POSITION PAPER ON ROOT CROPS IN JAMAICA

MINISTRY OF AGRICULTURE AND IICA/JAMAICA

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JAMAICA

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FOREWORD

As in many other countries, root crops constitute a principal source of calorie-rich foods in Jamaica. Due to their adaptability to a wide range of agro-climatic conditions root crops have survived where others have failed to perform on a sustained basis.

Because of the steady increase in population, and the demand for more food, farmers are no longer able to afford the luxury of having land that is not cultivated. Also, due to the overall low yield levels of root crops experienced in Jamaica it is a sine qua non that the constraints to higher production and productivity levels be identified and recommendations to mitigate and/or alleviate these constraints be considered.

It was with this in mind that the Director of Research and Development, Ministry of Agriculture established the Root Crops Commodity Research Committee in 1979 to inter alia determine research priorities with respect to the needs of growers and the agro-industrial sector.

We are now pleased to submit the findings and recommendations of our deliberations. It is our sincere hope that the many hours spent in preparing this report will eventually lead to increased production of root crops in Jamaica, both for domestic use and the export market.

We gratefully acknowledge the support of the following individuals who have served unstintingly on the committee and without whose contribution this report could not have been prepared.

Mrs. Cynthia D. Graham	-	Ministry of Industry & Commerce
Miss Dorothea Sibblis	-	Ministry of Industry & Commerce
Mr. Joscelyn E. Grant	-	CARDI
Mr. Len B. Hutchinson	-	J.N.I.C.
Mr. Raymond E. Blake	-	Ministry of Agriculture
Mr. Roy Rainford	-	Ministry of Agriculture
Mr. Dexter G. Reid	-	Ministry of Agriculture

We also acknowledge with gratitude the inputs and encouragement of Mr. Noel Singh, Deputy Director of Research and Development, Ministry of Agriculture and Dr. Percy Aitken-Soux, Director IICA/Jamaica.

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Abdul H. Wahab
Chairman and Editor
IICA/Jamaica

POSITION PAPER

ROOT CROPS COMMODITY RESEARCH COMMITTEE

INTRODUCTION

The Root Crops Commodity Research Committee is one of 12 Commodity Committees established in 1979 by the Director of Research and Development, Ministry of Agriculture and given responsibility to:

(a) determine research priorities in the relevant commodity or group of commodities with respect to the needs of growers and the agro-industrial sector;
(b) monitor all research projects pertaining to the relevant commodity or group of commodities; and
(c) decide on recommendations for release to the farming community consequent on research findings

The members of the Root Crops Commodity Research Committee and contributors to this document are listed in Appendix 1.

In its initial deliberations, the Committee made an overview of all the root crops produced in Jamaica relative to their importance in (i) the national economy, (ii) the national dietary intake and local consumption, (iii) agro-industry and (iv) the export market. Based on these considerations and against the background of scarcities of funds and manpower to effect maximum research and development, the Committee selected the following root crops as deserving of immediate attention:

(a) YAMS (*Dioscorea* spp)
(b) CASSAVA (*Manihot esculenta*)
(c) IRISH POTATO (*Solanum tuberosum*)
(d) SWEET POTATO (*Ipomoea batatas*) and
(e) the AROIDS - coco and dasheen (*Colocasia* spp and *Xanthosoma* spp).

PRODUCTION OF ROOT CROPS IN JAMAICA; 1970-1979

Over the 10-year period 1970-1979, the acreage planted to and total production of most of the selected root crops increased steadily and appreciably although with fluctuations in some instances (Appendices 2 and 3). However, there was a steady decline in the production of white yams and yampies over this period. Production costs and consequently the prices paid at the farm gate and in the marketplace also increased steadily (Appendices 5 and 6). For some root crops however, production did not always keep pace with demands for local consumption and for export. The various factors contributing to fluctuations in quantitative production and to production not keeping pace with demand will be addressed elsewhere in this document.

Between 1970 and 1979, productivity of dasheen increased by nearly 100%, sweet potato by over 50% and of cassavas by over 30% while productivity of coco and negro yam actually declined and for the other root crops, showed slight to moderate increases (Appendix 4). The significant increases in total production of the selected root crops over the stated period therefore appear to be related to more land being put into production rather than to increased productivity. This suggests insufficient transfer of technology as this Committee is aware that prior to and during the stated period, research projects carried out in Jamaica resulted in the introduction of new, higher yielding cultivars, improved agronomic techniques, more effective methods of controlling pests and disease organisms, etc. The substantial increases in productivity which research showed to be attainable have not been achieved in the production of root crops in Jamaica. This Committee sees insufficient transfer of technology to growers as one major constraint to increased production of root crops.

EXPORT POTENTIAL OF ROOT CROPS

Between 1976 and 1978, increasing quantitites of yams, dasheens, and sweet potatoes were exported from Jamaica, the bulk going to the

U.S.A., Canada, the U.K. and to CARICOM markets. These positive increases suggest that these commodities now enjoy favourable overseas markets. However, quantities of exports in recent years still fall below levels of some years ago (Appendix 7). This is further argument in favour of the export potential of root crops grown in Jamaica. From reports which cannot be substantiated here, it appears that yams exported to the U.S.A., Canada, the U.K., etc. from Jamaica have superior eating qualities compared to yams from other Central American and Caribbean sources.

It is understood from reports in the press that the J.N.E.C. and J.E.T.C.O. are seeking new overseas markets for Jamaican yams, dasheens, sweet potatoes, etc. and are urging increased qualitative and quantitative production locally. This Committee fully endorses the efforts of J.N.E.C. and J.E.T.C.O.

This Committee is also of the opinion that the feasibility and benefits of preserving yams, etc. by canning, as done in other Caribbean countries, merits consideration.

