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 CARIBBEAN COUNCIL FOR SCIENCE AND TECHNOLOGY
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JAMAICA COUNTRY PAPER
 SUBMISSION BY THE MINISTRY OF AGRICULTURE,
 JAMAICA

Organized jointly by the United Nations Economic Commission for Latin America (UNECLA) Subregional Headquarters for the Caribbean and the Caribbean Council for Science and Technology (CCST) with support from the International Service for National Agricultural Research (ISNAR), the Swedish Agency for Research Co-operation with Developing Countries (SAREC), the International Development and Research Centre (IDRC), the Commonwealth Foundation, the University of the West Indies (UWI) and the Government of Trinidad and Tobago.



UNITED NATIONS

ECONOMIC COMMISSION FOR LATIN AMERICA Office for the Caribbean



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Mr. Chairman, other members of this August body
ladies and gentlemen.

I regard this as a rare and precious privilege to be given the opportunity to participate in a workshop of this magnitude and to give this brief paper on behalf of my country.

As we meet here this morning, as members from the several Caribbean Territories, I am cognisant of the fact that a good and common need exist for all of us. Because of our geography and topography, this may be more similar to some than others, but by and large, we fall in one large category where the management of Research in our individual countries must form an integral platform on which our countries will be developed. It is because of this that I hail the opportunity to interchange and I am sure I shall return to Jamaica with a clearer understanding of not only the meaning of Research Management in Jamaica, but within the Caribbean as a whole.

I am quite clear in mind that the progress of the region is related in a relative manner to the co-operation and understanding that exists between our various Research Committees. Nevertheless, Mr. Chairman, we have individual concerns and differences that will only be solved by the concerted effort of each member country or unit. I see this workshop as the hand with fingers each doing something that must finally be brought together by the whole "hand". Because of this, and the historical knowledge that research is not only a "today" thing, but has been continuous, going back into the pre-independence or colonial era, one recognises that Research Management becomes more intricate and involved as we endeavour to solve the cautious and mounting problems to find answers to improve our status in a shrinking economy and ever increasing population. The changes in policy due to political changes since the

post colonial days have had its mark on pure research in the regions and this had to be so as the directions though not reversed has veered from the original direction as each territory endeavours to follow a plan and policy that can best suit her own strategies for individual fulfillment.

In the colonial era, research was based on what was relevant to keep the mother country vibrant and alive, while, since the post colonial days, research has been based on strategies to help us to survive. The management of these resources, therefore, becomes very essential and important for both survival and forward progress.

The Research and Development Department of the Government of Jamaica in the Ministry of Agriculture plays many roles. Its main function is to through research and experiment find the answers to many vexing questions. Chief among which are factors such as:-

- a) Weed control
- b) Insect control
- c) Quarrantine
- d) Introduction of high yielding varieties
- e) The change from purely traditional export crops to non-traditional to meet the requirements of an enlarged and more competitive market.

Although of late much interest has been displayed on the traditional to non-traditional crops; our Animal Husbandry or Livestock Research has kept pace or has in some instances surpassed our progress in Crop Culture.

EARLIER SITUATION AND THE EVOLUTION OF THE PRESENT SYSTEM:

Whatever is currently being carried out has a foundation that was laid in the past. In Jamaica, for instance, Agricultural Research has been conducted on crops and Livestock for several decades. To cite a few examples, the breeding of varieties of banana that are immune to disease began in the Department of Agriculture. At that time, the idea of the present Banana Board which is now responsible for Banana Research was not even conceived. Similarly, work on Cocoa (propogation) was

carried out by the Department of Agriculture long before the Cocoa Industry Board came into being. The same can be said for other crops and Statutory Boards and relative Organizations such as:-

The Sugar Industry Research Institute
The Coffee Industry Development Board
The Citrus Growers Association; and
The Coconut Industry Board

For Livestock, selection and breeding of cattle was instituted over seventy (70) years ago and this continues to remain within the Ministry of Agriculture; but working in collaboration with the different Livestock Breed Societies. The point that I am now making, is that present activities have been influenced by the activities of the colonial era.

