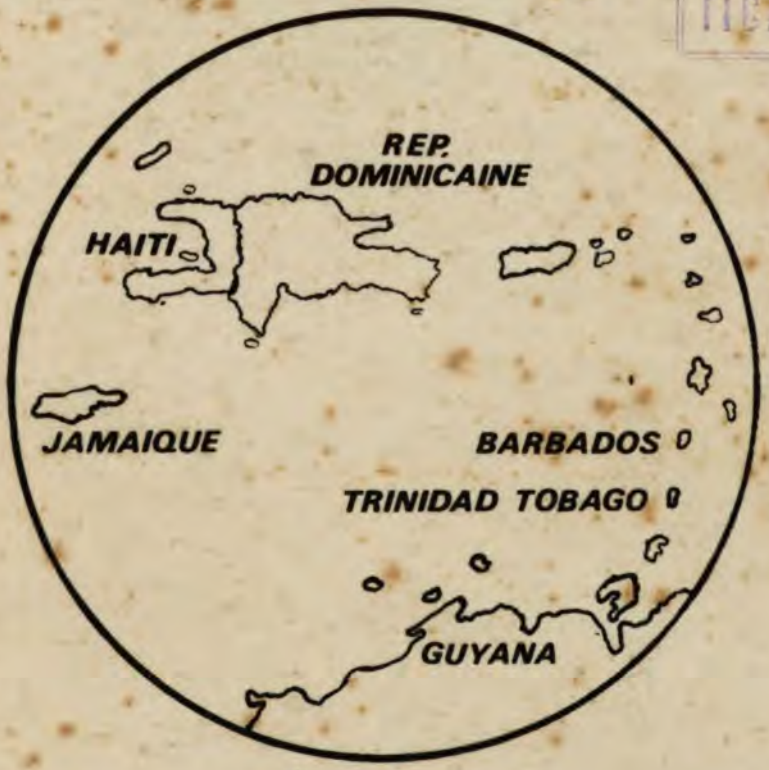
REUNION TECHNIQUE REGIONALE

SUR LES

SYSTEMES DE RECHERCHE AGRICOLE

DANS LES ANTILLES



PORT-AU-PRINCE, HAITI

NOV. 28 - DEC. 2 1977

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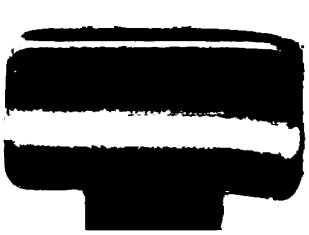

PRELIMINARY PROCEEDINGS OF THE REGIONAL TECHNICAL MEETING ON AGRICULTURAL RESEARCH SYSTEMS IN THE ANTILLES

Port-au-Prince
Haiti
Nov 28 - Dec. 2, 1977

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FOREWORD

This document represents the results of our effort to edit a preliminary version of the Proceedings of the Regional Technical Meeting on Agricultural Research Systems in the Antilles, held at Port-au-Prince, Haiti, from Nov. 28 to December 2 , 1977.

These preliminary proceedings include summaries of the Diagnosis Studies made in six countries of the Caribean Zone; These summaries were the ones presented during the Meeting. The original papers will be avaible later on, at the local offices of IICA.

In the coming nonths a final edition of the Proceedings will be printed out and sent to all participantes of the meeting.

The organnizing comittee is very pleased to be able to surrender this document at the closing session of the meeting, in the hope that it will be useful to the participants in their efforts to implement the recommendations and practical guidelines produced during the workshop sessions.

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INTERAMERICAN INSTITUTE OF AGRICULTURE SCIENCES-OAS (IICA)

AGRICULTURAL RESEARCH DIAGNOSIS IN THE ANTILLES ZONE

1. BACKGROUND

The IICA has identified agricultural research as one of the basic and foremost functions for achieving rural development objetives. Therefom it has adopted as one line of action in its member countries the improvement of the national syste-- and sub-systems responsible for producing and disseminati agricultural technological information.

In the Antillean countries, however, information on the situation of agricultural research is either non-existent, or not systematized enough to guide specific action for institu ional strengthening.

A preliminary step for preparing a significant Multinational Project to improve the effectiveness and efficiency of the national agricultural research systems, is the realization of a diagnosis that brings about a clear understanding of the status and perspectives of:

1.1 The performance of the agricultural research syb-systems

1.2 Cordination and cooperation among the sub-systems at national as well as regional and international levels.

2. OBJECTIVES AND GOALS

2.1 General Objective

The general objective of the project is to systematically determine, in institutional terms, the status of agricultural research in the countries of the Antilles Zone, where the IICA operates, as a basis for preparing of a multinational project

to promote or strengthen their agricultural research sub-systems. Such a project should generate or increase the capability of the sub-systems to carry out research that is relevant in quality and scope to the rural development needs of each country.

2.2 Intermediate Objectives

2.2.1 Prepare institutional diagnosis and specific studies of the agricultural research sub-systems at the national level.

2.2.2 Promote a broader and more objective understanding of the situation of agricultural research in the zone.

2.2.3 Encourage the establishment of intra-regional mechanisms of cooperation and coordination capable of strengthening the efforts of the countries in agricultural research matters.

2.2.4 Promote the technical support of international and regional organisations to agricultural research efforts undertaken by the countries.

2.2.5 Promote interest of international and regional agencies for the financial support of agricultural research in the countries.

2.3 Targets for the 1977-1978 Period

2.3.1 To have prepared the diagnosis of the institutional status of agricultural research in the countries with regard to rural development needs.

2.3.2. To have promoted and convened a regional technical meeting to examine the diagnosis and propose strategies and means to strengthen the national agricultural research sub -system in the countries.

3. PROPOSED ACTIVITIES

3.1 Support the diagnosis of agricultural research in the countries and the preparation of status reports by country.

3.2 Arrange a Regional Technical Meeting on the Status of agricultural Research in the Antilles Zone.

4. PROCEDURE

4.1 Country Diagnosis and Report

4.1.1 National Committee

In each of IICA's member countries in the Antilles Zone, a National Committee shall be established and will consist of two local agricultural professionals: one from Ministry of Agriculture or similar agency and the other from another agency of the agricultural sector. The Committee shall be assisted by a member of IICA's technical personnel and shall collect and analyse information concerning the status of agricultural research in the country, as indicated in the attached GUIDE.

4.1.2 Country Report

The Committee shall prepare a Country Report to concisely present the results of the diagnosis and suggest specific measures aimed at improving the national agricultural research system. The improvement basically involves the efficiency and effectiveness of agricultural research as a tool to facilitate rural development in the countries of the Antilles Zone.

4.2 Regional Technical Meeting

4.2.1 Objectives

The IICA shall arrange a Regional Technical Meeting to be held in one of the countries of the Zone, to:

4.2.1.1 Allow the National Committees to present and discuss at a regional level the country Reports.

4.2.1.2 Facilitate the exhange of information, ideas and experiences among leaders in agricultural research in the Zone.

4.2.1.3 Propose strategies and means to achieve the institutional strengthening of the agricultural research sub-systems in the countries of the Zone.

4.2.2 Type

The meeting will be a workshop encouraging effective involvement of all participants in the discussions and recommendations.

4.2.3 Programme

The proposed 4-day programme is as follows:

4.2.3.1 First day

4.2.3.1.1 Opening

4.2.3.1.2 Expositions by Special Guests

4.2.3.2 Second day

4.2.3.2.1 Presentations and discussion of Country Reports

4.2.3.2.2 Summary and consolidation of Country Reports

4.2.3.3 Third day

Work sessions in two groups:

4.2.3.3.1 Group I

The organizations and internal functioning of the Agricultural research sub-systems at country level.

4.2.3.3.2 Group II

Institutional relationships at Zone Level

4.2.3.4 Fourth day

4.2.3.4.1 Discussion of the reports of the Groups

4.2.3.4.2 Formulation of recommendations

4.2.3.4.3 Closing of the meeting

4.2.4 Participants

4.2.4.1 The National Committees representing IICA's six member countries in the Antilles Zone:

4.2.4.1.1 Barbados

4.2.4.1.2 Dominican Republic

4.2.4.1.3 Guyana

4.2.4.1.4 Haiti

4.2.4.1.5 Jamaica

4.2.4.1.6 Trinidad & Tobago

4.2.4.2 Representatives from other countries of the Antilles region shall be invited as observers.

4.2.4.3 The IICA shall encourage the participation of regional and international organisations which actively support agricultural research in the Zone.

4.2.5 Product of the Meeting

A document will be published containing the Country Reports and recommendations for strenthening agricultural research in the Antilles Zone.

Revised: August 15, 1977

GUIDE FOR THE DIAGNOSIS OF AGRICULTURAL RESEARCH IN THE ANTILLES ZONE (BY COUNTRY)

1. INTRODUCTION

1.1 Synthesis of the Development of the country and Agricultural Sector. Brief summary of the development policy of the country, specially the agricultural sector, making emphasis on the objectives of the rural development plan.

1.2 Research policy within the Agricultural Sector.

Official policy, as established by the legislature and sectorial plans. If official policy is lacking look for implied agricultural research policy in the development plans.

2. IDENTIFICATION ON THE NATIONAL AGRICULTURAL RESEARCH SYSTEM

2.1 Identification of the directing Agricultural Research agency (if any).

2.2 Number and list of the Agricultural Research agencies (if any)

2.3 Historical development, characteristics and present objectives of each ARS. (Indicate the degree of investigation-education-extension relationship).

2.4 Organisation and performance of each ARS.

2.4.1 Internal Structure: organisation chart, units, and functions.

2.4.2 Relationship (administrative, financial, technical) with other ARS and with other agencies and institutions of the sector.

2.4.3 Formal and informal relationship (technical, financial)with regional and international organisations.

2.4.4 Planning and Programming Systems of each ARS (Basis, formulation, financing, execution, supervision and evaluation of research programmes, projects and activities).

2.5 Resources of each ARS (by year during the last five years).

2.5.1 Human:

- No. of investigators
- Academic qualifications and specializations
- Experience in Research (Years of technical work).
- Position and Salary (Compared to National Income/ Capital).
- Stability and job security.
- No. of Auxiliary Personnel (Technical Assistants and General Services personnel).

2.5.2 Physical:

- Infra-structure (buildings, land, other)
- equipment (laboratories, vehicles, computing ware, machinery, other).
- Library (inventory and coverage).

2.5.3 Financial:

- Sources
- Total annual budget
- Annual Operating Budget (total budget less personnel expense).
- Timelines (dates for disbursements) and proportion of budget needs covered.

2.6 Scope of each ARS (during the last five years)

2.6.1 Geographical coverage:

-Number and location of operating units.

-Amount and % of total agricultural area, directly attended.

-Amount and % of total number of agricultural units, directly attended.

2.6.2 Clients:

-No. and type of potential agricultural clients (small, medium, or large producers).

-% of the total number of potential agricultural clients (by type) directly assisted.

2.6.3 Problems:

- Type (biological, economic, and social aspects) of problems concerned with

- Relative importance (according to number and type of clients involved, economic value, and social implications)of problems dealt with.

3. EFFICIENCY AND EFFECTIVENESS OF EACH ARS (Last five years).

3.1 Degree of relationship between project carried out and rural sector problems as pointed out in the development plan (in relevance, priority, and size).

3.2 Results (achievements and failures) of the agricultural research Projects carried out.

3.3 Number and title of publications based on the results.

3.4 Transfer process of technology (identified, modified, or developed).

3.5 Degree of adoption of technical information (technology) by clients.

3.6 Significant changes (economic and social)observed in the agricultural sector in particular and in the country in general, as a direct or indirect result of agricultural research.

4. PERSPECTIVES OF EACH ARS

4.1 Objectives and targets at short and medium term (over the next five years).

4.2 Organisation, internal functions, and external relations.

4.3 Human, physical, and financial resources (in quality and quantity).

4.4 Scope (geographical coverage; number and type of clients; number and economic and social relevance of problems to be dealth with).

5. SUGGESTIONS FOR IMPROVING EACH ARS (IN EFFICIENCY AND EFFECTIVENESS)

5.1 Changes in the integration and coordination of agricultural research at national level.

ANNEX II

CONTRIBUTION OF_____TO AGRICULTURAL RESEARCH IN THE ANTILLES ZONE

I. Introductory Information about _____

1.1 Historical Background
1.2 Objectives
1.3 Formal Organization
1.4 Functions
1.5 Human and Finantial Resources

II. Activities carried out in the Antilles Zone from 1970 to 1977

2.1 Countries and Institutions Involved
2.2 Nature and Scope (biological, economic and social) of activities both current and completed
2.3 Results and Products
2.3.1 Nature and Scope of Results
2.3.2 Relevance to Rural Development Needs of the countries involved

III. Perspectives (1978-1983)

3.1 Proposed Targets
3.2 Strategies and Means to reach targets
3.3 Expected Results and Products
3.3.1 Nature and Scope
3.3.2 Relevance to Rural Development Needs of the countries

IV. Recomendations for Strenghtening National Agricultural Research in the Antilles Zone

4.1 Country Level
4.2 Regional Level
4.3 International Cooperation

V. Additional Comments and Proposals.

TECHNICAL REGIONAL WORKSHOP ON THE AGRICULTURAL RESEARCH SYSTEMS

IN THE ANTILLES ZONE

PROGRAM

Monday Nov. 28, 1977

	Inauguration
8:00 - 9:45	Registration
10:00 - 10:05	Introduction (C. Grand Pierre)
10:05 - 10:20	Welcome: His Excellency, M. Edouard Berrouet, Minister of Agriculture
10:20 - 10:25	IICA/Haiti (E. Salvado)
10:25 - 10:45	Inaugural Speech: Director General of Ministry of Agriculture (M. Dépestre)
10:45 - 11:00	Break
	PRESENTATION OF COUNTRY REPORTS
	Moderator: Ariel Azael
11:00 - 11:15	Workshop Methodology (Antonio M. Pinchinat)
11:15 - 12:00	Haiti Report
12:00 - 12:45	Dominican Republic Report
12:45 - 14:30	Lunch
14:30 - 15:15	Guadeloupe Report (INRA)
15:15 - 16:00	Trinidad-Tobago Report
16:00 - 16:30	Break
16:30 - 17:15	Barbados Report
17:15 - 18:00	Jamaica Report

Tuesday Nov. 29, 1977

	PRESENTATION OF COUNTRY REPORTS (cont.)
	Moderator: Ariel Azael
8:30 - 9:15	Guyana Report
	PRESENTATION OF REGIONAL AGENCIES REPORTS
	Moderator: Rafe Bazan
9:15 - 9:45	CATIE (R. Bazan)
9:45 - 10:15	UWI (J. Spence)
10:15 - 10:30	Break
10:30 - 11:00	CARDI (S. Forde)
11:00 - 11:30	CFCS (G. Jackson)
11:30 - 12:00	CDB (M. Campbell)
12:00 - 14:00	Lunch

PRESENTATION OF INTERNATIONAL AGENCIES REPORTS

Moderator: Antonio Pinchinat

14:00 - 14:30	CIAT (G. Galvez)
14:30 - 15:00	CIMMYT (W. Villena)
15:00 - 15:30	CIP (M. Jackson)
15:30 - 16:00	Break
16:00 - 16:30	CIID (P. Mermelstein)
16:30 - 17:30	Formation of working groups

Wenesday Nov. 30, 1977

WORK GROUPS SESSIONS

GROUP I.	Internal structure of National Agricultural Research Systems
GROUP II.	External relationships of National Agricultural Research Systems 1. Regional level: (Moderator Réginald Pierre) 2. International level (Moderator: Antonio Pinchinat)
8:30 - 10:30	First Session
10:30 - 10:45	Break
10:45 - 12:00	Second Session
12:00 - 14:00	Lunch
14:00 - 16:00	Third Session
16:00 - 16:30	Break
16:30 - 18:00	Fourth Session and preparation of work group reports

Thursday Dec. 1st, 1977

FIELD TRIP

8:00 - 10:00	Visit to Damien (DARNDR)
10:00 - 13:00	Visit to Artibonite Valley (ODVA)
13:00 - 15:00	Lunch
15:00 - 17:00	Return to Hotel

Friday Nov. 2, 1977

PRESENTATION AND DISCUSSION OF WORK GROUP REPORTS

Moderator: John Spence

8:30 - 10:15	First session
10:15 - 10:30	Break
10:30 - 12:00	Second Session
12:00 - 19:00	Free

CLOSING

19:00 - 20:00	1. Summary Report: Antonio Pinchinat

	2. Thanking words: Organizing Committee
	3. Closing words: His Excellency, M. Edouard Berrouet, Minister of Agriculture
20:00 - 22:00	Cocktail offered by the Ministry of Agriculture.

Messieurs les Secrétaires et Sous Secrétaires d'Etat,
Messieurs les Ambassadeurs,
Messieurs les Représentants de la Coopération Externe,
Honorables Délégués et distingués invités,

Il m'est agréable de souhaiter la bienvenue aux participants de cette Réunion Technique et de remercier les distingués invités dont la présence nombreuse témoigne de leur intérêt à ce séminaire qui prend les dimensions d'un symposium.

La recherche constitue, en effet, la toile de fond de nos activités agricoles et c'est pourquoi j'avais instruit mes collaborateurs de renforcer qualitativement et quantitativement le Service de Recherche du Département.

Je veux seulement souligner à votre attention que nos travaux de recherche doivent être orientés dans le sens des besoins du développement national, adopter le niveau approprié à notre environnement technologique et comporter des points d'appui suffisants pour permettre l'extrapolation des résultats. L'observance de ces simples normes éviteront que vos conclusions ne restent de simples vues de l'esprit ou des exercices intellectuels peu fonctionnels.

Je veux espérer que vos réflexions durant toute la durée de ces assises retiendront pareille reférence. J'achève mon propos en vous exprimant mes souhaits de fructueuse besogne et mes remerciements renouvelés.

EDOUARD BERROUET
Secretaire d'Etat de l'Agriculture,
des Ressources Naturelles et du Développement Rural

Hotel Christopher, 28 Novembre 1977

Son Excellence Monsieur le Secrétaire d'Etat de l'Agriculture, des Ressources Naturelles et du Développement Rural
Monsieur le Directeur Général du Département de l'Agriculture,
Messieurs les Délégués des Pays des Caraibes,
Messieurs les Ambassadeurs,
Messieurs les Délégués des Institutions Nationales et Internationales,
Mesdames et Messieurs,

J'éprouve un réel plaisir à me trouver parmi vous et de pouvoir vous souhaiter au nom de l'IICA, la bienvenue à cette Réunion, en Haiti.

Depuis 1942, l'IICA travaille à promouvoir et à appuyer les efforts déployés par les pays dans le domaine de la Recherche Agricole et du Transfert de la Technologie.

Au cours de ses 35 années d'existence, l'Institut a vécu intensément l'expérience de chaque Pays Membre, en matière de Recherche. Une fois de plus, nous sommes en train de collaborer avec le Gouvernement d'un Pays Membre dans l'analyse de la Recherche.

Dans les dernières années, plusieurs institutions nationales et internationales ont fait des pas gigantesques dans ce sens, il suffit de rappeler ce qu'on a dénommé "la révolution verte", pour ne citer qu'un exemple de l'effort réalisé.

Je n'ai aucun doute que les pays et les institutions réunis ici, ont déployé des efforts notoires pour promouvoir la recherche selon leurs propres besoins et en accord avec leurs propres ressources.

Cependant, il me parait opportun de souligner, au début de votre travail, quelques données de base, sans lesquels la Recherche Agricole se débattrait dans une mer de chiffres et de faits très sophistiqués, mais peu utiles aux pays et à leurs propres populations.

Messieurs les Secrétaires et Sous-Secrétaires d'Etat,
Messieurs les Représentants Résidents des Organismes Internationaux de Coopération et d'Assistance Technique,
Messieurs les Directeurs des Institutions Nationales et Internationales de Recherche, d'Enseignement et de Développement Agricole,
Messieurs les Délégués et Observateurs des Pays Membres de la Direction Régionale de l'IICA,
Messieurs les Directeurs et Représentants des Organisations et Institutions Nationales,
Mesdemoiselles,
Mesdames,
Messieurs,

Le progrès de la connaissance augmente sans nul doute le pouvoir de l'homme sur son milieu. Il enrichit la pensée et justifie la mission de l'homme à travers les générations successives. Cette mission de l'homme consiste à édifier pour la permanence de son existence une civilisation clémente et prospère. Il appartient à chaque génération d'approfondir les démarches esquissées et de reculer au fur et à mesure les limites de l'ignorance en vue de l'édification d'un monde meilleur.

Honorables Délégués des pays amis membres de l'IICA,

J'ai le plaisir, au nom du Gouvernement et du Peuple Haitien, de vous souhaiter une cordiale bienvenue sur cette terre hospitalière d'Haiti. Il est réconfortant qu'à cette période angoissante de la croissance de notre civilisation, des efforts de rapprochement et de dialogues se concrétisent au niveau des Régions en vue de l'établissement d'une coopération plus fructueuse et plus efficace. L'interdépendance du présent et du passé, comme source de référence, évidente chaque jour davantage l'intérêt profond des peuples à cultiver et à développer une intelligente et réciproque solidarité dans bien des domaines. Dans cette nécessaire prise de conscience, la Caraibe en tant qu'entité géographique, s'ingénie à orienter son avenir. Ceci est essentiel.

Je n'essaierai pas de justifier la nécessité de la Recherche Agricole. Le positivisme veut que la connaissance conditionne l'action. Celle-ci doit être de tout profit pour l'homme. Dans un cadre dominé par le spectre de la faim, l'approfondissement de la révolution verte devient un impératif, une priorité. En effet, le déséquilibre entre les ressources disponibles et le nombre de familles à nourrir, à loger et à éduquer s'accentue lentement dans une bonne moitié de l'humanité. La productivité, compte non tenu des phénomènes naturels tels que ouragans, cyclones, inondations... qui, périodiquement amenuisent progressivement les ressources existentes, n'augmentent pas à un rythme satisfaisant alors que s'accroit la rapidité explosive de la pression démographique. Dès lors, la Recherche Agricole devient un élément stratégique pour l'augmentation de la productivité.

L'acceptation d'Haiti comme siège de cette importante Réunion sur les Systèmes de Recherche Agricole revêt une signification profonde. Elle ne s'explique point par une situation florissante de la Recherche dans le pays. Peut-être, faudrait-il évoquer ce passé laborieux où depuis 1924 le Service des Recherches du Département de l'Agriculture explorait les réalités haitiennes en vue de leur trouver des solutions convenables. On se souvient des différentes stations disséminées à travers le pays en vue d'éprouver l'adaptabilité des espèces économiques aux différentes altitudes. Des travaux ont été menés sur le coton, le café, les plantes à huiles essentielles, les cultures maraichères, l'élevage. Des recherches ont été conduites sur l'utilisation des intrants et les pratiques culturales en général. On pourrait dire qu'Haiti a connu des périodes d'intenses labeurs dans le domaine de la Recherche Agricole. Malheureusement des situations conjecturelles ont ralenti les élans si riches de

promesses. L'érosion de nos ressources humaines qualifiées, l'insignifiance de l'appui financier indispensable, le manque des investigations de soutien, ont constitué les principales contraintes de l'évolution progressive des recherches agricoles dans notre pays. Aussi, l'accord du Gouvernement pour qu'Haiti soit le siège de ces importantes assises peut-Il s'interpréter par l'urgence reconnue d'une obligatoire et prochaine relance des activités dans ce domaine.

Ainsi le Gouvernement de la République, décidé à engager le développement économique du pays, entend redonner à la Recherche Agricole sa place dans ce processus. Dans cette optique, ce Séminaire fournit l'occasion de dégager un diagnostic objectif de la situation en Haiti et ailleurs. Il représente un facteur d'intégration des structures locales de la Recherche au Système de la Caraibe. L'avenir des populations du Tiers-Monde et plus spécialement des humanités de la Caraibe est étroitement lié au progrès dans ce domaine. Qu'elle soit fondamentale ou appliquée, la Recherche Agricole augmente le pouvoir de l'homme sur la nature. Cette intégration des structures dans le système de la Caraibe, non seulement établit les canaux de communication entre des hommes visant un but commun, mais aussi garantit relativement le bien-être des masses rurales dans la mesure où les efforts de la Recherche sont appuyés par la Vulgarisation et le Crédit.

Les leaders de la Région, face aux exigences nouvelles des populations rurales préparées à se sentir solidairement responsables du processus de déve - loppement "qui implique à la fois un progrès économique s'appuyant sur le progrès technique et un épanouissement des individus, des communautés, des nations", doivent réajuster les structures existantes et reviser la stratégie en cours. Le développement est un phénomène global qui explore en les

exploitant les moindres possibilités d'accroissement de la production et de la productivité, garantes d'une certaine dignité à atteindre dans l'ordre économique, "facteur non négligeable d'enthousiasme accrû pour le développement". Ainsi se proposent les travaux de ce Séminaire, ainsi s'établiront de meilleurs dialogues entre la base et le sommet si nécessaire à une planification enrichie de contenus nouveaux au bénéfice de l'objectif fondamental des nations: l'élévation du niveau de vie des populations.

Au niveau individuel la science traduit un besoin de l'homme "de savoir pour savoir" et surtout "de comprendre pour comprendre". C'est ce que Renan a appelé "le miracle grec". Cependant, du point de vue collectif ou social, l'une des justifications de la Science réside dans son "utilité".

L'Investigation Agricole est un investissement social. Elle est appelée à consommer des ressources tant financières qu'humaines. En retour, la collectivité classe parmi ses expectatives les effets pratiques et bénéfiques de la Recherche Agricole. Car selon Aldrich, l'une des missions de la Recherche Agricole consiste à résoudre les problèmes spécifiques que confronte l'agriculture locale ou régionale.

Je crois fermement que cette Rencontre, base d'une coopération élargie, va nous permettre non seulement d'utiliser à bon escient les résultats de recherches des pays voisins mais aussi de renforcer nos propres structures. Cette expérience, en vérité, est d'une richesse insoupçonnée. Aussi formulé-je le voeu d'une fructueuse besogne à ces assises. J'espère qu'il en sortira un document réaliste de haute valeur scientifique devant permettre aux instances de décisions intéressées de s'engager dans l'action afin de faire mieux ce qui est déjà bien et de reculer davantage les obstacles au

progrès économique et social de leur pays.

Par delà l'impersonnalité des exigences techniques des travaux auxquels vous vous adonnerez bientôt, les Organisateurs de ce Séminaire fondent de grands espoirs sur un rapprochement humain de vous tous, Honorables Délégués, en vue d'une meilleure compréhension des problèmes complexes et interdépendants de cette terre des hommes et d'une coopération internationale intelligente et renforcée. C'est dans cette optique finale que je vous souhaite, Chers participants à ce Séminaire sur les Systèmes de Recherche Agricole, tant en mon nom personnel qu'en celui du Gouvernement et du Peuple Haitien tout entier, une fructueuse et enrichissante besogne, de même qu'un agréable et merveilleux séjour dans ce coin de terre qui toujours vous réservera le même chaleureux accueil et un lot toujours renouvelé d'agréables surprises.

Marcel Dépestre
Directeur Général
DARNDR

Hôtel Christopher
28 novembre 1977

14. JAIMES, Fernando - Representative of Venezuela's Ambassador

15. LOKER, Zvi - Ambassador of Israel

16. LOUIS, Georges - General Director IDAI
(Institut de Développement Agricole et Industriel) Haiti

17. MENAGER, Gustave - General Director ODN
(Organisme de Développement du Nord)
Haiti

18. NAN HSING, Lee - Ambassador of National China

19. ST CLAIR, Paul - General Director DRIPP
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WORKSHOP PURPOSE AND METHODOLOGY

A.M. Pinchinat

BACKGROUND

The Interamerican Institute of Agricultural Sciences - OAS (IICA - OEA) since its foundation by the American Gouvernments in October 1942 has been fostering and supporting efforts directed towards converting agricultural research and technology transfer into an effective instrument for agricultural development purposes in the member countries through the generation, innovation and diffusion of technologies and production systems. In this endeavor, the different categories of producers as well as the relative availability of and access to production factors are taken into account.

This forms IICA's Line III of Action, entitled "Agricultural Research and Technology Transfer". As set out in the current Medium Term Indicative Plan (IICA Medium-Term Indicative Plan. IICA, San José, Costa Rica. 1977 pp. 29-32), this Line of Action includes two programs, namely:

1. Research and the Transfer of Technology (III.A) and
2. Multinational Coordination of Research and the Transfer of Technology (III.B).

The present workshop encompasses both programs and conforms to the general guidelines established in the Indicative Plan.

PROCEDURE

To meet the workshop's objectives the following procedure will be observed:

1. Each country will present a summary of the state of its agricultural research system (ARS). The time allocated is 45 minutes, including a question/answer period.

2. Each participating regional or international agency will present a summary report of its contribution to agricultural research in the Antilles Zones. The time allocated is 30 minutes: including a question/answer period.

3. Each participant will be invited to join one of three specific work sub-groups, dealing with:

   3.1 ARS internal structure (sub-group I)

   3.2 ARS external relations at regional level (sub-group II)

   3.3 ARS external relations at international level (sub-group III).

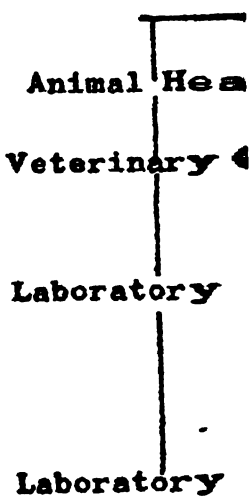
   Lead questions will be proposed to facilitate and orient sub-group discussions. Each sub-group will prepare and present a sub-group report which will be discussed in a plenary session.

4. Original country and agency reports as well as final sub-group reports will be included in the workshop proceeding.

5. Countries and agencies are encouraged to review and publish their reports to reach a broader public than that present at the workshop. The establishment of data banks on agricultural research systems should be promoted to facilitate periodic up-dating of agricultural research statistics in the Antilles Zone.

6. Periodic diagnosis of agricultural research in the Zone will be promoted.

7. Proposals to set up and finance national or regional projects to improve and strenghten agricultural research systems in the Zone will be stimulated.



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to

[illegible] step in trying to encourage production by reducing costs of imports.

To summarise, the overall aims of policy in the agricultural sector are:-

/2.....

1. To maintain and if possible, increase export earnings from agriculture.

2. To reduce agricultural imports wherever import substitution is technically and economically feasible.

3. To achieve rising incomes and improve living standards for those engaged in agriculture.

4. To maintain as large agricultural population as is compatible with rising incomes and living standards and efficient production methods.

5. To develop the linkages between agriculture and other industries so as to devise maximum benefits from the leading growth sectors.

6. To develop the linkages between agriculture and other industries so as to devise maximum benefits from the leading growth sectors.

7. To econserve land and protect all land resources by arresting soil erosion, and to make optimum use of unutilised and underutilised land.

2. Identification of the leading Agricultural Research Agency

2.1 The leading Agricultural Research Agency is the Research Section of the Ministry of Agriculture, Food and Consumer Affairs.

2.2 Agricultural Research Sub-systems - Agronomy Research Unit of Unit of the Sugar Producers' Association.

2.3 The Ministry of Agriculture Research Unit started as the Imperial Department of Agriculture for the West Indies in 1898. This has now become the Ministry of Agriculture with the change over to self government in 1966. The present objectives are as set out in section 1.2. There is close cooperation between the Research and Extension branches of the service. Some of this must of necessity be official, but in a small territory like Barbados, much of it is of necessity personal.

/3.....

The Technology and Agronomy Research Unit of the Sugar Producers' Association is as the name implies, is a commodity research organisation. It was founded in 1949 by Sir John Saint and concentrates on the technological and agronomicaly aspects of sugar production. Some work has been done in the last four - five years on the development of a mechanical harvesting system.

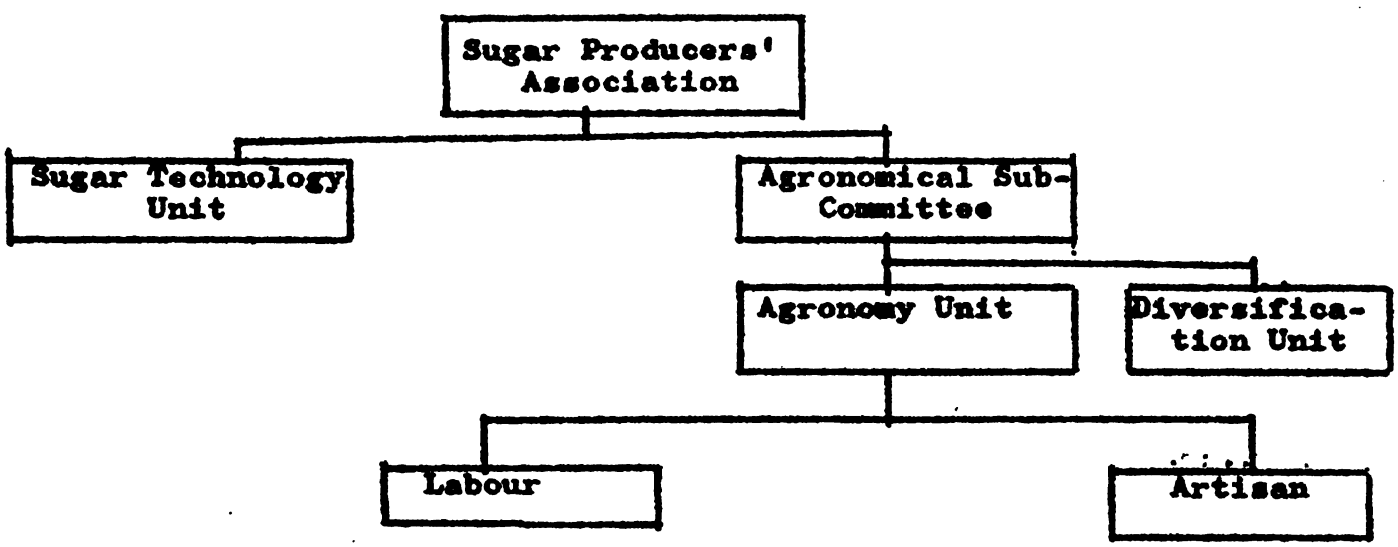
This is a strong commodity association and research problems and findings are readily passed to and fro between procedures and the research organisation. As with the Ministry, much of this interchange is personal and not an organised basis.

2.4 Organisation and Performance of each ARS.

2.4.1 The Ministry of Agriculture Research Unit is headed by a Deputy Chief Agricultural Officer. His area of responsibility includes Plant Quarantine, Agronomy, Soils, Agricultural Engineering. Research to bring about the policy objectives set out in 1.2 are the main activities.

The organisation of the Ministry of Agriculture is as shown at Appendix 1.

The Agronomy Unit of the Sugar Producers' Association is administered by an Agronomy Sub-committee. This sub-committee directs the work of and is responsible for the financing of the Unit.



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2.4.2 There is no formal technical nor financial relationship between the Ministry of Agriculture and the Sugar Producers Association. The only relationship is an administrative one in that the Deputy Chief Agricultural Officer (Research) is a member of the Agronomy Sub-committee.

In addition to the Sugar Producers' Association, there are also the Barbados Marketing Corporation, The Barbados Agricultural Development Corporation - Statutory Bodies reporting to the Ministry of Agriculture, and the Barbados Agricultural Society, a Farmer Association.

The first two associations carry out the policy of the Ministry with regard to Marketing and Production, especially of food crops. The Barbados Agricultural Development Corporation also spear heads our production efforts in Sea Island Cotton.

The Barbados Agricultural Society as a farmers' organisation, has free access to the Research as well as the Extension Sections of the Ministry. The relationship is both formal and informal. The research programme in the area of vegetable production, for instance, is prepared in consultation with the Barbados Agricultural Society.

2.4.3 The Ministry of Agriculture is involved formally with Caribbean Agricultural Research and Development Institute (CARDI), in that the Chief Agricultural Officer is one of the Regional Directors and the Deputy Chief Agricultural Officer (Research) is the Alternate Director. The Ministry of Agriculture is also associated with Inter-American Institute of Agricultural Sciences (IICA), Commonwealth Science Council (CSC), Caribbean Plant Protection Commission (CPPC), and was until recently the Commonwealth Agricultural Bureau.

The Sugar Producers' Association is associated with West Indies Sugar Technologists and the International Sugar Technologists.

2.4.4 Planning and programming is done on a yearly basis by the Deputy Chief Agricultural Officer (Research) in consultation with his senior technical staff as well as the Deputy Chief Agricultural Officer, (Extension) and his senior staff.

Supervision is by the Deputy Chief Agricultural Officer (Research) and evaluation is done on an annual basis by the Deputy Chief Agricultural Officer (Extension) and has senior staff.

The Agronomy Unit of the Sugar Producers' Association has its programme developed by the Agronomy Sub-committe. This programme is periodically renewed and evaluated by the Sub-committee.

2.5 Resources of each ARS

2.5.1 Human - Ministry of Agriculture

	1973/74	1974/75	1975/76	1976/77	1977/78
Investigators	12	12	12	13	13
Technical Assistants	18	20	20	23	24
General Services	200	200	240	250	250

Academic Qualifications

	PhD.	MSc.	BSc.	Diploma	Experience
Agronomy			3	4	2-10 years
Entomology	1	1		5	3-10 years
Plant Pathology	1				
Animal Nutrition		1	1	10	2-10 years
Animal Husbandry		1	2		
Hydrology		2		1	2-20 years
Soil Conservation		1		3	5-20 years
Agricultural Engineering		2		1	3-20 years

Position - Ministry of Agriculture.

	1973/74	1974/75	1975/76	1976/77	1977/78
DCAO	15,840	15.840	17,280	17.280	21,768
AO/SAO	9-11,000	9-11,000	10-14,000	10-10,000	15-18,000
AA/SAA	63- 8,400	66- 8,784	8220- 9,840	9924-11,724	10692-42,792

/6.....

Human Agronomy Research Unit, Sugar Producers Association

1973/74	1974/75	1975/76	1976/77	1977/78
5	5	3	3	3

Academic Qualifications- Ministry of Agriculture

	PhD.	MSc.	BSc.
Agronomy	1		
Sugar Technology	1		

Academic Qualifications.- Agronomic Research Unit

	1976/77	1977/78
Sugar Technologist	28,800	28,800
Sugar Technologist		26,000
Agronomist	26,000	26,000

2.5.2 Physical - Ministry of Agriculture

Infrastructure. Building - Offices, Stores, Workshop
Land - 100 ha

Equipment. Soil, Entomology, Pathology, Animal Nutrition Laboratories, Vehicles including Tractors. Full range of Agricultural Equipment.

Library - Consists of 12,000 volumes and gives coverage in the areas of Agronomy, Animal Husbandry and Nutrition, Entomology, Plant Pathology, Agricultural Engineering and Sugar Production.

Agronomy Research Unit, Sugar Producers' Association

Infrastructure Buildings. Office, Workshop.

Land 30 ha Laboratories, vehicles including tractors and cane harvesting equipment. Library covering all aspects of sugar cane production and manufacture.

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2.5.3 Financial Sources - Government of Barbados

Total Annual Budget

1973/74	1974/75	1975/76	1976/77	1977/78
1,292,935	1,494,694	1,154,030	946,855	1,845,877

Annual Operating Budget

1973/74	1974/75	1975/76	1976/77	1977/78
998,900	744,600	737,429	771,000	1,534,497

Disbursement of funds is arranged on a quarterly basis. The Financial year starts on 1 April and ends on 31 March. Requirements for spending are arranged for April, July, October, January. The whole budget need as passed in the Estimates are met.

Agronomy Research Unit, Sugar Producers' Association

Sources - Sugar Producers' Association

Total Annual Budget

1976/77	1977/78
387,000	360,000

Annual Operating Budget

1976/77	1977/78
342,200	300,000

Timeliness From information received, funds are disbursed as required by the Investors.

2.6 There were three main Research Units located in the Christ Church, St. Michael area and five sub-stations, one in each of the Extension Districts.

These units adequately service the whole island.

Agronomy Research Unit, Sugar Producers' Association

There is one centre located in St. Thomas.
This unit services the whole island.

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2.6.2 Clients

Clients catered to	small producers	5 ha	86000
	medium producers	5-10 ha	161
	large producers	7 10 ha	254

There are no statistics on the total member of clients served.

2.6.3 Problems taken care of

Entomological
Pathological
Agronomic
Irrigation
Fertiliser
Mechanisation

The Agronomical, Pathological and Entomological problems are of the greatest economic value, but no evaluation of social implications have been made.