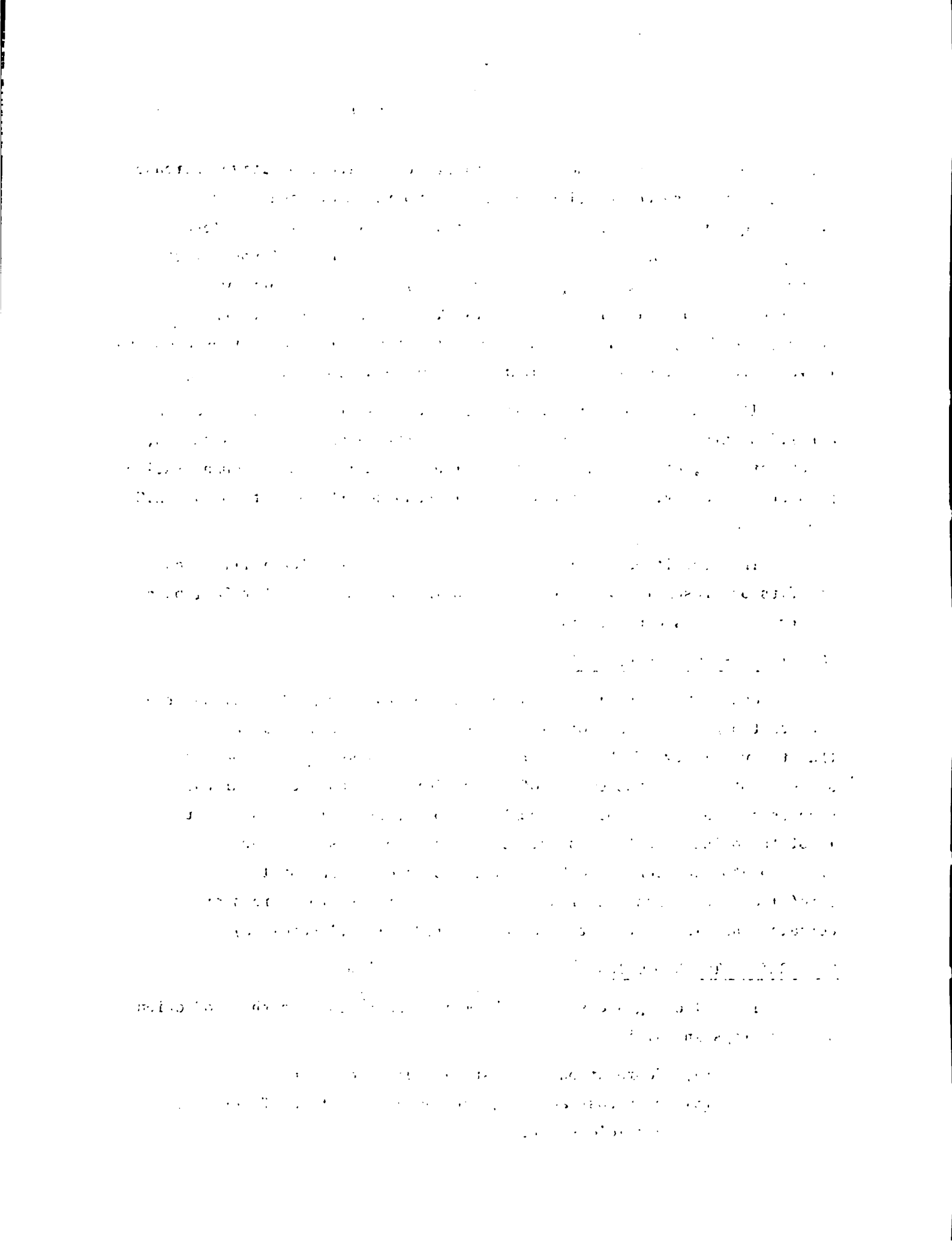
POTENTIAL OF ROOT CROPS LOCALLY

Considering the increasing demand for root crops locally and the fact that production has not always kept pace with demand, it appears that the viability of the root crops industry is assured for the foreseeable future. In these days of scarce foreign exchange to purchase staples such as rice, wheat (flour) and corn (cornmeal), this Committee is of the opinion that the substitution value of cassava flour, yams, sweet potato, dasheen and other root crops is deserving of long and careful consideration. Current local prices of most root crops are certainly no disincentive to increasing production (Appendix 6).

CONSTRAINTS TO PRODUCTION

The following are seen as the major constraints to the production of root crops in Jamaica:

(a) depredations by pests and disease organisms
(b) high cost and frequent unavailability of fertilizers, pesticides, etc.



(c) lack of appropriate equipment that could be used in planting and harvesting operations on the plains

(d) scarcity of planting material (e.g. of softer yam cultivars, cassava, etc.)

(e) use of nematode/insect-infested and/or diseased planting material

(f) general unavailability of dependable labour

(g) lack of hand or small, powered implements for use in hillside farming where applicable, e.g. on terraced land

(h) lack of storage space and storage problems affecting some root crops (e.g. some yam cultivars)

(i) sparsity of information re technological developments and insufficient technology transfer

(j) relatively low prices received by growers compared to those received by higglers and intermediate sellers

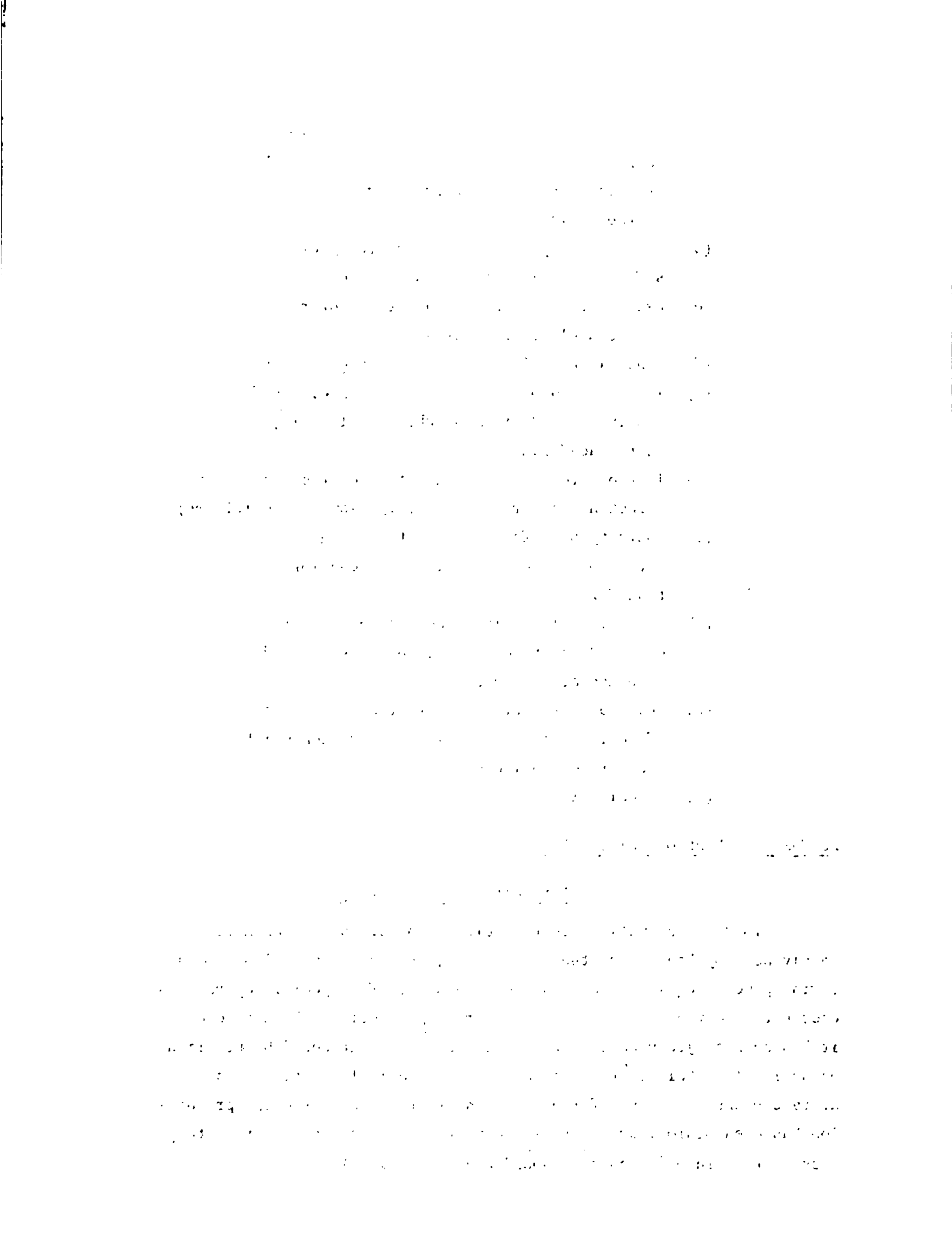
(k) inappropriate agronomic practices (e.g. use of individual hills in yam cultivation which accelerates soil erosion)

(l) praedial larceny.