One cannot deny that the Planners, Research Managers and Implementers of times past did not make the Agricultural worker or researcher fully aware of his prime responsibilities; and that is to serve the industry and the country of which he was a part. When those reports and records are examined, we can clearly see that most if not all the work that was carried out then, was applied research. Although we are approaching the 21st century, this situation basically remains and should remain the same, because applied research or research at the practical level aims to answer problems of immediate importance to the Agricultural Sector. For the records or to refresh our memories, basic research delves more deeply, but the choice of subject is largely determined by its likely importance to Agriculture. Fundamental research is concerned with the ultimate description of how things are and how and why reactions occur. The latter two types of research are not for us at this point; we are concerned with applied research or research at the practical level.

The areas in which it is necessary to do applied research have increased significantly. The institutionalisation of statutory bodies came about since it was thought that such bodies could complete certain tasks within a given time frame. This required a certain amount of effort but the effort to complete a task within a given time frame has

its costs. The Statutory bodies were able to obtain funds and were permitted to operate in a less restricted atmosphere than the Government Departments. They were able to pay higher salaries; consequently, employees from Government Departments and Ministries sought and obtained Secondment to Statutory Bodies. This created a staffing problem in Government Departments and the Research and Development Manager is forced to operate within this situation.

These problems were recognized by the Inter-American Development Bank (I.D.B.) Team which came to Jamaica in the mid-1970's following the Government's decision to accelerate the development of Agriculture. This necessitated the re-organization of the Ministry of Agriculture. As a part of the total re-organization exercise, Agricultural Research has been the subject of a special FAO/IDB Co-operative Programme.

A very good programme was prepared, the aims and objectives were:-

- 1) Provision of physical facilities necessary for conducting research work in Livestock, Crops and Plant Protection.
- 2) The construction at the Research Station at Bodles, main Research Complex.
- 3) The establishment in the Western part of the island at Montpelier, a new Research Station.
- 4) Up-grading existing facilities at other Research Stations.
- 5) The development and improvement of Jamaica's Livestock Breeds and Production Systems. Cattle, goat and other livestock.
- 6) The production and development of improved varieties of Crops, both for traditional and non-traditional.
- 7) Investigational work on the use of chemicals for plant disease control, pest control and weed control.

Provisions were made for training of personnel.

Although the programme as earlier said can be considered good, yet there are a number of constraints with which the Research and Development Manager is forced to operate.

First, are the constraints otherwise known as 'imported advisers'. In many instances, these Consultants are unable to fit into existing conditions and situations of the host country. They are in a developing country which can be considered a pioneer state, and they cannot adapt to the social economic and political situation within the period that they should effectively operate. There have been instances right there in Jamaica, where Consultants have used the blue prints from a developed country with resources in the Jamaican situation when there are limited resources. There is the tendency to heed the advice of those imported advisers, although researchers of the host country are not in agreement; however, a prophet is not without honour, save in his own country and the local researchers can at times become frustrated in situations like these.

Then, there are constraints in the purchases of items and equipment which, although the purpose is to have safeguards, have in many instances, become an impediment i.e. the purchasing of yam sticks through tender. Again, the Research and Development Department Manager in the Jamaican situation has to operate in these circumstances.

NATIONAL AGRICULTURAL RESEARCH PROJECTS IN PROGRESS

The machinery exists for the overall planning and escalation of research projects. National Agricultural Research Projects in Crops, Livestock and Plant Protection are currently being carried out.

There are Commodity Committees that are made up of scientists, farmers, laymen and others who are considered capable of making a significant contribution towards the needs of the identity and the direction research should take. Recommendations are made to the Ministerial Committee for Research and Development, of which the Director of R + D is a member.

Research Projects currently being conducted by Research and Development Department are:-

Research Projects currently undertaken are as follows:- (See APPENDICES I- IV)

<u>CROPS</u>	<u>LIVESTOCK</u>	<u>PLANT PROTECTION</u>
90	18	25

Evaluation of the present situation should indicate what is likely to take place in the future. Areas that are of essential importance to the Research and Development Manager are:-

- 1) Funding
- 2) Staffing
- 3) Facilities

In the days of scarce money for Research and Development, one of the major problems facing the Research and Development Manager is to arrange his Research Programme in order of priorities and to complete his programme when faced with rising costs and a reduced budget.