Of greatest importance appear to be the Agronomic problems, followed by those in the area of Plant Protection.

The Sugar Producers' Association takes care of problems in the area of Agronomy and Mechanisation of the Sugar Cane Industry.

3. Efficiency and Effectiveness of each ARS

3.1 In the last five years, efforts have been mainly in the area of crop diversification and mechanisation of the sugar cane harvesting. These being the major objectives of the development plan.

3.2 In the area of crop diversification, there have been encouraging results. For a significant part of the year, we can supply our needs for vegetables and in some instances, e.g. onions have surplused for export within the region.

The sugar cane harvesting project while not a failure, has not been as successful. This has been due mainly to field layouts, field sizes and irregularities in the topography. A significant factor here was also the necessity to burn fields prior to harvesting to accommodate the then available harvesters.

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3.3 The problem of Internal Spotting of Yams - Dioscorea sp. in Barbados: W. DeC. Jeffers and W. Headley:

Principles of Vegetable Production in Barbaods - W. DeC. Jeffers.

Vegetable Production in Barbados - K. A. Ingersent, A.H. Brathwaite and J.O.S. Nurse.

A Vegetable Variety Selection Programme - B. W. Eavis et al.

Direct Seeding Vegetable Crops under Tropical conditions in Barbados - B. W. Eavis.

Vegetable Production in Barbados - B. W. Eavis.

Attempts at Mechnnised Harvesting of Root Crops in Barbados - J.P. W. Jeffers; W. Harvey.

A Further look at Mechanised Planting and Harvesting of Root Crops in Barbados - J. P. W Jeffers; Mrs. I. Chandler.

Mechanisation of Yam and Sweet Potato Production in Barbados - J. P. W. Jeffers.

Vegetable Crop Recommendations - Mrs. F. Chandler; H. Williams et al.

3.4 In this area, especially at the start of the period, there was a significant and rapid transfer of technology especially in the area of vegetable production. This included mechanisation, cultivation techniques and crop protection techniques, especially in the fields of weed control, pest and disease control.

3.5 Among the medium and large farmers, there was a high degree of adoption of technologies. Among the small farmers there was a lesser degree of adoption. This can be attributed in a large measure to the unavailability of capital and to the scale of their operations which preclude the use of some techniques possible on larger farms.

/10.....

3.6 The most obvious change in the agricultural sector is the definite change in the cropping pattern. More and more land is being planted in vegetables, and in many of these areas irrigation, limited as it is, is being used more than ever. This is a direct result of the work that has been done in this area.

4. Perspective of each ARS

4.1 The objectives for the next five years is an intensification of the work that started five years ago. Already, plans are being formulated for additional work in the area of cotton, sorghum and peanut for the drier areas. As a flour mill is planned, it is proposed, that cassava for the purpose of making composit flours, should be investigated. Intensified work on vegetable production for extra-regional export has already started.

In the area of sugar cane, the objective still remains as increased sugar production per acre. In addition, new methods of sugar extraction as well as alternate use of the by-products, especially, bagasse, and the cane rind, are being pursued.

4.2 The present organisation and functions of the Agricultural Sectors is likely to remain as it is in all sectors.

External relations with organisation such as Inter-American Institute of Agricultural Sciences (IICA), International Potato Centre (CIP), International Centre for the Improvement of Maize and Wheat (CIMMYT), International Centre for Tropical Agriculture (CIAT), etc. are likely to increase as our agricultural base is further diversified.

4.3 Human - Physical and Financial Resources in each ARS need to be improved

Suggestions for the increase of staff to meeting the requirements of the next five years.

Plans are at the moment on the drawing board for a new research office - laboratory complex. This should be started shortly and will greatly improve the capabilities of the research section.

/11.....

4.4 The scope, number and type of clients will remain as before. The economic and social relevance of the problems may alter, but no radical change is envisaged.

5. Suggestions for Improving each ARS

5.1 To date, yearly research programmes within the five year development plan have been the result of consultation between the Research and Extension staff of the Ministry of Agriculture with some input from the private sector. Within the context of the Development Plan, a National Council may be better suited for planning a research programme at the National Level.

5.2 Strengthening of both inter-regional and international technical cooperation is going to be essential to any sustained thrust. To this end, in addition to those agencies mentioned in 4.2, the cooperation of the University of the West Indies, Faculty of Agriculture; Jamaica School of Agriculture (Jamaica), Eastern Caribbean Institute of Agriculture and Forestry, (Trinidad) and Caribbean Agricultural Research and Develoment Institute (CARDI), both in the area of technical cooperation as well as training will be further pursued.

In the areas of animal science, Sugar Cane Technology, Animal Health, such organisations as PAHO., USAID., CIDA., to mention a few, will be approached.

5.3 There is definite need for increased financial assistance, but it will not be possible to furnish further details.

6. Additional Comments

6.1 So far, a fair amount of work has been done with a small research staff. There is urgent need for a strengthening Information Unit to transfer research staff reports into "Farmers Bulletins". The purpose of agricultural research is not only to find solutions to agricultural problems, but also to communicate the results obtained to those who can benefit from them. The Extension staff is the link between researchers and farmers. Thus it is vital that both

Information and Extension be strengthened and improved, so that farmers may derive the full benefit of research findings.

6.2 We have been very fortunate that we have been able to see positive results from most of our work, without any conscious evaluation or evaluation mechanism.. It is going to become increasingly difficult to determine not to mention evaluate progress as the increements of inprovement get smaller and smaller. It is essential therefore, that some method of evaluation be built into future programmes, in order to get an objective and accurate assessment of our programmes.

J.P.W. Jeffers,
10.11.77

BARBADOS

Question from:

PINCHINAT, Antonio M. (Haiti)

Is Livestock included in the Barbados ARS?

ANS.- Yes, time did not permit me to include this aspect of our work in this presentation.
However, in Barbados we are interested and working on the improvement of the Barbados Black Belly Sheep, meat production from crossing the local sheep with exotic meat types.
A programme of dairy improvement is also in progress. Canadian holsteins has been imported to improve our milk producing capacity.
In the general livestock area, work is continuing on the use of sugar cane as a livestock feed.

RESUMEN DEL INFORME
DE LA
REPUBLICA DOMINICANA

Reunión Técnica Regional sobre los Sistemas de Investigación Agrícola para la zona de la Antillas. Port-au-Prince, Haití, 28 de Noviembre al 2 de Deciembre de 1977.

Para comenzar quiero hacerles conocer el hecho de que en mi país, la República Dominicana, lo que podemos llamar Investigación Agropecuarias es muy joven, demasiado joven, con una edad que pudiéramos decir es la de los primeros pasos. Les ruego tomar esto en consideración al analizar nuestro sistema.

Aunque existen políticas de investigacion agropecuatia a nivel de instituciones publicas y privadas, éstas no estan claramente definidas a nivel nacional; sin embargo, sí lo están a nivel de entidades que realizan experimentación.

Tal es el caso del proyecto de investigación de PIDAGRO, en el cual se consideró el ordenamiento de la politica oficial en materia de investigacion, en lo correspondiente a la SEA. Este proyecto comenzó a ejecutarse en 1973.

Actualmente, está en fases finales de elaboración el Plan Sectorial 1978-1982, en el cual se considere un plan nacional de investigación y extención.

Existe interés, por parte de las altas autoridades, en formar una estructura organizativa eficiente y eficaz en materia de investigacion y transferencia tecnológica donde la planificación y evaluacion estan bien definidas.

El organismo rector de la investigación es la SEA a traves principalmente del DIA, de la SEIECA. Esta responsabilidad le fue ortagada por medio de la ley no.8 del año 1965.

Ademas de la SEA, localizan investigaciones agropecuarias las tres Universidades del País que cuentan con Facultades de Agronomia y/o Veterinaria, el CEA, organismo del Estado que cuenta con el CEAGANA y la Estación Experimental "Duquesa" donde se realiza experimentación agronomica en caña de azucar.

Además, existe experimentación agropecuaria particular en el Central Romana (Gulf-Western) y en el ingenio Vicini. La experimentacion la efectuan principalmente en cana de azucar para su propio beneficio.

Antes de 1965 existían instituciones de carácter educativo tales como el Instituto Politecnico Lorola y el Colegio Agricola de Moca, que iniciaron trabajos de experimentación Agricola. La primera de éstas tuvo mayor énfasis con trabajo de maíz y sorgo y dado el carácter que dio a la investigacion, fue una de las de mayor crédito.

En noviembre de 1962 se crea la Facultad de Agronomía y Veterinaria de la UASD , como una necesidad de preparar profesionales de alto nivel.

En 1964 se crea la División de Investigación Agrícola del ISA, la cual dio origen en 1974 al CENDA.

La estructura de la SEA fue establecida mediante el decreto no.1142 de 1966; en ella se crean varios departamentos, tales como Suelos, Sanidad Vegetal, Ganadería y el DIA, en el citado decreto se establecen como funciones principales del Departamento de Investigación las siguientes:

a) Establecer estaciones y campos de experimentación agropecuarios.

b) Realizar investigaciones encaminadas al mejoramiento de los cultivos, pastos y forrajes.

c) Servir de base para la introducción; adaptación, perpetuación y multiplicación de materiales vegetativos considerados promisorios, insectos predatores, animales superiores y semen.

d) Coordinar los servicios de investigación agropecuarios con otras entidades públicas o privadas que se dediquen a fines similares.

e) Promover la selección y diferenciación de especies nativas economicamente importantes,

En ese mismo año, 1966, comenzó a adecuarse lo que en el futuro inmediato se convertiría en el CNIA localizado en San Cristóbal, el cual en su inicio tuvo poca proyección como tal y que, en teoria, ejercia las funciones encomendadas al DIA.

Simultáneamente con el CNIA y a raíz de un convenio con la misión técnica de China Nacionalista se crea la EEAJ dedicada exclusivamente a efectuar investigación en el cultivo de arroz.

En el 1968 se aprobó un programe de las Naciones Unidas desarollo PNUD llamado de diversificación y aumento de producción en el Valle del Cibao cuya ejecución fue confiada a FAO y que posteriormente en 1974 dio origen a CENDA.

En el 1970 el CNIA contaba con las Divisiones de Cereales, Leguminosas y Hortalizas, laboratorio de Control de Alimentos y de Sanidad Vegetal.

En el 1971 se crea la División de Investigación Pecuaria, DIP y en el 1973 se crean las Divisiones de Horticultura Tropical y Biometría y Análisis y en 1975 se creó la División de Raíces y Musáceas.

A pesar de que el DIA fue creado en 1966, puede decirse que fue a partir de 1973 cuando comenzó a adquirir el carácter de entidad rectora de la investigación agrícola del país.

En 1970 la Oficina Nacional de Planificación elaboró el primer Plan Nacional de Desarrollo Agropecuario. En 1972, por medio de una ley fue creado el FEDA, al cual ingresarían los recursos destinados al financiamento de los proyectos, aportados tanto directamente por el Estado con cargo al presupuesto nacional como los obtenidos a través de préstamos contratados con organismo internacionales de financiamento. Este fondo está encargado de realizar el PIDAGRO, mediante una organización ad hoc con características muy especiales y utilizando para la ejecución de los sub-programas respectivos, los organismos ya existentes de la administración publica, siendo depositario de los fondos el Banco Central Dominicano.

En el mencionado Plan Nacional de Desarrollo Agropecuario se establecierón objetivos tales como el de acelerar la investigacion en forma ordenada e integrarla en un programa nacional en el que participen todos los organismos del sector agrícola.

Relaciones entre organizaciones de investigación de la SEA con otros organismos e instituciones del sector.

Existe cooperación técnica de la SEIECA con otros organismos de investigación agrícola e instituciones del sector tanto públicas como privadas. Actualmente, se cuente con un total de 15 relaciones instrumentadas con organismos diversos, 8 de las cuales protocolizadas mediante convenios y las 7 restantes mediante acuerdos de participación conjunta. La mayoria de los mismos tienen vigencia permanente y no tienen plazo de expiración.

Como ejemplo, es posible citar el convenio entre la sub-Secretaria de investigación, extensión y capacitación/Cuerpo de Paz/instituto de Recrusos Hidráulicos y la Dirección General de Caminos Vecinales para "Desarrollo de Infraestructura Rural"

Relaciones entre el sistema de investigación de la SEA y Organismos Internacionales y de Paises Extranjeros.

Existen estas relaciones formales, algunas de larga duración, amparadas por la vigencia de convenios. Solo para mencionar algunas citamos: Contrato 358 SF/DR, PIDAGRO Gobierno dominicano BID acuerdo de cooperación entre la República China y el Gobierno dominicano; acuerdo de asistencia tecnica entre el Gobierno federal de Alemania y el Gobierno dominicano etc.... Ademas existen relaciones de cooperación tecnica con reconocidos Centros Internacionales como CIMMYT, CIAT, ICRISAT, CIP, etc...

Programación de la Investigación y la Extensión

Las actividades de Investigación y Extensión no se han guiado hasta el presente por un plan matriz general, ni por programas (por tema o per producto) que lo implemente. Sin embargo, se presentan esquemas de programas individuales a los que se denominan proyectos; éstos conforman un paquete que a la postre pueden considerarse programas (Ej. Proyecto Delno, Proyecto de pequeñas presas, Proyecto de Extensión en el Valle del Cibao, etc) y que suplen, en mayor o menor medida, la carencia de un conjunto de acciones en repuesta a objetivos que van de lo general a lo particular.

Una de las formas en que se programa, especialmente la acción a a corto plazo (un año calendario) es mediante la elaboración

presupuestaria. Un caso tipo de este ejemplo es la labor de extensión a través del mecanismo de las Direcciones Regionales, o la labor de investigación a través de la programación de las divisiones que conforman el Departamento de Investigaciones Agropecuarias.

Actualmente se está elaborando un Plan Nacional de Investigación y Extensión, el que, conjuntamente con el Plan Sectorial de Desarrollo y otros como el Plan de Comercialización Agropecuaria permitiran establecer las bases de orientación en el mediano plazo.

Recursos Humanos

En 1976, había en el país 102 profesionales universitarios del Sector Agrícola vinculados a la investigación, de los cuales 62 pertenencían al Sector Público, 10 al Sector Privado y 30 a instituciones de enseñanza. Entre estos se contaba con 30 profesionales con título de Post-grado; 29 con MS o su equivalente y uno con doctorado (Ph.D). De estos 30, 19 pertenecían a las entidades de ensenanza, 9 a las entidades de investigación del sector público y uno al sector privado.

Recursos Financieros

Para la SEA, el monto aproximado de recursos financieros utilizados por investigación en 1976, fue de 1.263.370 $ R.D. De acuerdo con el origen, 56,6% provino de fondos presupuestarios del Estado, el 37,9% de préstamos reembolsables y el 5.5% de otras fuentes.

Clientela

De la superficie total de República Dominicana que es de 48.442 Km^2, 26.775 tenían uso agrícola en 1974, de las cuales

se utiliza un 31% en cultivas agrícolas representando los pastos y forrages, el 54%. Sobre estas superficies se tienen 253.000 fincas, las que en un 74.3% son de propriedad privada.

El 84% aproximadamente de las fincas tienen una superficie menos de 10 ha; esto con lleva a que los esfuerzos del Estado, en cuanto a los trabajos de investigación y extensión se dirijan principalmente el pequeño y mediano productor.

Resultados de Investigación

Como anexo en nuestro documento se encuentran los resultados obtenidos en investigación en los ultimos cuatro años, en estos aparecen los datos de iniciación de ensayos fecha de termino, objectivos y un resumen de los resultados y sus conclusiones, etc.

En cuanto a la contribución de la investigación al desarrollo agrícola, aunque es muy difícil cuantificarla, presentamos en el documento un análisis sobre el posible reterno marginal que se lograria si se duplicara el area sembrada con variedades mejoradas en el país, in 5 cultivos: arroz, frijol, maíz, platano y yuca. Así, en 1976 el area sembrada de arroz fue de 91,200 ha, de las cuales el 25% fueron sembradas con variedades mejoradas cuyos rendimientos son superiores en un 100% a las variedades tradicionales; si ese 25% se elevara a 50% el retorno marginal para los agricultores sería de 31.5 millones de pesos.

Aunque ya se ha mencionado el PIAMIE, vale la pena repetir que es un instrumento que servira para organizar y sistematizar las acciones a desarrollar en investigación y extensión, haciendo

que estas no sean improvisadas sino que dependan de una previa programación a corto, mediano y largo plazo, con prioridades establecidas de acuerdo a la realidad nacional.

En el PIAMIE se han identificado los mayores problemas que afectan a cada uno de los principales rubros de la producción y se han establecido y delineado las acciones que deben tomarse, in orden prioritario, para resolverlos.

Se considera que con la implementación del PIAMIE, logicamente efectuando les ajustes institucionales requeridos, la República Dominicana contara con un sistema armonico, eficiente y eficaz, tanto en investigación como en extensión, con estabilidad y continuidad.

Nota: El documento base se encuentra a disposición de los interesados en el DIA, para su consulta.

Lista de los siglos empleados en el texto.

1.	CEA	Consejo Estatal del Azucar
2.	CEAGANA	Centro de Desarrollo Ganadero
3.	CENDA	Centro Norte de Desarrollo Agropecuario
4.	CNIA	Consejo Nacional de Investigación Agropecuaria
5.	DIA	Departamento de Investigaciones Agropecuarias
6.	DIP	División de Investigación Pecuaria
7.	EEAJ	Estación Experimental Arrocera de Juma
8.	FAO	Food Agricultural Organisation
9.	FEDA	Fondo Especial para el Desarrollo Agropecuario
10.	PIDAGRO	Programa Integrado de Desarrollo Agropecuario
11.	PIAMIE	Plan Nacional de Investigación y Extensión
12.	PNUD	Programme des Nations Unies pour le Développement
13.	SEA	Secretaría de Estado de Agricultura
14.	SEIECA	Sub-Secretaría de Estado Investigación, Extensión y Capacitación Agropecuaria.
15.	UASD	Universidad Agropecuaria de Santo Domingo

REPUBLICA DOMINICANA

Questions from:

1. DOWNER, A.V (Guyana)
   Would you look at the slide which shows the hypothetical results of research? I did not hear your comment on the benefits (marginal Returns) of the "improved varieties".

2. FLETCHER, Richard (Guyana)
   Could you expand on the role that the private sector plays in agricultural research. For exemple, are there agreements between government and the private sector similar to those with international organizations?

3. LOUIS, Marie-Thérèse (Haiti)
   Ud. enumero una lista de instituciones de investigacion agropecuaria que han sido creado, me gustaria saber si esas instituciones trabajan seperadamente o si tienen relaciones estrechas entre ellas para alcanzar las metas del Plan Nacional de Investigacion y Extension de la Republica Dominicana?

4. SPENCE, John (Trinidad-Tobago)
   How is the Research of the Universities integrated with the National Research System?

5. Dr. THAI/CIDA
   There should be many homogeneous Agricultural zones in terms of climate, soils between Haiti and Republica Dominicana. For better transfert of Agricultural Technology between these 2 countries of the same island, I just wonder if the Dominican Republic and Haiti have a general soil map which is a basis for crop data extrapoliation.
   Your Station in the "Noroeste" area might be similar to our "Cap-Haitien" for instance.

6. VICTOR, André (Haiti)

Como se proyecta el Departamento de Suelos en el campo? Es a traves de un plan Matriz o como sistema de apoyo a otros servicios de investigacion o tambien como medio de servicios directos a usuarios?

7. WROY, Claude (Haiti)

L'apport des terres de montagne est importante en regard à la production agricole du pays. La recherche y relative est pourtant bien mince - Pourquoi?

AGRICULTURAL RESEARCH

IN

GUYANA

Prepared by: R. FLETCHER

With imputs from: P. McKENZIE
F. McLEAN
V. CHIN

November 1977.

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INTRODUCTION

The Cooperative Republic of Guyana is situated on the north-eastern coast of South America. It is bordered by the Atlantic Ocean on the north; Brazil on the south; Surinam on east, and Venezuela on the west. With a land area of 83.000 sq. miles, and a population of 790.000, Guyana's economic mainstays are agricultural commodities (sugar and rice) and bauxite.

Although the Bauxite Industry makes a significant contribution to the country's development, it is upon agriculture that the economy critically depends. During the period 1964-1973 the contribution of agriculture to the Gross Domestic Product (GDP) averaged 20 %, but in 1974 and 1975 this increased to 29 and 31 % respectively.

Despite its importance, Guyana's agriculture suffered from a number of adverse features until recently. In the first instance, it was heavily export oriented and, therefore, very vulnerable to external forces; secondly, there was heavy importation of food items giving rise to a large outflow of funds; and thirdly, it had a very narrow production base, rice and sugar accounting for somme 80 % of agriculture's contribution to the GDP.

These problems led the Government to develop certain strategies for agricultural development based on

a) import substitution and rectriction;
b) export promotion on a broader agricultural base;
c) agro-industrial development.

The general agricultural policy has been directed to bringing new areas under cultivation and beneficial occupation thereby reducing unemployment; agrarian reform to provide

land for the landless thereby creating a strong and independent farming community earning reasonable incomes, and the replacement of imported foods by local foods in terms of quality, quantity and variety.

Guyana's economic activities take place within the Public, Private and Cooperative Sectors, with major emphasis on cooperatives as an instrument for national development. The development thrust is centered around Government's determination to feed, clothe and house the nation, since the provision of these three requirements is regarded as a basic responsibility of any Socialist Government.

RESEARCH POLICY

Agricultural research in Guyana is handled by the State and State financed agencies. At present, there are no privately owned or operated research agencies in the country. Agricultural research in Guyana can be considered to be in a state of transition. The Ministry of Agriculture, under the direction of the Minister, has executive responsibility for formulation of Agricultural policy including research in the agricultural sub-sector. This responsibility embraces all significant areas of the agricultural economy including livestock and the two major crop commodities, sugar and rice.

Some idea of Guyana's agricultural research policy may be gleaned from recent address by the Hon.Minister of Agriculture at a Seminar on "Rationalization of research in agriculture and related fields". While recognizing research as a "vital precursor and sine qua non for higher production", it is felt that research should provide

practical solutions in the shortest possible time. Four categories of research projects which have "no place in the Guyana situation" were listed as follows:

1. Those which deal with problems which are not researchable or where prospects for successful solution are remote;
2. Those which would inevitably yield results which are not usable for cultural, socio-economic, financial or other reasons;
3. Those which are irrelevant to the nation's development;
4. Those which merely satisfy academic curiosity, scientific abstract theory or the researcher's personal interest or ago,

NATIONAL AGRICULTURAL RESEARCH SYSTEM

There are four major agencies involved in agricultural research in Guyana, as follows:

1. The Ministry of Agriculture;
2. The Guyana Sugar Corporation (GUYSUCO)
3. The Guyana Rice Board (GRB)
4. The Livestock Development Company.

In addition, two other agencies - the Faculty of Natural Sciences, University of Guyana, and the Hydro-meteorological Division of the Ministry of Works are engaged to a limited extent in some investigations of an agricultural nature.

SUB-SYSTEMS

A. MINISTRY OF AGRICULTURE

HISTORICAL DEVELOPMENT:

Downer, in his paper "A review of the Development of Agriculture in Guyana" summarises adequately the historical background to the development of an Agricultural Research System in Guyana. Most of this development evolved under a system or organization that now represents the State bureaucratic agency responsible for Agriculture, i.e. the Ministry of Agriculture. The establishment of a system of agricultural research arose through an obvious need by the farming community for education and instruction in the science of farming. Agricultural extension was in those early years intimately associated with investigational work of a fundamental nature, and provided a direct linkage to the farmer, since the personnel involved in research also worked in the field of extension.

Formal agricultural research was initiated in Guyana in 1881 with the breeding of sugar cane varieties resistant to disease and investigation of a variety of crops, including cocoa, cotton, pineapple, mango and fodder grasses. This research activity arose out of necessity and initially benefitted the plantation system of agriculture. It was not until 1927 with the establishment of an Agricultural Department that any organized policy for agricultural experimentation to benefit indigenous farmers was laid down. Agricultural stations were set up and officers appointed to organize educational work among farmers. These stations were also to be centres for experimental work on various crops being grown by farmers.

Livestock research has had a more recent history having been initiated in the era of the Rupununi Cattle trail in the early 1940's when beef cattle were walked several hundred miles to the coast from the Rupununi Savan-

nahs. During this journey, there was a period of rest in the Intermediate Savannahs where the animals were grazed on the native range. It became obvious that the native grasses in this location were nutritionally poor resulting in physiological disorders in the animals. This led to the establishment of a station to investigate and rectify the problem, and the Ebini Livestock Research Station has since developed into the major beef research unit the country. In the late 1960's considerable assistance was received from the University of Florida through a cooperative research programme. Work was intensified in the area of range management, establishment of improved pastures, soil fertility and animal nutrition.

ORGANIZATION

An organizational chart for the Ministry of Agriculture ARS is set out in Appendix 1. The technical administrative head is the Chief Agricultural Officer who advises the Minister directly on technical matters and handles technical organization through six principal officers responsible for each of the major sections - Crop Science, Soils, Veterinary and Livestock Science, Fisheries, Extension and Planning. Research activity is restricted essentially to the first four named divisions.

The Ministry is responsible for crop research in all necessary areas except sugar and rice which as the two major export crops possess autonomy with regard to research. Rice research was previously part of the Ministry of Agriculture programme and achieved its autonomous status in 1972. Until the early 1970's crop and soil research were grouped together However, because of the increasing importance and magnitude of the soils programme, a separate Soils Division was formed. The Soils Division has programme priorities centred around soil surveys, soil classification and soil fertility and provides a soil testing service.

The major livestock development programmes in Guyana now fall under the direct supervision of the recently established Livestock Development Company Limited. They are charged with both the National Dairy Development Programme and Beef Cattle Development. Their function is primarily developmental and commercial production and as such there has been very little research activity within this company since its formation in 1975. The Veterinary and Livestock Science Division of the Ministry of Agriculture is actively involved, on a small scale, in some aspects of swine research and plans have been formulated for small ruminant research (sheep and goat) and nutritional research using local feed by-products. In the poultry subsector research is virtually non-existent and emphasis is primarily on commercial production.

In the Dairy Sub-sector, Government's policy is first self-sufficiency in fluid milk. As such, numerous large scale dairy projects are planned in different climatic and ecological areas of the country. Essentially each dairy would comprise a large centrally located state farm surrounded by several small satellite farms managed by dairy farmers.

For beef, the development policy clearly shows that large, state-run enterprises will be the backbone of this industry. The rural farmer will play the supporting role with much smaller holdings and being serviced financially by the Agricultural Development Bank and technically by staff from both the Bank and the Ministry of Agriculture.

The Fisheries Division is concerned with both marine and inland fisheries, and while development and production are the major functions of this unit, some research is done

in both areas. The lucrative shrimp industry is the major focal point of marine research, while promotion of fish culture among farmers is the basis of research for inland fisheries.

The Apiculture unit under the administration of the Extension Division is also concerned mainly with developmental work among bee-keepers. The research policy for this unit is based on modification of technology for use by bee-keepers.

RESOURCES

There is an alarmingly high rate of staff turnover in the Ministry of Agriculture ARS. This, together with the fact that the majority of new staff constitutes new graduates or diplomates, has resulted in a staff composition that is young and markedly deficient in experience. Over the period under review, the average age of the professional staff was 30 years and the level of experience three years.

This staff situation during the period 1973 through 1977 is summarised in Tables 1 and 2

Table 1 - Human resources of the Ministry of Agriculture Agricultural Research Sub-system

	1973	1974	1975	1976	1977
Professional Staff	25	27	28	27	27
Sub-professional staff	34	42	45	47	45
Auxiliary staff	90	90	95	85	80

Table 2 - Qualifications (%age of total) - Professionals

Phd	15	9	13	10	5
MSc	25	27	26	30	31
BSc	60	64	61	60	64

Finance is through the State Financing machinery. These funds are included in the annual budget of the Ministry under the two main sub-divisions of recurrent allocations to cover new or special projects which may involve infrastructural expenditure. Funding for research programmes is also made available through regional and international research and funding organizations for specific projects or programmes identified for such assistance. In such cases technical assistance and training are also an integral part of the package.

Table 3 indicates the approximate annual expenditure on research for this ARS.

Table 3 - Annual operating budget - Ministry of Agriculture A.R.S. ($G) $2.50 G = $1.00 U.S. approx.

	1973	1974	1975	1976	1977
Crops and soil	750,000	800,000	1,200,000	900,000	450,000
Livestock Science	350,000	350,000	400,000	250,000	207,000
Others	30,000	30,000	35,000	20,000	18,000
TOTAL	1,130,000	1,180,000	1,635,000	1,170,000	675,000

Funds are approved byParliament at the beginning of the calendar year which corresponds with the fiscal year. They are then made available to the various executing agencies in accordance

with a phased projection for expenditure of such funds.

Infrastructure and basic facilities of the subsystem are set out in Appendix 2. It should be noted that in no case is the facility described sol ly for the purpose of research. Other functions such as developmental work, specialised production, e.g. seed, breeding stock and services, are also served by the existing facilities. It is difficult therefore to differentiate precisely the contribution to research in such situations, especially as it applies to technical expertise, manpower and certain generalized facilities and equipment that are shared or that exist as common services.

SCOPE

In table 4 is set out a summary of the location and activities of the sub units of the system. The locations are in some instances representative of the environment they are designed to serve. (cf. tableau 4)

The Ministry of Agriculture - Agricultural Research Sub-system by nature of its responsibility is involved in a diversity of investigational and developmental activity. It is the most prone to change in direction and policy related to its programmes. There are inherent disadvantages in this situation, the most serious being the ineffectiveness of long term planning and the high percentage of failure or abortion of on-going projects. In Appendix 3 a summary of the major projects and programmes of the ARS is given. The heavy emphasis and the varied nature of the activity in crop and soil research is notable but is not uncommon in such an organization. Livestock research carries less emphasis, and work is of a more practical nature, despite the relatively greater importance of this sub-sector in the country's development programme.

Table 4

Identity	Location	Agricultural area	Activity
Central Agricultural Station	Mon Repos East Coast Dem.	Coastal	Crop/Soils/ Livestock
Kairuni Research Station	Soesdyke/ Linden Highway	Forested brown sands	Crop Research
Long Creek Research Station	Soesdyke/ Linden Highway	Forested white Sands	Crop re-
Ebini Research Station	Intermediate Savannahs	Brown sand Savannahs	Livestock/ research
Central Hort. Station	Demerara River	Riverain area	Crop research
Onverwagt Fish Culture Station	West Coast Berbice	Coastal	Fisheries Research
Botanic Gardens Fish Culture Station	Georgetown	Coastal	Fisheries research
Waini Apiaries	North West District	Hinterland	Agriculture

Projects and programmes of this ARS have a direct relevance to production problems of farmers or farming organizations that are not taken major sub-systems and hence carry a high economic and social relevance in the particular community.

EFFICIENCY AND EFFECTIVENESS

Within the Agricultural Research of the Ministry of Agriculture the policy governing research is conditioned by the shortage of

technical expertise and material resources in the country. Research programmes are therefore of an applied nature and are rationalised along two major lines of approach.

a. Research to support development programmes including new land development on settlement schemes where new enterprises or new soils may be involved, or where a technological package is required to permit the correct approach to farming. Included among these would be agricultural units established in the Intermediate Savannahs, and drainage and irrigation projects on the Coastal Belt.

b. Diagnostic research aimed at rectifying or remedying existing field problems occuring on commercial farming locations or farming districts when such problems are of a serious or epidemic nature or are so likely to so develop. Such research is normally supported by development and extension programmes to disseminate information and ensure effective application of the technology developed.

In the absence of a significant level of basic or fundamental research, applied programmes are supported by background technical Agricultural Research Institutions which possess facilities that permit a high level of sophisticated research.

The level of achievement in thisAgricultural Research System is closely linked with the level of expertise available within the system. Long term projects, especially those involving research in animal science and perennial crops, or programmes fo a continuous nature are most prone to failure or to be inconclusive due primarily to frequent changes in staff at both the administrative and technical levels. There is however a high degree of success with short term programmes on which the re is a critical dependence on results for production.

Transfer of technology is one of the most difficult links in the research-development chain. The class ical system of technology transfer exists for the research systems within the Ministry of Agriculture. This system uses the Extension service as the vehicle for technology transfer.

Having developed, modified or adapted a particular technology the following methods are used for dissemination:

a. Publication of technical papers by the researcher;

b. Releases to the Communications Unit of the Extension and Education Division:

c. Modification of the technical release by the Communications specialist for consumption by fiels extension agents;

d. District seminars;

e. Field days and demonstrations.

In addition, technology transfer is effected during the development stage of a research project when the perfected technique is being fiel tested. Use of district demonstration stations or farmers'fields for this purpose has proved to be a very effective means. Unfortunately, this technique is not sufficiently used.

The level of acceptance of technology depends on the type of clientele being serviced and the demonstrated impact that such technology has on production and productivity. For this purpose the clientele can be categorised as follows:

a. State Agencies and Corporations - These agencies, because of the generally high level of professional input will adopt technology which spprars to be beneficial to the system.

b. Progressive farmers and cooperative farming groups - Farmers who have infuses the business approach into their operations are very sensitive to changes in technology as it relates to their particular enterprise and perhaps are the most reliable indicator of the level of acceptability and effectiveness of a particular technology. Such farmers actively seek outtechnical information on their operation, b u t will only accept such technology that appears practical and remunerative.

c. Subsistence or peasant farmers - These are the most difficult to convert and require strong extension and teaching methods in the introduction of new and beneficial technology into their farming systems. In many instances their ability to accept such technology is restricted by related factors, such as lack of finance or credit, inability with existing facilities to handle anticipated increased output, ans shortage of additional manpower to implement specific recommendations.

Effects of agricultural research conducted by the Ministry of Agriculture ARS are not likely to be reflected in major social and economic changes in the short term. The most significant impact is usually generated in settlement shemas or new development projects where at the inception there may exist a lack of technology and expertise. Such changes usually take the form of an improvement in the status of the farmer from a position of dependency or subsistence to one

of self-sufficiency. On such example is the Wauna Land Development Scheme in the North West District where an agricultural research programme was initiated simultaneoously with the introduction of settlers into the area. There has been noticeable improvement in the economic and social status of the community over the decade 1963-1973 arising out of research conducted during the first 5 years of the project. It is however significant that the developed technology - that for peanut production took several years to be fully accepted and in some instances was further modified by farmers for their convenience. The other major crop-oilpalm - has yet made any significant contribution to the community's economy because of the long term nature of the crop.

It has been found that technology associated with livestok production is more difficult to pass on the farmer and is readily acceptable only in critical situations; e.g. disease outbreaks when the farmer is forced ao accept technical advice offered or face heavy economic loss.

In the relatively small enterprise of Apiculture, there has been over the past five years a significant improvement in the status of farmers involved Technology available in Guyana for this enterprise is transferred or modifiec rather than developed. However, the facility with which it is accepted by farmers may also be related to the preciseness of the technology of bee-keeping as well as to the good economic standing of the industry as a wole.

PERPECTIVES

The major objective and general policy of the Agricultural Re search Subsystem will remain the same over the short and medium terms. Essentially it is to provide the technological support for miscellaneous food production systems outside of the major commodities (sugar and rice). Emphasis will natu-

rally be placed on those enterprise which, by virtue of their adaptability, have the capacity for rapid development to commodity status and generate, as a consequence in the social and economic well-being of the producer, the community and the the nation. Political and economic considerations are also very relevant. For example, the national policy decision to develop cassava and grain legumes or small stock (sheep and goats) to ensure steady improvement in the availability of energy and protein locally means that research programmes in these areas to be strengthened to provide the necessary support.

While the Agricultural Research System within the Ministry of Agriculture is expected to maintain its general organizational structure and statu. quo its development over the next five years will reflect the urgent need for the technical suport in development of crops suitable for diversification, More specific emphasis is expected in the area of technology modification and transfer with the objective of more fully and efficiently utilising the limited resources available.

THE GUYANA SUGAR CORPORATION (GUYSUCO)

Sugar is the crop on which Guyana's economy is most heavily deoendent. Prior to the early 1970's two multi-national companies produced sugar, the large Bookers holdings and a smaller operation under Jessel securities. Production of this crop is now state-owned and controlled and involves eleven major production units across the country's coastal belt under the administration of the Guyana Sugar Corporation (GUYSUCO). There is, however, an increasing level of farmer production which is sold to the state-owned mills.

A historical review of agricultural research in sugar indicates that cane breeding for higher productivity initially and eventually for resistance to specific pests and diseases has been the major and most significant activity. Guyana was one of the first countries in the western Hemisphere to embark on breeding programme for sugar cane This work was initiated by Harrison and Jenman in the late 1800's and resulted in several locally-bred varieties.

The industry made a decision to participate in a regional cane breeding programme which has headquarters in barbados and immediately benefitted by the introduction of the variety B34104 wich heavily out-yielded existing commercial varieties at that time.

The Guyana Sugar Planters'Experiment Station, which was established in 1920 for the breeding of sugarcane and the improvement of cultural and manurial practices, eventually developed into a testing and selection station for new varieties. Agronomic and soils research as it pertains to sugar production has always been conducted on individual estates. This work is now coordinated by a centrally located research and production unit.

ORGANIZATION

The internal structure of the GUYSUCO Agricultural Research system is set out in Appendix 4.

The relationship of GUYSUCO with other Agricultural Research systems is an informal one based on mutual coooeration in the area tehnical assistance. No formal administrative or financial relationships exist.

GUYSUCO is a member-cooperator of the Central Breeding Station in Barbados which is an arm of the Sugar Association of the Caribbean (S.A.C). There is an interchange of sugar cane germplasm material with other members of the Central Breeding Station which also sends.

GUYSUCO also represents Guyana on a Select Group (with Mexico and Argentine) for development of quarantine facilities and procedures.

RESOURCES

The level of staffing of the research unit during the period 1973 through 1977 is shown below :

	1973	1974	1975	1976	1977
Investigators	14	14	12	11	10
Auxiliary Personnel	32	32	32	32	32
Academic BSc.	30	59	62	59	59
Qualifications	27	27	30	31	31
Phd	14	14	8	10	10

The conditions of employment in the GUYSUCO Agricultural Research System can be considered to be more favourable than those existing in the regular Government service at equivalent level. Staff experience is generally high and broad-spectrumed and the rate of staff turnover relatively low. Most professional staff have a minimum of 5 years working experience.

Research facilities are centralised in Georgetown where the head office of GUYSUCO is located. A Central Analytic Laboratory and offices exist at this location. Each of the leven estates has a field laboratory where preparatory work on soil and plant samples is done and which serves as a base for field operations. The research staff have access to field vehicules and other transport and support facilities as required from the production unit of each estate. There are no centralised library facilities. However, each operational section carries a collection of relevant technical literature.

Operations of the research unit of GUYSUCO are financed solely from surpluses arising out of the activities of the organization. The annual operating budget is estimated at $1.5 million for research and development.

SCOPE:

Ten of the eleven estates under the control of GUYSUCO are all located on the 10 to 40 mile wide coastal belt where the most suitable soils for cane cultivation exist. Main analytic laboratory facilities and coordinating staff are centrally located in the Georgetown headquarters. The Guyana Sugar Experiment Station is located on the L.B.I. Estate 9 miles from Georgetown and is concerned primarily with the Breeding Programme.

GUYSUCO is responsible for 90% of the sugar output. Private farmers and organizations account for the other 10%. GUYSUCO's research programme is geared primarily for its production. Small farmers are, however, advised on varieties to be planted and they also derive spin-off benefit from general production recommendations which are made available to them on request. There exists no formal system of technology dissemination or transfer from estate to farmer.

EFFICIENCY AND EFFECTIVENESS

Integration of all systems within the GUYSUCO structure facilitates technological transfer from the research to the production system. The Agricultural Research System carries the full responsibility of development of adapted or modified technology in collaboration with the various production sub-units. It is this stage that the commercial applicability of the research recommendations are tested.

PERSPECTIVES

The objectives and goals of the GUYSUCO Agricultural Research System will remain basically the same in the short term. Essentially, it is to develop and modify technology to support and sustain an increase in productivity and production.

Major considerations would be :

a. Intensification of research into mechanical harvesting attendant systems; e.g. land preparation.

b. Continuation of varietal screening on a regional and international cooperation basis with the major objectives being yield, and pest and disease resistance, and

c. Mechanical efficiency.

C. GUYANA RICE BOARD (GRD)

Rice is one of the two major crops on which the economy of Guyana depends. The GRB has sole responsibility for processing, marketing and research work in rice. Production is largely by farmers.