RESEARCH CARRIED OUT SINCE 1970

Agricultural Engineering

To date, operations in the cultivation of root crops have mainly been by hand. For the near future, the use of animal or engine-powered equipment or hand tools designed for specific operations does not appear as a feature of root crops production. Furthermore, it has been conjectured that where powered equipment could be utilized economically, their cost would make them unavailable to growers of average means. The use of rubber-tyred tractors in root crops production has been minimal due to their scarcity, high cost and to the steepness of terrain on which they would have to work (8).



For staking yam plants, Payne has suggested placing short, hollow lengths of steel pipe on a semi-permanent or permanent basis in yam fields; wooden stakes which could be removed as required could be supported in the pipes. In additon, Payne has suggested various staking arrangements and submitted designs for a yam digger and sacks for fitting on farmers and donkeys to facilitate planting and harvesting operations (23).

Agronomy

Yams - Payne found that certain cultivars did not response to fertilization (22) but that continuous mounds were more beneficial than hills and that for some cultivars, increasing yields of tubers were associated with increasing stake height (21).

Stone found no yield response to various levels, placement, time and method of fertilizer application with D. alata but showed that 3/4 to 1 lb was the optimum size for planting pieces (any section) and that 2 ft. apart on continuous mounds was the best spacing (27).

On reclaimed bauxite lands, Morgan (17) showed that high fertilizer rates, spreading the soil to 30 cm and no ripping of the soil were all profitable to growth and production.

Cassava - Reid has developed a technique for rapid multiplication of planting material (25) while Weir (37) found that application of a 10-10-20 fertilizer yielded the highest number of tubers per plant; no fertilization yielded the lowest.

Sweet Potato - High fertilization rates and spreading soil to 30 cm depth on reclaimed bauxite lands were factors beneficial to sweet potato growth (17).

Tannia (Xanthasoma sp.)- Two local cultivars, Sally and Commander, gave good yields under shade but no yield when planted in the open (27).

Potato - A document prepared by Dexter Reid, formerly Potato Agronomist, Ministry of Agriculture, has set out results of variety trials, trials looking at the suitability of various soil types and methods of soil preparation, fertilizer and moisture requirement trials,

seed treatment, benefits of pre-sprouting and bitting, the diseases which have been investigated, etc. (26).

Crop Protection

Yams - The various disease organisms and parasitic nematodes affecting Dioscorea spp have been identified (5, 6,7,9,10,11,14,18,19,20, 30). Anthracnose was reported to be the most important disease of and major constraint to production of white yam (D. alata) (18, 19, 20). Recent work has shown that dipping yellow and negro yam planting material in hot water and/or certain nematicide solutions suppressed populations of noxious nematodes (Pratylenchus coffeae and Scutellonema bradys), forestalled development of a nematode-related dry rot called "burning" and resulted in better stands and higher quantitative yields; post-plant nematicide treatments reduced levels of dry rot on harvested tubers (4, 5,6,11,12,13).

Christie (3) demonstrated that two weeks after planting, i.e. prior to sprouting, was the best interval for applying chemicals for weed control while Watt (36) found that Atrazine at 4.4 kg/ha gave good control of mixed weeds in sweet yam (D. alata) fields.

Cassava - Pathogens, noxious nematodes and insect pests have been identified (7,11,14,18,19,34).

Sweet Potato - The sweet potato weevil is reportedly the major pest affecting this crop (1,18,19,28). Several chemicals were found to give good control (29). Important disease organisms and nematodes have also been identified (7,11,14,18,19).

Aroids - Fungus pathogens have been listed and some control recommendations given (14,18,19). The parasitic nematodes associated with coco, dasheen, etc. have also been identified (7,11).

Potato - Several fungus and virus diseases have been identified (14,18,19,35). Late blight (caused by Phytophthora infestans) was/is the most important disease. Several fungicides were found to give good control of late blight but Daconil and Difolatan were most effective (35); control measures have been developed for early blight (20).

Cutworms and other insects which damage tubers have also been investigated (24,28,29). Various chemicals on a sawdust, coir, citrus pulp or pigmeal base as well as high moulding are now recommended for cutworm control (29). Nematode problems of and nematodes associated with this crop have also been identified (11, 18, 19).