Staffing problems affect execution of Research Programmes and Projects. Conditions should be such that capable and competent individuals are not only attracted but maintained.

Adequate facilities are necessary. Sometimes the Research and Development Manager when faced with limited funds, will have to decide between the employment of an extra scientist or obtaining an extra piece of equipment. Facilities without scientists and scientists without facilities are anomalous situations.

However, he has to use his better judgement not only for such a decision, but for all decisions of the Research Organization that he has to manage, which must maintain its research capabilities and improve to meet the demands of the industries which the organization serve.

WHAT OF THE FUTURE:

Because of the foregoing, a critical look is now being made into the management and general strengthening of Research and Development. This has as its primary aim, the setting of a National Agricultural Research Institute (N.A.R.I.) under one umbrella that will look towards dealing with all aspects of research for all crops, commodity associations and boards. This will ensure that the best available staff will be employed on conditions that will be sufficiently attractive to attract and maintain a permanent stable staff. It is interesting to note, that one of the main functions of the Research and Development Department over the past 7-8 years was to provide training ground for young graduates, who, as soon as they gained experience were wooed away by other boards, associations or private sector. Because of this, the total evaluation of the Research and Development Department could not be done unless cognisance was taken of the work done by these officers in their various fields to which they were seduced.

With a pooled resource of knowledge and finance, it is anticipated that the research needs of Jamaica will be met. It is also envisaged that because of job satisfaction and reasonable remuneration, the N.A.R.I. will be a cohesive whole. It is further anticipated, that funding dissipated to various bodies, managed under one central pool will be sufficient to make marked improvement in Agricultural Research and so give the answers and encouragement to an expectant public.

Finally, Mr. Chairman, as we go forward in century 21, and the world gets smaller and smaller, let me hope that conferences such as these will play the vital role in solving the many problems not only of the individual countries, but of the entire region involved. Again, I wish to thank you for this opportunity and hope that the meeting of the minds will eventually aid in the ultimate relief of humanity.

LIST OF RESEARCH STATIONS

MAIN STATION (ms) OR SUB STATION (ss)	LOCATION	ACTIVITIES
1. Bodies (ms)	St. Catherine	Dairy Cattle Breeding and Husbandry Animal Nutrition Pasture Research Crop Research
2. Lawrencefield (ss)	-do-	Crop Research
3. Top Mountain (ss)	St. Andrew	Crop Research
4. Orange River (ms)	St. Mary	Crop Research
5. Grove Place (ms)	Manchester	Beef Cattle Breeding and Husbandry Pasture Research Small Stock Crop Research
6. Montpelier (ms)	St. James	Dual purpose cattle breeding and Husbandry Pasture Research Crop Research
7. Beverly (ss)	St. Ann	Pimento Research (Being handed over to Production and Extension Division)

<u>CROP GROUPS</u>	<u>NO. OF EXPTS.</u>	<u>COMPLETED</u>	<u>ON-GOING</u>
Cereals	19	14	5
Legumes	16	13	3
Vegetables	17	12	5
Tree Crops	7	-	7
Root Crops	23	16	7
Oil Crops	3	2	1
Spices	<u>5</u>	<u>-</u>	<u>5</u>
	90	57	33

<u>LOCATION</u>	<u>NO. OF EXPTS.</u>
Hope	- 1
Orange River	- 4
Bodles	- 25
Grove Place	- 9
Lawrencefield	- 21
Montpelier	- 2
Top Mountain	- 6
Beverley	- 5
Thetford	- 6
Farmers Holdings	- <u>11</u>
	90