ORGANIZATION

Within the GRB there is a research unit which has responsibility for research.

With regard to administrative, financial and technical matters, the Guyana Rice Board Agricultural Research Subsystem operates independently. There is, however, consultation on technical matter of common interest with other Agricultural Research Subsystems.

Guyana Rice Board Research Division has an informal relationship with IRRI, CIMMYT and CIAT through participation in the International testing programmes for Rice, Wheat and Triticales.

Planning and programming is done by the Director of Research within the framework of the objectives set out in the Country's development programme in so far as the relate to development of the rice industry.

RESOURCES

The situation in regard to professional staff is summarised below :

	1973	1974	1975	1975	197
No of investigators	3	3	3	3	3
Academic qualifications	1 BSc (Ento)	1 BSc (Ento)	1 BSc (Ento)	1 BSc (Ento)	1 B (En
	2 MSc (Agron)	2 MSc (Agron)	2 MSc (Agron)	2 MSc (Agron)	2 M (Agr

Conditions of service are slightly better than the regular Public Service and job security is good.

The available facilities are indicated below :

	1973	1974	1975	1976	1977
Land(total incl. canals road,etc)	-50 ac.	680 ac	630 ac	630 ac	630 ac
No of buildings	1	16	16	16	16
Laboratory building	0	1	1	1	1
Laboratories	0	0	1	2	3
Vehicles	2	2	2	8	8
Computing ware	0	0	1	1	1
Machinery	1 tractor & implements	2 tractors & implements	10 tractors	10 tract.	10 t

In addition, there is a small reference library for use by research staff.

The source of finance for research is the Guyana Government through the Guyana Rice Board. The annual operating budget is $ 790.000 for the 1977 financial year. Disbursement is in accordance with requirements and the budget covers 100 % of needs.

It is estimated that 25 % of the total agricultural area of the country constitutes rice cultivation. The Guyana Rice Board research unit is responsible for research relevant to all commercial rice cultivation

EFFICIENCY AND EFFECTIVENESS

The research objectives of the Guyana Rice Board are in consonance with the National Agricultural Sector development plans as they relate to rice production.

The Board's objectives are:-

1. Steady increase in production for local and export markets.
2. Maintenance of quality and grades acceptable locally and overseas.

Over the past five years the Guyana Rice Board Agricultural Research System has released three new rice varieties for commercial use. These varieties were superior to existing ones in most of the desirable agronomic traits. Improved plant protection and fertilizer recommendations have also been developed for use by farmers. A summary of current research activities is given in appendix 6

The Agricultural Research System of the Guyana Rice Board also is responsible for development and extension. The extension arm which is under the control of an agronomist is involved in the transfer of technology to farmers. The system as it exists is satisfactory. This is done essentially through field days.

Farmers are very conscious of the activities of the Guyana Rice Board Research unit. Because of the possible immediate benefits they are very willing to accept new technology especially in the following areas.

1. Use of new varieties.
2. Rice fertilization.
3. Pest and disease control.
4. Use of foundation and certified seed.

PERSPECTIVES:

Doctrines, objectives and goals of the Guyana Rice Board Agricultural Research Systems will remain unchanged. The major objective is to ensure through research a progressive development of the rice industry with resultant benefits both to individual producers and the national economy.

The primary objective is the development of high yielding, high quality, long grain varieties adaptable to local growing conditions. In the medium grain varieties with desirable characteristics. One major specific objective is the breeding of varieties resistant to shoot blight which is a serious disase in other rice producing countries.

The organization internal functions and external relations are expected to remain basically the same.

It is planned to improve the staffing situation with the employment of an engineer, two plant breeders and an economist.

The future plans for the rice industry anticipate a development from the current 90,000 hectares by 1985. While there may not be a significant increase in the number of farm families, it is expected that farm size work in rice. Production is largely by farmers.

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RESSOURCES

The situation in regard to professional staff is summarized below :

	1973	1974	1975	1976	1977
No. of investigators	3	3	3	3	5
Academic qualifications	1 BSc (Ento)	1 BSc (Ento)	1 BSc (Ento)	1 BSc (Ento)	1 BSc (Ento)
	2 MSc (Agron)	2 MSc (Agron)	2 MSc (Agron)	2 MSc (Agron)	2MSc(Agron) 1MSc(Path) 1Phd(Soil)

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Laboratories	0	0	1	2	3
Vehicules	2	2	2	8	8
Computing ware	0	0	1	1	1
Machinery	1 tractor &implements	2 tractors &implements	10 tractors	10 trators	10 tractors

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Doctrines, objectives and goals of the Guyana Rice Board Agricultural Research Systems will remain unchanged. The major objective is to ensure through research a progressive development of the rice industry with resultant benefits both to individual producers and the national economy.

The primary objective is the development of high yielding, high quality, long grain varieties adaptable to local growing conditions. In the medium term it is hoped to embark on programmers for development of short and medium grain varieties with desirable characteristics. One major specific objective is the breeding of varieties resistant to shoot blight which is a serious disease in other rice producing countries.

The organization internal functions and external relations are expected to remain basically the same.

It is planned to improve the staffing situation with the employment of an engineer, two plant breeders and an economist.

The future plans for the rice industry anticipate a development from the current 90.000 hectares to 150.000 hectares by 1985. While there may not be a significant increase in the number of farm families, it is expected that farm size will increase generally. Primary areas for expansion are Tapacuma in the Essequibo district and the Mahaica-Mahaicony - Abary Scheme in Demerara.

D. THE LIVESTOCK DEVELOPMENT COMPANY

The Livestock Development Company was formed during 1975 with responsibility for the major livestock development programmes of the country. The emphasis is on establishment of national beef and dairy enterprises. Although this organization possesses a research arm, this is not yet fully functional. Research previously done in the Ministry of Agriculture especially in the areas of pasture agronomy and range managment has been the basis for on going programmes of the Company.

It is anticipated that as staff and facilities become available, a research programme geared to give full support to the developmental and production objectives of the Company will be dramn up. Emphasis will continue to be placed in the areas of pasture management and pasture improvement, mixed awards and supplemental feeding.

E. OTHERS

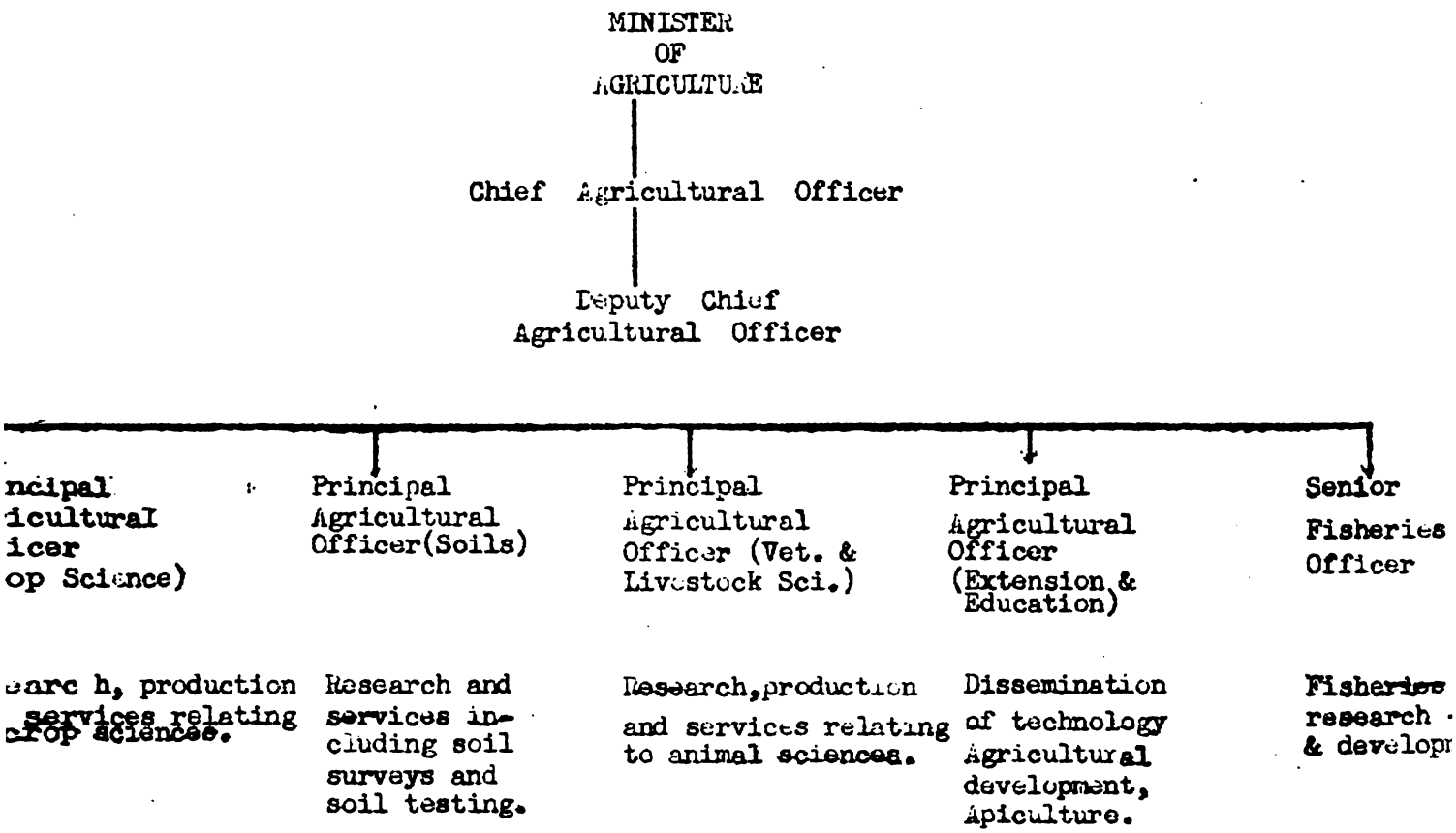
1. The Hydrometeorological Unit of the Ministry of Works: There has been a small research inputs from this unit in the field of agro-meteorology and the effects of water on the growth of selected crops in specific locations. This work has enabled recommendations to be made on irrigation of rice to permit the most efficient use of water.

2. The University og Guyana is also involved in Agricultural Research as it relates to the biological sciences. This work is done primarily as post graduate research projects and covers the fields of entomology, plant pathology and plant physiology.

A P P E N D I X 1

Organizational Chart of the Ministry of Agriculture

Agriculture Research Sub-system.



APPENDIX 2

Infrastructural and basic facilities of the Ministry of Agriculture

1. THE CENTRAL AGRICULTURAL STATION, MON REPOS

This is the main research station of the Ministry of Agriculture and serves primarily the Crop and Soil Science Division and to a lesser extent the Livestock Science Division. Facilities include:

i. Laboratories - Entomology, Plant Pathology, Microbiology, Soil Chemistry, Soil Surveys, Seed Technology, Greenhouse facilities, Artificial insemination and general livestock science laboratory.

ii. Basic laboratory equipment for laboratories mentioned above including equipment for rapid routine and specific analyses of soil and plant samples, (atomic absorption spectrophotometers, flame photometer, Nitrogen apparatus) seed technology laboratory equipment (vitascope, germination chamber, sepacator.

iii. Offices for specialist research staff and administrative support staff.

iv. Fleet of vehicles including 15 Land Rover type vehicles and 6 trucks.

v. Complete set of machinery and equipment for land preparation, crop production and pasture maintenance.

vi. Approximately 400 hectares of land of which some 250 hectares are under pasture and crop production including 40 hectares for studies in the rearing of buffalo for meat and milk.

2. THE EBINI RESEARCH STATION

Established for crop, soil and livestock research for the Intermediate Savannahs area. Crop facilities comprises a field station and approximately 100 hectares of land available for field trails. Basic machinery and equipment are available for fields operations.

Major research in beef production on native and improved pastures has been done here. Recently this facility has been converted to a commercial unit under the Livestock Development Company Ltd.

Nutritional studies with sheep and goats are conducted by the Livestock Science Division of the Ministry of Agriculture. Facilities include :

i. Pens and paddocks plus 60 Ha for sheep and goat studies;

ii. Animal nutrition laboratory (not yet fully functional)

iii. Housing and office accomodation for research staff.

3. THE SOESDYKE/LINDEN HIGHWAY RESEARCH STATION

Two field stations are situated each on 40 hectares of land at Long Creek and Kairuni on white and brown sandy soils, respectively. Research on these locations is specifically on crops adaptable to these inherently infertile soils.

Facilities include :

i. Storage bond, machinery shed, field office;

ii. Two tractors and basic machinery and equipment for field operations;

iii. Two road vehicles

iv. Some housing for technical field staff and workers.

4. THE CENTRAL HORTICULTURAL STATION - TIMEHRI

This is essentially a propagation station for orchard and perennial crops. Apart from investigations into systems of propagation, some crop research specific to the particular soil type is done. Research facilities include:

i. Established fields of fruit crops on which investigational work on production techniques and pest and disease problems is done;

ii. Greenhouse and mist propagation facilities;

iii. One tractor and land preparation equipment;

iv. Field office and staff quarters.

5. THE ONVERWAGT FISH CULTURE STATION AND THE BOTANIC GARDENS FISH CULTURE STATION

Both these field stations are concerned in research and development of inland fisheries. There are 1.2 hectares of research ponds at Onverwagt and about 0.3 hectare at the other location.

A P P E N D I X 3

A Synopois of the Ministry of Agriculture Research Programme 1972-1977

1. CROP SCIENCE RESEARCH

   i. Breeding of soyabean varieties adaptable to Guyana's latitude;

   ii. Varietal testing of germplasm material of maize,bean, cowpea peanut and other legumes obtained locally and from various international research institutions;

   iii. Development of cassava as a industrial crop for use in composite flour and general agronomic studies with other root crops (sweet potato, aroids and yam);

   iv. Plant Protection research to develop safer, cheaper and more effective and practical systems of pest and disease control on economic crops including maize, grain legumes, cassava, coconut, citrus, banana, plantain and pineapple;

   v. Vegetable production research with emphasis on cabbage, tomato,pepper, onion and carrot.

2. SOILS AND SOIL FERTILITY

   i. Detailed surveys and analytic diagnosis of soils in locations planned for agricultural development and in existing farming districts;

   ii. Soil fertility research;

   iii. Study and comparison of different laboratory methodologies for soil and plant tissue analyses.

3. LIVESTOCK SCIENCE

   i. Studies on the establishment and managment of improved pastures in the Intermediate Savannahs, North West District and Coastal areas;

ii. Grass/legume mixtures in pastures;

iii. Nutritional studies with sheep and goats;

iv. Swine research;

v. Buffalo studies

4. FISHERIES RESEARCH

i. Investigation of stocking density ratios and fertilizer levels for optimum yields of Tilapia mozambica;

ii. Trials on the rearing in captivity of Hyposternum litterorale (Hassar) and investigation of systems for spawning;

iii. Survey of shrimp landings to determine size and species composition and maturity stages;

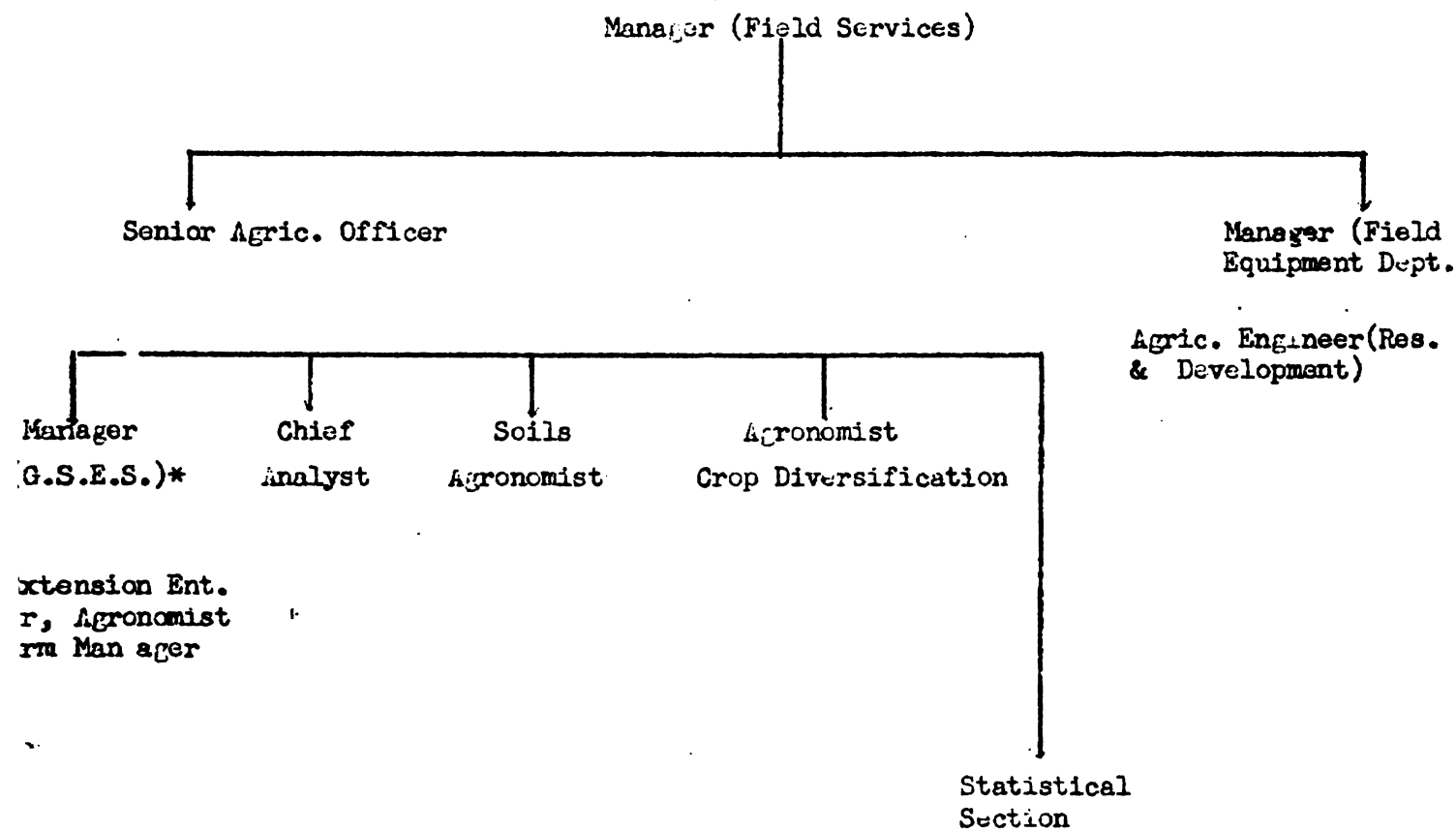
iv. Juvenile fish survey to determine types and species caught by Chinese and Pin seines.

5. APICULTURE RESEARCH AND DEVELOPMENT

Establishment of trial hives at Wauna in the North West District to determine the potential of the forest flora of the area as a source of honey.

A P P E N D I X 4

ORGANIZATIONAL CHART OF THE GUYSUCO A.R.S.



* G.S.E.S. - Guyana Sugar Experimental Station.

A P P E N D I X 5

SUMMARY OF GUYSUCO'S RESEARCH PROGRAMME

1. Evaluation of herbicides for effective weed control in sugarcane.
2. Evaluation of potential chemical ripeners.
3. Studies on response of sugarcane to major nutrients as influenced by variety, spacing and time and number of fertilizer application.
4. Breeding and selection of varieties.
5. Effect of various practices and operations e.g. flood fallowing, in field haulage on yield of cane.
6. Soil surveys and land classification.
7. Design, construction, modification and field testing of various agricultural equipment.
8. Disease and pest control studies.

APPENDIX 6

Titles of publications relevant to Guyana Rice Board Agricultural Research Scheme:

1. Fertilizer studies on rice - (i) Effect of seed rates and 3 Nitrogen rates on yield of paddy rice.
2. Incidence of stem borer and "Break In Sten" in new rice varieties.
3. Evaluation of three fungicides on blast disease of rice.
4. Chemical control of paddy moth (Sitrotraga cerealleala Olir) infesting paddy stored in bags.
5. Red rice problem in Guyana.

SUMMARY

The responsibility for Agricultural Research in Guyana, a country whose economy is heavily dependent on Agriculture, is borne fully by the State through various agencies under its control. There are no privately owned or operated Agricultural Research Agencies in Guyana.

The Ministry of Agriculture under the Executive Directorship of the Minister of Agriculture is presently responsible for formulation of national Agricultural policy of which the Agricultural Research Policy is an integral part. Each organization within the Agricultural Research System designs, executes and coordinates its research programmes in accordance with general formulated policy.

The basic structure of the Agricultural System in Guyana can be summarised as follows :

1. MINISTRY OF AGRICULTURE : Responsibility for research in the areas of Crop and Soil Sciences (excluding sugar and rice). Livestock Sciences (excluding beef and dairy), Fisheries and Apiculture. Research is designed for, and benefits all productive sectors and is based on national priority.

2. THE GUYANA RICE BOARD : The Research Division of the Guyana Rice Board (G.R.B.) has sole responsibility for rice research in the country. This Agricultural Research Sub-system is part of a fully integrated unit responsible for production, processing and marketing of the country's total rice production. Actual field production is to a large extent effected by farmers and farming groups who benefit fully from research done by G.R.B.

3. THE GUYANA SUGAR CORPORATION - (GUYSUCO) : Sugar production and marketing are state owned and controlled with a small percentage of field production (approximately 10 %) attributed to private farmers. Research for the sugar industry is carried out by the Research and Development Unit of GUYSUCO, and is geared towards improvement in production and productivity of the state enterprise, with spin-off benefits to private farmers.

4. THE LIVESTOCK DEVELOPMENT CORPORATION : This state owned organization is concerned with production, Research and Development aspect of the beef and dairy industries at a national level.

5. Other agencies including the Faculty of Natural Sciences of the University of Guyana and the Hydro-Meteorological Division of the Ministry of Works are engaged in some investigations of an Agricultural nature within their relevant fields.

Scientific investigation in Agriculture was evolved out of the plantation system together with the need to establish a level of selfsufficiency in food, hence reducing the heavy dependency on food imports. Objectives today are similar but greater emphasis is placed on research to support production of foods in an effort to attain a high level of self-sufficiency,plus the development of additional export potential to supplement the two major export commodities sugar and rice.

The Agricultural Research System itself possesses a natural dichotomy which is related to the level of development and economic importance of the particular commodity. On the one

hand research is handled by independent authorities (sugar, rice, livestock) with internal funding. Alternatively the Ministry of Agriculture holds responsibility for research in all other relevant areas with the primary objective of improving the level of technology of undeveloped enterprises and also developing appropriate technology for new areas of activity.

Research done in Guyana is of a practical nature and geared to provide material support to the productive sector. Heavy dependence is placed on Regional and International Research organizations for resources material which forms the basis of many programmes. Costly and unjustifiable duplication of effort is therefore avoided.

The future for Agricultural Research in Guyana is pivotal on the formulation of a National Science Policy of which Agricultural Research will be an integral part. This task is beign handled by the National Science Research Council, a statutory body on which the relevant disciplines and expertises competent to handle such a responsibility are well represented.

A RATIONALE FOR THE ORGANISATION OF A NATIONAL AGRICULTURAL RESEARCH SERVICE IN GUYANA

Prepared by-

A. V. Downer

Chairman, Agricultural Research Committee
National Science Research Council
and
Coordinator
Faculty of Agriculture
University of Guyana.

NOVEMBER, 1977.

INTRODUCTION

An agricultural research service is only of value in so far as it exerts a positive influence on the level of agricultural production in a given nation and meets the needs of industrial utilisation. Developing countries in their programmes for development seem to ignore the concept of utilization and to consider production as the ultimate objective. This 'primary' tendency is more apparent in the attempts at importing technology in that the 'commodity' itself is adopted, with all the attendant problems of adaptation, rather than the technology of production or utilisation. This tendency has resulted in the absence of effective motivation for production and a need for examination of the role and function of agricultural research services in those countries.

Agricultural production began with the recognition of edible plant parts and has evolved, over millenia, into the source of raw materials for a variety of industries, particularly national food industries. The course of this evolution has been punctuated by impacts of changes and improvements which grew out of research activity. The dibble stick has been replaced by the seed drill; cultivars and varieties have been adopted and adapted; breeds of livestock have been developed for the production of beef, milk, pork, bacon, eggs, poultry, meat, etc.; soils have been rendered productive through drainage, irrigation, the use of fertilizers, etc.; microbial transformations have been recognised, understood and built into viable commercial systems for the production and consumption of a variety of commodities. The diversity of production is exceeded only by the diversity of uses found for individual items of agricultural produce. Preservation and utilisation have provided a strong stimulus to the growth of secondary and tertiary industries which have in turn increased the demand for production.

Maize, wheat, barley and oats have achieved international acceptance and usage, sometimes in totally unrecognizable forms. It is significant that these are all now, essentially products of the temperate regions of the earth and that they constitute the basis of food, feed and fibre industries which, though non-agricultural, contribute positively to the quality of life.

The importance of utilization, as opposed to production, is effectively illustrated by the fact that grain used directly as food accounts for about 13% of the total grain production in North America, about 75% of that in India and China (3). The figures reflect not only the differential in the extent of non-food utilization of, and industrialization based on, agricultural produce, but also the differential in technological development and the interdependence of agricultural and non-agricultural industrial activity.

In the temperate regions, the interdependence and coexistence of agricultural and non-agricultural industrial activity is a direct consequence of research and the application or adoption of its findings. This interdependence has not developed to any comparable extent in the tropical world. Research into production processes has not been paralleled by research into methods of utilization. In Guyana, the ambition to Feed, Clothe and House the nation required implicitly that utilization of produce be maximized while production itself was accelerated. Research activity became, and remains, necessary in the various areas which interdependence between agricultural and non-agricultural industries.

This paper attempts to discuss the desired objectives of national research activity as related to agricultural production and to suggest how such activity might be organized in order to hasten the approach of a satisfactory stage of interdependent industrial activity at the regional level within Guyana.

MOTIVATION OF PRODUCTION

National patterns of consumption determine the desired volume of production in much the same way as patterns of production determine the desired nature of research activity. The consumers constitute the clientele for production and producers that for research. Thus trends of utilization influence the stimuli to production which in turn influence the needs of the clientele for research.

In general terms, the stimuli to agricultural production are trade, commerce and subsistence. Trade - the purchase, sale or exchange of produce - might be considered to be synonymous with commerce - interchange of goods between different parts of the same country or between different countries - except for, the wider scope and international connotation and the implication of transport in the latter. Subsistence on the other hand implies the farmers' concern to provide sustenance for himself and family. He attempts to satisfy his domestic requirements with as little recourse to the marketing system as possible. There is therefore a minimum of 'division of labour'; there is little specialization and his particular skills and attributes are not developed to any appreciable extent.

At the global level, these stimuli are in fact the parameters which lie behind the grouping of nations and permit the usage of euphimisms such as the Third and Fourth Worlds. It is perhaps not fully appreciated by residents that these 'worlds' are characterized by systems of agricultural production which are motivated by the subsistence stimulus. The efforts of the farmers of these 'worlds' are for the larger part geared to the upkeep of the farm family and have therefore a relatively small impact on the domestic market and virtually no impact on the international market. Their special skills do not contribute to the development of entities such as the 'corn belt' or the whisky industry.

The operation of the subsistence stimulus thus retards the development of the capability of the marketing system in discharging its role in the economic life of the nation. It is a statement of the inability of the nation to be involved in international trade except as an importer of processed goods. Since levels of production achieved by the subsistence farmer are in fact consequences of the use of his labour and land, the operation of this stimulus implies inherent diseconomies at the national level in the use of resources for production. To minimise these diseconomies, farm policies, land tenure systems, etc. have been devised and extension services established and operated. By these innovations, however, the farmer is implicitly required to assume a willingness to shed his values and traditions and to adopt on request, values and skills which have grown out of totally different systems of incentives and motivation. The extension service and the research activities which lie behind its functions thus tend to be ineffective if only because attempts are made to teach farmers techniques they do not appreciate.

ALLOCATION OF RESOURCES FOR PRODUCTION

In economic terms, resources for production are invariably described as land, labour, capital and management. In systems of agricultural production which are motivated by subsistence, labour tends to include management, while capital refers to the size and quality of the population. Increase in the contribution of the two factors - land and labour - to levels of production would therefore constitute increased productivity in the system as a whole and the factor which yields the greater increase in contribution would be the more likely to be allocated in greater quantities.

In essence, Guyana has relatively large amounts of land and a comparatively small population. From these two natural resources the nation has to generate financial resources for its economic well-being and development. It is generally accepted that much of the land space is covered by soils of marginal fertility and that subsistence is the stimulus to production on most of the cultivated portions of these marginal soils. The allocation of land and labour to agricultural production must therefore, at the national level, be such as to effectively and constructively combine the two resources for the realization of the objective of generating financial capital (7). However, before the optimum combination can be arrived at, there is need for the adumbration of the capabilities and comparative advantages of the various areas and types of soil in the country; there is need for the assessment of existing skills within the population and the definition of additional skills needed for the exploitation of the natural advantages of any given location. There is need also for an assessment of national needs in terms of commodities which could be locally produced and those which must of necessity be imported. With this as a basis, the scope for, and ambition towards industrial activity are likely to be viewed in proper perspective and the nature and structure of the agricultural industry defined in terms of the relative use of resources.

Most of the data described above as necessary, will have to be generated by the agricultural research service and the service will therefore exert a major influence on the degree of success to be attained not only in the efficacy of the combination of resources but in the realization of production targets. Because most of the necessary information is yet to be garnered, the allocation of resources must perforce be based on theoretical considerations. The risks concommitant on such an approach can best be minimized by affording the agricultural research service the opportunity to have an input into the elaboration of development programmes, and more particularly, into the definition of strategies for the implementation of those plans. The strategies would have implications as to the combination of resources, the emphases and priorities in the programmes of research and in the development of skills and capabilities. They would also have implications as to the number of phases for implementation of the plan and as to the structure of the implementing agencies in light of the volume of existing knowledge and the adequacy of existing skills and structures.

THE STRUCTURE OF AGRICULTURAL PRODUCTION

It has been shown that the structure of the agricultural sector in Guyana consists in part, because of tradition and other historical phenomena, of a relatively large number of farms, of about six acres in size, on which food crops e.g. root-crops, fruits, coffee, cocoa, pigs, sheep, goats, etc., are raised. The farmers involved are motivated to varying degrees by a combined subsistence commerce stimulus. On smaller farmers, generally in the more remote parts of the country, subsistence is the major stimulus and cassava, beans and fruits are the dominant items of produce. On the larger farms the stimulus is almost totally commercial, and rice, green vegetables, fruits, coconuts, pigs and poultry are the principal products. The commercial stimulus reaches its zenith on the state owned farms where rice, sugar, corn and beans are produced. Cotton, oil palm, milk and beef have recently been added to this list of commercially produced items.

From a commodity point of view, rice is grown by private farmers, individually and cooperatively. While the corporation performs the marketing function, meets the research and extension needs of the industry and caters for the distribution of inputs. Sugar production is differently organized in so far as all of the processing and 90% of the cultivation is done by the corporation. Research, extension and the distribution of inputs to the peasant cane-farmers are all performed by the corporation. Other 'commercial' crops are grown by corporations which provide employment but perform no service functions of education or input distribution.

It can be readily appreciated that the commercial stimulus has developed to the export level in sugar and rice; to the domestic level for corn, cotton, beans, pigs, poultry and coconuts and only to a very limited extent for a wide range of commodities. The national research service would most probably be the most appropriate authority to define commodities which are likely to respond best to commercial stimulation. This stimulation would necessarily depend

on the potential for utilization. In fact, the research and extension services of the Ministry of Agriculture launched an 'Accelerated Production Drive' in 1975 which hinged on the strengthening of the commercial stimulus. Farmers were offered incentives of short-term credit, guaranteed markets, remunerative prices and supervision from within their own communities to encourage increased production by traditional practices (5). The programme had positive results in terms of the volume of production, achieved by each family, income to the individual farmer and to the community and the conservation of foreign exchange. It pointed to the need for facilities for on-farm drying and storage and led to the elaboration of a Food Crop Project[1]. This project proposed the erection of commercial centres at strategic locations in the rural areas of the country, for the distribution of inputs and collection of output. It proposed also the construction of facilities for grading and storing produce and the acquisition of facilities for the effective transportation of specific commodities.

Though the project has not yet been taken to the stage where the infra-structure works could be considered to be complete, it has been the subject of a fairly detailed study[2] which concluded that the internal rate of return on investment would be, at worst, 39%. In better circumstances, a return of 50% could be expected.

Having looked at the structural ingredients of the production function and the forces which contribute to their existence, one can recognise that changes are necessary if research activity is to be of positive consequence. One can consider the nature, and desired objectives of a research system and how best such a system can be organized at the national level to permit effective cooperation and collaboration with regional and international systems.

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[1]Project first outlined by A. V. Downer in 1975.

[2]Food Crop Production/Marketing Project: Pre-feasibility study, Ministry of Agriculture, Guyana.

RESEARCH FOR PRODUCTION

The impact of the subsistence stimulus extends beyond physical production and influences the need for, and scope of research activity. This stimulus minimises the demand for technical change and innovation by minimising the development of a 'clientele' for research. It encourages the development of technology for neither production nor utilization. Subsistence farmers find it difficult to benefit from research even when programmes are geared towards the understanding of what they do and why it is done. The subsistence farmer has developed an awareness of what traditional practices he should follow at a given stage in his production programme (4); and both he and his advisers are hard put to relate these to the modern techniques which he is usually expected to adopt. There is no allowance of time for blending of the merits of the old and new.

It seems therefore that development programmes should cater for the gradual transition in stimulus from subsistence to commerce and that strategies of implementation should indicate clearly the expected role of the agricultural research service in the social and political circumstances obtaining. Transitions from subsistence to commerce as the stimulus for production have been achieved in various parts of the world by different means and strategies. Arndt and Ruttan (1) concluded that:

- Innovation was induced according to the factor endowments of the country, e.g., Japan with cheap labour and expensive land achieved development by means of land - augmenting technology, while the U.S.A. with cheap land and expensive labour emphasised labour saving technologies. In both cases, the cheap factor was utilised while the expensive one was conserved. In both cases, there were:

  i) a strong "agricultural research constituency";

  ii) a decentralized state research service

which was capable of responding flexibly to changing local circumstances and developing locally appropriate technologies;

iii) back-up by a national research service;

iv) close liaison between research, extension and education;

v) a cohesive social structure, i.e., suitable social and economic circumstances augmented by strong farmer organisations.

In both cases, the agricultural research service succeeded in meeting the farmers' needs. Both countries now belong to the developed world.

In the developing world in contrast:

i) social structures tend to be unorganised and particularistic in rural areas. This dictated in Brasil that the Agriculture Research Service needed to be directed by a central planning unit and to proceed in a logical and organised manner to seek information about the farming sector through research and to orient itself around explicit development and production goals, gearing its research to these ends;

ii) the organisation of production influenced the demand for and acceptance of technical change. In Colombia, the concentration of production of some crops by organised groups facilitated the adoption of research results while different land tenure arrangements in the same country had a negative effect on the demand for technical change and the spread of new technology (1).

It is interesting to note that Brazil, with its abundance of land and its policy of increased production through expansion of cultivated areas, considered the dispersed network of research units as a strength of its agricultural research service. The network of units permitted extension to be emphasised, but it was agreed that there were two forces which negatively affected that research service. These were:

- the relative abundance of land and labour resulted in little pressure for research to develop technology which economized on those factors;
- the extremely individualistic patterns of work (11).

The importance of extension to the effectiveness of the research service lies in the fact that it involves the individual farmer in research activities. Lord (9) pointed out the efficiency of the agricultural industry depends to a great extent on the ability of the individual farmer to:-

a) adopt and adapt new ideas;

b) develop research ideas into commercially viable farming systems;

c) train his staff;

d) advise his neighbours.

It is conceivable that on-farm research was instituted to enhance this effect of the individual farmer on the industry as a whole. Such research has developed into a major activity of the Extension Service and forms the basic link between the farmer, the extension worker, and the researcher. Unfortunately the channel of communication has not, in most cases, been used to understand the activities of the subsistence farmer but rather to coerce him into accepting a new set of values. This system of communication has not led to utilization of what was produced nor has it led to the development of technology for utilization.

Types of Research Activity

Agricultural Research activity has been categorized in a variety of ways but the classification which seems appropriate at this time is that advanced by Williams (12).

- Research on the composition and organisation of the physical and biological world; variously described as pure fundamental or basic research, it is often speculative in character;
- Research on the function of known natural systems and processes; also variously described as pure, fundamental or basic research and sometimes as applied research when the function has practical implications;
- Research aimed at understanding the specific factors in production which limit optimal efficiency, i.e., production research, often described as applied or agricultural research;
- Research aimed at:-
    - i) describing the current state of production of organisations;
    - ii) discovering future trends, i.e., survey research;
- Research aimed at development:-
    - i) systems of production, e.g., feeding of animals, minimal cultivation;
    - ii) primary resources and products, e.g., new breeds or varieties conservation of soil and water;
    - iii) supply of products to agriculture, e.g., biocides, machinery;

iv) supply of products to consumers, e.g., increased storage life, substitution of products, etc.;

v) social advancement, e.g., manpower training, rural education, etc.

Evaluative action research which has been described by Bowers (2) as the study of an operational programme, the results of which are fed back directly and immediately to the operational staff to help improve the effectiveness of the activities could perhaps be properly listed as a sub-heading of survey research.

Another classification of research, that is of importance here, is that put forward by Cde. G. B. Kennard, Minister of Agriculture in Guyana (8). He had listed the following categories of research activities:

- those which deal with problems which are not researchable or for which prospects of successful solution were remote;
- those which would inevitably yield results which are not usable for cultural, socio-economic, financial or other reasons;
- those which are irrelevant to the nation's development;
- those which merely satisfy the academic curiosity, scientific abstract theory or the researcher's personal ego.

He also indicated that the National Science Research Council in Guyana had been charged with the responsibility for coordination of research activity and as such should identify research problems which could be best handled at the national, regional (i.e., Caribbean) or international levels.

These classifications are interesting if only because, when combined with the ecological determinants of the transferability of

results, they provide some insight into the considerations which should underlie the structuring of an effective research service within or without national boundaries. On these bases the activities of a national research service in Guyana should include:

- for short-term effect:-

  a) survey programmes aimed at understanding the current state of identifying trends in production, evaluating on-going activities and disseminating results and information;

  b) local testing of results of development research done elsewhere, i.e., adaptive research in Mellor's classification (10);

  c) manpower training, including farmers and staff employed by the research service.

- for medium-term effect:-

  a) programmes aimed at production research, i.e., in the definition of specific factors which limit optimum production and the correction of these factors;

  b) programmes aimed at developmental research, e.g., in the supply of inputs to production e.g., seed material, etc., and the supply of products to consumers, e.g., substitutes or increased range of similar products, etc.;

  c) manpower training.

- for long-term effect:-

  a) programmes aimed at development research, e.g., systems of production, provision of primary resources, e.g., of new varieties, etc., new enterprises and products.

The programmes for long term effect could easily be carried out, as necessary and/or desirable, in conjunction with regional or international research agencies engaged in basic and/or developmental research.

Thus though the activities of the national research service can be easily described and phased relative to time frames of implementation, the organisation and structure of the service should be dependent on a variety of factors and circumstances, e.g., relative availability and cost of factors of production, the nature of the stimuli and/or incentives to production, the state of technical and scientific knowledge, market structure and functions, the supply of inputs and materials, etc.

Current Organisation of Research Activity

The agriculture research service in Guyana has been patterned and developed along the lines of the European model. Initially, the major component of the demand for agricultural research came from the sugar producer and, in response, research on sugar was emphasised by the Ministry of Agriculture (6). Eventually all such work was handed over to the sugar industry and rice replaced sugar as the commodity receiving research emphasis. This responsibility passed gradually to the rice industry and with the establishment of other corporations, each was given responsibility for specific commodities. Only one of these, the Agricultural Products Corporation, had responsibility for utilization.

Accordingly, the Sugar Corporation now does all research on sugar and has recently been assisting the Research arm of the Ministry of Agriculture with research on cassava, soybeans, and black-eye peas. The Rice Board produces and markets rice and has developed its own facilities for research in that crop. The Agricultural Products Corporation has the responsibility for research in the area of food processing and the utilization of oil palm, while the Marketing Corporation processes data on the market conditions for agricultural produce. The Livestock Development Company is currently building a research unit to support its programme for production of beef and milk. The National Service and the Upper Mazaruni Development Authority are also building research capabilities and it is likely that the Mahaica-Mahaicony-Abary Authority and the Matarkai Authority will follow this trend. The activities of the agencies listed are coordinated by the Ministry of Agriculture which provides guidelines of policy and production targets. The Ministry, which in its early stages had the responsibility for all agricultural research, still carries a research programme on all agricultural commodities produced in Guyana except sugar, rice, beef and milk.