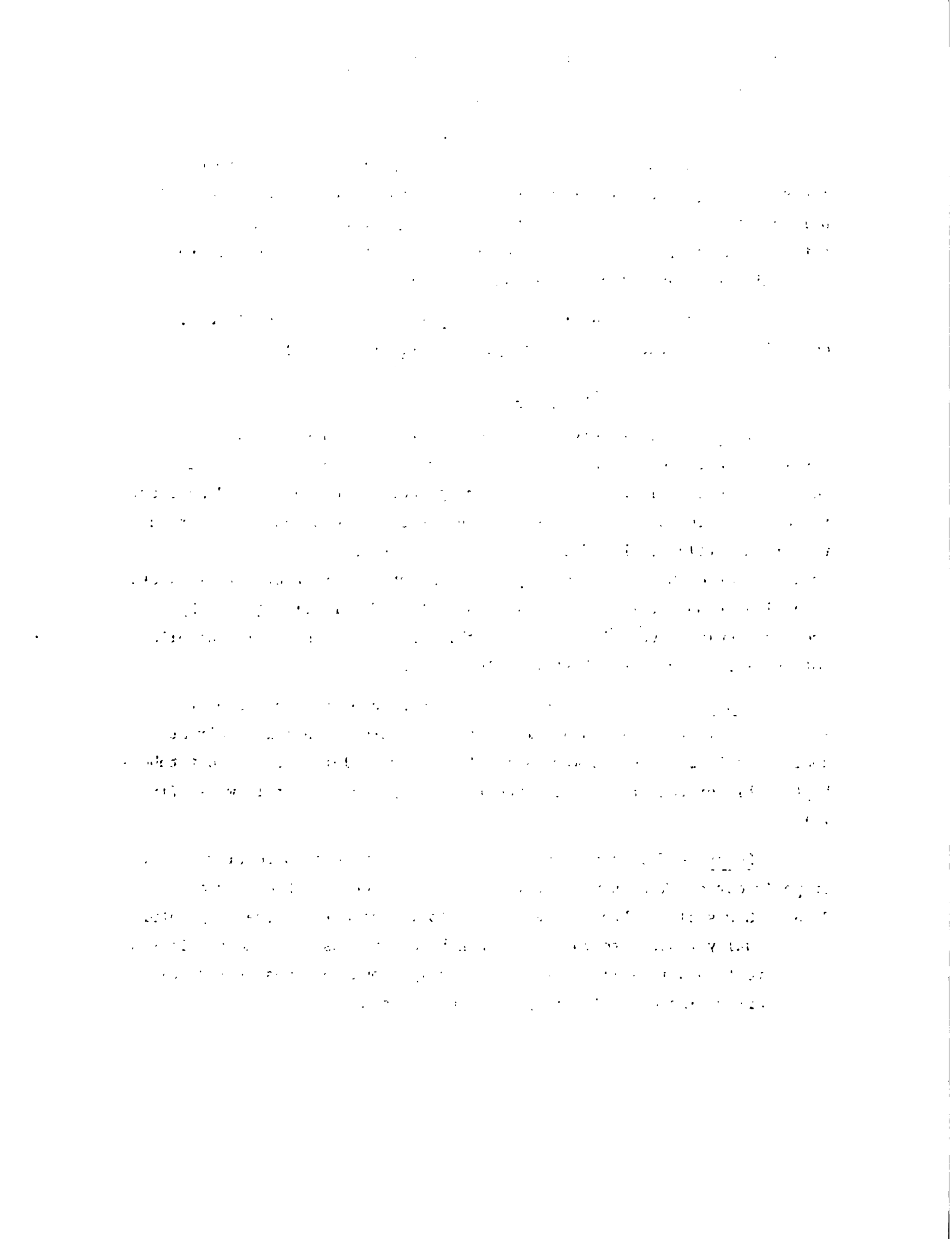
Metribuzin at 1.4 or 1.68 kg/ha post emergence gave effective control of weeds excepting nut sedge and water grass (36).

Storage and Infestation

Yams - Yams are highly susceptible to post-harvest injury resulting in reduced market value and increased storage losses. Curing encourages rapid wound healing through cell suberization and periderm formation to inhibit water loss and ingress by micro-organisms. Various temperature/relative humidity/time regimens have been tried. After treatment at 40°C for 1-7 days, yellow yam tubers were kept for six weeks at ambient temperatures after which they started sprouting (2,31,32). Treating newly harvested tubers with thiabendazole or benomyl controlled rot fungi thereby reducing storage losses (33).

Cassava - After harvest, tubers are susceptible to vascular streaking. Six to 12 weeks after being cured (stored in moist coir at ambient to 12.5°C) tubers were still free of vascular streaking but tubers kept at higher temperatures started to develop roots after 10 weeks (15, 16).

Potato - Tubers are easily damaged and subject to rotting if not properly cured. Tubers were kept for 2-3 weeks during which air at 27.5-29°C was blown through the stores; following airing, the temperature was gradually reduced to 70°C. Six months after these treatments, losses due to rotting were still very low. Locally grown potatoes stored well at 7°C after nine days of curing (Unreported data).



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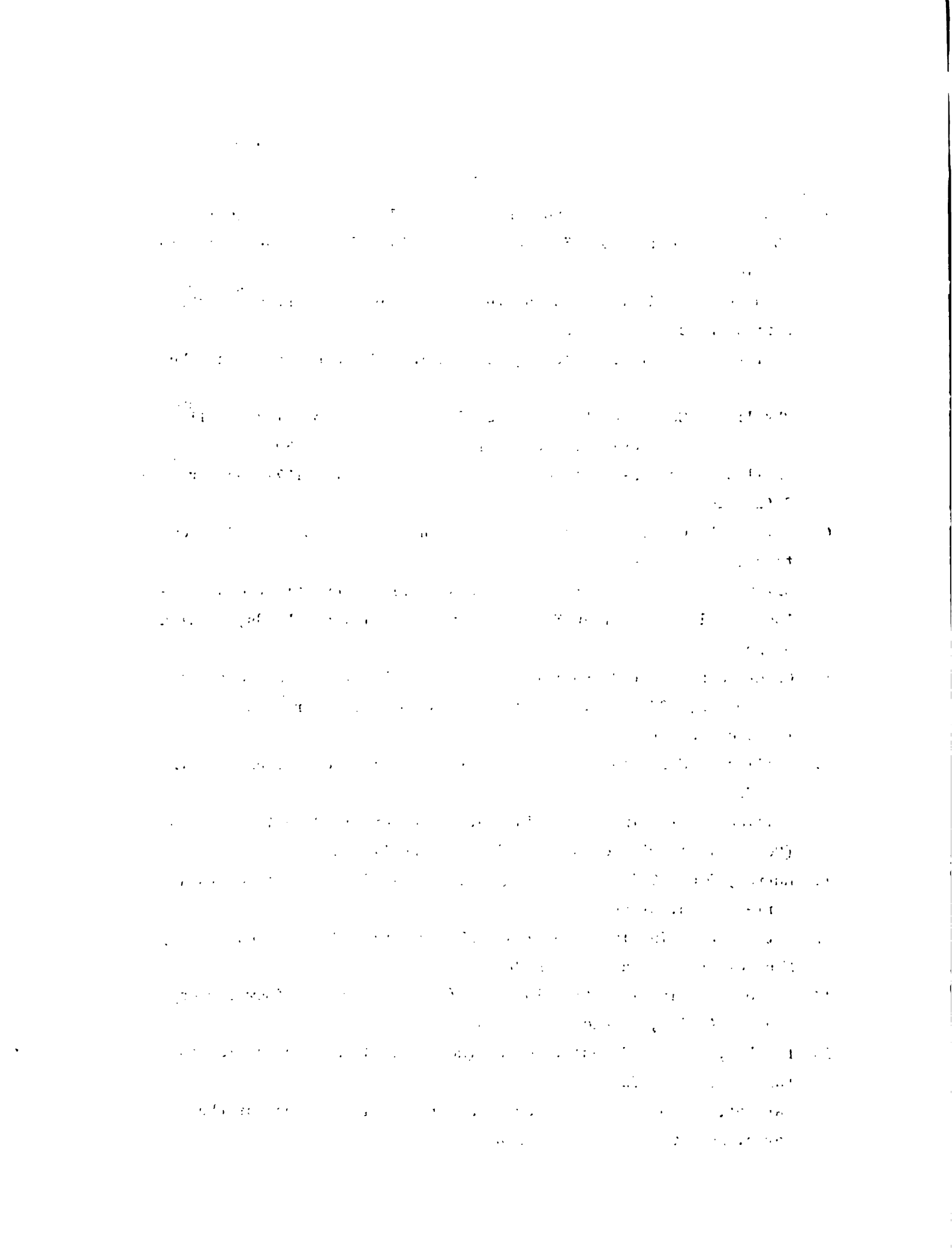