AREA	PROJECT	PLACE AND DATE OF PLANTING	REMARKS
<u>CEREALS</u>			
Corn	Maintenance Plots (3)	Boldes May, June 1983	Estab. on farmers holdings
-do-	Observation Plots (3)	Manchester, St. Ann March 1983	Estab. on farmers holdings. Comparison of local vars. with introduced selections.
Maize	Seed Increase	Bodles - May 7, 1982	Performance of some varieties was promising, further testing planned.
Sorghum	Seed Increase and Selection	Bodles -	Yellow endosperm varieties yield over 4,000 lbs /ac for each of the four selections, D11205, 11083, 11261, 11225.
(Corn Popcorn Sorghum)	Introduced from Manilla	14.9.82 Lawrencefield	Yields of corn and popcorn were poor but the sorghum varieties Tropic and Goldfinger were satisfactory and the plants are being ratooned. Ongoing.
<u>LEGUMES</u>			
Red Peas	IBGMVN (Golden Mosaic Trial)	Bodles - June, 1983	To evaluate 170 test lines for tolerance to virus.
-do-	Multipli- cation of varieties	Top Mountain March 1982	Seeds in storage for further trials.
Cow Peas	Spacing Trial (African Red)	Lawrencefield - June, 1982	Seeds stored for further trials.
Pigeon Peas	Variety Improvement	Bodles - July, 1982	Vars. from ICRISAT (15) all day neutral. Further testing will be done in St. Thomas and St. Ann.

AREA	PROJECT	PLACE AND DATE OF PLANTING	REMARKS
<u>VEGETABLES CONT'D</u>			
Onion	Variety Trial	Lawrencefield -	Bulbs cured and stored at room temp. Texas Early Grano, El Toro, Yellow Desex, New Mexico Yellow Grano
-do-	Development Trials	Yallahs, Baraco, Halse Hall and Malvern, Nov. 82 - March 83.	16 vars. estab. e.g., White creoso, Bronze age, Majestic, Golden, Robust etc. Germination poor in some cases. Harvesting being done.
Cabbage	Variety Trials for Development in different locations.	Old Harbour - May 15, '82 (Farmers Holdings)	KK, KY and Round Up seeds given to farmers. Fertilizer shortage at Land Authority was problematic.
Hot Pepper	Trace Element Observation	Lawrencefield - Jan. '83	Effects of NPK and Magnesium evaluated. Lack of irrigation water problematic. Good response to nutrients observed.
Paprika Observ.		Lawrencefield - Jan. '83	Production of partially tree-dried peppers being observed. Samples are being submitted to JNIP for quality rating. Fruit spoilage and fungal attack significant after 3 weeks ripen.
<u>TREE CROPS</u>			
Coffee	Museum Plot	Orange River	Maintenance of "Geisha" Plots
-do-	Demonstration Plot	Grove Place - 1964	Maintenance of plot.

AREA	PROJECT	PLACE AND DATE OF PLANTING	REMARKS
<u>TREE CROPS CONT'D</u>			
Coffee	Demonstration Plot	Chestervale - 1964	Cleaned, fertilized and sprayed.
Mango	Museum Plot	Lawrencefield - 1969	The peak period for the crop was late April to early June. Plants will be pruned shortly and the plot cleared of weed. The following varieties did not bear fruits this crop: Aramandusker, Borsha, Jacquelin Irwin and Rehman-Pasaud.
Ackee	-do-	Lawrencefield	All 8 cultivars are now bearing. 8 doz. pods have been reaped. In addition pods have been stolen.
Avocado	-do-	Lawrencefield	27 varieties are now bearing. The crop is not yet at its peak. Masutomi and Munro varieties are now maturing.
Cocoa	Introduction (T.S.H.)	Hope (Greenhouse) March, 1982	1,000 seeds of hybrid selection sown in pots. 99% germination within 3 weeks. Withering of plants observed - 250 destroyed at Plant Protection instruction.