The programme reflects the Divisions within the Ministry. Economic studies are the responsibility of the Research Development

and Planning Division while activities in livestock, crops, soils and land use and surveys, are the responsibility of the Divisions which bear the same names. On-farm research is within the province of the Extension and Education Division.

There is thus a multiplicity of research needs and programmes with as yet no really established system of integrating these programmes into a national one. There is thus also, a multiplicity of efforts to adopt and adapt technologies developed elsewhere. In some cases the efforts at adoption of technology have been in fact efforts to imitate production programmes of other lands e.g., the production of white potatoes and soybeans; the use of corn in the preparation of livestock feeds. While the production of white potatoes and soybeans might constructively form part of a programme of developmental research, the technologies for planting harvesting and utilization might have been meaningfully examined and transferred for use in the production and utilization of sweet potatoes, cassava, black-eyed peas, etc. In the case of preparation of livestock feedstuffs technologies exist for the use of rice in lieu of corn and research activity could enjoy a positive impact by working to adapt such technologies to the national circumstances.

The Agricultural Research Committee of the National Science Research Council has recently been charged with the responsibility of coordinating all agricultural research activity in the country. The membership of the committee includes representation from most of the corporations and from the Ministry of Agriculture.

RECOMMENDED OBJECTIVES OF AGRICULTURAL RESEARCH

Arndt and Ruttan (1) point out that research could increase agricultural productivity in several ways:-

i) through raising returns to the factors of production by lowering costs or increasing output;

ii) through improving output quality and introducing new products;

iii) reducing the cultivator's vulnerability to forces beyond his control.

The objective of agricultural research in Guyana could constructively be to increase returns to labour by fostering better use of land through larger holdings. The organisation and structure of the facility could perhaps parallel the Brazilian service in terms of central planning and gearing of activities to clearly defined production and developmental programmes and ambitions (11).

A seminar on the 'Rationalisation of Research in Agriculture and Related Fields' arrived at several conclusions: First of these was that the national agriculture base should give priority to farm enterprises aimed at producing in primary form - sugar, rice, coconuts, oil palm, fruits, grain legumes, cassava, cotton, corn, coffee, pigs, poultry, cattle, sheep, goats, bees and fish.

One of the misfortunes of organisation was that there was no attempt to consider how the primary products listed related to the national ambitions, and constraints seen to the realisation of these ambitions for growth and development. There was no conclusion as to the uses to which the primary products should be preferentially put. Fortunately, it can be considered that cotton, fruits (citrus), coconuts, rice and cassava, could be used in preparation of feedstuff for cattle, pigs and poultry. There was no consideration given to primary products or by-products useful in packaging e.g. jute, kenaf; even though the nation incurs substantial expenditure of foreign exchange reserves on

the importation of bessian bags for the rice and sugar industries. Importation of paper bags of various sizes is also a significant source of loss of foreign exchange.

Despite these omissions however, it would be constructive for the country to concentrate on developing a capability for production and marketing of a restricted range of commodities. Thus research, education and extension could for medium-term effect be geared towards the organisation of production (i.e. size and structure and tenure of farms), the organisation of farmers, the elimination of waste of produce and the development of new products and/or uses from material yielded by the different enterprises and the improvement of levels of productivity.

Despite the modifications made to the Agricultural Research Service in Guyana, there are still constraints to effective research. These constraints have a striking similarity to those which obtained in Brazil until very recently and which have been described by Pastore and Alves as consequence of the European 'diffuse' model of research service. A Committee set up in 1972 to recommend reform in the Brazilian agricultural research system listed strengths and weaknesses of the system. Among the weaknesses were:

- Basic national needs in respect to agriculture were unknown to most research personnel;
- There was little interaction between research personnel and farmers;
- The existing administrative structure inhibited recruitment, training and promotion of well-qualified personnel;
- A complete lack of internal communication among units and individual researchers was evidenced by the large numbers of parallel projects and unimportant products;
- The lack of suitable programming and evaluation mechanisms permitted researchers to undertake individual activities of doubtful value;

- The salary policy did not permit the government to compete in the professional labour market;
- Higher salaries given to administrators reduced researchers' incentives to argue for their projects;
- All existing facilities were under-utilised.

The strengths of the system included:

- A geographically dispersed network of research units was available and covered practically the whole nation;
- Journals were available for publication of research results;
- There was a small but well-qualified group of researchers whose talents could be better utilised;
- A relatively well-defined consciousness of the need for an integrated research policy for the agricultural sector was present in most researchers (11).

The Committee was set up in reaction to "the increased donestic and international needs for food and fibre and the political need to feed the urban population created a new atmosphere which encouraged a shift from the diffuse research model to one in chich concentrated effort predominates". Extremely limited human and financial resources in Brazil and the absence of an organised mass of farmers to sensitize the authorities of the sector's needs, rendered the diffuse model unlikely to succeed.

It was considered that developing countries lacked some of the essential ingredients for the success of the diffuse model:

- resources for research;
- the cultural levels of farmers difficulties of transportation, communication, etc., do not permit a defined clientele for research;
- researchers trained in developed countries tend to adopt individualistic approach.

The deficiency result is the alienation of research from the current agricultural situation and lead to dispersion of research among many crop and animal enterprises with reduced efficiency of research. The farmer thus finds only limited and incomplete information available which does not permit the elaboration of a production system.

General principles which were developed and followed in reforming the existing research apparatus were:

- Applied research should be guided by the concrete needs of the nation as expressed by governmental policies, farmers and industry.

- Research should generate technology which can be readily incorporated in the production process in technological packages that can achieve technical and economic efficiency.

- Transfer of foreign technology, though a valid means of improvement, is only of limited importance in many instances. The transfer of specific materials and certain packages, e.g., poultry technology, could be meaningful.

- Because of the scarcity of human and financial resources for research activities, efforts should be concentrated on regional projects. This would help overcome difficulties of transferring technology among different ecological and economic regions of the country.

- The private sector should participate in the development of most of the research projects.

- The agricultural research service should have more administrative flexibility, including freedom to:
  - obtain additional resources through contracts and agreements;
  - pay researchers at market rates;
  - carry out an aggressive training programme.

- A closer relationship should be developed with the extension service and agricultural input industries, to speed dissemination of knowledge throughout the country.

- Knowledge from international institutes and other foreign research centres should be adopted and spread throughout the country. The agricultural research service should seek technical packages which can decrease the farmers' risks i.e. economic investigations should be systematically included in agronomic investigations.

On the basis of these principles, the Brazilian Public Corporation for Agricultural Research (EMBRAPA) was established and charged with:

- increasing the quantity and quality of scientific knowledge relevant to agricultural development;
- making the whole research system more sensitive to the demand for technology.

The corporation directs its main research programme through national centres, concentrating financial and human resources on a few but relevant products e.g. wheat, rice, dairy (11).

PROPOSALS FOR ORGANISATION OF THE AGRICULTURAL RESEARCH SERVICE IN GUYANA

The Brazilian experience supports the recommendations of the Seminar on 'Rationalization of Research in Agriculture and Related Fields', to the effect that research efforts should be concentrated on a narrow range of commodities. In addition to this, the dire consequences of the relatively rapid turnover of researchers dictate that serious attention should be those factors which promote the retention of effective researches. As in Brazil, these include:

- Scope for professional development and job satisfaction;
- Adequate motivation and remuneration;
- Administrative flexibility;
- Effective programming and evaluation of research which promotes continuity of activities and efforts relevant to the realisation of the national developmental goals;
- Promotion of inter-disciplinary and inter-agency cooperation.

To meet the conditions and circumstances described, it is proposed that the organisation of the Guyana Agriculture Research Service should be as follows:

Central planning, programming and evaluation of agricultural research will be effected by the Agricultural Research Committee of the National Science Research Council. The Committee will in fact "translate the nation's developmental objectives to research objectives in preparing a national agricultural research programme".

Cooperation among the various agencies now involved in agricultural research will be directed towards:

- easy communication;
- optimum utilisation of facilities and technical manpower;
- the implementation of the national research programme;

Production research will be done as relevant and practical by

the Rice Board, the Sugar Corporation, the Agricultural Products Corporation, the Livestock Development Company, the National Service, the University of Guyana, the Developmental Authorities and the Economics, Crop, Soils, Animal and Extension Divisions of Ministry of Agriculture. Staff members of the various agencies would provide technical supervision to sub-professional staff attached to the various units of the research service as a whole.

Survey research will be done by the Marketing Corporation, the University of Guyana, and by the Resource Development and Extension Divisions of the Ministry of Agriculture.

Cooperation will be stimulated by the formation of Committees, according to professional discipline and/or commodities, which will be involved with the Agricultural Research Committee in formulating the national programme. From this sort of beginning, A National Agricultural Research Institute can be expected to develop, while the service as a whole enjoys a strong Research-Education-Extension link.

- Farm units will be established in each ecological zone of the country. These units will be geared towards:
  - the determination of the optimum size and composition of farms in the respective zones, and
  - the determination and definition of the factors which can effectively permit the organisation of such farms into a base for industrial activity within the zone or region.

research activities could be geared towards:

- the understanding and improvement of existing practices and recognition of requisite skills;
- adumbration of optimum patterns of land use, systems of production and utilisation of produce;
- improvement of crops and animals;

the short, medium and long-term respectively.

The determination of optimum patterns of land use will hinge on the systems of production considered desirable in light of the stated expectations from land and labour and the programmed rate of encouragement of the commercial stimulus to production. Crop and animal improvement programmes would also have to be part of the initial effort. Such programmes can be considered to have already been started - some $40,000 were spent in the last year on the importation of cattle semen while more than 900 varieties of different crops have been tested over the last decade - but in the absence of effective systems of evaluation the degree of progress made or the contribution to production cannot be properly assessed.

Possible locations of farms and industrial communities can be defined by examination of the determinants of production capabilities - latitude, elevation, rainfall and its distribution, soil fertility, On this basis, farms located in the Northeast, Mazaruni, and Rupununi and Intermediate Savannah areas, can constructively investigate pastures (their composition and utilization) and the selection and breeding of cattle, sheep and goats. A farm in the Mazaruni can investigate possibilities for the production of vegetable seeds while farms in the coastal areas investigate the production of rice, sugar, vegetables and beans. The production of fruits (avocado, citrus and pineapple) oil palms and coconuts can be studied in the Rupununi and Intermediate savannahs. In brief farm enterprises and associated biological principles can be researched in locations as follows:

Northwest Region:	pastures, animal production and improvement; production of beans, peanuts, oil palm, coconuts, fruits, cassava, yams and sweet potatoes and fish.
Mazaruni:	pastures, animal production and improvement; vegetable production and improvement, vegetable seed production and fish.

Rupununi: pastures, animal production and improvement, production of rice, cassava, yams, sweet potatoes, (mango, cashew, avocado, citrus), vegetables, beans, corn, cotton, tomato, pepper and fish.

Intermediate Savannahs: pastures, animal production and improvement, production of beans, fruits (citrus, avocado, mango, pineapple), vegetables, cassava, rice, corn, cotton, oil palm and fish.

Coastal and Riverain Areas: production and improvement of pigs and poultry, production and improvement of corn, rice, sugar, coconuts, cocoa, coffee, plantains, cassava, yams and sweet potatoes, vegetables and fish.

The farm network proposed has, to some extent, already been initiated in terms of locations and units for biological investigations. Unfortunately, these attempts have not enjoyed capacities for promoting either continuity of effort or appropriate manpower development. In fact, the turnover of staff which has accompanied these attempts seems to have so stultified the development of the research service that there is not now an organisational structure which can permit meaningful utilization of the services of specialists trained in the industrial milieu of developed nations.

It is anticipated that the network of farms would include at least on model commercial farm in each administrative region of the country and one research facility which would be used also in an educational context. The network would thus provide a basis for concentrated research activity in the broad areas of:

- Tree crops;
- Vegetables and roots;
- Field crops;
- Meat and milk;
- Fish.

A research service built along the lines proposed, could with effective central direction, adequate inter-agency cooperation and manpower development, yield a rich harvest. It would allow constructive regional and international cooperation and to this end a few specific areas which can be examined regionally or internationally, beyond the establishment of the different farms, might be described broadly as follows:

- land use studies and post-harvest operations (at the 50% level of use of produce, only 50% of the cultivated land is in fact in use);
- optimum farm size and structure for specified enterprises (farm income levels are probably desirable criteria but national production goals may well prove to be more constructive);
- organisation and management of agricultural cooperatives;
- cropping systems i.e. rotational sequences, multiple cropping, etc.;
- crop plant and livestock improvement;
- non-food utilization of agricultural produce.

These topics all represent components of an exercise in Rural Development and could perhaps form part of a Regional Project which spans production and utilization of primary agricultural materials.

SUMMARY

The paper attempts to consider the agriculture research service in relation to the organization and motivation of production and utilisation of agricultural commodities in Guyana. It discusses the objectives and organization of research as reported for selected countries and accepts that a national agricultural research service in Guyana should be centrally planned and programmed. It is argued that since there needs first to be a production base, i.e. groups of farmers or farming organisations in given locations with proven capabilities for the production of specific agricultural commodities, before conventional research activities can have any real impact, the research service should, in combination with a strong extension service, have clearly defined objectives and philosophies of fostering the development of a commercial motive for production within that production base. This, in Guyana's circumstances, would imply the increase of production through the utilisation of land for the purpose of improving the skills and technologies for production, the productivity of land could then be improved by the use of genetically improved materials on farms that are of economic size and composition.

It is argued also, that, to realise the objective of higher productivity of labour, research and production activities should be restricted to a relatively narrow range of commodities, viz:

- Tree crops e.g. citrus, avocado, coffee, cocoa, coconuts, oil palm;
- Vegetables and roots e.g. cassava, sweet potato, yam, plantain;
- Field crops e.g. rice, sugar, corn, cotton, beans, pasture;
- Milk and meat (beef, pork, poultry and mutton);
- Fish (inland and marine).

Research efforts should permit the recognition of natural advantages of the various ecological zones for production of the different commodities by the establishment of a network of farms in appropriate areas of the country and should also permit the adoption or development of technologies for utilization of these commodities.

It is suggested that the national agricultural research service should have representation on the National planning agency and that the service should enjoy a maximum of inter-agency cooperation for the optimization of use of facilities and manpower. The national agriculture research service should have as major objectives the development of a body of appropriately trained manpower and the maintenance of continuity of effort in order to be in a position to effectively cooperate and collaborate with regional and international agricultural research agencies.

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GUYANA

Question from:

1.- LEGAGNEUR, Dr. Salmon (Guadeloupe)

a) Research budget from your Ministry of agriculture have sharply increased from 1975 to 1977. What are the reasons why or the consequences for minning programms

ANS.- The reason for the sheep increase in the Guyana Ministry of Agriculture research budget over the past 2 years arises out of the financial constraints being experienced by the country at the present moment. It is anticipated that the budget will be restored to its normal level with an improvement in the economic situation.

b) Does the British Government give assistance to Guyana Research?

ANS.- No direct assistance has been given toward research by the British Government in recent years, however, research has benefited to some extent from aid made available for developmental projects primarily through the ODA and other British based funding agencies.

2.- SPENCE, John (Trinidad-Tobago)

Would not Dr. Downer consider the production of rum from Sugarcane, the use of bagasse for full and particle Board or the use of citrus meal for livestock feed comparable to the Scottish Barley Story?

ANS.- It is potentially so, but at the moment: rum is a by-product,not an alternative product. - Bagasse is used as fuel in sugar production not as a useable commodity. Papas production was attempted in the nineteenth century but proved uneconomical then. No particle board is manufactured from it. The potential is yet to be exploited.

DEPARTEMENT DE L'AGRICULTURE, DES RESSOURCES NATURELLES ET DU DEVELOPPEMENT RURAL

DIAGNOSIS OF THE AGRICULTURAL RESEARCH SYSTEM IN HAITI

(AN OUTLINE)

28 novembre 1977

FOREWORD

This diagnosis of the Agricultural Research System in Haiti has been prepared during the months of October and November 1977 in view of a Regional Technical Meeting to be organized by the Haitian Department of Agriculture, Natural Resources and Rural Development (DARNDR), with the technical cooperation of the Regional Direction of the Interamerican Institute of Agricultural Sciences for the Antilles Zone.

This document which covers data during the last three years has been elaborated by a National Research Committee appointed by the Department of Agriculture as follows:

Julio BARTHELEMY, Director of Agricultural Research Service (SERA)

Claude GRAND-PIERRE, Research Agronomist at SERA

The Committee has been joined with the collaboration of M. Georges Werleigh, Agricultural Economist assigned to the Regional Integrated Development Project of Petit-Goâve and Petit-Trou-de-Nippes (DRIPP), and a national professional of the Interamerican Institute of Agricultural Sciences (IICA), Ariel Azael, as local coordinator.

LIST OF ABBREVIATIONS

ARS	Agricultural Research System / Service and/or Section
CEEMAT	Centre d'Etudes et d'Expérimentation du Machinisme Agricole et Tropical / France
CIAT	International Center for Tropical Agriculture /Colombia
CIMMYT	International Center for Maize and Wheat Improvement / Mexico
CONADEP	Conseil National de Développement et de Planification / Haiti
CM	Chinese Mission to Haiti
COM	Cooperation Mission to Haiti (Mission of Experts)
DARNDR	Département de l'Agriculture, des Ressources Naturelles et du Développement Rural
DRIPP	Développement Régional Intégré de Petit-Goâve et Petit Trou-de-Nippes /Haiti (Projet Haiti-Canada)
FAC	Fonds d'Aide et de Coopération /Ambassade de France (Haiti)
FAMV	Faculté d'Agronomie et de Médecine Vétérinaire, Damien / Haiti
ICAR	International Centers for Agricultural Research
IDAI	Institut de Développement Agricole et Industriel / Haiti
IICA	Institut Interaméricain des Sciences Agricoles de l'OEA
IM	Israeli Mission to Haiti
INRA	Institut National de la Recherche Agronomique / France
IO	International Organizations
NO	National Organizations / Agricultural Development (Haiti)
ODN	Organisme de Développement du Nord / Haiti

ODPG	Organisme de Développement de la Plaine des Gonaives / Haiti
ODVA	Organisme de Développement de la Vallée de l'Artibonite / Haiti
SEA	Section d'Etudes Agricoles/IDAI (Haiti)
SERA	Service des Recherches Agricoles /DARNDR
SRA	Section de Recherche Agricole / IDAI
SRAA	Service des Recherches Agricoles Appliquées / IDAI
USAID	United States Agency for International Development / Mission to Haiti

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Development Policy of the Agricultural Sector

The five-year plan 1976/81 summarizes the basic goals of the sector as follows :

- improving the socio-economic conditions of rural populations;
- promoting economic growth in rural areas, thereby reducing income disparity between urban and rural populations;
- developing human resources, creating employment and stimulating the participation of the private sector in agricultural development;
- increasing production and productivity of basic food crops;

with the latter goal being priority number one of the sector plan.

1.2 Research Policy within the Agricultural Sector

It can be summarized as follows:

- promoting applied research with emphasis being put on adaptive on-farm processes for sucessful transmission of improved technology to small holdings;
- stimulating, assisting and coordinating all current research activities dealing with economic crops.

2. IDENTIFICATION OF THE HAITIAN AGRICULTURAL RESEARCH SYSTEM

2.1 Agricultural Research Agency

The national agency is the Department of Agriculture (DARNDR), through the Agricultural Research Service (SERA). DARNDR has the responsibility of research orientation, implementation, and management of experiment stations.

2.2 Number of ARS

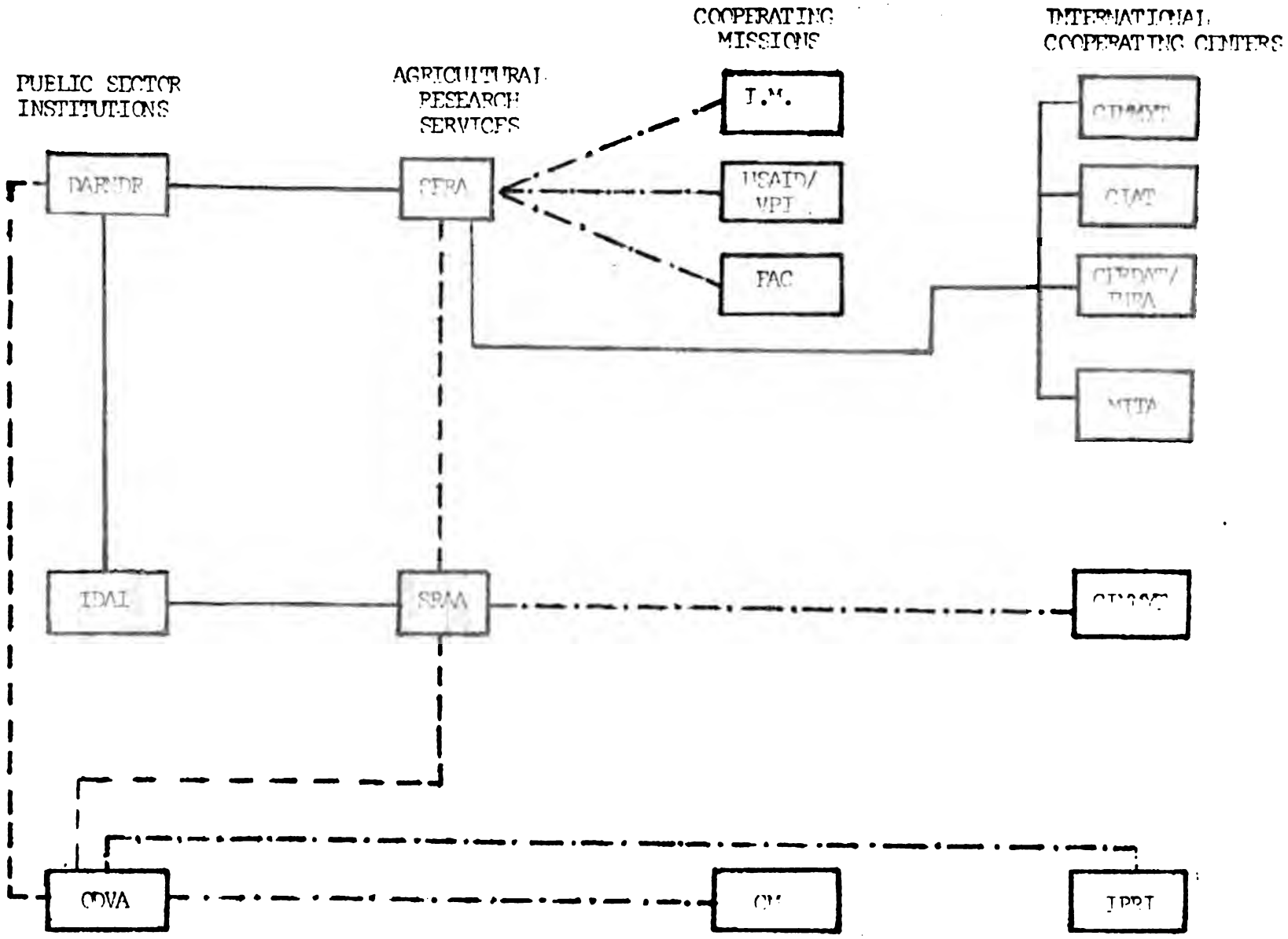
The main ones are :

SERA within the Department of Agriculture

SRAA within the Institute for Agricultural and Industrial Development (IDAI)

The Agricultural Research system is schematized in Figure 1.

Fig.1. PRESENT SITUATION OF AGRICULTURAL RESEARCH IN HAITI 1/



1/ See page ii for abbreviations

2.3 Historical Development and Characteristics of ARS

SERA

Agricultural research activities at DARNDR date back to 1924 with the creation of the "Ecole Centrale d'Agriculture" at Darien. However, the present structure of SERA is in operation since 1962.

The main objectives of SERA can be stated as follows :

- selection and diffusion of improved planting materials adapted to local conditions;
- developing improved technological packages best adapted to production systems of small holdings;
- promoting better seed production technology for basic food crops, including processing and safe storage facilities;
- promoting country-wide plant protection services.

SRAA

It was created at IDAI in 1967, to primarily cover two zones : North and South. Its main objectives since 1975 are :

- introducing cultural practices adapted to the ecological conditions of the target areas throughout the country;
- realizing economical studies in connection with the technolo - gical package recommended;
- transmitting research results to farmers fields through demonstration plots, and credit facilities;
- organizing production, processing and storage of selected breeding plant material for farmers;
- developing handling of improved implements.

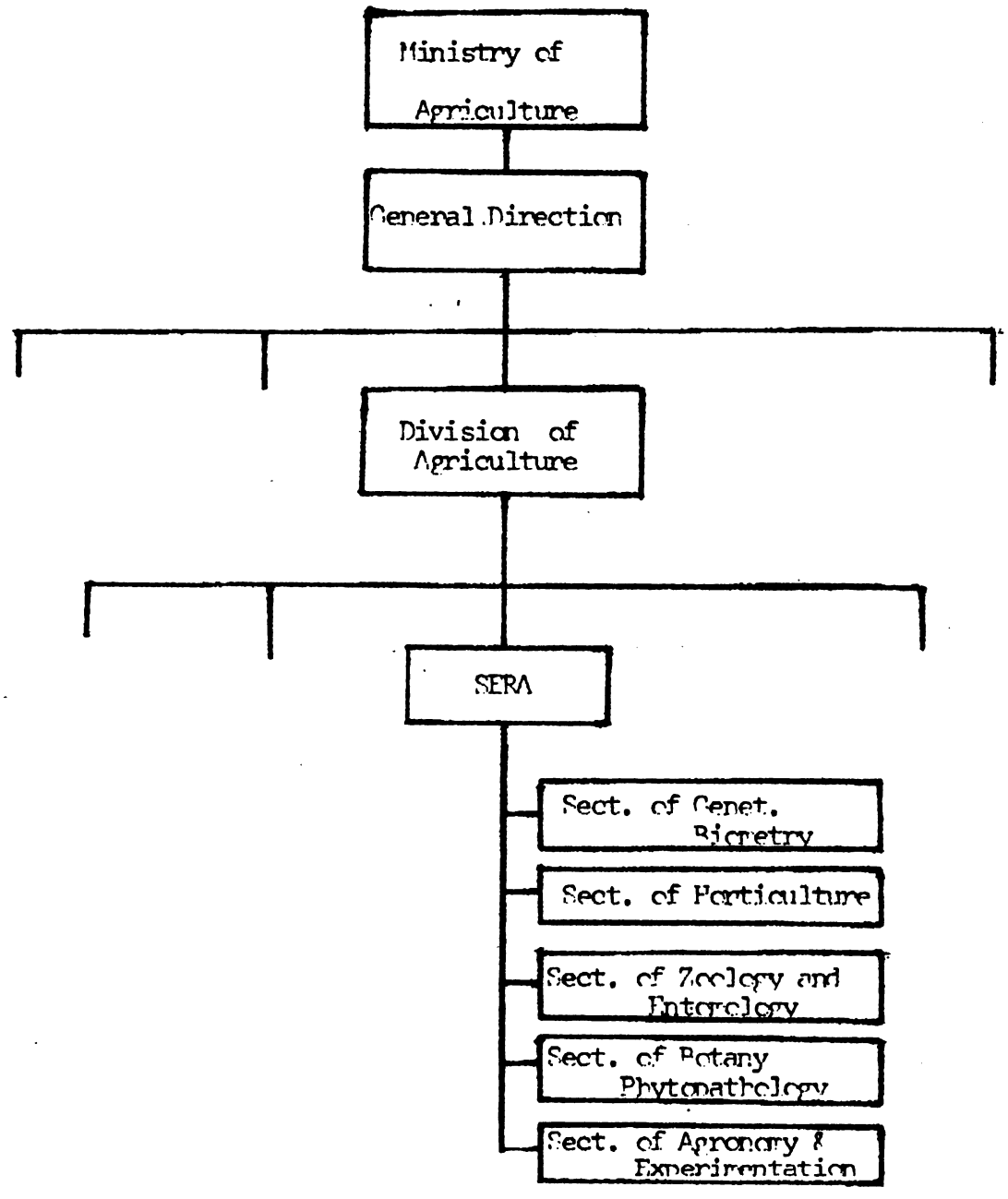
2.4 Organization of Performance of ARS

2.4.1 Internal structures

SERA

It is composed of five technical sections as follows :

Fig.2. ORGANIGRAM OF THE AGRICULTURAL RESEARCH SERVICE (SERA) AT THE DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES AND RURAL DEVELOPMENT (DARNDR)



- Genetics and Biometry
- Botany and Plant Pathology
- Horticulture and Field Crops
- Zoology and Entomology
- Agronomy and Experimentation

SRAA

It is composed of two technical section : SRA and SEA

SRA activities are:

- applied research
- seed production and storage
- demonstration of cultural practices
- improving agricultural implements.

SEA activities are:

- socio-economic studies in connexion with the technolo - gical packages recommended;
- market prices analysis;
- on-farm evaluation of production costs.

SERA and SRAA organigrams are presented in Figures 2 and 3.

2.4.2 Relationships between ARS

They are either technical, administrative or both. (See relationships in Figure 1)

2.4.3 Relationships of ARS with National and International Organizations

SERA and SRAA maintain fairly good working relations with CIMMYT, CIAT, INRA, CEEMAT, IDAI, ORIPP, ODVA, through:

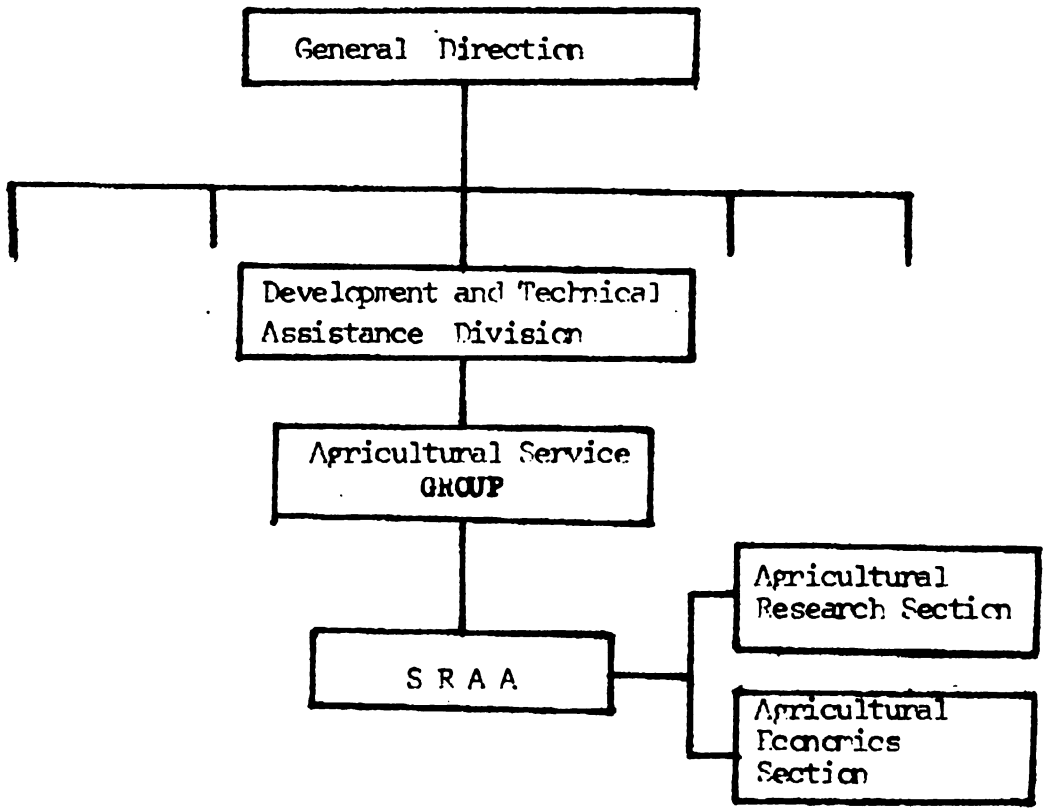
- exchanges of research results, technical publications, and improved planting material for field testing;
- training courses and short-time consultants for technical assistance
- research activities of common interest.

2.4.4 Planning and Programming systems of ARS

SERA

Research activities at SERA are still running on traditional field trials. Made-to-order planification, programmation,

Fig.3. ORGANIGRAM OF THE AGRICULTURAL RESEARCH SERVICE (SRAA) AT THE INSTITUTE FOR AGRICULTURAL AND INDUSTRIAL DEVELOPMENT (IDAI)



execution and supervision system for research work in general not usually considered. Operation funds are rather scarce.

SRAA

Annual research program and operation funds are usually included in the over-all budget of IDAI. The formulation, execution, supervision, and evaluation of research activities are based on the crops financed under IDAI supervised credit program.

2.5 Resources of ARS

2.5.1 Human resources

Number of investigators, academic qualification, specialization, and other indicators are summarized in Table 1.

2.5.2 Physical resources

Physical resources of SERA and SRAA are shown in Table 2.

2.5.3 Financial resources

Personnel, operation, general services and equipment budgets of SERA and SRAA for the last three years are presented in Table 3.

2.6 Scope of ARS

2.6.1 Geographical coverage

Number and location of operating units, amount and percentage of total number of agricultural units directly attended by SERA and SRAA are summarized in Table 4.

2.6.2 Clients

Table 5 summarizes the data on number and type of potential agricultural clients and percentage of those directly attended by ARS.

3. EFFICIENCY AND EFFECTIVENESS OF ARS

3.1 SERA

Traditional research activities as pointed out already, are usually done on a few economic crops but limited in scope by lack of planning and funding. Coordination with priorities as defined by the last five-year plan 1971-76 not apparently realized.

Table 1. HUMAN RESOURCES INVOLVED IN AGRICULTURAL RESEARCH ACTIVITIES IN HAITI A.R.S.

SPECIALIZATION	TOTAL	A.R.S.		Qualification		Position		Years of Experience		Annual Salary US $		% & N.I/ Capita ($960)	
		SERA	SRAA	SERA	SRAA	SERA	SRAA	SERA	SRAA	SERA	SRAA	SERA	SRAA
Plant Breeder	2	1	1	Agr.	M.S.			15	7	5.040	4.200	525	437.5
Tropical Agronomist	1	1		B.S.				20		3.960		412.5	
Horticulturist	1	1		B.S.				20		3.960		412.5	
Corn Production Agronomist	2	1	1	B.S.	B.S.			2	2	2.640	2.400	275	250
Plant Pathologist	1	1		M.S.				1		4.200		437.5	
Entomologist	1	1		B.S.				1		3.600		375	
Forest Specialist	1	1		B.S.				1		3.120		325	
Rural Economist	1		1		B.S.				6		3.600		375

Table 2. FINANCIAL RESOURCES IN HAITIAN ARS

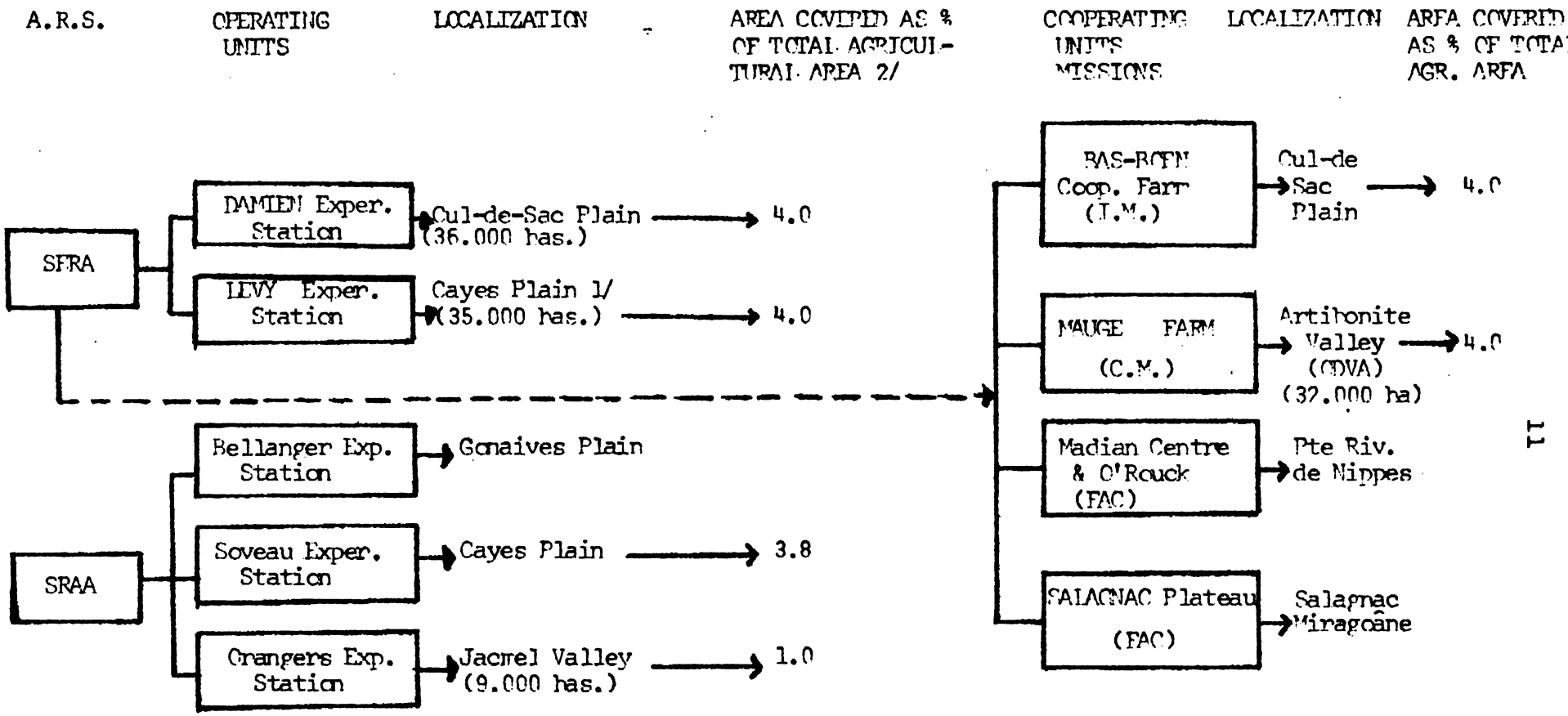
Type of Resources	Central Station		Regional Stations	
	SERA	SRAA	SERA	SRAA
a. Land owned (ha)	3	2	10	1
b. Offices				
Number	1	1	1	1
Area (m^2)	50	5	30	5
c. Store Rooms				
Number	1	1	1	
Area (m^2)	50	5	30	
d. Agricultural Machinery	small equip.	small equip.	small equip	Small equip.
e. Vehicles				
f. Library	FAMV (1) 37.200 vol.	Common reference material	-	-

(1) FAMV Library is used by DARNDR Technicians

Table 3. PHYSICAL RESOURCES OF HAITIAN ARS

Fiscal Year	A.R.S.	Budget (x1000 US$)			Equipment	TOTAL (x1000 $)
		Personnel	Operation	General Services		
1975/76	SERA	8.56	0.00	0.00	0.00	8.56
	SRAA	11.70	0.60	0.40	0.10	12.80
1976/77	SERA	8.63	0.00	0.00	0.00	8.63
	SRAA	15.96	1.00	0.60	0.30	17.86
1977/78	SERA	6.84	0.00	0.00	13.40	20.24
	SRAA	15.96	1.00	0.60	0.30	17.86

Table 4. GEOGRAPHICAL COVERAGE OF EXISTING A.R.S. IN HAITI



1/ USAID Cooperating

2/ 900.000 has.

Table 5. NUMBER AND PERCENTAGE OF POTENTIAL AGRICULTURAL CLIENTS (BY TYPE) AT NATIONAL LEVEL, AND NUMBER AND PERCENTAGE OF THOSE DIRECTLY ATTENDED BY SERA AND SRAA

TYPE OF CLIENTS	Number and percentage at national level		Number and percentage of clients directly attended			
			by SERA		by SRAA	
	Number	%	Number	%	Number	%
SMALL (0.1 - 3.0 ha)	2.924.425	88.0	supposed to cover all parts of the country		20.000	1.0
MEDIUM (3.1 - 10 ha)	148.250	8.6			-	-
LARGE (+ 10.0 ha)	10.875	3.4			-	-
TOTAL	3.083.500	100.0			20.000	1.0

SRAA

IDAI, a supervised credit institution, carries out research activities closely related to farmers problems and priorities of the plan.