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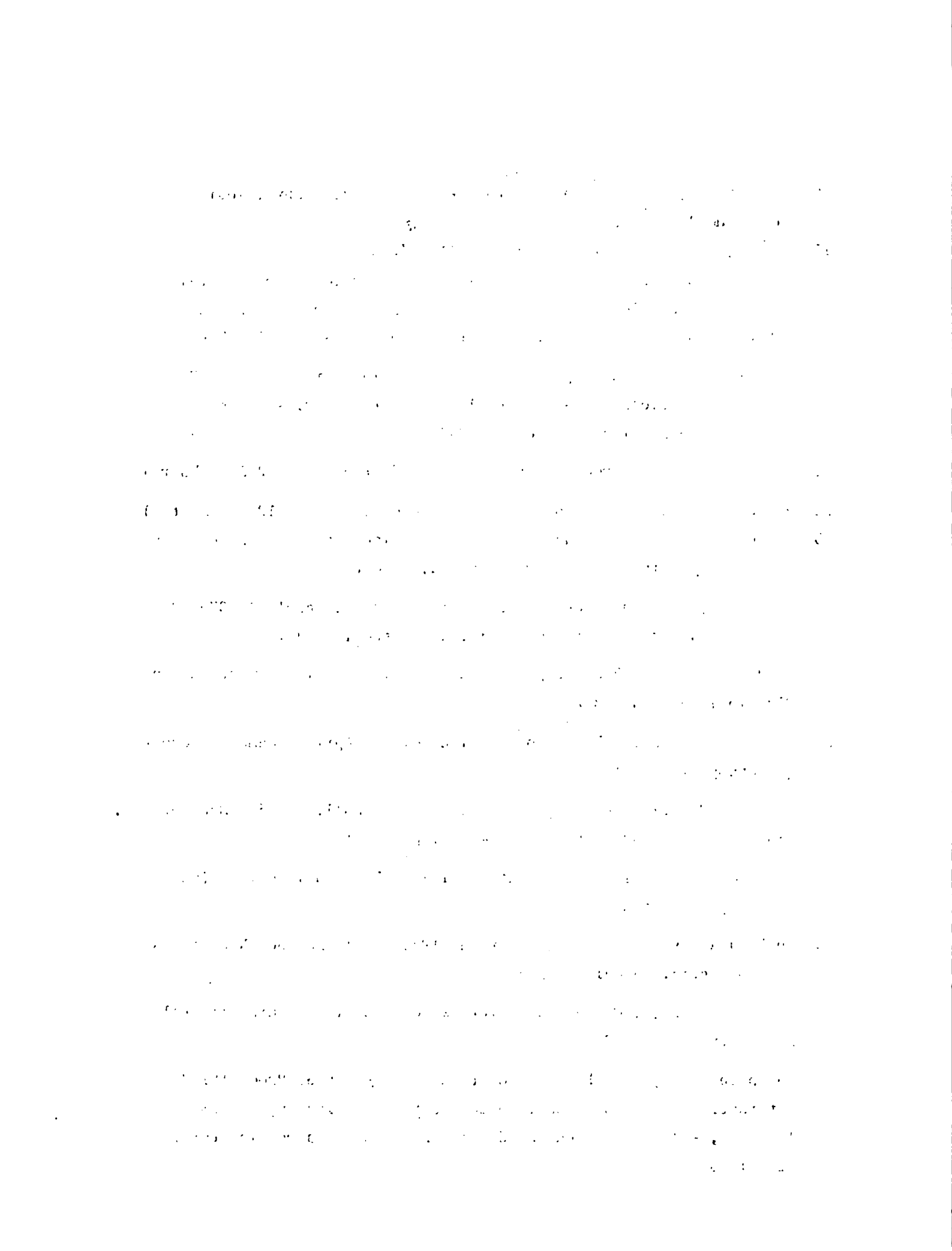

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RECOMMENDATIONS

Research Priorities

This Committee strongly recommends that adaptive research be carried out in the following areas in order to alleviate or eliminate problems identified as the major constraints to production and storage of yams, cassava, potato, sweet potato and dasheen.

Yams

1. CONTROL OF ANTHRACNOSE OF WHITE YAM - This disease is the major constraint to production. To date, specific recommendations for its control are unavailable.
2. DETERMINING CRITICAL LEVELS OF NEMATODE-RELATED DRY ROTTING OF PLANTING MATERIAL (ALL CULTIVARS) AND MEASURES TO FORESTALL DEVELOPMENT OF THIS CONDITION- "Burning" on yam heads appears to cause destruction of stem primordia; consequently, planting heavily "burnt" heads results in poor stands and significant reductions in yield.
3. CORRELATION OF SIZE OF PLANTING MATERIAL (ALL CULTIVARS) WITH YIELD - Growers should be advised on the optimum size of plantings pieces to offset the high cost of planting material.

4. INVESTIGATING THE EFFECTS OF OPTIMUM FERTILIZER REGIMES ON YIELD, STORAGE LIFE (ESPECIALLY OF YELLOW YAMS), ETC. - To date. little is known about the response of yam plants to fertilization but it appears that improper fertilizer regimes can retard maturity. Following harvest, immature yams deteriorate rapaidly in storage.

5. STUDIES TO DETERMINE THE FEASIBILITY OF PRODUCING YAMS ON THE PLAINS - A long-term project.

Cassava

1. INVESTIGATING THE CONTROL OF MITES, THRIPS AND BUD MAGGOTS (SILBA PENDULA) WHICH CAUSE SEVERE DAMAGE TO CASSAVA - Insects, especially bud maggots, are a major impediment to growth and development of plants.

2. THROUGH FIELD TRIALS ON DIFFERENT SOIL TYPES AND AT VARYING ALTITUDES, IDENTIFICATION OF LOCAL AND IMPORTED CULTIVARS WHICH ARE HIGH YIELDING, HIGH IN DRY MATTER CONTENT, HAVE PROPER ROOT ORIENTATION FOR EASE OF HARVESTING, ACCEPTABLE SKIN THICKNESS FOR PROCESSING, ETC. - Such varieties are urgently required to get production moving apace.

Potato

1. FURTHER INVESTIGATIONS INTO METHODS OF CONTROLLING EARLY AND LATE BLIGHTS - These diseases are the major constraints to production.

2. LOCAL ASSESSMENT OF CULTIVARS DEVELOPED IN CENTRAL AND SOUTH AMERICA FOR LOWLAND TROPICAL CONDITIONS - These varieties, now available, must be tested for adaptability, yield potential, etc.