ROOT CROPS

Yam	Field Collection of Varieties	Bodles - April - May, 1981	Projects have been reaped and data obtained are being analysed. Statistical analyses of project three (3) is being carried out.
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AREA	PROJECT	PLACE AND DATE OF PLANTING	REMARKS
<u>ROOT CROPS CONT'D</u>			
Yam	Propagation of White	Bodles -	Projects have been reaped and data obtained are being analysed. Statis- tical analyses of project three (3) is being carried out.
-do-	Method of planting x Fertilizer quantity	Bodles - June, 1983	Comparison of setts being estab. in the middle of the ridge and on both sides of the ridge.
-do-	Sett Size x Sett Type Spacing Trial (White Yam)	Bodles - June 1982	Reaping operations were completed in April and tubers are stored at Bodles. Data being analysed.
-do-	Fertilizer Grade x Quality Trial (W. Yam)	Bodles - May, 1982	-do-
Sweet Potato	Variety Trial (2)	Lawrencefield - Sept. 82	Massive damage by weevils despite soil treatment with hept- achlor 30 vars. being compared in museum plot.
-do-	-do-	Bodles - Nov. 1982	-do-
-do-	-do-	Orange River - Nov. 1982	-do-
-do-	-do-	Grove Place Nov. 1982	-do-
-do-	-do-	Montpelier	Plant satisfactory established 15 varieties.

AREA	PROJECT	PLACE AND DATE OF PLANTING	REMARKS
<u>ROOT CROPS CONT'D</u>			
Cassava	Variety	Montpelier - May, 1983	Var. No. 69 estab. for observation purposes.
-do-	Variety	Bodles - May, 1983	Var. CM 321 - 1-8 estab. to observe performance under local conditions. 23 other vars. local and imported also being evaluated.
-do-	Variety Trial	Thetford Seed Farm - March, 1982	20 vars. local and Colombian being evaluated for desir- able characteristics and yield.
-do-	Museum Plot	Lawrencefield - June, 1982	Vars. M. Col 22, 69, 30 Bassue X, Mex. 55 and Blue being com- pared for performance etc.
<u>OIL CROPS</u>			
Jjoba	Adaptation	Lawrencefield - Oct., 1982	Slow growth continues, pest evaluated.
<u>SPICES</u>			
Pimento	Beverly/ Grenada Observation Plot	Beverly - 1963 and 1971	Watering of trees with berries showing effect of drought. Pruning, mulching, recording of flowering and assessment of yield for 1982.
-do-	-do-	Beverly - 1971	Wards Plot. Data recording of flowering, assessing yield for 1982, pruning, mulching and spraying for plot control.

AREA	PROJECT	PLACE AND DATE OF PLANTING	REMARKS
<u>SPICES CONT'D</u>			
Pimento	Museum Observation Plot	Beverly - 1973	General crop care. Recording of field data e.g. prolificacy of flowering, knitting of berries etc.
-do-	Progeny Observation	Beverly - 1968	Watering of drought affected trees. Soil type No. 78 unable to retain sufficient moisture.
-do-	Old Fertilizer Trial Plot	Beverly - 1968	General crop care. Assessing need for further decrease in population to improve yield.

APPENDIX II

LIVESTOCK RESEARCH

PROJECT TYPE	SUBJECT AREA	LOCATION	OBJECTIVES	STATUS
1. Cross-breeding for milk production.	-do-	-do-	To compare the potential for milk production in Jamaica Red X, Jamaica Hope animals with purebred Jamaica Hope animals under similar management system.	Ongoing
2. Progeny Testing of Jamaica Hope Bulls through their first lactation production of their female Off-Spring.	-do-	-do-	To test and record milk production and performance of Jamaica Hope cows in their first lactation under a uniform and improved environment. Aim to do 30-40 cows annually.	"
3. Comparison of Jamaica Hope with Holstein - Friesian Dairy Cattle during their first lactation.	-do-	-do-	To appraise milk production potential of the Jamaica Hope and Holstein Friesian under three levels of supplementary concentrate (grain feeding.)	"
4. The development of a strategic control programme for Fasciola Hepatica and Haemonchus Contortus Infection in small ruminants.	Animal Health		To design a cost effective locally appropriate control programme for Fasciola Hepatica and Haemonchus contortus infections in small ruminants.	"

LIVESTOCK RESEARCH (CONT'D)