3.2 SERA

Research activities at SERA are limited in general due to lack of operating budget, clearly defined objectives, sufficient personnel, and physical facilities. Results have only a limited impact on the agricultural sector.

SRAA

For crops like beans, cotton, and maize, a fairly improved technological package has been implemented by SRAA.

3.3 Number of publications based on results last three years):

SERA

Coconuts : 1
Beans : 5
Corn : 1
And several unpublished station reports.

SRAA

Cotton : 15
Beans : 6
Corn : 17
And several unpublished research results

3.4 SERA (simple demonstration on farms through Extension Service)

SRAA (See Figure 4 for maize and cotton)

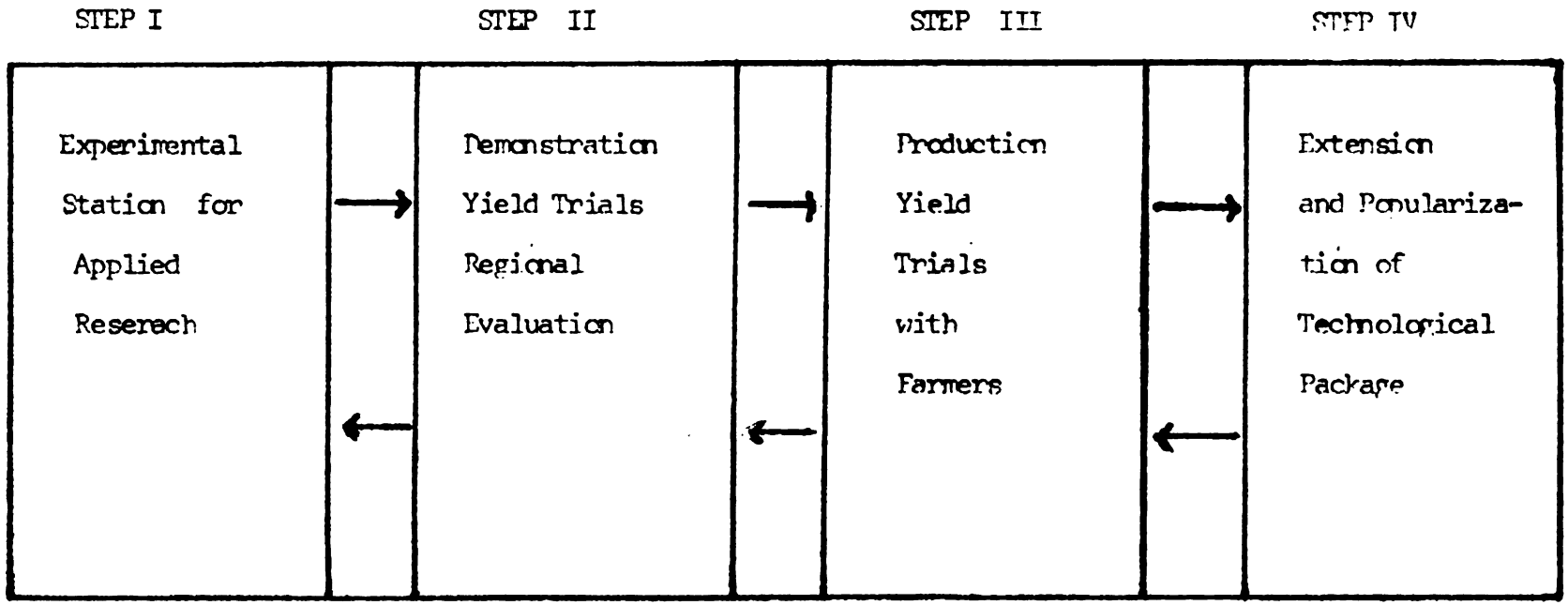
3.5 Degree of adoption of technical information

SERA

The more progressive farmers apply improved cultural practices as recommended in time and space, as a result of applied research mainly for vegetables and corn.

SRAA (The same is true for SERA).

Fig. 4. TECHNOLOGY TRANSFER PROCESS OF SRAA



3.6 SERA and SRAA

On account of the actual research system in Haiti, it is likely difficult to evaluate social and economic changes due to research (lack of basic data).

4. PERSPECTIVES OF ARS

4.1 Objectives

SERA

- linking research activities to those connected with economic and social development
- coordinating all research activities in Haiti towards common goal.

SRAA

- Broadening research themes
- reconsidering negative results
- stimulating positive results.

4.2 Organization

SERA

- Restructuration of services to be performed with made-to-order planning for achieving sucessful impact on the agricultural sector.

4.3 Resources

a. Human Resources

SERA

- graduate and in-service training of Agronomists and Technical Agents in the fields just needed for better services to agricultural development.

SRAA

- training of Agronomists in fields related to Plant Breeding and Crops Production.

b. Physical resources

SERA

- refitting offices, labs and regional experiment stations for adaptive research work.

SRAA

- refitting regional experiment stations.

c. Financial resources

SERA

- financial support required.

SRAA

- budget allocations to be determined.

d. Geographical coverage

SERA

- extending SERA activities to national programs of integrated rural development
- promoting country-wide development research and application.

SRAA

- land acquisition for refitting central experiment station.

5. SUGGESTIONS FOR IMPROVING AGRICULTURAL RESEARCH AT BOTH NATIONAL AND INTERNATIONAL LEVELS

There are four basic steps to follow in improving efficiency and efficacy of agricultural research as instrument for promotion of rural development.

a. Establishing a research policy where priorities are defined and in which the role of national public and private sectors, of international organisms and international centers concerned with Agricultural Research is clearly defined.

b. Creating or strenghtening the institution of instruments inducive to execution of research policy.

c. Elaborating a research program at national level, in which the following points are considered :

- the crops the program will be concerned with;
- the problems which will be attacked;
- the areas where the program will be in operation and likely to be successful;
- the specific objectives of the program;
- the targets of the research activities;
- the amount and kind of human resources which will be involved in;
- the physical and financial resources which will be necessary to perform successfully research activities;
- the alternative sources of those resources.

d. Establishing an operational mechanism for coordinating the actions of all institutions involved in the program.

Research policy is a concern of the highest decision authorities, i.e. CONADEP for global planification and DARNDR for the agricultural sector. Once research policy is stated, SERA within DARNDR will be the executive instrument of research policy.

SERA functions will be to ensure:

- planification, programmation and coordination of all research activities and results with closer linkage with Extension Service for large scale and efficient diffusion.

Within the integrated research system proposed, four levels of integration are recognized.

a. Political level

At this level, cooperation agreements are signed between the representatives of the Haitian Government, CONADEP and DARNDR, and International Organisms (IO) or International Centers for Agricultural Research (ICAR).

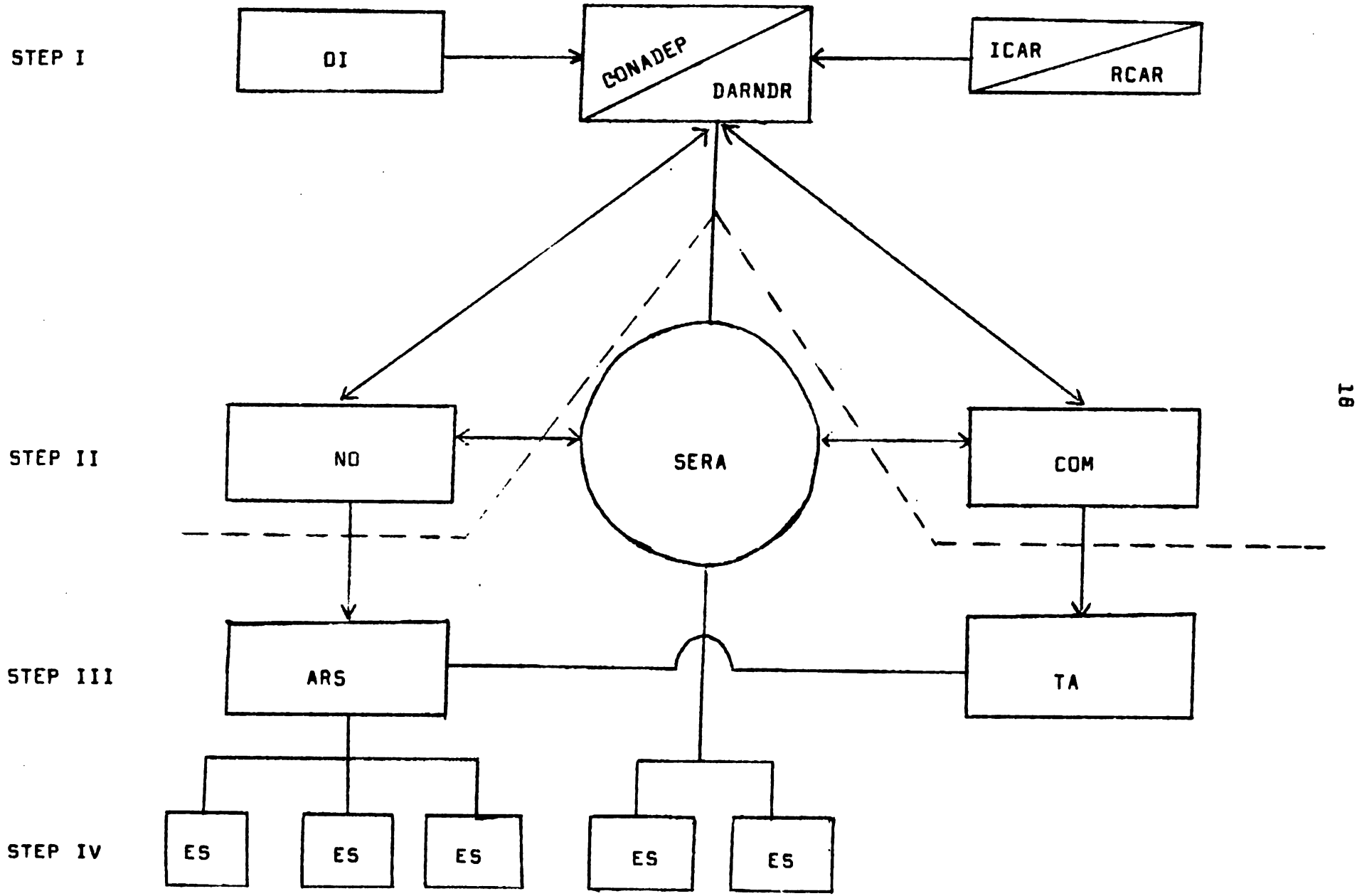
b. Functional level

At this level, a specific project which can be of integrated nature or just a research project is developed, to strengthen the activities of DARNDR itself or any other national institution (NC) like FAMV, DRIPP, CDVA, CDN, IDAI, CDPG and others. For all activities involving research, DARNDR is represented by SERA for planification and coordination. The ICAR may send a cooperating mission to Haiti.

c. Operational level

At this level, research activities of the NC are systematized by means of an ARS. In case of a technical mission, cooperation is

Fig. 5 A PROPOSED INTEGRATED AGRICULTURAL RESEARCH SYSTEM FOR HAITI



made operational by technical assistance (TA), either to SERA, NC or ARS.

d. Executive level

The research activities of ARS are operated at Experiment Stations (ES). Some reliable selected farmers fields must also be included.

Figure 4 schematizes the integrated research system proposed.

Within the dotted circle is the national agricultural research system represented.

It is strongly suggested to settle an internal financing system for research.

AGRICULTURAL RESEARCH IN JAMAICA

by

G.H. Barker, A.H. Wahab and L.A. Bell

A Report Presented at a Regional Technical Workshop on Agricultural Research Systems in the IICA/OAS Member Countries of the Antilles Zone, held in Port-au-Prince, Haiti. November 28 at December 2, 1977.

1. INTRODUCTION

1.1 The Ministry of Agriculture (M.A.) is the principal Agricultural Research and Development Agency in Jamaica. In this respect, one of its major functions is to ensure that in developing agricultural programmes and projects due consideration is given to efficient allocation of available resources of land, labour, capital and management in such a way that optimum production will result. Of equal importance is the need to ensure that those who are engaged in agricultural activity receive adequate compensation, wich will enable them to improve their general well-being and place them on a comparative level with their counterparts in other sectors of the economy. Translated into action, this means that the Ministry is charged on the one hand with ensuring the provision of basic infrastructure such as roads and water supplies, distribution of land for settlement and in some cases housing and domestic water supplies, and on the other hand with the provision of services such as extension, research, training, marketing and credit facilities.[1)]

1.2 To understand the present state of Agricultural Research in Jamaica, it is important to examine the recent past insofar as Agricultural Planning and Development are concerned. Likewise, an examination of the present state of research in the island as undertaken in 1975/76 by the Ministry of Agriculture with the assistance of FAO/IDB, a major task, provides a detailed document which is to serve as a blueprint for the reorganisation of the research activities.[2)] This proposed

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1) Annual Report, Ministry of Agriculture, Jamaica, March 1975.

2) Jamaica Agricultural Research Reconnaissance Mission Report, February 1976. Washington D.C. (FAO/IDB Cooperative Programme).

reorganisation of the research Service is to be compatible and dovetail with the reorganisation of the Ministry of Agriculture as a whole. To date three regional headquarters recommended in the report have been established as a first step in this direction. These recommendations are based on four concepts:

1) Decentralization of services
2) Effective coordination of research and development, extension and production
3) Avoidance of duplication
4) Effective transfer of technology for the benefit of farmers.

2. IDENTIFICATION OF THE NATIONAL AGRICULTURAL RESEARCH SYSTEM.

The Ministry of Agriculture (M.A.) is the principal Agricultural Research and Development Agency in the island. Over the years several divisions have evolved. These are identified below:

2.1 Ministry of Agriculture	Year established
- Soil and Land Use Division	1933
- Crop Research Division	1951
- Plant Protection Division	1950
- Veterinary Division	1912
- Livestock Division	1912
- Fisheries Division	1954
- Forestry Division	-
- Soil Conservation Unit (Agricultural Engineering)	1975

2.2 Statutory Bodies under the Ministry of Agriculture

- Banana Board (Research & Development Dept.)	1955
- Coconut Industry Board (Research Department)	1959
- Coffee Industry Board	1948
- Cocoa Industry Board	1957
- Tobacco Industry Control Authority (TICA)	1967
- Sugar Research Institute(Sugar-Industry Authority)	1942
- Agricultural Development Corporation (ADC)	1952

Other Statutory Boards and/or Research Agencies

- Jamaica Industrial Development Corporation (JIDC) 1952
- Scientific Research Council (SRC) 1960
- Storage & Infestation Division 1958
- Caribbean Agricultural Research & Development Institute (CARDI) 1975
- University of the West Indies (Mona Campus)
  - Department of Botany 1948
  - Department of Chemistry 1948
  - Department of Zoology 1948
  - Faculty of Agriculture 1977
- Pioneer Hi-Bred International Inc. (private company) 1958
- Alcan Jamaica Limited 1968

2.3 Organization & Performance of the Ministry of Agriculture Research Agencies

2.3.1 Internal structure

The organisation chart presented in Annex 1 shows that the Research & Resource Development Units report to the Permanent Secretary through the Chief Technical Officer, though there is considerable inter-disciplinary collaboration. The projected reorganisation set out in Annex 2.

2.3.2 Relationship with other agencies of the sector

The Statutory Boards and other organisations engaged in research receive government grants for research purposes. Although their administrative and technical services are autonomous, they are responsible to their respective Ministries. However, when useful, various divisions within the Ministry of Agriculture

will work jointly towards the fulfillment of a programme objective.
Forestry Development & Watershed Management in the Upland regions - Project no.67/505 - 1973.

2.3.3. Regional & international relationship

Research entities have and continue to maintain formal and informal relationships with technical and financial agencies, both regional and international, e.g.

a) introduction, testing and evaluation of improved germplasm material from CIMMYT and CIAT.
b) Technical and financial assistance to the Coconut Industry Board by U.K.Ministry of Overseas Development and FAO - particularly aimed at solving a specific problem: viz. Lethal Yellowing; and, by IICA on Soil Conservation and Hillside Farming. Particular assistance will be noted under the individual research agency concerned.

2.3.4 Planning and programming systems

Planning and programming fit into the Governmental Policy, and the Research Projects are rated according to the identified priorities.● However, these projects are severely constrained by: a)non-availability of qualified experienced personnel; b) lack of finance; c) limited inter-divisional integration towards the attainment of established targets

2.4 Resources of Ministry of Agriculture Units during the last five years

2.4.1 Human: Crop Research (CR); Soil and Land Use (S&L); Plant Protection (P.P); Veterinary Division (V.D) Livestock Division (L.D) Fisheries Division (Fish.D)

●) FAO/BID Cooperative Programme with the Ministry of Agriculture, Décembre 1976.

Forestry Division (For.D); Soil Conservation Unit(S.C.U)

a) Number of Investigators

	E.R	S&L	P.P	V.D	L.D	Fish.B	For.B	S.C.U
1973	23(11)	10(5)	16(5)	12(5)	22(13)	6(1)	-	3(1)
1977	12 (7)	9(5)	7(6)	12(6)	18(10)	8(3)	2(-)	17(1)

*)An analysis based on qualifications appears in the complete text. The figures in brackets indicate the number investigators with more than 5 years experience.

b) Position and salary

Having been classified on appointment, promotion is within the grade. However, the number of vacant posts within the grade limits the vertical movement of the employee. The salary scales presented below are to be reclassified, but temporary regrading of salaries has been instituted. Except for grade IV, which has not been altered, these revised salaries appear in brackets. All fall under the group of Natural, Physical and Social Sciences (N.P.S)

Grade IV J$9,960 x 480 = 11,400 p.a.@

Grade III J$8,580 x 420 = 9,840 p.a. (+ J$1,200)

Grade 11 J$7,380 x 360 = 8,460 p.a. (+ J$1,800)

Grade 1 J$4,500 x 300 = 6,900 p.s. (+ J$2,100)

Per capita disposable@@ income in Jamaica:@@@

1969	1970	1971	1972	1973	1974	1975	1976
465	545	576	653	780	1005	1163	1185

c) Stability & job security

There is considerable stability, but for personal advancement the individual must show initiative under the 'merit' system.

@ One Jamaican dollar equals U.S.$0.78

@@ Disposable income - that which remains after all compulsory income tax has been abstracted.

@@@ Statistics Yearbook of Jamaica, 1976.

d) Number of auxiliary personnel (technical assistants & general services personnel) (1974-77)

Technical Assistants		Office	
Crop Research including research assistants, headmen and drivers & artisans	25	Crop Research	16
		Agricultural Chemistry	6
Soil & Land Use	11		
Plant Protection	12	Plant Protection (some partly field staff)	15
		- 4 Quarantine Officers	
Veterinary Div.	11		8
Livestock Div. including research assistants (non-diplomates), laboratory technicians, headmen, drivers, rangers, farm hands & artisans	71		10
Fisheries Div.	1		2
Forestry Div. (Research)	2 sharing time and facilities with Forestry Div.		1
Soil Conservation Unit	semi-permanent or temporary assistants	13	4

2.4.2 Physical

Infrastructure (building, land): These are set art in detail in the complete text. The reorganisation strategy aims to rectify the present duplication of facilities.

2.4.3 Financial

Source: Jamaica Government

Annex 3 presents the Government Expediture on Crop Research, Plant Protection and Soil and Land Use during the period 1971-1977. The 1976-77 allocations are stated below.@)

For comparative purposes, Annex 3A tabulates the budgetary expenditures of the various agricultural research units for the 1974-1975 period@@). Other funding agencies have been specified wherever appropriate.

Annual operating budget (total budget less personnel expenses)

The Personnel Budget represents over 25% of the allocated funds.

2.5 Scope of the Ministry of Agriculture's Research Divisions.

@

Year	Tot.Govt.Exp. (T.G.E)	Allocation to Ministry of Agr.(MA)	% of T.G.E	Amt.spent. or Crop research	%alloc. to M.A.	% of T.G.E
1976/77	J$1,126,541,355	capital:				
	J$1,126,541,355	39,233,700	3,48	J$1,130,000	1,87	0.101
		recurent:				
		20.802,100	5,33			

@@

See complete country report.

2.5.1 Geographical Coverage

Number and location of operating units are identified under 2.1 and 2.4.2. Each research station is representative of an ecological/geographical area where local problems are given priority, either in livestock and/or crop research.

2.5.2 Clients

2.5.2i1 Soil and Land Use Section. Government is the largest client via the researcher/extension agent, who in turn serves farmers of mainly the medium sized farms (5-25 acres). Government is also served by the preparation of land capability maps when new developments are undertaken, and for subdivisions for property development.

The Soil and Land Use Division provides advisory service for crop/fertilizer use for medium, small and large sized farms.

Cartographic service for government and private sector.

Routine analyses etc...for coconut, tobacco, coffee Boards.

Salinity tests for irrigation water from wells and rivers. Various clients.

Collaboration with chemical/fertilizer manufacturers on research programmes to develop formulae for crop/fertilizer needs.

Crop Research Division. Government is the largest client. Research results are passed on to the Extension and Production units and often to the private progressive farmer who is prepared to collaborate by introducing new technology. Seed and chemical companies both benefit

and often participatein research and extension. Bauxite companies have conducted research on mined-out lands and collaborated with government in the adoption of their findings.

Plant Protection Division. Government is the largest client. Plant Protection screens and evaluates the latest chemicals, and in collaboration with Crops and Soils research results, are able to give recommendations to all farmers. Results are sometimes related to specific crops, e.g. choice or Nematocides on pineapples.

Veterinary Division. Government is the largest client. Advisory and therapeutic services are carried out from the various parish offices and regulatory measures such as vaccinations are undertaken.

Livestock Division. All livestock farmers in the island benefit from advisory services based on research findings.

Fisheries Division. Inland fish farmers obtain subsistance stocks of appropriate fish spp. Sea fishermen benefit from the developmental studies on utilization of fish stocks exploited by Jamaican fisherman.

Forestry Division. Farmers, particularly those on steep lands, benefit by way of choice and management of tree crops. Also, Government benefits in the area of Watershed Management in highly eroded areas.

Soil Conservation Unit. Small hillside farmers benefit from soil conservation treatments and also ongoing research programmes on hillside farming systems aimed at improving the family income.

Problems taken care of: These are itemised in the complete country report, research being geared to take care of the clients.

3. EFFICIENCY AND EFFECTIVENESS OF EACH MINISTRY OF AGRICULTURE RESEARCH UNIT (LAST 5 YEARS).

3.1 Relationship between project and rural sector

All research projects are relevant to the rural agricultural problems as indicated under 2.5.2 and amplified in the complete Country Report.

3.2 Achievements and failures of Agricultural Research projects.

In the complete Country Report details of achievement in the following are set out: Onions, Rice, Irish Potato, Cassava (Crop Research): Cabbage, tomato, pineapple; pest control(Plant Protection); Disease control (Vet.): productivity of Dairy Cattle (Livestock; control and productivity of lobster and sea muller(Fisheries) improved nursery techniques (Forestry); Terrace construction and associated crops (Soil Conservation).

Failures. The causes are outlined e.g praedial larceny, poor equipment maintenance, inadequate delivery of water supply, inadequate and inefficient technician support in the field.

3.3 Publications. - see Country Report.

3.4 Transfer of Technology

Officers from most of the research agencies present papers at International Seminars but most of the applied results are passed on as quickly as possible to the Extension specialist who simplifies or adapts the material for

the instruction of the farmer. The Ministry of Agriculture's publication "Investigations" documents. The research results on Crops and Soils, Plant Production, Vet., Livestock etc..... Although our latest edition is 1975, it ensures that applied research is not duplicated, and may serve as a basis for comparison and elaboration by Regional and International colleagues. The reluctance of investigators in writing up the results of their investigation is to be deprecated. Our Production unit, by disseminating high yielding planting material under the agronomic supervision of extension workers make a significant contribution. Extension literature (to the literate) and radio, along with seminars and field days presented by Research and Extension to the farmers are other lines of adoption. of new technology. These are two permanent residential training centers for farmer and extension workers where courses up to a week may be held.

3.5 Degree of adoption of technical information by clients.

The contraints of adoption of new technology by the small farmer is based on reluctance to depart from traditional practices. He needs to be convinced by the example of more progressive farmers as well as demonstration plots. The economic benefits must be apparent and credit facilities made available. The medium size farmer/acreage 5-25 acres will non readily adopt, provided the inputs are easily available. Statutory bodies eg. Coconut Industry Board in particular makes these easily available under strict supervision. Neglect

of young plants and of cultural practices may nullify the otherwise positive impact expected from the use of improved planting material.

3.6 Significant changes (economic and social) observed in the agricultural sector in particular and in the country in general, as a direct or indirect result of agricultural research.

The utilization of the basic soil maps[@] and recommended practices of soil/crop management were prepared in the form of lanf capability maps. These have served as the basis for the development of Land Reform Programmes. The social and political considerations of the country have had varying effects in terms of labour utilization and management, yet the adoption of new technology itself was triggered by the Land Reform Programme.

The feasibility of growing Irish potato under irrigation on the plains, giving significantly higher yields than on the uplands, as well as other considerations discussed times in a surplus for export. Improved storage techniques resulting from trials by the Storage and Infestation Department has further enhanced the role of this crop in concontributing to the economy, (see Appendix 8)

The selection (ongoing) of onion varieties has reduced the import tion of onions from 10M lbs.in 1970 to 5M in 1976. This has contributed towards remedying the adverse balance of payments experienced in food imports.

[@] Soil and Land Use Surveys. Regional Research Centre, UWI Trinidad 1958-1970.

Annual Report, Ministry of Agriculture, 1975, pp.2-7

4. PERSPECTIVES OF THE GOVERNMENT OF JAMAICA RESEARCH AGENCIES.

4.1 Policy objectives and goals for the next five years

@ The Government of Jamaica, desiring to accelerate the development of agriculture, has as a first step undertaken to reorganize the Ministry of Agriculture on the basis of (a) Central planing, coordination and monitoring of all agricultural activities, and (b) decentralized implementation of Government agricultural policy through three regional directorates. Special emphasis is to be given to the problems of the small fermer, to reduce reliance on imports of food crops and to reverse the adverse trade balance in agriculture; to increase efficiency of agricultural labour whilst maintaining labour intensive production methods.

4.2 Organization, internal functions and external relations

During the next four years the Central Experiment Station (Bodles) will be fully developed while the Western Research Station (Montpelier) will be equipped to include a livestock component within its research programme. In the reorganization (Annex 2 and 6) the centralization of planning, data storage, information and control will be at Headquarters, in Kingston, while Production and Rural Development Units have already to a large extent been decentralized and implemented in three regions. The proposed infrastructure and equipment will allow for the gradual integration of the larger Commodity Boards into the new Research Organization.

@ Final Draft FAO/IDB Cooperative Programme, December 1976. Project Preparation Synthesis Report.

The new Research Stations will be established to fit the decentralized regional structure of the Ministry of Agriculture, thereby facilitating coordination between research, extension and development. Cooperation would be continued with U.W.I., CARDI, CIAT, CIMMYT, IITA, CIP,ICRISAT. The Central Sugar Cane Breeding Station (Barbados), the Winban Banana Research Department and CIBC.

4.3 Human, Physical and Financial Resources (in quality and quantity human)

It has been stated in the IDB/FAO Final Draft Report that to counter the inadequate transfer technology, human, financial and physical resources should be pooled into a single framework, viz: The Agricultural Research Service of Jamaica. The Reorganized Structure (Annex 2) allows for a Director of Research supported by : a) Research Project Office; b) Econometric Unit, and c) Minimal Administrative staff.
Coordination between research and Extension should be assured at Director's level by a committee consisting of the Director of Special Programmes and a Director of Research and Extension. It is estimated that about 35 additional University graduates and 90 more diplomate technician will be required for the reorganized research service (Annex 5 Complete Country Report).

Financial

It is envisaged that IDB will be financing 60 percent of the project total (US$10.6M). + All Government agricultural research will be financed through the Ministry of Agriculture with the exception of that for sugar. Operating costs for the Crop Research Projects will be phased over a four-year period in terms of material, personnel, seasonal operations and cost of technical cooperation.

4.4 Scope, clients and identified problems

Orientation is towards maximising farm income of small farmers whose land occupies 70% of Jamaica. Farming systems and soil conservation/hillside farming schemes, and/or labour intensive projects are intended to alleviate unemployment. The middle and larger farmer groups are not specifically catered for apart from making available the technology. The Land Lease Programme will continue. The Food Farms Programme has been absorbed into the Land Lease Programme in 1977. The distribution of Land is thus intended to increase the unit from 2 to 5 acres and to avoid fragmentation.

Five Priority Research Projects have been selected for their labour intensiveness and their concern with small farmers who represent the majority of agricultural producers in Jamaica. These projects are identified as follows:

- Yam, cassava and sweet potato research - to give improved yields which would then release land available for diversified production.

  Pigeon peas and cow peas - selected for their potential as a replacement for low yielding Phaseolus as sources of protein.

FAO/IDB Cooperative Programme Report 475, Jamaica Agriculture, December 1976.

- Further sources of protein will be sought through research projects on milk production (improving milk herds and developing dual purpose herds), and on managment problems on small farmer goat herds.

- Facilities for the Fishery and Forestry Programme have not been provided for in the project, but research in these fields is beeing implemented in a joint Jamaica Government/USAID Programme.

5. SUGGESTIONS FOR IMPROVING EACH AGRICULTURAL RESEARCH DIVISION

5.1 At National level. This has been discussed under the Reorganization strategy.

5.2 Strengthening of intra-regional and international technical cooperation

@Cooperation with the appropriate international institutions would provide a scource of planting material of improved cultivas and information as basic and applied research topic of common interest. The Agriculture Service would be able to collaborate in testing breeding material, farming systems and agricultural practices. Some of the possible cooperative programmes are :

@ FAO/IDB Jamaica Government Final Draft Report 1976

1. CIAT : Cassava breeding & research
2. CYMMIT : Grain cereal varieties
3. IITA : Sweet potatoes and farming systems
4. CIP : Potato research
5. ICRISAT : Farming systems and cultural practices for semiarid tropics;
6. Central Sugar Cane Breeding Station, Barbados: Provision of breeding material:
7. Winban (Banana) Research Department: Nematode and weed control.
8. Commonwealth Institute of Biological control (CIBC): Biological control of insects...

It is suggested that if common regional problems are identified and the projects presented imaginatively and relevant to areas that need urgent problem solving, then finance would be attracted.

6. ADDITIONAL COMMENTS ...

It is suggested that each member should document ongoing programmes of research, and make available the results of completed investigations. If this is effected unnecessary duplication of efforts, and more relevant research activities would be generated. This should result in greater benefits to the region.

N.B. In the complete Country Report, details of Statutory Boards and other Research Agencies are presented in Appendices.

LA RECHERCHE AGRONOMIQUE AUX ANTILLES FRANCAISES

E. SALMON-LEGAGNEUR
C.R.A.A.G.
PETIT-BOURG
(Guadeloupe)

HISTORIQUE

Les Antilles Françaises (Martinique, Guadeloupe) et la Guyane Française ont des statuts de départements français. Leur économie est basée essentiellement sur les productions agricoles tropicales (canne, cultures fruitières et vivrières, élevage). Elles présentent des conditions climatiques variées allant du climat tropical sec (Grande-Terre, Saint-Barthelemy, Désirade) au tropical humide (Guadeloupe, Martinique) et au climat équatorial (Guyane) ; elles recouvrent donc une grande diversité de situations.

Il est compréhensible qu'elles aient eu à faire face à un grand nombre de problèmes techniques que seule la recherche agronomique pouvait permettre de résoudre.

Celle-ci s'est progressivement implantée aux Antilles depuis 1949, d'abord dans le secteur de la canne et du sucre (I.N.R.A. et C.T.C.S.), puis dans celui des productions maraîchères et fruitières (I.R.A.T., I.R.F.A., I.F.C.C.).

De 1965 à 1970, l'accent a été mis par le 5e plan français sur les études de milieu (carte pédologique et climatologique), les cultures de diversification (principalement vivrières destinées à l'alimentation locale) et sur l'élevage (porcins, bovins). Ces études ont été considérablement développées de 1970 à 1975 en liaison avec l'accroissement de la poussée démographique, jusqu'à constituer l'essentiel des activités de l'I.N.R.A., alors que dans le même temps, les recherches sur la canne à sucre, à l'exception

de la technologie, avaient tendance à régresser. Pendant toute cette époque, la partie la plus importante du dispositif de recherches a été développée en Guadeloupe et, à un moindre degré, en Martinique.

Après une période de stabilisation de 1975 à 1977, un redéploiement est amorcé pour le 7e Plan, avec la prise en charge d'objectifs nouveaux : riziculture et production oléagineuse (Guyane), aquaculture, forêts, protection des milieux naturels et l'amorce d'un nouveau centre interdisciplinaire en Guyane.

OBJECTIFS

Les objectifs principaux sont au nombre de trois :

- Tout d'abord assurer l'approvisionnement et promouvoir le développement des trois départements français de la région caraïbe, pour amener progressivement leur économie à un état d'équilibre et de relative indépendance vis-à-vis de la métropole. Si dans un premier temps, l'accent a été mis sur les recherches relatives aux cultures d'exportation, on peut dire qu'actuellement la priorité est donnée à celles qui permettent d'éviter des importations alimentaires (cultures légumières, tubercules, élevage, boissons).

- En deuxième lieu, une participation au progrès général des connaissances dans les domaines de la biologie, ou de l'agronomie générale. C'est ainsi que certaines études à caractère plus fondamental sur la physiologie des plantes (notamment sur la photosynthèse), la bioclimatologie, la microbiologie des sols (fixation symbiotique d'azote), plus faciles à conduire en milieu tropical sont effectuées en Guadeloupe par le Centre Universitaire et par l'I.N.R.A. Il en est de même en ce qui concerne certaines études de sciences humaines (Anthropologie, linguistique, géographie) conduites par le C.N.R.S. ou l'Université.

- Le troisième objectif est celui de la coopération et de l'assistance aux pays tropicaux voisins ou éloignés présentant une similitude de situation avec les Antilles Françaises. Cette coopération s'exerce, soit par une aide à la formation en accueillant des stagiaires étrangers dans les laboratoires de l'I.N.R.A. ou de l'Université, soit par une action directe à la demande des gouvernements. Dans ce dernier cas, des accords de coopération prévoient les modalités d'intervention ; elle nécessite en règle générale l'intervention, à côté de l'orgznisme français, d'un organisme homologue étranger, beaucoup mieux à même de poursuivre les études et d'exploiter les résultats de la recherche dans les conditions du développement local.

Des interventions sont ainsi faites à partir des trois départements français par l'ORSTOM (pédologie et hydrologie), le GERDAT (cultures d'exportation), ou l'I.N.R.A. (élevage, cultures vivrières), dans les différents pays de la Caraïbe, d'Amérique Centrale ou d'Amérique du Sud.

Il faut mentionner aussi des coopérations multilatérales avec des organismes internationaux comme la C.I.A.T., ou des sociétés comme la Caribean Food Sociéty dont l'I.N.R.A. a organisé le 14e congrès en Guadeloupe.

ORGANISATION GENERALE DES RECHERCHES

Le dispositif de recherche français peut paraître complexe, mais il est logique. L'ensemble des moyens matériels donnés par le gouvernement provient d'une seule source (Enveloppe Rrecherche) distribuée par le Ministère de la Recherche (Secrétariat d'Etat) qui dispose d'un organisme spécifique d'exécution, la D.G.R.S.T. Cet organisme a reçu pour mission d'animer et de contrôler la politique scientifique de la France, en proposant un plan pluriannuel d'orientation et d'investissement, et en procédant à la répartition annuelle des budgets des organismes de recherche nationaux.

L'ensemble des ressources affectées par la France à la recherche scientifique atteint 1,8 % du produit national brut, dont 60 % proviennent du budget de l'Etat, soit environ 109 francs. Sur cet ensemble, la recherche agronomique reçoit 15 %, dont le quart environ est consacré à l'agronomie tropicale, soit 4 MF.

Les organismes qui effectuent des recherches aux Antilles et en Guyane relèvent de plusieurs ministères et sont de différents types.

Les uns comme l'I.N.R.A. ou le C.N.R.S. ont une vocation générale, qui couvre tout le territoire français ; d'autres comme l'ORSTOM ou les instituts du GERDAT, sont spécialisés pour certaines productions (huile, café, coton, hévéas, forêt) et ne travaillent qu'en milieu tropical ; d'autres enfin comme les centres techniques de la canne et du sucre, et le centre universitaire de Guadeloupe se limitent aux Antilles Françaises.

L'ensemble de ces actions est coordonné au niveau national par le Comité de Coordination des Recherches menées en coopération et dans les D.O.M., et au niveau local, par les comités départementaux de la Recherche agronomique.

Chaque organisme de recherches entretient en outre des relations étroites avec les différents services ou organismes chargés du développement ou de la

formation (chambre d'agriculture, collèges agricoles, sociétés de développement) et avec ses homologues étrangers.

L'I. N. R. A.

L'Institut National de la Recherche Agronomique a reçu la mission du ministère de l'Agriculture d'exécuter tous les travaux de recherche nécessaires à l'aménagement de l'espace rural et au développement des productions agricoles.

Son domaine d'activité comprend :

- La Production animale
- La Production végétale
- La Protection des végétaux et la médecine vétérinaire
- La Technologie agricole et alimentaire
- La Protection de l'environnement et de la forêt
- L'Aménagement des eaux continentales
- L'Economie et la sociologie rurale.

Il dispose pour cela de 7 000 agents dont 1 750 scientifiques et ingénieurs répartis en 7 directions scientifiques et 23 départements (ou disciplines).

Ces activités sont localisées dans 20 centres principaux de recherche, ayant chacun une spécialisation (par production, ou par thème scientifique, ou régional). Mais il est évident que les chercheurs de chaque centre peuvent à tout instant apporter leurs concours à un problème traité par un autre centre, ce qui donne/l'ensemble une grande efficacité et une grande souplesse.

Un seul de ces centres (C.R.A.A.G.) est entièrement consacré à l'étude des problèmes des milieux tropicaux. Il est situé en Guadeloupe.

LE CENTRE DE RECHERCHES AGRONOMIQUES DES ANTILLES ET DE LA GUYANE

Il est entièrement consacré à l'étude des problèmes tropicaux. Il reçoit ses moyens financiers et ses orientations de la Direction Centrale et des départements de recherche de l'I.N.R.A. ; mais il élabore ses propres programmes en fonction des priorités établies localement.

Parmi ces dernières, on peut retenir surtout actuellement :

- l'étude des productions maraîchères (tomates, aubergines, poivrons, melons) et vivrières (ignames, pois, haricots)
- l'élevage bovin et caprin (à viande), principalement en zone à faible productivité et à l'aide de sous produits, ainsi que les cultures fourragères.

- certains problèmes de la canne à sucre :
  lutte contre les insectes et les maladies, tecnologie du rhum et des sous produits.

Le personnel comprend 225 agents permanents, dont 40 scientifiques et ingénieurs répartis sur trois implantations en Guadeloupe (2 domaines de 100 ha et 1 de 10 ha) et une implantation en Guyane.

Les recherches sont effectuées par 9 stations de recherche disposant de moyens propres, assistées par des services généraux et un service commun de documentation. Ces stations sont les suivantes :

- Bioclimatologie (5 chercheurs) = connaissance du milieu climatique, bilan d'eau et d'énergie, étude des relations plantes, climat, dynamique de l'eau, morphogénèse et photosynthèse, étude pratique de l'irrigation.

- Agronomie (4 chercheurs) = pédologie, étude des sols, profils culturaux, nutrition minérale des plantes à graines (vigna, tournesol), des tubercules (igname) et des fourrages, etude des systèmes d'occupation des sols.

- Amélioration des Plantes (6 chercheurs) = étude de la variabilité génétique et expérimentale, nouvelles variétés de plantes maraîchères, vivrières, plantes fourragères annuelles et pérennes, coton et canne à sucre.

- Pathologie Végétale (6 chercheurs) = écologie microbienne des sols, flétrissement bactérien des solanées, fonte des semis, fixation symbiotique de l'azote, épidémiologie des pathogènes (virus, bactéries, champignons).

- Zoologie et Lutte Biologique (4 chercheurs) = entomologie : lutte contre les noctuelles, la fourmi manioc, les parasites de la canne, scolyte du Mahogany, nématologie, écologie générale.

- Hydrobiologie (3 chercheurs) = biologie des crustacés et des poissons d'eau douce et saumâtre, aquaculture.

