)
Pigs (2)
Silage or Hay Making

MachineryGeneral Objectives

The student will:

1. Be able to service and maintain a range of farm machines.
2. Be able to drive and operate a tractor and attachments.
3. Be able to keep adequate records of machinery maintenance and usage.
4. Be able to operate various other types of farm machinery.
5. Be able to select the proper equipment for varying land situations.

Courses in Machinery

Safety Procedures
Tractor Maintenance
Petrol & Diesel Engines
Electric Motors
Other Equipment
Implements and Attachments
Use of Machinery
Plumbing

Projects

Tractor Driving
Operating Riding Tractor with
Attachments
Operating Walking Tractor with
Attachments

APPENDIX V

KNOCKALVA AGRICULTURAL TRAINING CENTRE

Temporary Syllabus - First Year

Field HusbandryDefinition of Agriculture and Field Husbandry

- Soil:** Soil formation, mechanical composition of soil, soil particles and air spaces.
- Structure and Texture.
- Soil Water, Soil Erosion, Soil Conservation.
- Effects of lime in Agriculture.
- Tillage, drainage, irrigation.
- The Plant:** Composition, carbohydrates, protein and fat in plant material.
- Essential elements and their role in green plant.
- N.P.K. Fertilizers.
- Photosynthesis and food storage.
- Growth and the effect of environment with reference to light, soil and temperature.
- Vegetable cultivation.
- Classification of vegetables with group based on cultivation requirements.
- Organic and inorganic manures.
- Entomology:** Insects as pests and beneficial organisms.
- Classification of insects.
- Fungicides, Insecticides, Repellants and fumigants.

KNOCKALVA AGRICULTURAL TRAINING CENTRE (cont)

Temporary Syllabus - First Year

Mathematics

1. The uses of the four rules applied to weights, measures and money in English and metric systems.
2. Simple graphs (Rainfall, Temperature etc.)
3. Simple and compound practice.
4. Vulgar and decimal fractions; uses of brackets in order of progress; decimalization of money.
5. Average, ratio and percentages; profit and loss; proportion and proportional parts.
6. Simple interest including use of formulae.
7. Mensuration of rectangle, triangle and circle - practical work.

Animal Husbandry

1. Definition and scope.
2. Advantages and objections to livestock farming.
3. Terms used in livestock (cattle, pigs, goats, sheep, horses, poultry).
4. Sanitary production of milk.
5. Dairy and beef cattle - selection, feeding, care and management, marketing of livestock, judging (Phehetype and Records) common diseases of cattle.
6. Milk as a food. Simple tests for sugar, protein, fat in milk.
7. Structure of the udder.

KNOCKALVA AGRICULTURAL TRAINING CENTRE (cont)

Temporary Syllabus - First Year

Commercial Farm Practice

- The Farm:** Definition, classification, economic, size, type labour, implements, finances.
- Farm Products:** Prices, marketing, profits.
- Farm B/Keeping:** Definition and scope comparison between farms and commercial accounts.
- Records:** Dairy, farm inventory cash, analysis account, livestock, production records. Crop production records.

Temporary Syllabus - Second Year

Field Husbandry

- Soil:** Soil reaction and P.H. classification of soil. Soil types of Jamaica.
- The Plant:** Cultivation of coffee, citrus, cocoa, banana, sugar cane. Two important diseases of the crop studied.
- Forestry:** Importance. Uses of forest products. Identification of timber trees; forestry in relation to agriculture.
- Weeds:** Methods of propagation, chemical used control. Identification of common weeds. Common and Botanical names.
- Farm Management:** Emphasis on types of farming characteristics of a good farm. Farm plan objectives, land classification and land use. Simple forms of accounts and records. Methods of getting started, selection of a farm. Chain surveying.
- Educational Tours:** Farm visits and tours should be arranged so as to get the students up to date on different current production methods.

KNOCKALVA AGRICULTURAL TRAINING CENTRE (cont)

Temporary Syllabus - Second Year

Mathematics

1. The fundamental processes in algebra.
2. The addition and subtraction of simple algebraic fractions.
3. Solution of simple and simultaneous equations.
4. Harder problems on 2, 3, 4, 5, 6 as in first year.
5. Areas of irregular figures (Chain Surveying).
6. Further works on products, squares, square roots and factorization.
7. Linear and quadric equation in one unknown.

Animal Husbandry

1. Principles underlying rations for livestock. Need for carbohydrates, proteins, fats, minerals and vitamins.
2. Study of animals (pigs, poultry, sheep and goats) based on origin, classification, utility.
3. Diseases of farm animals with emphasis on causative agents, symptoms and control measures. Importance of preventative measures to be specially emphasized.
4. Parasites. Damaged produced symptoms and control methods.
5. Castration and caaponizing.

Educational Tours: Farm visits and tours to be arranged so as to bring the students up to date in different current production methods.

First and Second Years

General Knowledge and Civics

1. Current events of national interest.
2. Structure of Parliament - House of Representatives, Senate, Cabinet, Constituencies and Representatives.

KNOCKALVA AGRICULTURAL TRAINING CENTRE (cont)

First and Second Years

General Knowledge and Civics

3. Ministers and their portfolios. Important functions of Ministers.
4. Industrial enterprises in Jamaica; locations.
5. National Stadium; flower, bird, tree, fruit.
6. National Flag; Significance of colours.
7. Chemistry; element, acids, bases, compound, mixture.
8. Physics; magnets, matter, current, electricity, expansion, contraction.
9. Agriculture; tractor driving, surveying.
10. Etiquette.

APPENDIX VI

NEW AGRICULTURAL HIGH SCHOOL
PROPOSED THREE - YEAR CURRICULUM

Semester I - Year I

<u>Subject</u>	<u>Hours Per Week</u>
English I	2
Spanish	1
Integrated Science	3
Math	3
Social Studies	3
Physical Education	2
Cultural Education	2
Agriculture I (or)	4
Home Economics I	4
Practical Work Assignments	20

Semester II - Year I

English I	2
Spanish	1
Math	3
Integrated Science	3
Social Studies	3
Physical Education	2
Cultural Education	2
Agriculture I (or)	4
Home Economics I	4
Practical Work Assignments	20

Semester III - Year I

English I	2
Spanish	1
Science (Biology or Physics)	3
Math	3
Social Studies	3
Physical Education	2
Cultural Education	2
Agriculture I (or)	4
Home Economics I	4
Practical Work Assignments	20

NEW AGRICULTURAL HIGH SCHOOL (cont)Semester I - Year II

<u>Subject</u>	<u>Hours Per Week</u>
English II	2
Spanish	1
Math	3
Social Studies	3
Science (Biology or Physics)	3
Physical Education	2
Cultural Education	2
Agriculture II (or)	4
Home Economics II	4
Practical Work Assignments	20

Semester II - Year II

English II	2
Spanish	1
Math	3
Social Studies	3
Science I (Chemistry)	3
Physical Education	2
Cultural Education	2
Agriculture II (or)	4
Home Economics II (or)	4
Business	4
Practical Work Assignments	20

Semester III - Year II

English II	2
Spanish	1
Math	3
Social Studies	3
Science (Chemistry)	3
Physical Education	2
Cultural Education	2
Agriculture II (or)	4
Home Economics II (or)	4
Business	4
Practical Work Assignments	20