PROJECT TYPE	SUBJECT AREA	LOCATION	OBJECTIVES	STATUS
5. Studies on the utilization of dried poultry litter, urea and cassava by sheep.	Animal Nutrition	-do-	1) To evaluate the nutritive value of poultry litter as a source of nitrogen in sheep production. 2) To see the comparative effect of a urea based ration on growing sheep. 3) To formulate a supplement for sheep using poultry litter as a nitrogen source and cassava as a source of energy.	Completed
6. The use of Cassava in the feeding of goats.	-do-	-do-	To evaluate cassava as an energy source for growing goats.	"
7. The Samanea Saman (Guango Pod) as a feed source for goats with or without maize.	-do-	-do-	To evaluate the effect of the guango pods on weaning goats with respect to feed intake and weight gain.	"

LIVESTOCK RESEARCH (CONT'D)

PROJECT TYPE	SUBJECT AREA	LOCATION	OBJECTIVES	STATUS
8. Maintenance and improvement of the Government's herd of Jamaica Red Poll Cattle.	Beef Cattle Breeding and Husbandry.	Grove Place	1) To develop and maintain a nucleus herd of Jamaica red Poll breed of cattle for use in the improvement and stabilization of beef cattle throughout Jamaica. 2) To provide seed stock.	Ongoing
9. Maintenance and improvement of a nucleus herd of Jamaica Black Cattle.	-do-	-do-	1 and 2 as above.	"
10. Evaluation of economic traits of beef cattle breeds.	-do-	-do-	To document information on the various economic traits of native beef cattle and measure the response of these traits to breeding, selection and improved husbandry conditions.	"
11. Performance testing of Beef Cattle.	-do-	-do-	To measure the growth potential of animals to be used for breeding purposes and to use their measure in ranking these animals on relative breeding merits.	"

LIVESTOCK RESEARCH (CONT'D)

PROJECT TYPE	SUBJECT AREA	LOCATION	OBJECTIVES	STATUS
12. Cross-breeding for Beef Production.	Beef Cattle Breeding and Husbandry.	Grove Place	To evaluate the potential of native Beef Cattle in a system of rotational cross breeding with or without the inclusion of exotics.	Ongoing
13. Effect of supplementation on post weaning stock, 400 days weight and its subsequent effect on the performance of replacement heifers.	-do-	-do-	<u>Phase I</u> Getting animals to a breeding weight of 700 lbs. by 15 months of age using grass and local feed ingredients.	"
14. Plant Introduction and testing.	Grass Land Research	-do-	To evaluate introduced grass and legume varieties for desirable attributes such as Dry Matters Yield, response to fertilizer etc.	"
15. Cynodon Grass variety trial.	-do-	-do-	To examine the effect of stage harvesting on dry matter yield and chemical composition of four promising Cynodon varieties.	"

LIVESTOCK RESEARCH (CONT'D)

PROJECT TYPE	SUBJECT AREA	LOCATION	OBJECTIVES	STATUS
16. Cynodon grazing trial.	Grass Land Research	Grove Place	To measure the potential of two promising Cynodon varieties (Star and Cost Cross I) for Beef production, mowed and unmowed under rotational grazing system.	Ongoing
17. Coastal Bermuda and Lucaena grazing pastury.	-do-	-do-	To measure live-weight gain of animals grazing grass, legume pastures.	"
18. Addition of Nitrogen to grassland from grass/legume sward (Biological Nitrogen Fixation Project).	-do-	-do-	To measure the amount of Nitrogen added to the soil by the legume crop in a grass/legume sward as against a pure grass sward in which there is no legume.	"

APPENDIX III

LIST OF PROJECTS
PLANT PROTECTION DIVISION, AUGUST, 1983
Reporting Officer - David W. Ellis