Sweet Potato

1. FURTHER WORK ON CONTROL OF THE SWEET POTATO WEEVIL - This insect is the major pest of this crop; adequate control methods are still to be developed.

2. COMPARISON OF THE YIELD POTENTIAL OF DIFFERENT CULTIVARS - High producing cultivars must be identified, bulked and distributed.

3. TIME OF PLANTING TRIALS - Time of planting seems to be a factor governing growth, development, production, etc.

Dasheen

1. INVESTIGATING METHODS TO CONTROL "SALTPETRE" - This disease is devastating in certain areas.
2. TESTING VARIETIES IN VARIOUS ECOLOGICAL SITUATIONS - It is possible that some varieties might have low moisture requirements. The apparent high export potential of this crop should be explored.
3. Arising from 2, INVESTIGATING WORK AIMED AT CURING TO PROLONG STORAGE LIFE should be pursued.

Developmental Priority Considerations

The following recommendations, if adopted, could result in speedy development of a viable root crops industry.

Yams

1. Establishment of an agency or agencies to:
   (a) produce "clean" planting material (all cultivars) and/or be responsible for disinfesting planting material to be made available to growers
   (b) catalogue, classify (nomenclatorially) and maintain a germplasm collection of the various cultivars.
2. Growers should be encouraged to intercrop yams with compatible crops such as potato, peanut, cowpea, ginger, etc. to optimize land use, increase production, increase rural employment and raise farm income levels.
3. The factors responsible for the drastic decline in yampie and white yam production should be identified and eliminated.

Cassava

1. Rapid multiplication of planting material of superior local and imported cultivars for distribution to growers.
2. Identification of cropping or rotation systems in which cassava is the main or alternate crop.

3. Cataloguing and classifying (nomenclatorially) local cultivars.

Potato

1. Establishment of a seed farm. This should drastically reduce if not eliminate the large sums of foreign exchange used to purchase seed from abroad.

2. Introduction of cost saving crop production techniques to growers. Presently, fertilizer and seed constitute 25 and 30% respectively of production costs. Practices such as zero tillage where applicable, use of less fertilizer, use of sprouts as the propagative unit rather than seeds, etc. should reduce these costs considerably.

Sweet Potato

1. Establishment of an agency to distribute improved planting material.

2. Classification (nomenclatorially) of local cultivars and resurrection of the museum plot.

Dasheen

1. Investigating dasheen as a possible source of starch and flour for processing at the cassava factory.

2. Maintenance of a germplasm collection.

Other Recommendations

This Committee recommends that the Ministry of Agriculture fosters close or closer working relationships with International Agricultural Research and Development Institutions which are equipped (resources, personnel, background data, etc.) to investigate situations pertinent to us, e.g.:

CIP (Peru) - breeding for early and late blight resistance (potato).
CIAT (Colombia) - various aspects of work on cassava
AVRDC (Taiwan) - screening of sweet potato germplasm, control of the potato weevil, other work on this crop.
IITA (Nigeria) - development of yam planting material from aerial tubers, effect of fertilization or increased fertilization of yam on storage life of harvested tubers, etc.

APPENDIX I

Members of the Root Crops Commodity Research Committee and contributors to this Position Paper

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Mr. Roy L. Rainford - Extension Specialist, Extension Division, Ministry of Agriculture.

Mr. Dexter G. Reid - Crop Agronomist, Crop Agronomy Division, Ministry of Agriculture (now Deputy Director, Northern Region, Production and Extension Dept., Ministry of Agriculture).

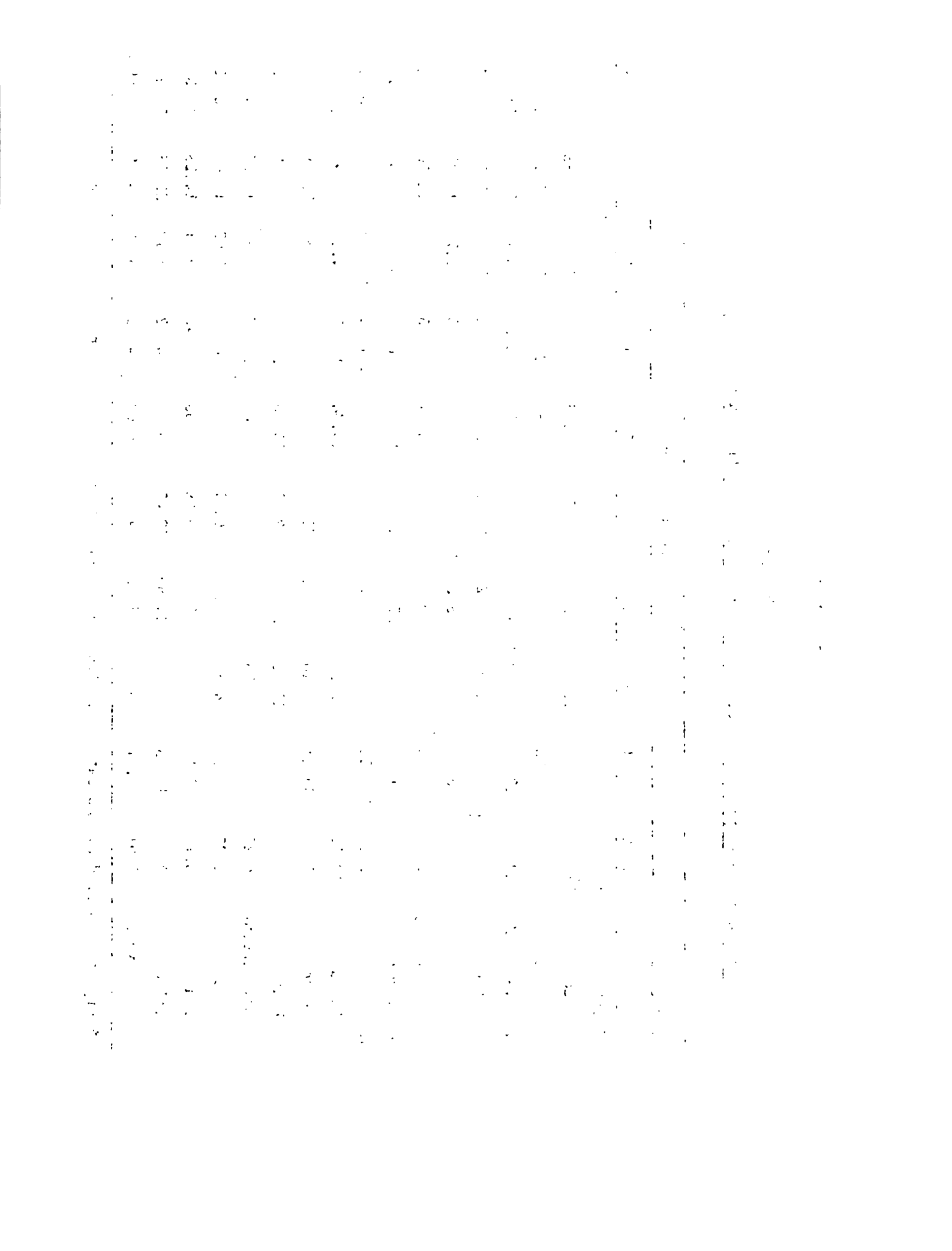
This Committee has recommended to the Research and Development Department, Ministry of Agriculture that two (2) Grower Representatives be accepted as ex-officio members.