- Zootechnie (5 chercheurs) = sélection et reproduction des races locales, etude des besoins alimentaires et de la digestion chez les bovins et les caprins, fourrages verts et aliments de complément, ou sous-produits (banane, son, levure, mélasse), pâturage, systèmes d'élevage.

- Technologie alimentaire (4 chercheurs) = fermentation alcoolique (sélection et contôle des souches microbiennes), arômes, production de levures, extraction de substances naturelles.

- Station de Guyane (3 chercheurs) = systèmes d'élevage et de culture, recherche forestière (bioclimatologie).

L'ensemble des activités de ces stations est coordonné, au niveau du centre de recherches, par un conseil scientifique et un conseil de centre présidés par l'Administrateur. Mais il est bon de signaler qu'à cette structure par stations (disciplines), se superpose un système de groupes de travail horizontaux, interdisciplinaires, pour l'étude de certains thèmes prioritaires. Parmi ces derniers, on peut mentionner :

- l'étude des systèmes d'exploitation des sols (interaction entre cultures) plus particulièrement les systèmes de grande culture, les systèmes d'élevage et les systèmes traditionnels sur les petites exploitations. Un programme de coopération avec Haïti est en cours sur ce dernier point.
- une étude complète et intégrée de l'igname comme modèle de plante à tubercules, sous ses composantes agronomiques, physiologiques, pathologiques et technologiques.
- la détermination de la valeur fourragère de certaines plantes et l'organisation rationnelle du pâturage.
- la microbiologie et la parasitologie du sol, et le flétrissement bactérien des solanées.
- la physiologie comparée en milieu tropical, en vue d'apprécier notamment les composantes climatiques, avec une application particulière au problème de la fixation symbiotique de l'azote par les bactéries.
- la canne à sucre et ses sous-produits.

L'ensemble de ces activités coordonnées est financé, soit par les stations à partir de leur budget propre, soit par des crédits spéciaux dits "d'action concertée" délivrés par la Direction de l'INRA, ou la D.G.R.S.T. Ceci contribue donc à améliorer la souplesse du système.

MOYENS FINANCIERS

On peut estimer à 17 MF (4 M$) le coût de fonctionnement annuel, salaires inclus de l'I.N.R.A. aux Antilles. Cette somme doit être légèrement majorée par les dépenses effectuées à partir des centres européens.

De leur côté, l'ORSTOM et le GERDAT dépensent respectivement 4 MF et 9 MF par an aux Antilles. Il s'y ajoute environ 3 MF pour les deux centres techniques de la canne.

Au total, on peut donc estimer à plus de 30 MF (7 M$) les dépenses de la recherche agronomique aux Antilles Françaises.

PRINCIPAUX RESULTATS

Il ne peut être question de les énumérer tous. Nous nous limiterons à quelques exemples choisis parmi ceux dont les applications pratiques sont les plus immédiates :

- sur les cultures maraîchères : inventaire des principales maladies, mise au point de techniques de greffes pour lutter contre le flétrissement bactérien de la tomate et de l'aubergine, et de variétés hybrides d'aubergines résistantes à l'antracnose.
- sur les plantes à tubercules : création de variétés d'igname sans tuteur techniques de conservation après la récolte.
- sur la canne à sucre : mise au point d'une technique de lutte biologique contre le borer de la canne.
- sur les plantes fourragères : choix des meilleures espèces et variétés adaptées aux conditions des Antilles Françaises (D. décumbens transvala, brachiaria décumbens, sorgho fourrager, vigna sinensis) en se basant sur l'aptitude culturale et la valeur aliment in vivio (digestibilité).
- sur l'élevage : influence du système d'exploitation sur la production laitière et la production de viande des troupeaux bovins et caprins. Utilisation des sous produits industriels et des déchets de récolte (canne, banane).
  Techniques d'alimentation du Porc à base d'aliments locaux (tubercules, bananes) ou dérivés d'industrie locale, (son, levures de distillerie).
- En technologie : mise au point d'un procédé de fabrication de rhum faible en alcools supérieurs. Contrôle de la fermentation par des levains sélectionnés.
- sur la protection des milieux naturels : définition d'un parc naturel régional, études écologiques pour la lutte intégrée contre la bilharziose et diverses parasitoses.

LIAISON AVEC LE DEVELOPPEMENT

L'I.N.R.A. apporte la plus grande attention à l'utilisation des résultats de la recherche par la profession agricole. Pour cela, toute une série d'étapes sont mises en place avec le concours des services chargés du développement, mais il faut le préciser, avec une efficacité qui est en grande par-

tie fonction du degré d'organisation de la profession.

Après l'étude principale effectuée nécessairement en laboratoire, ou dans les conditions expérimentales rigoureuses du centre de recherche, les principales étapes sont les suivantes :

- étude en vraie grandeur, intégrant des conditions écologiques spécifiques, dans des stations appartenant à l'Etat (Domaines INRA ou des services agricoles).
- étude chez les particuliers, ou dans des installations appartenant aux organisations, ou groupements professionnels.
- publication des résultats dans une revue spécialisée "Les nouvelles agronomiques des Antilles et de la Guyane".
- Organisation des journées d'information technique et formation des vulgarisateurs.

ORIENTATIONS FUTURES

La recherche agronomique est appelée à se développer aux Antilles Françaises, si l'on considère qu'elle est la seule, à côté de l'organisation des structures, à pouvoir apporter des améliorations durables à une économie agricole chaque jour plus préoccupée par des problèmes de compétitivité et de plein emploi de la main-d'oeuvre.

La recherche de solutions pour une meilleure autonomie de l'approvisionnement interne, notamment dans le domaine de l'alimentation traditionnelle, doit être considérée comme une véritable priorité.

Il en va de même en ce qui concerne la mise en valeur des terres insuffisamment occupées, ou que leur valeur marginale rend impropre à une activité nécessitant des investissements importants.

Sur un plan plus général, il importe de ne pas perdre de vue que le principal bénéficiaire des améliorations proposées doit être l'agriculteur lui-même, c'est-à-dire l'Homme. Ceci passe donc par une meilleure connaissance de ses besoins, de ses aspirations, et aussi de son aptitude au changement. Une intégration de ces aspects socio-psychologiques aux données techniques des problèmes agricoles apparaît aux Antilles Françaises comme la véritable condition de succès pour le progrès de l'agriculture.

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DEFINITION DES ABREVIATIONS

I.N.R.A.	:	Institut National de la Recherche Agronomique
I.R.F.A.	:	Institut de Recherches sur les Fruits et Agrumes
I.R.A.T.	:	Institut de Recherches Agronomiques Tropicales
I.F.C.C.	:	Institut Français du Café et du Cacao
C.T.F.T.	:	Centre Technique Forestier Tropical
C.T.C.S.	:	Centre Technique de la Canne et du Sucre
C.U.A.G.	:	Centre Universitaire Antilles-Guyane
O.R.S.T.O.M.	:	Office de la Recherche Scientifique et Technique Outre-Mer
G.E.R.D.A.T.	:	Groupement d'Etudes et de Recherches pour le Développement de l'Agronomie Tropicale
I.R.C.T.	:	Institut de Recherches du Coton et des Textiles Exotiques
D.G.R.S.T.	:	Délégation Générale à la Recherche Scientifique et Technique
C.I.A.T.	:	Centro International de Agricultura Tropical
D.O.M.	:	Département Outre-Mer
C.N.R.S.	:	Centre National de la Recherche Scientifique
C.R.A.A.G.	:	Centre de Recherches Agronomiques des Antilles et de la Guyane

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INRA (GUADELOUPE)

Questions from

1. MERMELSTEIN, Patricia

Est-ce que vous avez des activités spécifiques en cours ou programmées pour travailler avec les pays de la région (autre que le cas d'Haiti cité). S'il vous plait, donnez des exemples.

Ans : Comme je l'ai indiqué dans mon exposé, nous avons des relations avec la plupart des pays de la Caraïbe. Ces relations sont de trois sortes :

- échanges d'information ou de matériels
- formation de chercheurs
- programmes d'expérimentation en commun

C'est actuellement avec la République de Cuba que ces relations sont les plus étendues dans les trois domaines, plus particulièrement en ce qui concerne le développement des productions animales.

Avec la République Dominicaine, nous avons un programme de formation et d'organisation de cours en pathologie végétale, ainsi qu'un programme conjoint sur la lutte contre les parasites de la canne à sucre et les nématodes.

Avec la Jamaïque et Trinidad, nous échangeons des matériels biologiques avec communication des résultats (canne à sucre, igname, légumes).

Avec Haiti, nous avons des programmes spécifiques pour l'amélioration des légumineuses a graines et de diverses céréales.

2. Dr THAI, CIDA, INRA - Guadeloupe

Vous avez projeté un slide sur le CAYANUS CATAN, Est-ce que vous avez fait des études sur le CAYANUS INDICUS (Pois congo)

Ans : Je ne peux malheureusement pas répondre avec précision à cette question.
Je sais seulement que mes collègues de l'amélioration des plantes travaillent sur diverses variétés de Cajanus en Guadeloupe et que nous avons un programme de création de variété de vigna sinensis à gros grains rouges pour Haiti.

tor's job should be advertized and selection done by a Scientific Personnel advisory committee. Appointment should be on contract for 3 years, renewable.

4.6.1 Leadership must display some minimum level of recognition for past work, must process adequate training and competence, generating respect and admiration among staff.

4.6.2 Leader must have the ability to establish rapport with staff, maintain their confidence and project concern about their professional well being and personal progress.

The leader must direct and establish effective goals, policies and procedures; finally, he should have the capacity to mobilize human and material resources needed to achieve desired goals.

4.1 AUTONOMY

Whether fully or partially financed by Government, Agricultural Research should be autonomous and independent of the normal Civil Service Stream, and responsible to a National Research Council if its effectiveness and impact on Agricultural Development is to be made meaningful.

b) Research- Extension Linkage

Mechanism should be established for setting out a policy and procedure to improve the level of contact between Research and Extension.

4.4 COORDINATION OF AGRICULTURAL RESEARCH POLICY AT THE NATIONAL LEVEL

A national agricultural research council comprising Ministry of Agricultural commodity research organizations, commodity Marketing Organization, Regional University, CARDI and agricultural society - to promote and coordinate scientific research.

4.5 MINISTERIAL RESEARCH COMMITTEE

Subordinate to the national research council there should be a ministerial research committee with representatives.

- Permanent Secretary, Chief Technical Officer, Directors of all Ministerial Research Organizations to :

  a) approve Projects

  b) monitor quality and progress

  c) scrutunize reports.

4.6 LEADERSHIP

At present promotion to leadership is solely by seniority with very little consideration for competence. Direc-

4. RECOMMENDATIONS

4.1 Creation of a healthy Research Environment

a) Organizational Structure must include middle management, opportunities for promotion, Sectional Autonomy and a reward system.

b) Basic facilities must be present

- Research facilities
- Library facilities

c) Mechanism must be established for internal collaboration among disciplines.

4.2 ACCOUNTABILITY

Researchers should account for "their stewardship" by way of annual reports, technical reports, seminars, colloquia.

4.3 LINKAGES

a) Research organizations

Linkages with regional universities, autonomous and semi-autonomous Research Organizations in order to mobilize human and financial resources. These could result in total national output.

Press - radio - Television, exhibitions field days, farmers' meetings, advisory visits etc.

With regard to publications there is no incentive - except professional pride - for the State Research worker to commit to writing the results of his experimental work. Unlike his counterpart at U.W.I. and CARDI who must publish or perish the state researcher obtains no reward for publication -nevertheless over the past five years very useful farm bulletins have been published on a wide range of crop and livestock improvement. Publications on mechanization of cereals and pulses, land capability surveys, silviculture and fisheries are all available now.

In the absence of up to date statistical data it is difficult to quantify research results but some areas do stand out significantly - these are the food crop areas - In fact the amount of seed material sold thru CADP to local farmers in 1977 surpasses the total amount sold over the past 5 years - this is by no means a small feat.

3. EFFICIENCY AND PERSPECTIVES

Every Government Research Station is committed to our intensification in domestic crop and livestock production. A complete reorganization of the Staff Structure is being studied to overcome some of the inherent management problems. There is little or no problem with respect to financial resources - mobilizing the human resources, however, the most variable of all the resources will necessitate the most delicate and tactful maneuverability.

This sum will be increased for 1978. In fact CADP's estimate of expenditure for 1978 is .9 mill U.S. half of which will be utilized for Research purposes.

2.7.4 All estimates of expenditure are submitted for approval at least six months before the beginning of the financial year for which the funds are required. My own experience over the part 12 years in research is that no reasonable request for funds in unheeded. The problem is that research officers are requested by their Directors to submit estimates for research material needed for coming year and some do not respond - or if they do, their proposals are so stoppishly presented that the Director finds it almost impossible to justify its inclusion in the draft estimates - result the particular officer does not get what he wants - sulks, shouts of frustration.

2.7.5 By January of each year funds are allocated to Research Stations based upon the estimates submitted six months earlier - hence funds become available on time.

2.8 GEOGRAPHICAL COVERAGE

Except for the Sugar Cane Industry the Ministry's research facilities cater for all farmers - cacao, coffee coconuts, food crops, orchard crops and livestock both plantation owners and small farmers.

2.9 EFFICIENCY AND EFFECTIVENESS

The results of experimental are extrapolated in the field mainly thru the use of conventional extension techniques.

No other employer in Trinidad and Tobago offers as much job security and stability as the Government Service. This situation is fortified by the fact that Public Servants are bonded into one of the most formidable Trade Union movements in the country.

2.7.2 PHYSICAL RESOURCES

While the Government Researchers and research Stations are not as generously endowed with Research Facilities as their counterparts at U.W.I.; CARDI and at commodity research stations, there are adequate resources present and available for type of applied research that is required of the Units : land buildings, machinery, equipment, laboratory and library facilities are to my mind are quite comparable to those of more developed countries anywhere in the world.

2.7.3 FINANCIAL RESOURCES

All research in the Ministry of agriculture is funded by the Government of Trinidad and Tobago. A conservative estimate of funds allocated for 1977 will be about U.S. $2.000.000,00 broken down as follow :

C.E.S.T. Red Ring Research	1.2 mill
Animal Research	.5 mill
C.A.D.P	.3 mill
	2.0 mill

2.6.3 Programs are executed along plans drawn up in a Project Statement which spells out in detail the experimental design, timetable of operations, expenditure involved. The Director supervises the field lay out and evaluation of results; he also determines subsequent course of action based upon the experimental results.

2.7 RESOURCES

Human

Table I describes briefly the distribution of human resource in respect of disciplines which obtain in the Ministry's research facilities.

The minimum academic qualification accepted by Government in Specialist Research Post isa MSc degree. Supporting professional staff with a first degree is attached to most specialist officers.

The present annual salary of Director is approximatively U.S. $15.000,00 with an additional non taxable allowance of U.S.1.800,00.

The present annual salary of a Specialist Research officer is approximatively U.S. $10.000,00 with an additional non-taxable allowance of U.S.$ 1.800,00.

The present annual salary of an agricultural officer is approximatively U.S. $7.500,00 with an additional non-taxable allowance of U.S. $1.800,00.

work. The relationship, however, is somewhat improved with respect to international research agencies, particularly in the area of crop research, e.g. C.A.D.P. collaborates with INTSOY on Soya improvement, with CYMMYT on Maize, improvement with U. of Cal. Riverside on sesame, with IITA (Nigeria) on cow Peas research, just to mention a few.

2.6 PLANNING AND PROGRAMMING AGRICULTURAL RESEARCH SYSTEMS

Theorefically, a research programme must bear relevance to Government's agricultural policy; within the framework of this policy it should attempt to find solutions to farm problems as identified by the Extension Agent.

2.6.1 All research programs in the Ministry (C.E.S.; Livestock, CADP) are financed by the Government of Trinidad and Tobago based upon estimates of expenditure submitted by each research unit and approved by Ministry of Finance.

2.6.2 Research programs are formulated by the individual researcher in consultation with his Director. The program is only approved if the objectives and justifications meet the national interest, e.g. Research on Sesame and Soya at CADP is designed to find alternative sources of edible oil because of the rapidly declining coconut industry; also, these crops are being investigated as possible protein supplements in both human and livestock feeds.

work from these same colleagues. Even within a single research division, many individuals are not really aware of what lines of research are being pursed by their colleagues. Research seminars or colloquia are not scheduled as part of the management system; a researcher may decide on his own free will to present a seminar from time to time but there is no commitment to it.

While there is contact between researchers of the Ministry of Agriculture and other local agencies, e.g. U.W.I and CARDI there is little or no ongoing collaborative research work between ministerial staff and these agencies. Futhermore, whatever little does occur, is strictly dependent upon the personal initiative of individuals, and there is no guarantee of any follow up or continuity in the event one member is shifted to another situation.

2.5.2 The need for collaboration is acknowledged by university and CARDI staff members and Ministry's researchers; the problem, however, is that over the years, step have never been taken to develop any king of mechanism or procedure which would ensure some minimum activity in this respect. Consequently, the regional research effort has not been able to maximize possible advantages in terms of economies to be gained from shared facilities, the benefits of collaborative scientific input, and the safeguards against unnecessary duplication of effort.

2.5.3 There is very little contact between researchers of the Ministry and their colleagues in other Caribbean islands in respect of relevance to their research

TABLE 2 PRESENT AND PROPOSED TECHNICAL STAFF

STRUCTURE FOR C.A.D.P

PRESENT	PROPOSED
a) Director (agronomist)	a) Director (agronomist)
b) Agric. Officers (5)	b) Seed Technologist
c) Agri. Assistants	c) Horticulturist
	d) Plant Breeder
	e) Plant Pathologist
	f) Agronomist
	g) Agric. Officers
	h) Agric. Assistants

2.5 RELATIONSHIP OF RESEARCH DIVISIONS OF MINISTRY OF AGRICULTURE WITH OTHER AGENCIES INSTITUTIONS

There is very little evidence of collaboration in the sense of a truly joint tackling of a problem; wherever there is a semblance of collaboration it is usually some special arrangement because of the need for laboratory services of some kind, e.g. an agronomist or agrologist in need of soil or forage analytical data an agronomist requesting the pathologist or entomologist to check pest or disease problems on a crop in the field.

2.5.1 There is an absence of formal, organized relation which could provide the opportunity for individual Scientists to become aware of what this colleagues were doing or to be able to obtain the benefit of input in their own

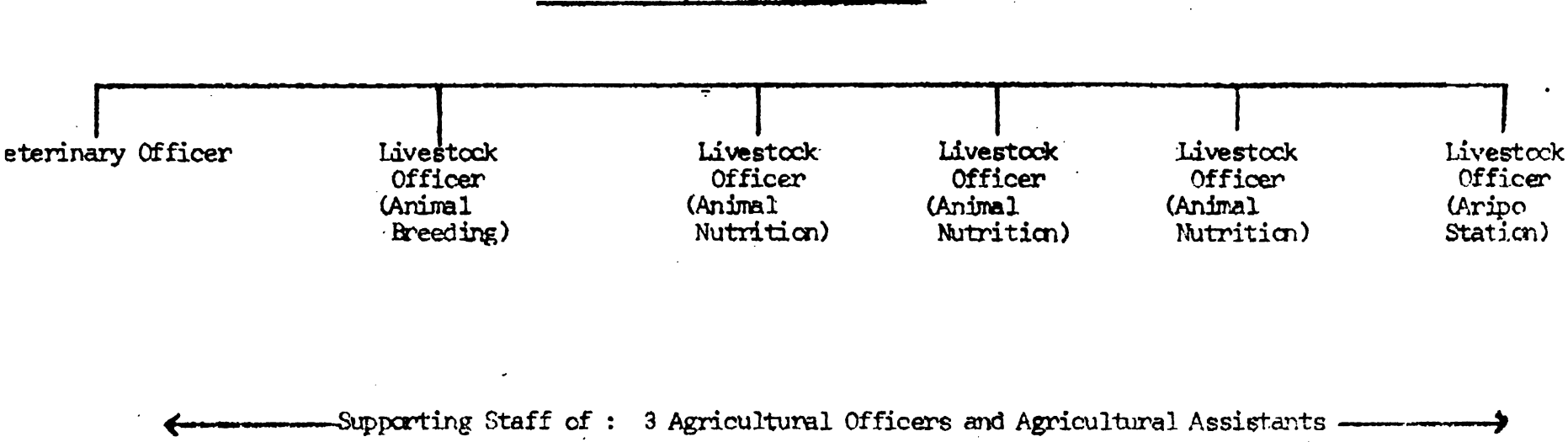

Figure 2: Structure of Animal Production and Research Division

ver been any concerted program of research in the area of livestock development.

2.3.1 The division carries a total of five senior Specialist officers (Livestock officers) who are regarded as research scientists, and one Veterinary officer, their civil service grade and salary range is the same as the Specialist Officers in the Crop Research and Red Ring divisions. (See Figure 2.)

2.4 THE CHAGUARAMAS AGRICULTURAL DEVELOPMENT PROJECT

The chaguaramas Agricultural Development Project was initiated in 1970 to a) determine the commercial feasibility of large scale mechanization of corn, soya and sorghum; b) establish a plant breeding unit and seed farm for Trinidad and Tobago. As a supporting service to both objectives a minimum of research is undertaken here. They are in the areas of corn and soya breeding; fertility, herbicides and pesticides trial, introduction and evaluation of new varieties of cereals and pulses, mechanization systems for various types of cereals and pulses - large and small scale.

2.4.1 The minimal research mentioned here is very vital to the survival of the Project and its contribution to food crop farmers. Over the past three years this aspect of the Project's work has grown in prominence and played a significant role in establishing C.A.D.P as the Seed Farm of the Caribbean.

2.4.2 The present and proposed Technical Staff structure is given in Table 2.

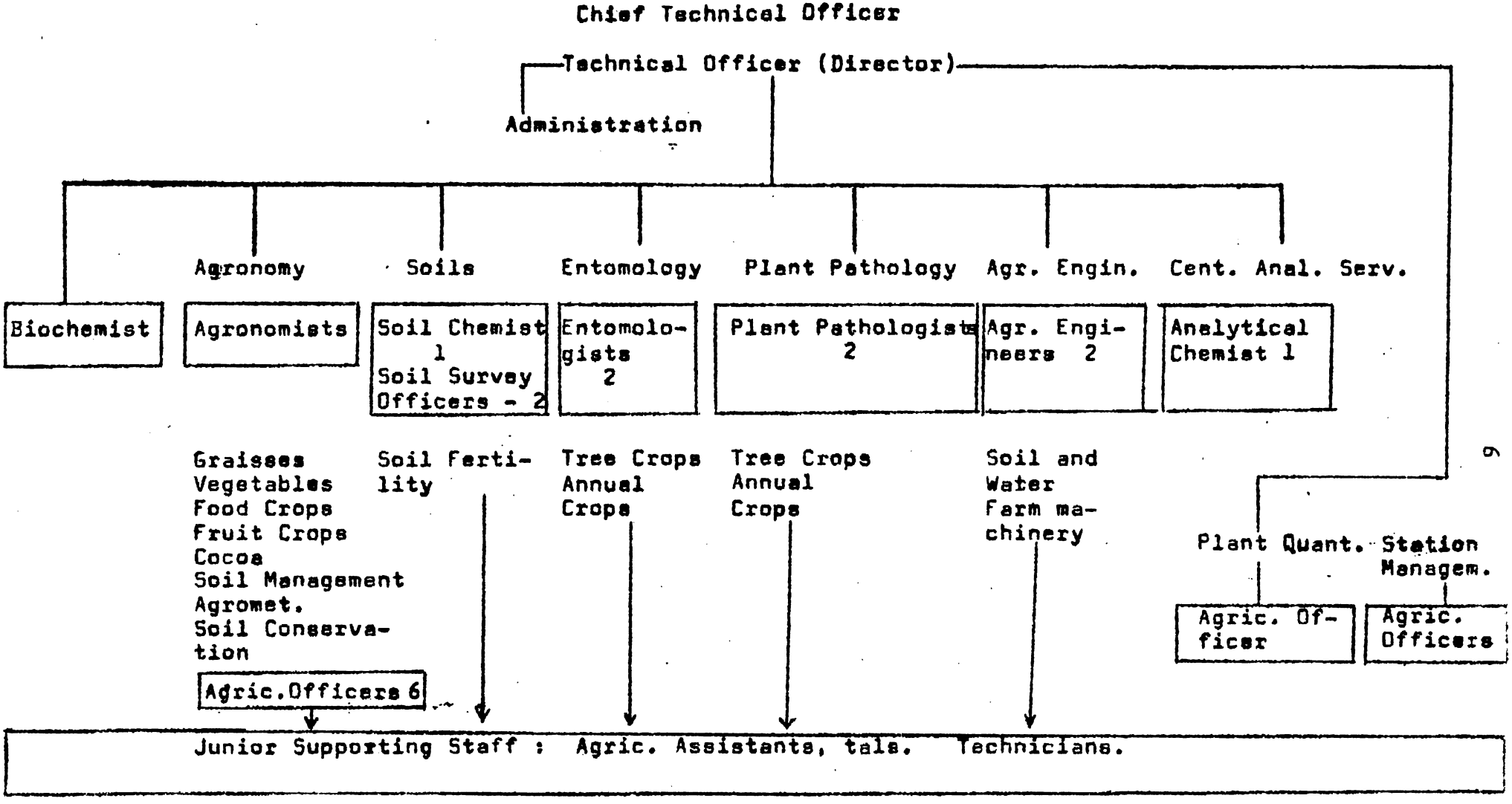

Figure 1 : Staff, Structure, Crop Research Director, Trinidad and Tobago

POST	NUMBER	APPROX. PERIOD OF VACANCY
Agric. Engineers	2	At least 10 years
Biochemist	1	Seven years
Soil Chemist	1	Five Years

Commencing 1968, there has been a sustained gradual reduction in the number of filled posts in the establishment.

2.2 RED RING DIVISION

The Red Ring Division was created about ten years ago for the specific purpose of conducting research aimed at finding recommendations for the control of the serious Red Ring disease of coconuts. There are no indicators, however, that it is meant to be a permanent establishment. It is headed by a Director of equal status to the Technical Officer for Crop Research. Research Scientist constitute an entomologist and a botanist supported by an Agricultural officer, assistants and laboratory technicians.

2.3 ANIMAL PRODUCTION AND RESEARCH DIVISION

The recognition and renaming of this division as a research arm of the Ministry is quite recent. It is simply a renaming of the old livestock Division, which was also referred to interchangeably as the animal Husbandry Division. Prior to this arrangement, there had been a limited research program for many years, depending upon the particular training and interest of members of staff. Except for an ongoing cross breeding programme in dairy cattle and some law-keyed work in the development of livestock rations, there has ne-

able 1. Distribution of Professional Posts by Research Disciplines, Central Experiment Station,

Research Disciplines Posts	Number of posts in establishment	Number filled	Number vacant
. Crop Research			
Technical Officer	1	1	-
Agronomy			
- Agronomists	7	5	2
- Agric. Officers	6	6	-
Soils			
- Soil Chemist	1	0	1
- Soil Survey Officers	2	2	-
- Agric. Officers	1	1	-
Entomology			
- Entomologists	2	2	-
Plant Pathology			
- Pathologists	2	1	1
Agr. Engineering			
- Agric. Engineers	2	0	2
Central Analytical Services			
- Analytical Chemist	1	1	-
Sub-total	25	19	6
2. Red Ring Research			
Technical Officer	1	0	1
Entomologist	1	1	-
Botanist	1	0	1
Agric. Officer	1	0	1
Sub-total	4	1	3
TOTAL	29	20	9

2. IDENTIFICATION OF THE NATIONAL AGRICULTURAL RESEARCH SYSTEM

The Ministry of Agriculture, Lands and Fisheries has sixteen divisions within the technical services, three of which are recognized research units, Viz. Crop Research, Red Ring Research and Animal Production and Research Unit. A fourth Unit, Chaguerames agricultural Development Project, though not officially recognized as a research unit has gained prominence in the field, primarily, through defaulting in official research quarters.

2.1 CROP RESEARCH DIVISION

This division is located at Central Experiment Station, centeno, about ten miles from the capital city, Port-of-Spain. Since the initial staffing of this station in 1950, there has not been any real restructuring or reorganization of any kind. The number of scientists has increased in an ad hoc manner to a total of 21 "specialists" position.

"The basic staff structure is shown in figure 1. The division is divided into five sub-areas on the basis of broad academic disciplines; in addition, there is the Central Analytical Services, staffed by an analytical chemist, and a separate post of Biochemist with no particular attachment to any of the sub-areas".

2.1.2 The disciplinary areas, level of staffing by research scientists and basic supporting professional cum technical staff is shown in Table 1. Almost one half the present establishment of professional officers in this entire division is vacant, some of these vacancies having been in existence for between three to ten years. e.g.

tively modern extension service. The results however, have been disappointing, the production of domestic food requirements has failed to keep up with local demands and export crop performance has been stagnating. The agricultural sector on which 20 - 25% of the population is dependent for a livelihood, has failed to make any significant progress.

1.6 While many factors may be cited as having contributed to the failure of ambitious agricultural programmes in the West Indies agricultural development strategy may be cited as one which did not particularly emphasize the potential contribution from a vigorous agricultural research policy. - The best organized research programes in the British Caribbean both at University and governemental levels have been until recently in the area of export crops - hence the post independence thrust in domestic food production lacked the supporting research service to ensure successful implementation.

1.7 The problem is futher accentuated when one considers that over 95% of agricultural research scientists in F&T are trained at foreign institutions - N.A. or U.K. The problem of technology transfer, is therefore, obviously and directly applicable.

1.8 Also of paramount importance is the total management system for agricultural research; recruitment procedures adequacy of funding, personnel management, linkage with agricultural extension, orientation of research projects. These factors militate against the establishment, maintainance and management of adequate institutional research capacity which can make a meaningful contribution to agricultural modernization, structural socio-economic changes and achievement in relation to development goals.

1. INTRODUCTION

1.1 It is estimated that 95% of all Scientific research is done in approximately 30% of the most developed countries; the remaining 5% in another 100 countries which have more than 2/3 of the world population. It is anybody's guess where Caribbean research falls in this classification.

1.2 Moseman comments, "the lack of scientific manpower is the major limiting factor in the upgrading of agriculture in most developing nations today. The Caribbean area is no exception.

1.3 Trinidad and Tobago, a former British Caribbean Colonial territory, gained political independence in 1962. Situated seven miles off the North East coast of Venezuela; it covers 1980 square miles with a population of 1.1 million.

1.4 Historically, the economy was founded on agriculture; export oriented agriculture : sugar, cocoa, coffee, bananas and coconuts in that order. In recent years petroleum resources have played a paramount role in the economy of the country. Because of its mineral wealth, Trinidad and Tobago has remained the most prosperous of the former British Caribbean territories. The estimated per capita income is in the region of U.S. $1.700.

1.5 with the attainment of independence agricultural development has shifted from a metropolitan-oriented policy to one with greater emphasis on food crop and livestock production. This has been accompanied by various packages of five and ten year development programs involving credit facilities, rural infrastructures easily available state lands and a rela-

CRITICAL COMMENT
OF THE AGRICULTURAL RESEARCH SYSTEM
CONTROLLED BY THE MINISTRY OF AGRICULTURE
LANDS AND FISHERIES

TRINIDAD AND TOBAGO

Mannie R. DOOKERAN

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CONTRIBUTION OF THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE (CARDI) TO AGRICULTURAL RESEARCH IN THE ANTILLES ZONE[1]

By

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CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

NOVEMBER, 1977.

CONTRIBUTION OF THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE (CARDI) TO AGRICULTURAL RESEARCH IN THE ANTILLES ZONE[1]

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SUMMARY

The Caribbean Agricultural Research and Development Institute was established in 1975 as an autonomous organisation to serve twelve member states of the Caribbean Community. The Institute has its headquarters in Trinidad and sub-centres in six other territories in the region.

CARDI provides for the research and development needs of the agriculture of the region as identified in national plans and policies. Following guidelines given by the Standing Committee of Ministers Responsible for Agriculture in the Caribbean Community, the Institute has developed a work programme that gives priority to servicing projects identified in the CARICOM Regional Food Plan, and to commodities for which there is a major production deficit in the region. The approach is to formulate for immediate use, systems of production of crops and livestock based on currently available information, and to plan applied research programmes towards eliminating identifiable constraints in an effort to improve these production systems.

CARDI's work programme in Food Legumes and Cereals, Root Crops, Vegetable Crops, Animal Production and Training have already made a number of significant contributions to research and development in the region.

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[1]Paper presented at the Regional Technical Meeting on the Contribuation of Agricultural Research Systems in the Antilles Zone, 28 November - 2 December, 1977, Port-au-Prince, HAITI

CONTRIBUTION OF THE CARIBBEAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE (CARDI) TO AGRICULTURAL RESEARCH IN THE ANTILLES ZONE

1. INTRODUCTORY INFORMATION ABOUT CARDI:

1.1 Historical Background

The Caribbean Agricultural Research and Development Institute (CARDI), was established in 1975, to serve the twelve (12) member states of the Caribbean Community (CARICOM); viz;

"Antigua, Barbados, Belize, Dominica,
Grenada, Guyana, Jamaica, Montserrat,
St. Kitts-Nevis-Anguilla, St. Lucia,
St. Vincent and Trinidad & Tobago."

The Institute is the successor organisation to the Regional Research Centre (RRC), which has a history dating back to 1955 when it administered regional research programmes which were part of the responsibilities of the Imperial College of Tropical Agriculture (ICTA). Later (1960) ICTA became the Faculty of Agriculture of the University of the West Indies (UWI). The R.R.C. and its research staff were absorbed by the University.

CARDI continues to be affiliated to the University of the West Indies, with Headquarters at the St. Augustine Campus, Trinidad, but is a fully autonomous organisation.

1.2 Objectives & Functions

The broad objectives of CARDI have been set out in the articles of agreement establishing the Institute, and these include:-

(a) provision for the research and development needs of the agriculture of the Region as identified in national plans and policies;

(b) provision of an appropriate research and development service to the agricultural sector of Member States;

(c) provision and extension of new technologies in production, processing, storage and distribution of agricultural products of Member States;

(d) pursuing for specified periods long-term research in pertinent areas;

(e) provision for the co-ordination and integration of the research and development efforts of Member States where this is possible and desirable.

1.3 Formal Organisation

CARDI is governed by the Standing Committee of Ministers responsible for Agriculture in the Caribbean Community. The Committee meets annually to consider the annual report of the Institute along with budgetary and other policy matters. The decisions of this Committee are implemented by a Board of Directors consisting of ten (10) voting members and four (4) non-voting members. Of the voting members six (6) represent individual territories and groups of territories, one (1) represents the University of Guyana and three (3) represent the University of the West Indies. The non-voting members on the Board are the Chairman, the Executive Director, a representative of the Caribbean Community Secretariat and a representative of the Caribbean Development Bank.

The Executive Director is responsible for the day-to-day control and management of the Institute and is assisted by an Administrative Director.

1.4 Human, Physical and Financial Resources

The Institute currently has some twenty-seven (27) professional staff and approximately seventy (70) supporting staff, both Technical (field and laboratory) and Clerical. Most of the staff have considerable experience in agricultural research by virtue of their long association with the Regional Research Centre of the University of the West Indies. Areas of expertise include Agricultural Economics and Farm Management, Agronomy, Analytical Chemistry, Animal Nutrition, Animal Production, Biometrics, Entomology, Nematology, Plant Breeding, Plant Pathology, Soil Chemistry and Fertility, Soil Physics and Water Management and Virology.

The Institute's facilities at its Headquarters include several well equipped laboratories capable of carrying out routine chemical and physical analyses of livestock feeds, fertilizers, soils, plant tissues and other agricultural materials. It is also equipped to carry out pesticide residue analysis on soil, plant and animal tissues, as well as on other agricultural materials. Adequate laboratory facilities exist for work in entomology, nematology, plant pathology and virology. The Institute also has access to the Field Experimental Station, Library and Computer facilities of the University of the West Indies.

CARDI receives its core financial support from the Member States based on a formula agreed to by Heads of Governments and project aid from external funding agencies. The 1977/78 approved core budget of the Institute was TT $2.9 million.

2. ACTIVITIES CARRIED OUT IN THE ANTILLES ZONE FROM 1970 to 1977:

2.1 Countries and Institutions involved

In addition to the Institute's Headquarters at which most of its staff are located, six other centres have been established in Member States with at least one member of the professional staff resident in these territories. These centres are sited in Barbados, Belize, Guyana, Jamaica, St. Kitts and St. Lucia. Funds are being sought to provide for the establishment of centres in the remaining five territories served by the Institute.

The activities of the centres are fully integrated in the agricultural and rural development plans of the various territories, and the centres work very closely with staff of the various national Ministries of Agriculture.

Additionally, the Institute collaborates fully with Universities and other agencies involved in agricultural and rural research and development in the Region. It also maintains strong linkages with national and international Institutions outside of the region, particularly for the purpose of exchange of materials and information and collaboration in outreach programmes of mutual interest.

2.2 Nature and Scope (biological, economic and social) of activities both current and completed

CARDI's work programme has been developed in the light of certain national initiatives and consideration of the project areas identified in the CARICOM Regional Food Plan.

Priority is being given to those commodities for which there is a major production deficit in the region as well as to those projects in which there is commercial interest by the private sector and agencies such as the Caribbean Development Bank.

The work programme is divided into the following broad areas:

1. Food Legumes and Cereals
2. Root Crops
3. Vegetable Crops
4. Other Crops
5. Animal Production
6. Special Projects including Training

The philosophy underlying the programme is to formulate for immediate use, systems of production of crops and livestock based on the currently available information, and to gear applied research programmes towards eliminating identifiable constraints in an effort to improve these production systems.

2.3 Results and Developments

2.3.1 Food Legumes and Cereal Programme

Five crops are included in this programme, viz. corn (*Zea mays*), soybean (*Glycine max*), cowpea (*Vigna unguiculata*) dry bean (*Phaseolus vulgaris*) and peanut (*Arachis hypogea*).

In each crop the main thrust of the programme has been to identify high yielding varieties having good agronomic characteristics, and resistance or high tolerance to disease or pest attack. Varietal assessments have been carried out in Trinidad and successes achieved include the following:

(i) CARDI's Farm Corn selection has yielded as well as Pioneer X304 and X306 hybrids and high lysine lines from CIMMYT.

(ii) A high yielding (2,100 kg/ha) soybean cultivar from Indonesia has been identified. This compares favourably with standard varieties (Jupiter and Improved Pelican) yielding about 1,600 kg/ha.

(iii) Two high yielding cowpea cultivars introduced from IITA, Nigeria, were identified, one of these being resistant to cowpea mosaic virus. In the development of varieties resistant to cowpea mosaic virus, the stage has been reached where highly resistant lines have been isolated among F_2 and back cross progenies.

The cause of stem rot of Vigna unguiculata has been determined and the fungi in the leaf spots caused by Cercospora spp. have been identified.

(iv) Peanut varieties from the RRC/CARDI Grain Legume Programme in Jamaica achieved yields of 5,400 kg/ha and while none were completely resistant to either Cercospora leaf spot or rust, some showed a high degree of tolerance.

(v) More than 200 breeding lines from the International Bean Rust Nursery (IBRN) along with other varieties from U.S.A., Puerto Rico, Mexico, Honduras, Jamaica and Costa Rica have been evaluated for yield or disease resistance in field trials. The

ICA variety Duva gave the largest yield and this variety along with ICA Guali and Diacol Nima showed higher resistance to both rust and bacterial blight than the others.

2.3.2 Root Crop Programme

The crops included in this programme are cassava and yams. Cassava introductions are undergoing rapid multiplication. Most of the work in yams is based in Barbados where the emphasis has been on the development of methods for the production of clonal material free of virus diseases. A tissue culture propagation technique has been developed and it has been shown that many plantlets could be produced within a short period of time using a comparatively simple growth medium.

2.3.3 Vegetable crop programme

A wide variety of vegetable crops are under investigation, but the most important are onion and tomato in which varietal assessments have been made. The work on onion (Barbados) involves studying the factors that affect yield, keeping quality and tolerance to 'Blast'- a disorder of unknown cause affecting the onion industry in Barbados. The studies in tomato have been done mainly in Trinidad. Some of the main aspects have been the evaluation of the potential of selections for fruit-set under high temperature, resistance to pests and diseases, qualities for processing and agronomic characteristics such as earliness and concentrated flowering. As a result of a cooperative

breeding programme initiated between RRC/CARDI and the University of Florida, CALYPSO a high yielding open-pollinated tomato variety with multiple disease resistance has been produced primarily for farmers in the West Indies who are producing tomatoes for the fresh market.