PROJECTS	LOCATION	OBJECTIVE	REMARKS
<u>ENTOMOLOGY</u>			
1. Evaluation of insecticides for control of Diamond back moth.	Top Mountain; Orange River; St. Thomas	To provide farmers with efficient chemicals to control this pest.	Thuricide, so far Selectron and Belmark working well.
2. Evaluation of Chemicals to control tomato pinworm.	Hope Laboratory; Orange River	As in 1.	Drought set back work.
3. Preliminary Survey to determine status of citrus white fly.	Major Citrus area	To characterize past status of citrus white fly.	Preliminary report in. Detailed survey when white weather suitable.
4. Evaluation of cowpea varieties for resistance to podborer.	Lawrencefield	To obviate need for use of insecticides.	Ongoing
5. Evaluation of Chemicals for control of pigeon pea pod borer.	Bodles, Lawrencefield	To find suitable chemicals.	Ongoing
6. Evaluation of chemicals for control of cyclamen mite of gerberas.	St. Andrew St. Catherine		Going according to plan.
7. Evaluation of granular insecticides to control coffee leaf miner and coffee berry borer.	St. Mary, St. Ann, Manchester	To eliminate need for spray applications.	Promising preliminary results.

PROJECTS	LOCATION	OBJECTIVE	REMARKS
8. Evaluation of Day Neutral pigeon pea varieties for resistance to pod borer.	Bodles	To eliminate need for use of chemicals.	U.W.I. 26 showing some resistance.

NEMATODOLOGY

1. Control of root-knot nematode affecting coffee.	Porus	To study effect of control measures on yield of coffee berries.	2nd year of three year project. Encouraging results so far.
2. Survey of Nematodes associated with coffee in Jamaica.	Island-wide	To document Plant parasitic nematodes of coffee.	Ongoing
3. Survey of nematodes associated with ornamental plants in Jamaica.	In all ornamental growing areas.	As in 2.	Ongoing
4. Investigating the benefits of at and post planting nematicide treatments to plantain.	Point Hill	To find suitable nematicides for nematode control in plantain.	Second year of five year project. Going according to plan.

PLANT PATHOLOGY

1. Fungicidal control of mildew and Anthracnose disease of mango.	St. Thomas; St. James	To produce exportable fruits.	This is a continuous study.
2. Assessment of potato cultivars for resistance to blight diseases.	Manchester	To reduce losses to these diseases to end need for chemical control.	This is a year by year project.

PROJECTS	LOCATION	OBJECTIVE	REMARKS
3. Screening of pimento cultivars for resistance to rust disease.	Orange River		Study nearing completion.
4. Screening of fungicides for the control of blight diseases in potato.	Trelawny Manchester	To find efficient chemicals to control the disease.	This is a yearly exercise.
5. Investigations into root diseases of gerbera.	St. Andrew	To study epidemiology of disease.	Going according to plan.
6. Screening fungicides for the control of <u>Fusarium</u> .		To be able to control this disease so that crops may be grown in succession instead of only in rotation.	So far no efficient chemical has been found.
7. Studies of the three major leaf diseases of coffee.	Islandwide	To be able to manage these diseases efficiently.	Long term project, going according to plan.
8. Citrus budwood certification and virus indexing programme.	Islandwide	To certify virus free mother trees for budwood distribution.	Second year of programme. Progress hampered by inadequate transport facilities.
9. Island survey of occurrence of virus disease of citrus.	Islandwide	To document virus disease of citrus in Jamaica.	Ongoing
10. Survey of foot rot disease of citrus.	Islandwide	To note the effect of <u>Phytophthora</u> on various root stocks.	Ongoing

PROJECTS	LOCATION	OBJECTIVE	REMARKS
<u>WEED SCIENCE</u>			
1. Effect of mulch in controlling weeds in vegetable crops.	Plant Protection	To study efficiency and economics of weed control using mulch.	Drought hindered work; but now progressing satisfactorily.
2. Chemical control of weeds in onions.	Lawrencefield	To find suitable herbicides for use in this crop.	Project not yet in field owing to water shortage problems.

APICULTURE

An Economic survey of the Bee Industry in Jamaica.	Islandwide	To study economics of bee industry.	Proceeding according to plan. First year of two year project.
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Total Projects

Entomology	8
Nematology	4
Plant Pathology	10
Weed Science	2
Apiculture	<u>1</u>
	25

Staff

2	Entomologists
1	Nematologist
3	Plant Pathologists
1	Weed Scientist
2	Bee Keepers