APPENDIX 2

Estimated total production of selected root crops in Jamaica for the period 1970-1979

Root Crops	Thousand short tons*									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
AROIDS										
Coco	12.53	11.54	12.42	12.31	14.01	15.03	11.69	15.98	22.55	18.70
Dasheen	10.09	18.13	20.35	16.03	16.55	20.58	21.49	22.16	22.16	19.39
CASSAVAS (ALL)	22.22	20.20	23.42	16.61	16.29	20.55	23.07	36.99	39.52	31.52
Bitter	16.09	13.76	16.07	11.23	11.22	15.14	16.32	23.28	23.75	19.54
Sweet	6.13	6.44	7.35	5.38	5.07	5.41	6.75	13.71	15.77	11.98
POTATO (Irish)	9.30	14.56	17.78	9.86	11.10	15.01	8.43	9.28	12.36	13.88
SWEET POTATO	13.98	21.59	21.99	17.78	22.01	16.63	18.02	30.26	62.05	29.16
YAMS (ALL)	89.04	135.28	140.64	130.71	142.17	144.59	131.83	151.53	181.81	173.25
Lucea	10.13	14.33	12.94	12.26	13.39	14.34	13.03	14.28	15.93	17.65
Negro	23.72	30.24	31.10	28.97	32.77	28.20	15.27	26.36	35.88	34.16
Renta	12.43	18.55	22.68	23.71	22.77	25.70	26.09	25.94	28.73	27.99
St. Vincent	4.28	8.68	9.75	8.85	10.14	11.04	11.67	11.55	12.85	14.54
Sweet	3.23	3.90	4.54	4.83	6.17	5.14	6.53	6.09	10.66	8.33
Tau	5.10	13.12	10.40	11.61	9.59	9.35	10.43	10.01	14.25	11.52
Yellow	27.69	40.85	42.64	44.60	42.47	46.20	44.62	52.12	59.25	54.47
Other yams	3.01	5.61	6.59	5.88	4.87	4.62	4.19	5.18	4.26	4.59

* Figures supplied by the Data Collection and Statistics Section, Ministry of Agriculture



APPENDIX 3

Estimated acreage* planted to selected root crops in Jamaica over the period 1970-1979

ROOT CROPS	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
AROIDS										
Coco	2667	3435	3990	4010	4360	4120	3688	4446	5453	4576
Dasheen	3141	3698	3780	2950	3050	3870	3785	3747	3630	3151
CASSAVA (ALL)	5791	5094	6930	4610	4360	4990	5665	7525	8172	6250
Bitter	3907	3081	3690	2880	2780	3700	3770	4267	4583	3598
Sweet	1884	2013	2240	1730	1580	1690	1895	3258	3589	2617
POTATO (Irish)	2216	3321	4210	3150	3410	4590	2520	2337	2886	2970
SWEET POTATO	4206	6047	6440	5290	6160	5060	4870	6422	12418	5839
YAMS (ALL)	17589	26164	28145	28060	27400	29540	27345	28336	32987	30785
Lucea	1834	2743	2760	2760	2710	2740	2450	2631	2814	3007
Negro	3592	5044	5430	5080	5090	4990	3105	4737	6355	5956
Renta	2678	3642	4460	4810	4520	5830	5070	4727	5152	4855
St. Vincent	1046	1874	2230	2050	2040	2270	2600	2735	2599	2900
Sweet	862	1033	1230	1340	1610	1480	1800	1748	2624	1937
Tau	905	2288	1840	1910	1740	1620	2100	1551	2294	1933
Yellow	5803	8174	8600	8790	8530	9600	9355	9199	10499	9500
Other yams	869	1366	1595	1320	1160	1020	865	1008	650	697

APPENDIX 4

Average yield per acre (productivity) of selected root crops grown in Jamaica over the period 1970 - 1979

ROOT CROPS	Short tons per acre*									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
AROIDS										
Coco	4.7	3.4	3.1	3.1	3.2	3.6	3.2	3.6	4.1	4.1
Dasheen	3.2	4.9	5.4	5.4	5.4	5.3	5.7	5.9	6.1	6.2
CASSAVAS (ALL)	3.8	4.0	3.4	3.6	3.7	4.1	4.1	4.9	4.8	5.1
Bitter	4.1	4.5	4.4	3.9	4.0	4.1	4.3	5.5	5.2	5.4
Sweet	3.3	3.2	3.3	3.1	3.2	3.2	3.6	4.2	4.4	4.6
POTATO (Irish)	4.2	4.4	4.2	3.1	4.7	3.3	3.3	4.0	4.3	4.7
SWEET POTATO	3.3	3.6	3.4	3.4	3.6	3.3	3.7	4.7	5.0	5.0
YAMS (ALL)	5.1	5.2	5.0	4.7	5.2	4.9	4.8	5.3	5.5	5.6
Lucea	5.5	5.2	4.7	4.4	4.9	5.2	5.3	5.4	5.7	5.9
Negro	6.4	6.0	5.7	5.7	6.4	5.7	4.9	5.6	5.6	5.7
Renta	4.6	5.1	5.1	4.9	5.0	4.4	5.1	5.6	5.6	5.8
St. Vincent	4.1	4.6	4.4	4.3	5.0	4.9	4.5	4.2	4.9	5.0
Sweet	3.8	3.8	3.7	3.6	3.8	3.5	3.6	3.5	4.0	4.3
Tau	5.6	5.7	5.7	6.1	5.5	5.8	5.0	6.5	6.2	6.0
Yellow	4.8	5.0	5.0	5.1	5.0	4.8	4.8	5.7	5.6	5.7
Other yams	3.5	4.1	4.1	4.5	4.2	4.5	4.8	5.1	6.5	6.5

* Calculated from data in Appendices 2 and 3

APPENDIX 5

Cost of production of selected root crops in Jamaica over the period 1970-1979

Selected Root Crops	Dollars per acre*									
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
AROIDS										
Coco	366	309			285		491		771	1181
Dasheen						832	956		1571	1915
CASSAVAS	323			440			615	561		972
POTATO (Irish)							1527	1171		1782
SWEET POTATO	248	267	278	328	388	450	524	540	644	728
YAMS										
Lucea					484		2278			
Negro					977		1393	1911	3560	3700
Renta					946		1323		3523	
Sweet	460		755			988		2794		
Yellow	614		813	1200		1189	1743	2498	2678	2850