2.3.4 Animal production programme

In Trinidad, CARDI participates in the Sugarcane Feed Centre through the secondment of its Animal Nutritionist to this project. From preliminary results it appears that there is little difference in weight gains when bulls are fed either whole chopped sugarcane or cane with the rind layer removed. In collaboration with the Ministry of Agriculture, Barbados, the following studies are in progress:

(i) energy and protein requirements of Grade Holstein replacement heifers.

(ii) 'Sugarfith' (derinded sugarcane) in poultry feeds.

(iii) Supplements for feeding lambs.

Another area of this programme involves seed production of forage legumes.

3. PERSPECTIVES (1978 - 1983):

3.1 Proposed Targets

Efforts will be made to achieve the objectives set out in the CARDI work programme. Emphasis will be given in the Food Legume and Cereal Programmes, to supporting

the Regional Food Plan Projects in Guyana and Belize. Research will centre on the evaluation of varieties of corn, soybean, blackeye and red beans; solving crop protection problems in these crops and evolving practices for soil fertility management on the Intermediate Savannahs in Guyana.

The developmental work on cotton will continue with particular reference to Guyana and possibly Barbados.

In conjunction with other agencies in the region, research and developmental work in peanuts will be continued in the less developed territories of the Caribbean Community and in Barbados and Jamaica.

In the vegetable programme attention will continue to be given to work on onions in Barbados and Jamaica, and to tomatoes in Trinidad and Jamaica.

The Animal Production programme will continue to develop systems for ruminant production, forage production and utilization of by-products and new sources of feed.

3.2 Strategies and Means to reach targets:

Barbados, Guyana, Jamaica and Trinidad & Tobago, are all served by their own National Research Institutions, that are staffed with varying degrees of expertise. The work programme of CARDI has been developed mainly out of discussions with these Ministries of Agriculture and it can therefore be said that the CARDI work programme seeks to address itself to the problems

identified by the territories themselves. Therefore, in the execution of the projects, CARDI collaborates quite closely with personnel in the various Ministries of Agriculture. It functions in complementing and supplementing the programmes of the territories it serves. In the less developed countries (LDC's) of the Caribbean Community there is greater dependence on the expertise within CARDI for identifying useful developmental projects and for assistance in executing them, as the local Ministries of Agriculture are generally deficient in staff for doing this work.

In all territories CARDI will provide basic research and developmental support by way of its well equipped laboratories and training programmes geared to meet the needs of the region.

3.3 Expected Results and relevance to agricultural development

It is expected that CARDI in collaboration with other agencies engaged in agricultural research and development in the region, will make significant contributions to the region's agriculture in terms of removing the technological constraints in the projects that have been identified in the Regional Food Plan. Additionally, it will contribute to the process of technology transfer to the small farmers of the region and thus aid in the development of improved agricultural systems in the rural sector.

CARDI

Questions from

1. BERNHEIM, Pierre (Repr. FAO en Haiti)

To illustrate your intervention could you say few more words on your eventual contribution jointly with FAO to promote "Food legumes" in the area included Haiti (level of achievement, results, etc..., if any, in particular country)

Ans : CARDI has recently undertaken a study in behalf of FAO, of the state of food legumes in the Caribbean, Latin America and Panama. The survey aspect of this study has now been completed, and a report is being prepared. The main aim is to identify areas of constraints to food legume production in the region and to suggest strategies to overcoming them.

2. PINCHINAT, Antonio M

Since CARDI and UWI carry research work in many common countries, how do they coordinate their work ? If not, what coordination mechanism would you propose?

Ans : Since the University of the W.I. is represented on the CARDI Board through 3 of its members, this should serve to investigate towards duplication of effort. However, there is need for a formal body representing not only CARDI and UWI (but also other agencies serving agriculture in the region, eg. CARDATS & CDB) to meet and discuss areas and uses of work. An example of this is a committee set up by the ECCM (Eastern Caribbean Common Market) to work in Peanut development in the CDC's Represented is this committee are : UWI, CARDI, CDB,)

3. MERMLESTEIN, Patricia

In your opinion what are the advantages and drawbacks of being separated from the university of the West Indies both for the U.W.I and for CARDI? May be also Mr Spence could answer

Ans : The need of separation of CARDI from UWI was recognized by the Campbell Committee in its Report in Agricultural Research in the Caribbean. In the main, the advantage has been to allow staff to develop an orientation of research that can be applied towards agricultural development, rather than is continued in an academic environment where there was the intensive to pursue lines of research not related to the needs of the region.

CATIE
CENTRO AGRONOMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA
Departamento de Cultivos y Suelos Tropicales

EL CENTRO AGRONOMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA, CATIE Y SU CONTRIBUCION A LA INVESTIGACION AGRICOLA EN LA ZONA DE LAS ANTILLAS

Rufo Bazán

Documento preparado para su presentación en la Reunión Regional sobre el Estado de la Investigación Agrícola en las Antillas. Port-au-Prince , Haití. Noviembre 27 - Diciembre 2, 1977

Turrialba, Costa Rica
1977

BAZAN, R.* El Centro Agronómico Tropical de Investigación y Enseñanza, CATIE y su contribución a la investigación agrícola en la zona de las Antillas. Turrialba, Costa Rica, CATIE. 1977. 29p.**

RESUMEN

Se presenta, una reseña histórica del CATIE, sus objetivos, su organización y los recursos para operar en el ámbito centroamericano y de las Antillas.

Se describe su participación directa en las Antillas, tanto en investigación como en capacitación.

Se discuten las perspectivas de la participación del CATIE en el futuro de la investigación agrícola en el área, así como las recomendaciones que surgen para hacer efectivo el fortalecimiento de la investigación agrícola, tanto a nivel de país como de la región toda.

SUMMARY

A historical outline of CATIE is given including its objectives and organization as well as its resources to operate in Central America and the Caribbean.

A description of the role of CATIE in the Caribbean is given as a research and training Center. Finally, the possibilities of CATIE's participation in future agricultural research in the area are discussed as well as recommendations to strengthen agricultural research both at country and at regional level.

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* Ph.D. Edafólogo, CATIE

** Trabajo preparado para su presentación en la Reunión Regional sobre el Estado de la Investigación Agrícola en Las Antillas. Port-au-Prince, Haití. Noviembre 27-Diciembre 2, 1977

CONTENIDO

EL CENTRO AGRONOMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA, CATIE Y SU CONTRIBUCION A LA INVESTIGACION AGRICOLA EN LA ZONA DE LAS ANTILLAS*

Rufo Bazán**

I. INFORMACION PREVIA SOBRE EL CATIE

1. ANTECEDENTES HISTORICOS

Creación

El Centro Agronómico Tropical de Investigación y Enseñanza (CATIE) fue creado el 1°de junio de 1973, como una institución autónoma regional, para la investigación y la enseñanza agrícola, mediante un contrato (de 10 años) entre el Gobierno de Costa Rica (GOCR) y el Instituto Interamericano de Ciencias Agrícolas (IICA) de la Organización de los Estados Americanos, para servir principalmente a los países del Istmo Centroamericano, y en segundo lugar a Las Antillas. Fue establecido legalmente en Costa Rica como Asociación Civil, ratificada por Ley N°5201, para ser gobernado por un Consejo Directivo Autónomo, compuesto por dos representantes del GOCR, el Rector de la Universidad de Costa Rica, dos representantes del IICA y cuatro miembros procedentes de otros países fuera de Costa Rica, seleccionados en base a una sobresaliente experiencia en el campo del desarrollo agrícola. El Consejo es la máxima autoridad y es responsable por todos los bienes, la designación del Director, el establecimiento de la política de programas y de los principios operacionales de la institución.

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* Documento preparado para su presentación en la Reunión Regional sobre el Estado de la Investigación Agrícola en las Antillas. Port-au Prince, Haití Nov. 27-Dic. 2, 1977

** Ph.D., Edafólogo, CATIE

En agosto de 1975, el Gobierno de Panamá ingresó al CATIE como nuevo miembro de la asociación civil y acredita un Representante ante el Consejo Directivo.

En octubre de 1974, la reunión de Ministros de Agricultura de América Central celebrada en San José, Costa Rica, reconoció al CATIE como la Organización Regional dedicada a la investigación agrícola para América Central.

Localización e Instalaciones Físicas

El CATIE tiene su sede en Turrialba, Costa Rica, Evolucionó de lo que fué anteriormente el Centro de Investigación y Enseñanza del IICA, fundado cerca de la ciudad de Turrialba, Costa Rica, en 1942, para servir a todos los países de América Latina. Turrialba está situada al Este de San José, en la vertiente Atlántica, a una elevación de 650 msnm. El clima es cálido (temperatura promedio de 22°C), con un promedio anual de lluvia de 2600 mm, generalmente bien distribuida durante todo el año.

Cuando se creó el CATIE, el IICA le hizo transferencia a todos los bienes acumulados en su antiguo Centro, a excepción del Centro de Documentación, el Centro de Computación y la Biblioteca, esta última continúa en el CATIE, siendo controlada y operada por el IICA. A continuación se hace una enumeración de los terrenos e instalaciones físicas del CATIE.

Terrenos

Aproximadamente 1000 hectáreas en su sede central cerca de Turrialba y 100 hectáreas localizadas en la Costa Atlántica, cerca del Puerto Limón y que comprende la finca experimental de cacao La Lola.

Edificios

El campus principal o central ocupa una área de aproximadamente 25 hectáreas.

Administración central: seis aulas de clase; dos laboratorios de enseñanza; una sala amplia de conferencias, que puede acomodar hasta 100 personas para seminarios, talleres de trabajo, cursos cortos, etc.; laboratorios de suelos, fisiología vegetal, entomología, fitopatología, laboratorios de nutrición y fisiología animal; laboratorio de productos forestales, instalado en la Universidad de Costa Rica en San José; laboratorio de idiomas, herbario, una cámara fría para almacenamiento de semillas con una capacidad de 40 metros cúbicos.

Además de las instalaciones para investigación y enseñanza mencionados arriba, el CATIE posee 34 casas de habitación para las familias del personal profesional y 13 casas de habitación para familias de estudiantes graduados; una casa de huéspedes con capacidad para 10 personas; dormitorios para 80 personas; un comedor que puede acomodar hasta 112 personas, servicios de lavandería, un club social con restaurante, cuartos para juegos, una piscina y campos de deportes.

La excelente biblioteca del Centro Interamericano de Documentación e Información Agrícola (IICA-CIDIA) permanecerá en el campus del CATIE. Esta Biblioteca es la primera en su clase en toda América Latina. La unidad de Estadística y Computación Electrónica (UECE) del IICA, que está equipada con computadora IBM 1130, ha sido trasladada a la sede central del IICA en San José,pero sus servicios están disponibles y fácilmente accesibles para los programas del CATIE.

La mayor parte de los amplios terrenos fuera del campus principal, están sembrados con café y caña de azúcar y constituyen los campos de aplicación de resultados de investigación. Los terrenos que no se usan para estos dos cultivos, son utilizados para investigación en cultivos tropicales, silvicultura y ganadería. Parte de ellos se usan para mantener un banco de germoplasma de árboles tropicales. El programa forestal incluye un arboretum con aproximadamente 200 especies.

2. OBJETIVOS

Los objetivos del CATIE fueron claramente establecidos al tiempo de su creación, ellos son:

a. Apoyar a los países del área centroamericana y de las Antillas en sus políticas de desarrollo agropecuario y forestal.

b. Contribuir mediante la investigación y la enseñanza a aumentar el ingreso medio por unidad de superficie en el sector rural, mejorar el nivel de vida y fomentar el mejor uso de los recursos.

Para llevar a cabo éstos objetivos, el CATIE realiza, promueve y estimula la investigación y la capacitación a diversos niveles en los campos agrícola, forestal y pecuario en beneficio de las regiones del trópico americano. Su alcance es de tipo regional y sus programas orientados hacia el fortalecimiento de las instituciones nacionales y en beneficio directo del pequeño productor.

3. FUNCIONES

Cuando el Centro estaba bajo la administración del IICA, sus programas estaban concentrados principalmente en la educación de posgrado

al nivel de Magister Scientiae, combinada con actividades de investigación local orientadas hacia líneas disciplinarias y realizadas por los estudiantes, como problemas de tesis. Prestaba servicios principalmente como un centro académico para estudiantes de toda América Latina. Desde sus inicios en la primera parte de la década de 1940, ha otorgado alrededor de 600 grados a nivel de Magister Scientiae.

En 1973, cuando las operaciones fueron transferidas al CATIE, la mayor parte del personal de investigación del IICA fue asignado al nuevo Centro y las actividades de investigación se concentraron en tres áreas, a saber: (1) Cultivos y Suelos; (2) Producción Bovina de Leche y de Carne; (3) Producción y Conservación Forestal. Dentro de estos tres campos, se han concentrado esfuerzos principalmente en la identificación y desarrollo de sistemas de producción más efectivos para la región Centroamericana.

Tres equipos de trabajo interdisciplinario han surgido de estos esfuerzos, uno en cada una de estas tres áreas. El grupo de trabajo en Cultivos y Suelos está al presente concentrando sus esfuerzos en los siguientes proyectos:

a) Sistemas de Producción de Cultivos Alimenticios para Pequeños Agricultores
b) Sistemas de Producción en Cultivos Perennes
c) Sistemas de Producción Mixtos incluyendo cultivos anuales y perennes
d) Fertilidad de Suelos

Con la cooperación de USAID/ROCAP, se han concentrado esfuerzos en la investigación sobre sistemas de cultivos para acelerar la producción de alimentos y el ingreso neto de los pequeños agricultores, en colaboración con instituciones nacionales interesadas, en todo el Istmo Centroamericano. Alrededor del 70 al 80% de los alimentos producidos en América Central proceden de fincas pequeñas y la mayoría es producida por sistemas tradicionales con muy poca introducción de tecnología moderna.

El grupo de trabajo de Ganadería, al presente dedica sus esfuerzos al desarrollo de Sistemas de Producción Bovina de Carne y de Leche más eficientes, utilizando pastos en combinación con sub-productos de cultivos tropicales, tales como: la melaza, hojas y otros sub-productos en la cosecha de la caña de azúcar, banano de desecho, cáscara de café y de cacao, hojas y raíces de camote y yuca, etc. Se están realizando Programas Cooperativos de Producción con el Gobierno de Panamá y el Banco Central de Honduras.

El grupo de trabajo en Ciencias Forestales concentra sus investigaciones actualmente en la introducción y evaluación de más de 300 especies forestales exóticas de rápido crecimiento, para la producción de madera elaborada, leña y otros productos forestales. Se han identificado catorce variedades muy prometedoras, las cuales están siendo plantadas en varios programas de reforestación en América Central. Otra línea de trabajo la constituye el mejoramiento de bosques naturales , en particular bosques secundarios, estimulando el crecimiento de especies más valiosas por medio de la eliminación de otras de menos valor.

Se están dedicando esfuerzos, además, a estudios cooperativos con instituciones interesadas del área centroamericana, para el manejo de cuencias hidrográficas y de áreas forestales, para la conservación de suelos y aguas.

El programa de adiestramiento a nivel de posgrado del IICA, que operaba anteriormente en Turrialba, ha sido modificado. El CATIE no otorga más el grado de Magister Scientiae ni opera una escuela para graduados. Sin embargo, mediante un Convenio especial con la Universidad de Costa Rica, el CATIE está cooperando en el desarrollo de un programa graduado a nivel de Magister Scientiae en agricultura y producción pecuaria. Algunos de los miembros del personal profesional del CATIE actuan como Profesores Adjuntos, también participan en otros tipos de capacitación tales como cursos cortos, seminarios y adiestramiento en servicio, sea en el CATIE o en los países del área.

Gradualmente el CATIE ha iniciado su evolución como un Centro Regional de Investigación y Desarrollo para América Central.

El CATIE ha empezado a participar y a proveer asistencia técnica en varias actividades de investigación y desarrollo en los países, por medio de convenios especiales o contratos con los gobiernos, o directamente con las instituciones nacionales. Estos programas de apoyo son financiados por los gobiernos o las instituciones nacionales de los países involucrados y, en ciertos casos, con la ayuda de agencias internacionales. A continuación se enumeran los contratos y convenios que están en operación actualmente:

a) CONTRATO: Países de América Central/CATIE/ROCAP

Un proyecto regional de investigación, establecido con ROCAP y los países de América Central en 1975. Las actividades están encaminadas al mejoramiento de los Sistemas de Producción en Cultivos Alimenticios para Pequeños Agricultores en Centroamérica. Su objetivo fundamental es establecer una red de actividades de investigación en sistemas de producción dentro de la región, en cooperación con los Ministerios de Agricultura.

b) CONTRATO: Gobierno de Panamá/IICA/CATIE

Un proyecto cooperativo entre el Ministerio de Agricultura de Panamá, el IICA y el Departamento de Ganadería del CATIE, finanaciado por el Gobierno de Panamá. En un proyecto integral que comprende investigación práctica, manejo, capacitación de personal, demostración y desarrollo y aplicación de estrategias para ganar una rápida adopción de tecnología productiva tendiente a mejorar la producción ganadera en las áreas bajas húmedas de Panamá.

c) CONTRATO: Banco Central de Honduras/CATIE

Un proyecto financiado por el Banco Mundial, a través del Banco Central de Honduras, tendiente a mejorar la producción pecuaria en Honduras. El CATIE provee asistencia técnica y ayuda en la capacitación de personal.

d) CONTRATO: Gobierno de la República Federal de Alemania/CATIE, para el establecimiento y mantenimiento de un Banco de Recursos Genéticos de plantas cultivadas.

El objetivo de este programa es el de colectar, conservar y multiplicar material genético de las principales especies cultivadas, nativas de

América Central, Las Antillas y el Norte de América del Sur. Brindará servicios a los países de las regiones mencionadas.

e) CONVENIO: CATIE/Oficina de Café de Costa Rica

Bajo este convenio, financiado por la Oficina del Café de Costa Rica, el Departamento de Cultivos y Suelos Tropicales del CATIE mantiene una amplia colección de variedades de café y provee semillas a personas interesadas. Con la llegada de la Roya del Café a América Tropical, ha aumentado considerablemente la demanda de semillas.

f) CONVENIO: CATIE/ACRI (American Cocoa Research Institute)

Por medio de este convenio, financiado por ACRI, el CATIE continúa las actividades de investigación para el mejoramiento de variedades y de producción de cacao y la promoción de la producción de semillas híbridas por el CATIE.

g) CONVENIO: CATIE/ROCAP sobre Fertilidad de Suelos

Un proyecto regional de investigación sobre fertilidad de suelos tropicales, financiado por ROCAP. Su objetivo es desarrollar y promover técnicas útiles de investigación en laboratorio, invernadero y en el campo, para determinar los requerimientos de fertilidad de suelos en América Central.

4. RECURSOS HUMANOS

Para llevar a cabo las diferentes actividades, el CATIE cuenta con una plantas de técnicos altamente calificados y de nivel internacional, cuya lista se presenta en el Anexo 1. Se deduce de la misma que del total de 53 técnicos, 29 poseen el grado académico de Ph.D., 14 grado M.S. y 10 poseen grados inferiores. En conjunto representan a 17 países.

Para complementar la actividad de estos técnicos, se cuenta con 95 auxiliares y aproximadamente 200 obreros.

5. FUENTES DE FINANCIAMIENTO

Previo a la fundación del CATIE, el IICA dirigía y manejaba el Centro de Turrialba, y proveía la mayor parte de los fondos para su operación. Sin embargo, desde 1973, la mayor porción del financiamiento del CATIE ha ido gradualmente pasando del IICA a otras fuentes. Cuando se constituyó el CATIE, el IICA contribuyó la suma de US$695.000 dólares, al presupuesto básico. El presupuesto anual total en esa época, incluyendo los proyectos especiales, era de alrededor de US$1.200.000 dólares, habiéndose completado la diferencia con recursos externos provenientes de agencias de asistencia nacionales y multinacionales y de la venta de producción y servicios. La suma asignada por el IICA, de acuerdo al contrato inicial entre el GOCR y el IICA, para el año inicial, debería ser la misma a la que tenía cuando el Centro estaba bajo su completo control. Esta suma sería reducida gradualmente en los siguientes tres años a un nivel de US$500.000 dólares y continuar a este nivel por el resto de la duración del contrato (10 años). El contrato también estipula que el GOCR proveerá la suma mínima de US$50.000 dólares anualmente, para el financiamiento del CATIE. Además, el contrato permite que otros países de la región se suscriban como socios en esta empresa, con representación en el Consejo Directivo, y que deben contribuir un mínimo de US$50.000 anuales, a los costos básicos de operación. Panamá se afilió a la Asociación en agosto de 1975 con un aporte anual de $50.000.

El Programa Presupuesto aprobado por el Consejo Directivo prevé, para el año fiscal 1976-1977, un recurso total de US$1.937.405. Dicho monto fue posteriormente ampliado hasta US$1.999.993 merced a negociaciones de nuevos contratos que comenzaron a implementarse en el período, o por efecto de la ampliación de otros ya existentes.

La distribución de los recursos se presenta en el Anexo 2, y se ajusta a la forma usual para Centros Internacionales.

II. ACTIVIDADES REALIZADAS EN LA ZONA DE LAS ANTILLAS

En su creación se identifica al CATIE como el Centro Regional cuya acción se extendería prioritariamente a América Central y en segunda instancia a la zona de las Antillas.

En el primer caso, la acción del CATIE es facilitada por su localización geográfica, que es en Costa Rica y su accesibilidad a los diferentes países del área centroamericana es fácil e inmediata.

Sin embargo, en los últimos cinco años, el CATIE ha dado apoyo efectivo a los países de la zona de las Antillas, tanto en programas de investigación y producción agropecuaria, como de capacitación de personal profesional de los países.

1. INVESTIGACION

República Dominicana, Haití y Jamaica son los países con los cuales CATIE ha colaborado en sus programas de investigación agropecuaria.

En República Dominicana ha participado en las reuniones de CEAGANA (Centro Estatal de Azúcar y Ganadería) en la evaluación de la investigación realizada en el país en la utilización de la caña de azúcar en la producción animal.

También se ha comenzado a prestar asesoramiento en la orientación del Programa de Investigación en Producción Animal de la Universidad Autónoma de Santo Domingo.

Al respecto se ha discutido con los miembros del Departamento de Zootecnia la elaboración de un plan destinado a desarrollar Sistemas de Producción de Leche y de doble propósito.

Con la Asociación para el Desarrollo de la Ganadería se han hecho acuerdos para colaborar en la mantención y mejoramiento del ganando criollo. Para ello, se envía el semen de los mejores toros de Criollo Centroamericano que hay en el CATIE, para el mantenimiento y mejora del ganado criollo de la República Dominicana.

En Haití se ha cooperado al IDAI en la revisión del Programa Ganadero que desarrolla esa Institución, y se ha dado una orientación hacia la utilización más eficiente de los recursos disponibles para la alimentación del ganado.

También se ha participado en la realización de un estudio de diagnóstico de situación del área productora de café, con recomendaciones específicas para su mejor manejo.

En Jamaica, CATIE ha participado con IICA en la preparación e implementación de acciones contenidas en el proyecto de Desarrollo del áreas de Allsides, proyecto que recibe financiación parcial del Fondo Simón Bolivar, administrado por IICA. La conducción del proyecto en el país es de responsabilidad del Ministerio de Agricultura del país con el asesoramiento adecuado del IICA.

La participación de CATIE ha sido específica en la parte pertinente a investigación agrícola en el área piloto de Allsides de manera de

estudiar las mejores alternativas de uso del suelo que previamente ha sido manejado desde el punto de su conservación, tarea ésta que fue de responsabilidad del Servicio de Conservación de Suelos del país.

Esta investigación está dirigida a su vez a crear tecnología para uso del pequeño agricultor, si se considera que Allsides es área característica tanto en condiciones de suelos como de concentración de pequeños agricultores, cuya unidad de producción es inferior a 1 hectárea (2.2 acres)

La investigación a nivel de campo fue iniciada en el presente año y se estima continuar por lo menos durante un período de tres años.

Recientemente, CATIE ha participado en los estudios de factibilidad de desarrollo de las áreas de Pinders y Two meetings, próximas a Allsides.

2. CAPACITACION

Es indudable que la acción de CATIE ha sido de mayor impacto, a la vez que ha tenido mayor continuidad, en la capacitación de personal profesional, a diferentes niveles.

El Anexo 3, presenta en detalle por países, el número de graduados a nivel de Magister Scientiae, y de otros a nivel no graduado. Estos datos son acumulativos desde el año 1947, por tanto cubre los períodos en que la Escuela Graduada era parte del IICA y ahora que funciona bajo el Convenio Universidad de Costa Rica/CATIE.

Nuevamente se detecta que Haití, República Dominicana y Jamaica han sido los países que más apoyo recibieran de CATIE en ambas formas de capacitación, luego en menor escala está Trinidad-Tobago.

Han sido igualmente importantes las acciones de capacitación ejecutados directamente en los países. Así por ejemplo en República Dominicana, recientemente se han dictado conferencias orientadas a profesores universitarios, estudiantes de zootecnia, profesionales en ganadería y ganaderos.

También se dictó un curso para técnicos nacionales en cultivo y manejo de cacao, el cual se realizó en la Estación Experimental de Mata Larga, San Francisco de Macorís.

En Haití se dictó un curso práctico en Producción Animal y Producción de Pastos a personal involucrado en proyectos de desarrollo ganadero.

Finalmente, CATIE por muchos años ha continuado haciendo envíos de material genético, con el fin de proporcionar material de alta calidad y producción para los programas de fomento y de investigación de los países de las Antillas.

En los últimos 3 años República Dominicana ha recibido de CATIE aproximadamente 337000 semillas de cacao, proveniente de híbridos de alta producción o de material de polinización abierta. Ambos provienen de la colección de cacao que posee CATIE en Turrialba y que es una de las más completas del mundo o de sus áreas experimentales y de producción situadas en la costa Atlántica del país.

Otro material genético que proporciona CATIE a los países de las Antillas es semilla de café, proveniente de su colección de introducciones que posee en Turrialba. En el periodo comprendido entre 1957 y 1977, Haití a recibido aproximadamente 507 kg; República Dominicana

aproximadamente 150 kg y Jamaica aproximadamente 64 kg de semilla de alta calidad en producción como en resistencia a la Roya del Café.

III. PERSPECTIVAS

Es evidente que el enfoque actual de los programas de investigación y de capacitación del CATIE se ajustan acertadamente a las condiciones predominantes que rodean al pequeño agricultor, tanto del área centroamericana como de la zona de las Antillas.

En ésta última, las estadísticas y datos en general que se conocen de países como Haití y Jamaica, dan evidencia de la alta concentración de pequeños agricultores cuyas unidades de producción son inferiores a 1 hectárea (2.47 ac.) y de la diversidad de cultivos que producen en tan reducidas áreas de terreno.

La tecnología que utilizan es de tipo tradicional, desde el momento que, al igual que en otras áreas de características similares, las técnicas generadas por los centros internacionales o por las estaciones experimentales no han tenido impacto en el agricultor de escasos recursos, por ser carentes de aquellos componentes que caracterizan a su medio; igual cosa se puede mencionar respecto a tecnologías importadas de países más avanzados.

Ante estas circunstancias, es evidente que el CATIE puede jugar un papel de preponderante importancia como generador de un nuevo enfoque de investigación caracterizado por estar dirigido hacia el agricultor de más escasos recursos, y por ser realizado a nivel de finca traspasando así las barreras del centro experimental clásico. Las condiciones del

agro en el área de las Antillas hacen favorable que ésta nueva forma de investigación puede ser adoptada por las instituciones responsables de crear tecnología dirigida al aumento de la producción de alimentos. La experiencia ya adquirida por el personal técnico del CATIE, a través de sus diversos proyectos de investigación y de producción en el área centroamericana lo convierten hoy en día en el centro por excelencia en éste nuevo tipo de investigación.

Sin embargo, la modalidad de investigación creada por CATIE hace indispensable que la participación de los países sea decidida a la vez que activa y efectiva, desde el momento que el programa de investigación que se inicia en un país es propiedad de éste con todas sus ventajas y responsabilidades, mientras que CATIE es el factor catalítico que motiva y acelera las acciones hasta que los equipos de trabajo de los países adquieren la capacidad y destreza de manejo que requiere el programa.

Consecuentemente,el rol que CATIE puede jugar en la investigación agrícola de los países de las Antillas, dependerá del grado de interés de los mismos y del adecuado respaldo financiero que pueda proporcionar para apoyar él o los programas de investigación, por cuanto que CATIE por sí mismo difícilmente puede ampliar el alcance actual de sus programas, con la financiación existente. Dejamos así claramente establecido el interés y deseo de CATIE de ser partícipe de la investigación agrícola del área antillana, con la seguridad de que su actual enfoque se ajusta plenamente a las características predominantes en los países del área.

El programa de capacitación del CATIE, tanto formal como informal se ajusta igualmente a su programa de investigación en todos sus Departamentos, desde el momento que todo proyecto de investigación lleva adjunto su correspondiente componente de capacitación tendiente a mejorar las capacidades y destrezas del personal técnico de los países que participan en los proyectos.

De igual manera, el CATIE mantiene las puertas abiertas para que los técnicos antillanos continuen haciendo uso de las facilidades que se les brinda, tan igual como lo hicieron tantos otros colegas, como se mencionó anteriormente.

Los mecanismos de ingreso a la Escuela Graduada se mantienen tal como lo fué en el pasado, y el primer contacto puede ser directo al CATIE o usando los canales intermediarios de las representaciones del IICA. Igual procedimiento puede seguirse para otro tipo de capacitación.

En el aspecto de capacitación informal, el CATIE está utilizando con singular éxito la realización de eventos directamente en los países participantes de sus proyectos con el fin de dar una mayor participación a técnicos del país, que de otro modo sería difícil trasladar a todos al CATIE.

IV. RECOMENDACIONES PARA EL FORTALECIMIENTO DE LA INVESTIGACION AGRICOLA NACIONAL EN LA ZONA DE LAS ANTILLAS

1. FORTALECIMIENTO A NIVEL DE PAIS

El fortalecimiento de la investigación Agrícola en una región es lógica consecuencia del fortalecimiento adquirido por cada uno de los países que la componen.

En América Latina en general, la investigación agrícola es realizada en escala y nivel variables por diversos centros, que pueden identificarse de la siguiente manera:

a) Departamentos o Divisiones especializadas de los Ministerios de Agricultura

b) Estaciones experimentales, oficiales y no oficiales

c) Institutos autónomos o semi-autónomos dependientes del Ministerio de Agricultura

d) Institutos estatales independientes del Ministerio de Agricultura

e) Unidades o secciones de otros Ministerios

f) Facultades de Agronomía, Colegios e Institutos Agropecuarios, Escuelas Prácticas de Agricultura

g) Empresas trans-nacionales

h) Centros regionales e internacionales

En la mayoría de nuestros países, la coordinación que existe entre los diversos centros de investigación, es ténue y superficial,consecuentemente existe gran duplicidad de esfuerzos en todo sentido.

En tales circunstancias, para conseguir el fortalecimiento de la

investigación es imprescindible que cada centro de investigación se considere como un nódulo componente de una red nacional de investigación con un flujo constante emisor-receptor de información tecnológica de y hacia nódulos vecinos. Estos nódulos a su vez deberán estar debidamente conectados a un centro motor que debiera ser el organismo de mayor jerarquía en el país relacionado con el sector agropecuario. De éste modo y a través de adecuada planificación y ejecución de actividades podrá obtenerse el máximo de rendimiento, evitando en cualquier caso duplicidad de esfuerzos y duplicidad de acciones.

El otro aspecto, a nivel de país, que debe ser considerado como indispensable para lograr el fortalecimiento de la investigación,es que ésta sea dirigida hacia la solución de problemas reales que de uno u otro modo sean limitantes a la producción de alimentos. De ninguna manera la investigación debe ser el resultado de los deseos del investigador.

Finalmente y complementando los dos aspectos anteriores, será necesario mantener en todo momento un programa de capacitación dinámico que permite mantener "al día" al personal técnico responsable por las acciones de campo.

2. FORTALECIMIENTO A NIVEL REGIONAL

A nivel regional el fortalecimiento de la investigación será obtenido uniendo los nódulos centrales de los países, para conformar una red regional de investigación, debidamente coordinada por un organismo o nódulo central regional responsable de políticas y directrices para el mejor desarrollo de acciones en la región.

Tanto a nivel de país como a nivel de región un centro de información y de comunicación que permita el flujo continuado de los resultados generados en la investigación, es imprescindible para permitir que la investigación tenga el debido impacto, especialmente a nivel del agricultor, ya que el fortalecimiento de la investigación será posible únicamente si sus resultados llegan y son acpetados por el agricultor a todo nivel.

3. COOPERACION INTERNACIONAL

La cooperación internacional, en el campo agrícola, en los países de América Latina en general, se manifiesta bajo la forma de centros internacionales de investigación o más comunmente por la presencia de agencias de fundaciones y otros organismos de diversa índole cuya función es de canalizar asistencia técnica al país o donaciones para proyectos específicos incluyendo la capacitación de técnicos nacionales.

Los esfuerzos son controlados mediante convenios con diversas agencias del gobierno del país; pero en la mayoría de los casos no existe coordinación alguna entre esas agencias de apoyo, y con frecuencia ellas se manejan dentro del país con mucha autonomía. De manera que si se considera a la "cooperación internacional" como un medio para fortalecer la investigación en los países, ella debería estar debidamente coordinada por el organismo rector del sector agrícola para que la ayuda o cooperación que se recibe sea debidamente planificada y canalizada hacia la solución de problemas que de uno u otro modo limitan la producción de alimentos.

V . BIBLIOGRAFIA CONSULTADA

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3. CENTRO AGRONOMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA. Reunión de posibles donantes del CATIE. Marzo 18, 1977. Turrialba, Costa Rica, CATIE 1977. 46 p.

4. _____. Memoria Anual 1976-1977. Turrialba, Costa Rica, CATIE. 1977. 347 p.

ANEXO 1

LISTA DE PERSONAL PROFESIONAL

NOMBRE:	NACIONALIDAD:	CARGO:
	DIRECCION	
Fonseca, Santiago (Ph.D.)	Colombia	Director
Delfino, Gustavo	Uruguay	Asistente del Director en Asuntos Administrativos
Erickson, Arnold (M.S.)	EUA	Encargado de la Oficina de Relaciones Públicas
Méndez, José Miguel (Adm.Emp.Agr.)	Costa Rica	Jefe Administrativo-Tesorero
	DEPARTAMENTO DE CULTIVOS Y SUELOS TROPICALES	
Soria, Jorge (Ph.D.)	Ecuador	Genetista, Jefe del Departamento
Arze, José Agustín (M.S.)	Perú	Residente del Proyecto en El Salvador
Bazán, Rufo (Ph.D.)	Bolivia	Edafólogo
Burgos, Carlos (Ph.D.)	El Salvador	Agrónomo, Especialista en Manejo de Suelos
Díaz-Romeu, Roberto (Mag.Agr.)	Guatemala	Jefe de Laboratorio de Suelos, Proyecto Fertilidad de Suelos
Engels, Johannes (Ing.Agr.)	Holanda	Especialista en Recursos Genéticos
Enríquez, Gustavo (Ph.D.)	Ecuador	Especialista en Agronomía
Fargas, José (Ph.D.)	Ecuador	Fitofisiólogo
Golbach, Heiner (Ph.D.)	Alemania	Fisiólogo en Semillas
Hart, Robert (Ph.D.)	EUA	Agrónomo, Sistemas de Producción. Residente en San Pedro Sula, Honduras

NOMBRE:	NACIONALIDAD:	CARGO:
Holle, Miguel (Ph.D.)	Perú	Horticultor
Jackson, Michael (Ph.D.)	Reino Unido	Fitomejorador
Jiménez, Humberto (M.S.)	Colombia	Especialista en Comunicación
Johnston, Tim David (Ph.D.)	EUA	Especialista en Mercadeo
King, Andrew B.S. (Ph.D.)	Reino Unido	Entomólogo
León, Jorge (Ph.D.)	Costa Rica	Jefe del Banco de Recursos Genéticos de Plantas Cultivadas.
Locatelli, Eduardo (Ph.D.)	Uruguay	Especialista en Controles de Malezas Tropicales
Meneses, Róger (Ing.Agr.)	Costa Rica	Agrónomo en Sistemas
Moreno, Raúl (Ph.D.)	Chile	Fitopatólogo
Navarro, Luis (Ph.D.)	Chile	Economista Agrícola
Ñoño, Pedro (Ph.D.)	Colombia	Biometrista
Palencia, Aníbal (M.S.)	Guatemala	Agrónomo, Especialista en Fertilidad de Suelos Residente en Managua, Nicaragua.
Paredes, Alfredo (Agr.)	Ecuador	Horticultor Asistente
Saunders, Joseph (Ph.D.)	EUA	Entomólogo
Shenk, Myron (Ph.D.)	EUA	Especialista en Controles de Malezas Tropicales
Stryker, Ronald (Ph.D.)	EUA	Especialista en Fertilidad de Suelos Residente en Tegucigalpa, Honduras
Walker, James (Ph.D.)	EUA	Especialista en Fertilidad de Suelos

NOMBRE:	NACIONALIDAD:	CARGO:
	CONSULTORES	
Andrade, Eduardo (Lic)	Ecuador	Asistente en Recolección y procesamiento de datos
Camacho, Edilberto (Mag.Agr.)	Costa Rica	Horticultor
Larios, Francisco (M.S.)	El Salvador	Agrónomo, Residente en San Salvador
	EMERITO	
Sylvain, Pierre G. (Ph.D.)	Haití	Horticultor
	DEPARTAMENTO DE GANADERIA TROPICAL	
Muñoz, Héctor (Ph.D.)	México	Zootecnista, Jefe del Departamento
Avila, Marcelino (M.S.)	Belice	Economista Proyecto CIID/CATIE
Cubillos, Gustavo (Ph.D.)	Chile	Agrostólogo
Deaton, Oliver (Ph.D.)	EUA	Zootecnista
Fuentes, Luis Guillermo (Ing.Agr.)	Costa Rica	Administrador de Campo-Finca Ganadería
Pezo, Danilo (M.S.)	Perú	Asistente de Investigación
Pineda, Jaime (Ph.D.)	Colombia	Zootecnista, Especialista en Producción Ganadera Residente en San Pedro Sula, Honduras
Ramírez, Alberto (M.S.)	Colombia	Zootecnista, Especialista en Producción y Utilización de Forrajes. Residente en San Pedro Sula, Honduras
Ruiz, Arnoldo (M.S.)	Costa Rica	Asistente de Investigación
Ruiz, Manuel, (Ph.D.)	Perú	Nutricionista
Vohnout, Karel (Ph.D.)	Ecuador	Nutricionista

NOMBRE:	NACIONALIDAD:	CARGO:
DEPARTAMENTO DE CIENCIAS FORESTALES		
Budowski, Gerardo (Ph.D.)	Venezuela	Dasónomo, Jefe del Departamento
Dalfelt, Arne (M.S.)	Noruega	Especialista en Manejo de Areas Silvestres
Gewald, Nico Jan (M.S.)	Holanda	Silvicultor Tropical
González, Guillermo (M.S.)	Costa Rica	Jefe-Laboratorio de Productos Forestales Residente en San José Costa Rica (Universidad de Costa Rica)
Hudson, John (B.S.)	Reino Unido	Ingeniero Forestal. Especialista en Manejo. Control de Incendios Forestales. Residente en Siguatepeque, Honduras.
Ramírez, Luis Fernando (B.S.)	Costa Rica	Tecnólogo de Maderas Residente en San José Costa Rica (Universidad de Costa Rica)
Rosero, Pablo (Mag.Agr.)	Ecuador	Dasónomo, Manejo Forestal
San Román, Manuel (Ing.Quím)	Costa Rica	Tecnólogo de Maderas Residente en San José Costa Rica (Universidad de Costa Rica)
* Zadroga, Frank (M.S.)	EUA	Manejo de Cuencas Hidrográficas
* Zeaser, Donald (M.S.)	EUA	Silvicultura Tropical y de Bosques Naturales y Artificiales

* A tiempo parcial (40%)

ANEXO 2.1

PRESUPUESTO CATIE

RESUMEN DE LA PROCEDENCIA DE LOS FONDOS

	1	2	3	TOTAL
OPERACIONES BASICAS				
Fondos no restringidos	916,880	5,000		921,880
Fondos restringidos	183,150		19,550	202,700
Sub-total	1,100,030	5,000	19,550	1,124,580
PROYECTOS ESPECIALES	832,375		43,038	875,413
Fondos Totales	1,932,405	5,000	62,588	1,999,993

1. Presupuesto aprobado en la Reunión Ordinaria del Consejo Directivo del 2 de junio de 1976.
2. Adicionales aprobados en la Reunión Extraordinaria del 20 de setiembre de 1976.
3. Adicionales obtenidos durante el año fiscal, por nuevos Contratos o Convenios, o por ampliación de los ya existentes.