*Figures supplied by the Data Collection and Statistics Section of the Marketing Unit, Ministry of Agriculture

APPENDIX 6

Average farmgate (top figure) and market (bottom figure) prices of selected root crops in Jamaica over the period 1971-1979

Selected Root Crops	Prices in cents per lb.*								
	1971	1972	1973	1974	1975	1976	1977	1978	1979
AROIDS									
Coco	4/-	6/-	7/-	9/-	12/-	14/22	16/25	16/23	20/26
Dasheen	6/-	5/-	6/-	8/-	10/-	9/17	15/20	12/22	18/23
CASSAVAS									
Bitter	3/-	4/-	4/-	7/-	8/-	10/12	12/14	11/17	12/17
Sweet	4/-	4/-	5/-	7/-	9/-	10/14	12/17	12/19	12/25
POTATO (Irish)	6/11	6/11	11/19	14/23	-/25	22/33	31/45	29/49	37/51
SWEET POTATO	5/8	5/8	7/11	10/14	-/18	18/21	17/23	13/22	20/28
YAMS									
Lucea	7/11	8/11	12/15	15/19	15/24	15/26	22/29	21/31	28/35
Negro	6/11	7/10	9/11	13/19	16/24	17/25	22/28	23/31	29/37
Renta	5/-	5/8	5/9	12/14	11/19	12/20	15/23	15/26	19/27
St. Vincent	5/9	5/8	6/8	13/16	11/17	11/19	16/21	15/25	21/28
Yellow	7/10	6/11	8/12	14/22	17/27	19/29	23/32	22/33	29/37

- Prices not available

* Figures supplied by the Data Collection and Statistics Section, Ministry of Agriculture

APPENDIX 7

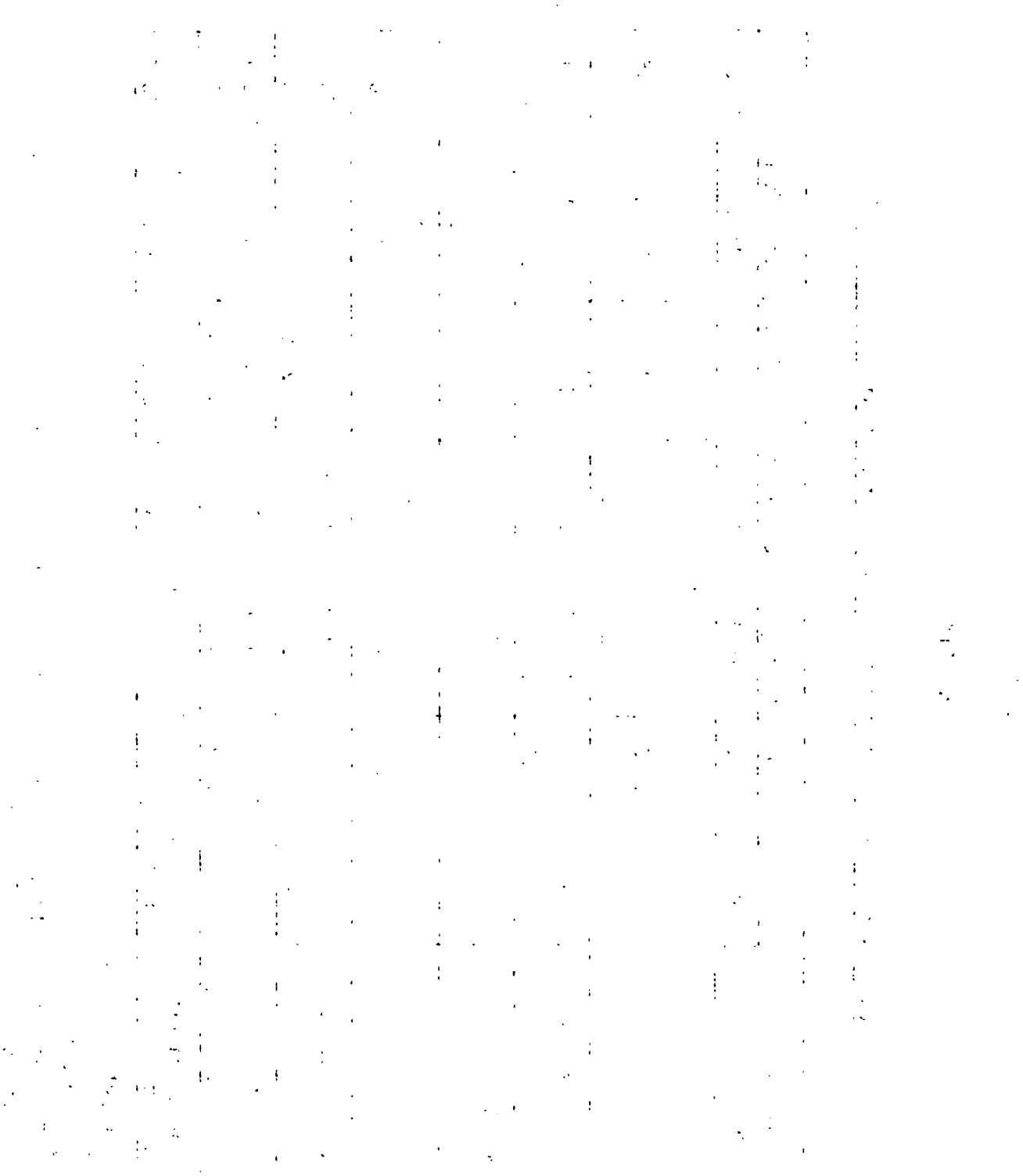
Quantity and value of root crops exported from Jamaica from 1972-1978

Selected Root Crops	Short tons (top figure) and 1000 Ja $ (bottom figure)*						
	1972	1973	1974	1975	1976	1977	1978
AROIDS							
Coco	-	345.5	739.4	75.1	322.0	362.4	786.6
	-	-	-	-	-	-	-[2]
Dasheen	-	379.9	1072.7	1101.0	799.5	773.1	785.1
	-	$32.1	$112.9	$244.8	$227.3	$299.6	$242.6
CASSAVAS	-	20.5	17.6	15.0	12.5	17.4	10.3
	-	-	-	-	-	-	-
POTATO	-	0	81.8	0	0	0.2[a]	0
	-	0	$14.1	0	0	$0.1	0
SWEET POTATO	-	97.7	221.0	179.2	68.0	93.1	375.4
	-	$16.7	$27.9	$39.1	$22.6	$46.3	$116.5
YAMS (ALL	-	3410.2	2204.7	1973.4	1386.7	1728.0	2476.1
cultivars)	-	$648.2	$446.6	$581.4	$586.4	$652.7	$1247.6
Total Quantity Exported	9100	4253.8	4337.2	3343.7	2588.7	2974.2	4433.5

- Figures not available

[a] Seed potato

* Figures supplied by the Produce Inspection Division and the Data Collection and Statistics Section, Ministry of Agriculture



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