ANEXO 2.2.

FONDOS NO RESTRINGIDOS

INGRESOS 1976-1977

EN US$

	Aprobado	Ingresado al 30/6/77	Diferencia
IICA	500,000	500,000	-
GOBIERNO DE COSTA RICA	50,000	50,000	-
GOVIERNO DE PANAMA	50,000	50,000	-
INGRESOS PROPIOS:			
a) Convenios y Contratos	55,000	49,056	5,944
b) Servicios brindados	95,400	105,100	(9,700)
c) Operaciones comerciales	105,480	105,480	-
d) Productos Agr.Experimentales	3,000	4,200	(1,200)
e) Otros	-	2,044	(2,044)
SALDO DEL EJERCICIO ANTERIOR	63,000	63,000	-
T O T A L E S	921,880	928,880	(7,000)

ANEXO 2.3.

FONDOS RESTRINGIDOS Y PROYECTOS ESPECIALES

(EN US$)

	Fondos Asignados	Ejecutado	Diferencia
I. Aprobados en Presupuesto 1976-1977			
FONDOS RESTRINGIDOS			
Laboratorio de Productos Forestales	50.000	49.747	253
Oficina del Café de Costa Rica	7.800	7.218	582
Financiación de Becas	125.350	125.350	---
Sub-Total	183.150	182.315	835
PROYECTOS ESPECIALES			
CATIE/ROCAP-Sistemas de Cultivo para Pequeños Agricultores	400.000	384.184	15.816
Centro Internacional de la Papa (CIP)	20.000	18.979	1.021
Ministerio de Desarrollo Agropecuario (MIDA), Panamá	50.000	21.155	28.845
Banco Central de Honduras (BCH)	135.000	30.245	104.755
Sociedad Alemana de Cooperación Técnica Ltd. (GTZ)	140.000	93.734	46.266
American Cocoa Research Institute (ACRI)	18.500	18.500	---
AID/ROCAP-Guatemala (Fertilidad de Suelos)	68.875	68.875	---
Sub-Total	832.375	635.672	196.703
T O T A L	1.015.525	817.987	197.538
II. Recursos adicionales obtenidos durante el año fiscal			
FONDOS RESTRINGIDOS			
Financiación de Becas	19.550	19.550	---
PROYECTOS ESPECIALES			
American Cocoa Research Institute (ACRI)	6.026	6.026	---
AID/ROCAP-Guatemala (Fertilidad de Suelos)	4.014	4.014	---
International Development Research Centre (IDRC)	7.751	7.751	---
Rockefeller Brothers Fund*	25.247	25.247	---
	62.588	62.588	---

* Proyectos nuevos

ANEXO 3

Número de profesionales de los países de las Antillas, que obtuvieron el grado de Magister Scientiae (Julio 1947-Diciembre 1977)

País	Extens. Agrícola	Econom. Agrícola	Rec. p/ Desarrollo	Cult. y Suelos		Ciencias Forest.	Ganad. Tropical	Total
Haití	4	-	1	6		1	9	21
Rep. Dom.	-	3	1	8	2	2	3	17
Jamaica	-	-	-	1		-	-	1
Trinidad	-	-	-	1		-	-	1

Número de profesionales de los países de las Antillas que recibieron capacitación informal (Julio 1947-Diciembre 1977)

País	Información	Biblioteca	Extensión Agri.	Cultivos y Suelos	Ciencias Forest.	Ganad Trop.	Total
Haití	5	2		16	1	4	28
Rep. Dom.		5		20			25
Jamaica			4	8			12
Trinidad				2			2

FITO-785-77
RB/lmb

CATIE

Questions from :

1.- BELL, Louis A. (Jamaica)

I heard Costa Rica had a weight gain problem on some cattle ranches. Has the cause been identified?

ANS.- Unfortunately I am not aware of the causes responsible for that happening.

2.- Dr. THAI (DRIPP/Haiti

How many students in your Graduate Program each year? Pattern of Students in Each Branch?

ANS.- Approximately, 50 to 60 students is the present load in the graduate school. The number of students depend first in the number of scholarships available; although self financed students, or financed by their own institutions are also welcome.
Students are now a day graduated as Production Specialists, in accordance to our research program.

THE CARIBBEAN DEVELOPMENT BANK AND AGRICULTURAL DEVELOPMENT [1]

I. INTRODUCTION

The Caribbean Development Bank places major emphasis on agriculture in its programme. It is not involved directly with programmes of research in agricultural science and technology development, but recognizes the importance of such endeavors in the setting of development priorities in the Region and where possible gives support to it. However, in its operation, the bank undertakes research which is mainly in the form of information retrieval or analysis which it needs in formulating projects and subjecting them to appraisals which will stand the test of accepted criteria for financial and economic viability. Obviously the information supply in such exercises must originate from research organizations as well as appropriate commercial operations and service institutions.

1.1 Historical Background

The Bank is a relatively new International Financial Institution. It was formally inaugurated in early 1970 but did not begin operations until the later part of that year when its first staff members were in place. Its headquarters is in Barbados.

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1) Presentation by Dr Lewis C. CAMPBELL, Director of the Agriculture Division Caribbean Dev. Bank.

Its initial subscribing members included Jamaica, Trinidad-Tobago, Bahamas, Guyana, Barbados, Antigua, Belize, Dominice, Grenada, St. Kitts, Nevis, Anguilla, St. Lucia, St-Vincent, Montserrat, The Virgin Islands, Cayman Islands, Turks and Caicos Islands, Canada and United Kingdom. Since then membership was given to Venezuela and Colombia. Its lending operations are concentrated for the time being in the English speaking Caribbean States.

1.2 Objectives

The purpose of the Bank is essentially to contribute to the harmonious economic growth of the member countries in the Caribbean and to promote economic cooperation and integration among them, having regard to the special needs of its less developed members.

1.3 The organizational structure of the bank provides for a Board of Governors, a Board of Directors, a President, a Vice-President and operational staff. All powers of the bank are vested in the Board of Governors which is comprised generally of Ministers of Finance or Planning of Member States or their representatives. The Board of

Governors can delegate certain of its powers to the Board of Directors who are generally responsible for direction of the general operations of the Bank. The Board of Directors comprises of ten members allocated according to shareholdings of members or groups of members and it is chaired by the President. The day-to-day administration of the Bank is conducted by the President who is assisted by seven divisional directors, one of them also functions as Vice-President.

1.4 Functions

In order to achieve its objectives the Bank is empowered to undertake the following functions:

a) to assist Regional Members in the coordination of their development programmes with the view to achieving better utilization of their resources, making their economies more complementary, and promoting the orderly expansion of their international trade, in particular intra-regional trade;

b) to mobilize within and outside the Region additional financial resources for the development of the Region;

c) to finance projects and programmes contributing to the development of the Region or any of its regional members;

d) to provide appropriate technical assistance to its regional members, particularly by undertaking or commissioning pre-investment surveys and by assisting in the identification and preparation of project proposals;

e) to promote public and private investment in development projects by, among other means, aiding financial institutions in the Region and supporting the establishment of consortia;

f) to cooperate and assist in other regional efforts designed to promote regional and locally controlled financial institutions and a regional market for credit and savings;

g) to stimulate and encourage the development of capital markets within the region, and

h) to undertake or promote such other activities as may advance its purpose.

The Bank also can, where appropriate, cooperate with national, regional or international institutions or organizations concerned with the development of the Region.

1.5 Human and Financial Resources

The staff of the Bank number approximately 120 (1977) officers, of which roughly half are professionals with at least a first degree or equivalent qualification. These serve with the seven divisions in the fields of (1) agriculture, (2) industry and tourism, (3) technical (infrastructure & housing), (4) legal, (5) economic and projects appraisal, (6) finance, and (7) administration. The agriculture division has a staff complement of 25 professionals based at headquarters and in the field, undertaking project identification, formulation, appraisal, and supervision. In general, the Bank has been able to recruit a very competent group of professionals who approach their work with considerable enthusiasm and have demonstrated in a relatively short period of time considerable degree of competence in the various development banking operations.

The financial resources of the Bank for its ordinary operations come from its share capital and borrowings from various sources including international financial organizations and the open money market. In addition it has received substantial contributions to its Special Development Fund and other special funds from a number of countries interested in the development of the Region or special operations.
By the end of 1977 the Bank will have committed for a wide range of project more than US $130, millions, of which roughly half will have been disbursed. The cost of administration of the Bank is carried by its earnings

from investments and from limited technical assistance funds. It does not depend on subventions from member governments for its administrative operations.

II. The main activities of the Bank have been in the financing of development projects primarily in the productive sectors of agriculture, industry, tourism and the support services and infrastructure for these.

To this it has undertaken with its own staff most of the formulation and appraisal of projects and the supervision of the disbursement of funds. It has used the services of consultants on some occasions and it is expecting to do to an increasing degree as its portfolio of projects expand in the future.

It is too early to measure the achievements of the Bank. Levels of loan commitments and disbursements could be used as a guide but this is not adequate as a proper measure of its development success.

In its operations, the Bank has been particularly active in agriculture and it will continue to pay attention to broadening and strengthening the agriculture base in the Region, giving special support to regional efforts at greater self-sufficiency in the food supplies and promoting greater diversity and volume of agricultural exports.

III. Perspectives

The Bank expects to continue playing active roles in various

aspects of development, and in particular, directing attention to achieving a greater measure of economic benefits for the vast majority of the region's poor, by making better use of local resources through the application of appropriate technologies directed at raising productivities. In this regard the needs of agriculture and rural development will receive high priority.

The Bank recognizes the need for research and technology development operations if its financial resources are to be fully used for the benefit of the main productive sector and actively gives support where possible to the work of Agencies and Organizations established for this purpose. For instance, it has been involved in the work of the Caribbean Agricultural Research and Development Institute from its inception and assists the Faculty of Agriculture in some of its teaching curricula development and examination functions.
The short supply of professional, technical and managerial skills for development in the Region could be the major limiting factor to greater economic growth and wherever it can influence some relief in this direction, the Bank will endeavour to play a role.

QUESTIONS - From John SPENCE

(1) With the greater channelling of funds through the CDB, it now has a very powerful role in influencing development. Does the Bank have machinery for consulting other competent organizations such as CARDI, UWI, CARICOM, etc... or for them to influence the Bank's activities.

ANSWER -

The Bank works very closely with the CARICOM Secretariat particularly with regard to regional initiatives in matters of development projects and policies. With regard to CARDI it has a representative on the Board of Directors and the Director of its Agriculture Division serves on CARDI's Board as its Chairman, although in this instance in an individual capacity and not as a Representative of the Bank. The Bank also influences to some extent the Direction of Manpower Training and Development with its loan operations. There is no mechanism for these institutions to influence the Bank directely.

QUESTION - From Robert CASSAGNOL

Does the Bank use only members of its staff for economic feasibility studies of projects submitted for consideration, or does it also use consultants as the IDB or World Bank?

ANSWER -

Until recently most of the preinvestment studies for the Bank's lending operations were undertaken by bank staff. It will however in the future be making increasing use of consultants for some of this work as it establishes and expands on a special preinvestment and technical assistance fund, specifically for this purpose.

CARIBBEAN DEVELOPMENT BANK (CDB)

Question from:

1. CASSAGNOL, Robert (Haiti)

   Do you use only members of your own staff for economic feasibility studies of projects submitted for your consideration, or do you use consulting firms like IBD and BIRD ?

2. SPENCE, John (Trinidad-Tobago)

   a) With the greater chanelling of funds through the CDB it now has a very powerfull role in influencing agricultural development. Does the bank have a machinery for consulting other competent organizations example CARDI, UWI, CARICOM, SECRETARIAT, etc.....

   b) Does not the attractiveness of CDB salaries attract staff from other institutions where they are sorely needed to do jobs at the bank which could be done by less well qualified staff ?

CONTRIBUTION OF THE CARIBBEAN FOOD CROPS SOCIETY TO AGRICULTURAL RESEARCH IN ANTILLES ZONE

I. Introductory Information about the Caribbean Food Crops Society (CFCS)

1.1 Historical Background: The CFCS came to being on the morning of May 3, 1963, at the Central Secretariat of the now non-existing Caribbean Organization, located, at that time in Hato Rey, Puerto Rico. Dr. Richard M. Bond (deceased) acting as Chairman, presided over the meeting. Other persons present and taking an active part in the formation of the CFCS were: Sr. Francisco Aponte Aponte, Sr. Carlos Aponte-Morán, Dr. Hassan Azzam (deceased), Sr. Carlos D. Acosta-Colorado, Mr. C. P. Erskine-Lindrop, Mr. A. dek. Frampton, Sr. Miguel A. González-Flores, Mr. G. C. L. Gordon, Dr. Arnold Krochmal, Sr. Jorge Mejía-Mattei (deceased) and Mr. Hugh C. Miller. These gentlemen, recognized today as the 12 founding members of CFCS, promptly elected its officers, drafted a Constitution and Bi-Laws, under which this Society continues to function at present. A prospectus was prepaired, inviting membership, and circulated throughout the Caribbean, and was received favorably.

The President, Dr. R. M. Bond called the first CFCS meeting to order at Christianstead, St. Croix, U.S.V.I., on October 7, 1963. Registered attendance was 49 persons with 40 from overseas, representing 10 countries (Antigua, Canada, Dominica, Guadeloupe, Jamaica, Montserrat, Puerto Rico, Tortola B.V.I., Trinidad, & the United States). Eighteen papers dealing with food crops research were presented. Since that date, CFCS has celebrated the following meetings:

October 19-23, 1964, at Bridgetown, Barbados.
August 9-13, 1965, at Río Piedras, Puerto Rico.
July 25, to August 1, 1966, Kingston, Jamaica.
July 24-31, 1967, Paramaribo, Surinam.
July 7-13, 1968, St. Augustine, Trinidad
June 30, to July 5, 1969, Fort de France, Martinique, F.W.I.
June 14-19, 1971, Georgetown, Guyana.
June 12-15, 1972, Mayaguez, Puerto Rico
July 2-6, 1973, Cave Hill, Barbados.
July 1-6, 1974, Kingston, Jamaica.
July 6-12, 1975, St. Augustine, Trinidad.
June 27, to July 2, 1977, Gosier, Guadeloupe, F.W.I.

1.2 Objectives: As set forth by the CFCS Constitution, are as follows:

To advance Caribbean food production and distribution in all their aspects, to the end of improving levels of nutrition and standards of living in the Caribbean area through:

Facilitating exchange of material and information on all aspects of food production, processing and marketing, and:

Stimulating the presentation of information on food production, processing and marketing, and:

Assisting in the general dissemination of information on the production, processing and marketing of food crops, and:

Provide a regional consultant service on food crops for the Caribbean area, and:

Maintain close contact with research problems and progress in the fields of food crop production, processing, and marketing, and:

Work towards the coordination of research and development programmes, and the optimum use of resources available in the Caribbean, and stimulating the development of joint projects of research and development, where such projects can be of value to the region as a whole, and:

Cooperation with other Organizations dedicated to the fastering of cooperation between the countries of the Caribbean area.

1.3 Formal Organization: The Society is not affiliated to any political on other Organization nor to any Government, and will not permit its affairs to be directed by any individual or group of individuals not properly authorized to control its affairs. The Society will be administered in accordance with decisions taken by the Board of Directors of the Society by votes of a majority of the Directors.

The authorized officers of the CFCS are: a President, Vice President, Secretary, Treasurer, Board Chairman, and six Board Members.

The President and Vice-president are elected at the annual business meetings. They are always elected from the membership of the Country that will host the next annual meeting.

The Secretary and Treasurer are elected or reelected at the annual business meetings. Due to the semi-permanent nature of the Society files, records, publications, receipts, banking, payments, etc., these officers are always elected from the membership of a same country.

The immediate past President automatically becomes the Chairman of the Board of Directors for one year, and is the presiding officer at all Society Business meetings.

The Society has six Board Members, and upon election from the general membership, serve a two year term and may be reelected for one term only.

Working Committies are appointed from active membership by the Board of Directors.

1.4 Functions: The Society functions are the persuit of the objectives outlined in Par. 1.2. This is accomplished through a week long meeting, which is held in one of the Caribbean countries yearly.

1.5 Human & Financial Resources: The Society has 304 members in 21 countries. Approximately 60% are current with their annual dues, which is $10.00 (US). Contributing membership is $100.00 (US) per annum, and the Society has 18 members that contribute with frequency. CFCS bank balance as of October 31, 1977 was $2226.35 (US).

II. Activities carried out in the Antilles Zone from 1970 to 1977

2.1 Countries and Institutions Involved: 1970. VIII Meeting, Santo Domingo, República Dominicana, August 24-28, 1970. Dr. Pedro E. Morales Troncoso, President. Registered attendance 47 persons, with 35 from overseas, representing 13 countries (Antigua, Barbados, Curacao, Dominica, French Guyana, Guadeloupe, Guyana, Jamaica, Martinique, Mexico, Puerto Rico, Trinidad and the U.S. Virgin Islands). Twenty-three papers presented in three working sessions. Field trips to Azua, Centro Nacional de Investigaciones Agropecuarias (CNIA) and El Cibao.

1971. IX Meeting, Georgetown, Guyana, June 14-19, 1971. Mr. H. A. D. Chesney, President. Registered attendance 51 persons, with 38 from overseas representing 13 countries (Antigua, Barbados, Columbia, Dominica, French Guyana, Guadeloupe, Jamaica, Martinique, Puerto Rico, St. Lucia, Surinam, Trinidad and the U.S. Virgin Islands). Twenty-eight papers presented in seven working sessions, with a special session devoted to Rice production. Field trips to the Sugar Experiment Station, Central Agricultural Station, Kibilibiri Agricultural Project and the Ebini Cattle & Crop Research Station.

1972. X Meeting, Mayaguez and Rio Piedras, Puerto Rico, June 12-15, 1972. Dr. Miguel A. Lugo-López, President. Registered attendance 68 persons with 46 from overseas representing 18 countries (Antigua, Barbados, Curacao, Dominican Republic, French Guyana, Guadeloupe, Guyana, Jamaica, Martinique, Montserrat, Nicaragua, St. Kitts, St. Lucia, St. Vincent, Surinam, Trinidad, United States, and U.S. Virgin Islands). Forty-three papers presented in five working sessions. Field trips to Univ. of P.R. Mayaguez Campus, Federal Experiment Station at Mayaguez, Univ. of P.R. Experiment Substations at Corozal Juana Díaz and Isabela. Tour of the Main Station at Rio Piedras, including the Food Technology Laboratory, the Rum Pilot Plant, and other facilities.

1973. XI Meeting, Cave Hill, Barbados, July 2-6, 1973. Mr. W. deCourcey Jeffers, President. Registered attendance 98, with 52 from overseas representing 15 countries (Antigua, Dominica, Dominican Republic, French Guyana, Granada, Guadeloupe, Guyana, Jamaica, Martinique, Montserrat, Puerto Rico, St. Vicent, Trinidad, United States, and U. S. Virgin Islands. Thirty-eight p papers presented in six technical sessions, including a special session on Onion production. All day field trip, M.A.S.T. Facilities at St. Phillips, an Onion farm, three vegetable farms, M. A.S.T. Fruit Research station at St. Andrews and a Dairy farm.

1974. XII Meeting, Kingston, Jamaica, July 1-5, 1974. Mr. Hugh C. Miller, President. Registered attendance 132 persons with 50 from overseas representing 13 countries (Antigua, Barbados, Dominican Republic, French Guyana, Guadeloupe, Guyana, Martinique, Montserrat, Puerto Rico, St. Vicent, Trinidad, United States, & U. S. Virgin Islands). Fifty-six papers presented in 11 technical sessions including special sessions on Root Crops production. Field trips included visits to Bodles Research Station, farming reclaimed lands at Battersea by Alcan, root crop farms at Christiana and the Grove Place Research Station. Also there were excursions to the Agricultural Marketing Corporation, Food Technology Institute, Pioneer Hibred Tropical Breeding Station, and the Vegetable & Tree Crops Research Station at Lawrencefield.

1975. XIII Meeting, St. Augustine, Trinidad, July 6-12, 1975. Dr. Syed Q, Haque, President. Registered attendance 93 with 31 from overseas representing 13 countries (Antigua, Barbados, Dominica, French Guyana, Grenada, Guadeloupe, Guyana, Jamaica, Martinique, Puerto Rico, St. Vicent, United States & U. S. Virgin Islands). Forty-six papers presented in 14 technical sessions, including special sessions on Edible Legume crops. Field trips were to the University Field Station, Chaguaramas Agricultural Project and a private farm at Wallerfield specializing in the production of coconuts for water, watercress and mangos.

1976. No Meeting celebrated.

1977. XIV Meeting, Gosier, Guadeloupe, F. W. I., June 27-29, and Trois Ilets, Martinique, F. W. I., June 30 to July 2, 1977. Dr. Lucien M. Degras, President. Registered attendance 107 persons, with 51 from overseas representing 15 countries (Antigua, Barbados, Canada, Cuba, Dominica Republic, Haiti, Jamaica, Puerto Rico, St. Kitts, Surinam, Trinidad, United States, U. S. Virgin Islands and Venezuela. Fifty-eight papers presented in 11 technical sessions, including special sessions on relation between Research and Extension (Development). Field trips in Guadeloupe were to: I.N.A. at Domaine Duclos, a Vegetable Growers Cooperative and the I.R.F.A. at Neuf Chateau. In Martinique: I. R. A. T. at Lamentin, the vegetable farm of M. de Reynal at Vauclin and the Irrigation Research Station at St. Anne.

Note: The Institutions involved in relation to each Meeting are too numerous to list here. At each Meeting, no less than 12 Government agencies, Cooperatives, and Agri-business concerns assisted in one way or the other.

2.2. Nature and Scope of activities both current and completed: All activities revolve around Caribbean agriculture, based on the exchange, by members, of scientific data obtained from research, teaching and extension activities currently in progress in their respective countries. These activities reflect advancement in food production, processing and marketing. Results have been well accepted at the scientific meetings, workshops, and study groups.

2.3 Results and Products: Publication of the CFCS Proceedings.
Vol. 8, 1970, (Dominican Republic), 23 papers and summaries, 56 pages, published.
Vol. 9, 1971, (Guyana), 28 papers and summaries, not published.
Vol. 10, 1972, (Puerto Rico), 43 papers and summaries, 151 pages, published.
Vol. 11, 1973, (Barbados), 38 papers and summaries, 473 pages, published.
Vol. 12, 1974, (Jamaica), 56 papers and summaries, 171 pages, published.
Vol. 13, 1975, (Trinidad), 46 papers and summaries, in press.
Vol. 14, 1977, (Guadeloupe-Martinique), 58 papers and summaries, in press.

2.3.1. Nature and Scope of Results: The acceptance of CFCS publications has been most favorable. Individual copies and complete sets have been solicited by Universities, Government Agencies, individual members and non-members from many countries. The National Agricultural Library of the U. S. Department of Agriculture has burchased a set of the Proceedings for deposit, and for abstracting and inclusion in the USDA Bibliography of Agriculture.

2.3.2. Relevance to Rural Development needs of the countries involved: The Proceedings are usually published, on a priority basis, by various agencies of the country that was host to the meeting. This often results in issue delay, at times up to three years following presentation.

To avoid such a delay in the desimmination of information, the author is now required to produce a minimum of 150 copies, at the time of presentation, for general distribution. This insures the meeting participants of immediately available information, which they may utilize, as they see fit, upon return to their home country.

III. Perspectives (1978-1983)

3.1. Proposed targets: 1978, XV Meeting. Paramaribo, Surinam, date to be announced by Mr. Frank A. del Prado, President.

1978-1983, Investigate the possibilities of holding Meetings in Caribbean countries not yet visited by CFCS, e.g., Haiti, Cuba, Netherlands Antilles (Curacao), Bahama Islands, and Belize, in no fixed order. Revisit, in no less than ten years; St. Croix, Dominican Republic, Guyana and other countries.

A more rapid method of publishing and distribution of information (proceedings, newsletters, etc.).

Seek more International outlets for abstracts of the CFCS Proceedings, e.g., Agrinter, CAB Abstracts, etc.

Improve laison with FAO-UN.

Continue investigation of possible coordination of CFCS with IICA-OEA activities.

Sponsor workshops, apart from regular Meetings, on topics of general Caribbean interest (food technology, pesticides, mechanization, etc.).

Update and re-publish CFCS Professional Register.

3.2 Strategies and Means to reach targets: To accomplish items listed in the above Par. 3.1, the activities of CFCS must be made better known throughout the Caribbean Basin. In order to accomplish these proposed targets, a publicity compaign for new members, particularly Contributors will be intitated, with vigor, in the near future.

3.3 Expected Results and Products: Patterns of response to such compaigns in the past have been fair to poor, particularly from Contributing members. A new, positive approach, explaining benefits and advantages to Contributors should yield positive results.

3.3.1 Nature and Scope: With more funds available, future meeting arrangements would be simplified. The Society could do its own publishing, thus making the information more rapidly available for distribution. Travel grants could be sponsored. Workshops, at least one a year, apart from the general meeting could then become a reality.

3.3.2 Relevance to Rural Development needs of the country: If the available information of food crop production, processing and marketing, could be more rapidly distributed to fellow workers in all member countries, it would produce a more effective understanding of the methods for the solution of the Rural Development problems common to all of us. Yearly sponsored workshops on topics that require immediate or urgent attention would even produce more rapid solutions to Rural Development problems

IV. Recommendations for Strengtening National Agricultural Research in the Antilles Zone:

4.1 Country Level: Travel grants, sponsored by the country, permitting more members to take an active part in CFCS activities.

Closer coordination of research and development activities of the various agencies within the country, thus avoiding duplication of expense and effort.

4.2 Regional Level: A coordinated effort permit ng the ease of exchange of knowledge, results and personnel to seek solutions to the problems of food production, processing and marketing, common to all the nations of the Caribbean.

4.3 International Level: Same as Par. 4.2, except on a International level.

V. Additional Comments and Proposal

The population of the Caribbean Islands, excluding mainland Central and South America, consists of more than 26 million persons, (W.I. & Caribbean Yearbook, 1974). A population increase of 46 million, or more persons in the Caribbean by the year 2000, is not considered unrealistic by some demographers. It is near impossible to grasp the magnitude of the logistics and personnel required to produce, process and market the food alone required for this population expected by the year 2000.

Therefore, it is proposed, that a meeting of all Directors of Agricultural Experiment Stations in the Caribbean gather for the presentation of their Institutions long range (10 years, or more) Agricultural Research Program. Such a meeting, with honest and forthright dialogue, would be enlightining, demonstrate Caribbean unity, avoid wastful duplication in certain areas of Research, and serve a common benefit to all of the Caribbean Nations, Territories, and States.

November 15, 1977

CONTRIBUTION OF THE FACULTY OF AGRICULTURE, UNIVERSITY OF THE WEST INDIES TO AGRICULTURAL RESEARCH IN THE ANTILLES ZONE

By

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I. INTRODUCTION

The Faculty of Agriculture of the University of the West Indies derives from the Imperial College of Tropical Agriculture (I.C.T.A.). The latter Institution was created in 1924 by the British Government to train Colonial Agricultural Officers for posting to the Tropical territories of the British Empire. From the outset the I.C.T.A. also embarked on Agricultural Research in tropical crops. The main thrust was in export crops - Cotton, Cocoa, Bananas, but some of the early work included basic studies on some Food Crops. Thus in the famous studies of Mason and Maskel on Translocation of assimilates in plants the Yam (Dioscorea) was included. However, it was not until the 1950's that an Agronomist/ Breeder was appointed to the staff of I.C.T.A. to specialise in Food Crops.

In 1960 the I.C.T.A. was incorporated into the University College of the West Indies (U.C.W.I.) as the Faculty of Agriculture. In 1962 the U.C.W.I. which had been a College of London University, became independent as the University of the West Indies. The main objectives of the Faculty of Agriculture of the University of the West Indies are to train agriculturalists at both the under-graduate and the post-graduate level; and to conduct research relevant to the needs of the Governments which support it. These Governments are Antigua, Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Jamaica, Montserrat, St. Kitts-Nevis-Anguilla, St. Lucia, St. Vincent, and Trinidad & Tobago.

Until 1975, in addition to the finance provided for teaching, the Governments (with financial assistance from the British Government) also provided for a research centre (the Regional Research Centre - R.R.C.) with the Faculty of Agriculture. In 1975 the R.R.C. was set up as a separate organisation, the Caribbean Agricultural Research and Development Institute (C.A.R.D.I.).

As presently constituted the Faculty of Agriculture comprises some 40 professional members of staff and 70 postgraduate research students. There are six departments: Agricultural Economics and Farm Management , Biological Sciences, Crop Science, Agricultural Extension, Livestock Science and Soil Science with one full-time Dean. There are two part-time Associate Deans, one for Academic Affairs and the other for Research and the annual budget provided by the Governments for teaching and research is approximately US $1.2 million. In addition, the Faculty has grants from International Agencies (British Government, International Development Research Centre of Canada, Ford Foundation and others) amounting to some US $500,000.

II. Activities for period 1970 to 1977

During this period the Faculty has strengthened its research organization and has developed a multidisciplinary approach which cuts across the departmental structure. Programmes here are in progress on Root Crops, Grain Legumes, Forage Legumes, Horticultural Crops and in Soils, Livestock, Agricultural Economics and Extension. Each of these programmes has a Programme Leader appointed by a Faculty Research Advisory Committee which is chaired by the Dean. This Committee also includes the Heads of Departments as well as the appointed Programme Leaders.

Each programme consists of a number of projects with project leaders and all programmes are approved by the Faculty Research Advisory Committee.

The research programmes have been aimed at developing systems of crop and livestock production that are economically viable for adoption by farmers in the countries listed earlier which contribute to the cost of the University.

Collaboration is established with the local Ministry of Agriculture, particularly where research in Extension methods or into the process of adoption of new technology is involved.

An example may be given from the Grain Legume Programme to illustrate the way in which the research is structured and the relevance to agricultural and rural development.

The Grain Legume Programme has concentrated mainly on Pigeon peas (Cajanus cajan) which is an important protein source throughout the West Indian region. The currently available varieties have a long growing season of some 6 months and crop only from December to March when they have become large shrubs. The central thrust of the Programme has therefore been a plant breeding project to produce a short-season pigeon pea plant which will crop at any period of the year. This would have the advantages of making the crop available in the fresh state for a long period of the year and reduce the inputs in weed and pest control needed between planting and harvest.

The breeding programme has been backed up by a number of studies in plant physiology, plant pathology, entomology, nitrogen fixation, agronomy, economics and farmer adoption as a new technology was developed. Thus the characteristics needed in the new variety are designated by the ancillary studies and the final package of practices is assessed in cost of production studies as well as being tested in farmers fields for suitability for adoption. These latter studies on adoption include an assessment on how the new variety would fit in to different cropping systems that might be used by the farmer.

In three years from the inception of the breeding programme two new varieties have been produced which are short season (cropping time reduced from 6 months to 3 months) and which are capable, at least under Trinidad conditions, of cropping at any time of the year. These results have the potential for a tremendous impact on production of pigeon peas at both small and medium size farmer level as well as opening up the possibility of large scale production.

In the area of Agricultural Economics mention may be made of a study on Productivity of Resource Use in Agriculture in Tobago.

This study provides background information essential to development planning in what is essentially a rural agricultural island, and included assessment of the productivity and needs of large and small farms. It identified a serious movement from the land of young people in Tobago.

During the five-year period 1971 to 1976, 63 M.Sc. and Ph.D. students graduated from the Faculty of Agriculture and each of their studies had relevance to agricultural development in the region (Henderson, 1974 and Henderson, 1977-78. In press).

III. Major New Developments (1978 to 1983)

A major project planned for the 1978 to 1983 period involves an Extension-oriented but multidisciplinary rural development study in the Leeward and Windward Islands. Planning to date has involved discussions with a group of U.S. Universities for collaboration in the study , the main object of which is to develop a model for a technology transfer system designed to make the greatest impact on rural development. The project will be based in two sites in the LDC's but will include back-up trained in the Faculty of Agriculture in Trinidad and at selected U.S. Universities. As far as it is practical undergraduate students will be involved but a major input will come from Graduate students. In both cases there will be the advantage that students will be in close touch with the farming community, as will be staff in the more academic disciplines who might not otherwise have the opportunity for such contact.

This study will have direct relevance to rural development as well as serving as a training process for future professional agriculturalists in the region.

The Faculty is now seeking funding for this project and has already approached an international funding agency with some hope for success.

It is also planned during this period to mount, in addition to the General Honours degree in agriculture which is now being offered, two new degrees, one in Agronomy and the other in Livestock Production. These degrees are aimed at producing the professionals needed for the Caribbean Food Plan, which has started with a Livestock Production drive and which will soon develop a Fruit and Vegetables thrust particularly aimed at the LDC's.

In addition post graduate diploma programmes will be mounted in Pest Management, Soil and Water Management, Post Harvest Storage and Handling, Forestry and Fisheries.

Further new degree programmes are proposed in Home Economics and Land Management (called in some countries Estate Management). The latter programme will be a joint programme with the Faculties of Engineering and Social Sciences and would include an interest in Land Tenure, which is of such major importance in many countries in the region.

IV. Recommendations for strengthening National Agricultural Research

One of the difficulties that has arisen over the last few years has been the position of National Institutions for Agricultural Research in relation to the development of International Organizations and Institutes with similar broad objectives, and therefore in many instances engaging in similar activities (Arndt, Dalrymple and Ruttan, 1977). This situation can be illustrated with respect to the University of the West Indies Faculty of Agriculture which has a fair measure of success in Applied research and in objective-oriented Basic research heavily supported by financial assistance from International

Agencies. Within recent years two changes have occurred, firstly, the financial assistance has been less readily forthcoming since these agencies are now heavily committed to supporting the International Institutes and secondly, Basic research (even when objective-oriented) is said to be the responsibility of the International Institutes.

Now it is only by the development of an indigenous group of agricultural scientists, with aspirations for excellence, that in the long run developing countries can achieve some measure of independence from imported Technology or even to have the skills to adapt to local conditions; technology which may, in some instances, still have to be imported.

And such indigenous science and scientists cannot be developed if the challenges they received are restricted to the application at field level of new concepts developed at the International Institutes. This situation becomes particularly acute for Universities since without the challenge of developing new scientific concepts, teaching would soon become academically sterile and the local Universities would cease to attract the best brains and the trek to overseas Universities would continue, with the great loss of talent to the developing country.

In addition to these undesirable features of a concentration of Basic Research (and it should be emphasised that this refers to objective-oriented and not Fundamental Research) there is the much greater cost involved in mounting multidisciplinary programmes at International Institutes than at Universities because the latter must, in any case, have a full complement of disciplines for teaching purposes. There is therefore an availability of talent in many instances not fully exploited because of lack of funds, while more and more of the International Funds are channelled into International Institutes with their much higher costs by way of salaries and fringe benefits for overseas staff.

Even in the area of applied research there is now the development of International organizations with units within National boundaries which are tending to compete for local staff (which even if they cannot be posted to the particular country are posted in a reciprocal way between adjacent countries) and again with the resultant deprivation of the National Institute or University of funds.

To summarise there is a problem that needs to be solved so that every encouragement can be given to the establishment of a local scientific infrastructure both for the effective transfer of technology and to set the scene for the development of indigenous technology, while demarcating a role for the International Institutes which should be seen as phasing out in the long run as the National Institutions gain strength.

Thus even though it is recognised that not all National Institutions will have the capacity at this time to mount extensive programmes of research, and therefore the present need for the International Institutes is well established, these latter should not be self perpetuating but should work towards the strengthening of National Institutes which would eventually take over their operations.

It is therefore recommended that wherever possible International Organizations channel their funds for Basic (objective-oriented) research to National Agricultural Research Institutes and Universities.

It is further recommended that International Organizations operate through National Institutions rather than themselves becoming involved with their own staff in development. Thus the local presence of the International Organization should be for the purpose of channelling funds to the National Institutions.

It is only by adopting the policies outlined above that a permanent solution can be found to the need for continuing output of high quality

agricultural research results at National level. There can then follow effective collaboration with International Institutes so long as it is necessary to maintain these, along with the creation of an organization aimed at developing a network of collaborating National Institutions which would take over many of the functions of the International Institutes.

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Henderson, T. (1974). Abstracts of Graduate Students' Research in Agricul - ture, 1970-1973. Research Summaries Nº 1, U.W.I., Dept. of Agric. Extension, 1973.

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U.W.I

Dr THAI, DRIPP - Haiti

1. In your Plant Breeding Program on legumes, I would like to know if you have new early improved variety of peanut (Spanish or Virginia Type) ?

   Ans : No, We do not breed peanuts.

2. About Soil Survey Program, would you elaborate more in scale of mapping,systems of soil classification ?
   Are some maps and reports on sale?

   Ans : The Soil maps are available from : the Head, Dept of Soil Science, Faculty of Agriculture, University of the West Indies, St Augustine, Trinidad

CONTRIBUCION DE LA CIAT A LA INVESTIGACION AGRICOLA EN LA ZONA DE LAS ANTILLAS

El Centro Internacional de Agricultura Tropical, CIAT, es una institución no lucrativa, dedicada al desarrollo agrícola y económico de las zonas bajas tropicales*. Su sede, entre las ciudades de Cali (25 kmt.) y Palmira (4 kmt) ocupa un terreno de 522 hectáreas, propiedad del Gobierno de Colombia, que en su calidad de país anfitrión brinda apoyo y facilidades a las actividades del CIAT.

El Centro trabaja en colaboración con el Instituto Colombiano Agropecuario (ICA) en varias de sus estaciones experimentales y también con agencias agrícolas a nivel nacional en otros países de América Latina y el Caribe.

Varios miembros del Grupo Consultivo para la Investigación Agrícola Internacional financian los programas del CIAT. Por ejemplo los donantes en 1976 fueron: la Agencia Estadounidense para el Desarrollo Internacional (USAID), la Fundación Rockefeller, la Fundación Ford, la Fundación W. K. Kellog, la Agencia Canadiense para el Desarrollo Internacional (CIDA), el Banco Internacional de Reconstrucción y Fomento (BIRF) por intermedio de la Asociación Internacional del Desarrollo (IDA), el Banco Interamericano de Desarrollo (BID), y los gobiernos de Australia, Bélgica, la República Federal Alemana, Holanda, Suiza, y el Reino Unido. Además, algunas de estas entidades, el Centro Internacional de Investigación para el Desarrollo de Canadá (IDRC) y la Junta Internacional de Recursos Fitogenéticos (IBGPR), financian proyectos especiales.

El CIAT tiene el mandato de investigación y adiestramiento a nivel mundial

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* La temperatura media es de 24ºC y su altitud sobre el nivel del mar es de 1000 mts. aproximadamente, y 1000 mm de lluvia anual.

de Sistemas de Producción de Ganado de Carne (Pastos y Forrajes), de yuca (Manihot spp.) y de fríjol (Phaseolus vulgaris). Además tiene un pequeño programa regional de cerdos, y, con personal de CIMMYT e IRRI estacionado en CIAT colabora con los países andinos en maíz y con arroz en Latino - américa y el Caribe.

Desde un comienzo de sus actividades CIAT ha manetnido vínculos de colaboración con la mayoría de los países del Caribe en arroz mediante el envíc de variedades desarrolladas en colaboración con ICA como CICA-4, CICA-6, etc.., de materiales segregantes del IRRI o CIAT. Asimismo tiene proyectos de cooperación con yuca, y fríjol. Además muchos de los técnicos de esta área han visitado CIAT para participar en Seminarios, Talleres, etc.., o para atender cursos cortos de producción, o más prolongados de adies - tramiento, o para conocer más a fondo determinados programas e intercambiar ideas con sus científicos.

Desde noviembre de este año mediante un "grant" de UNDP, y un convenio con el IICA, ha localizado dos de sus técnicos en San José, Costa Rica, para coordinar las actividades de los Programas de Arroz y de Fríjol del CIAT en Centroamérica y el Caribe: los doctores Peter R. Jennings para Arroz y Guillermo E. Gálvez para Fríjol.

Entre nuestras actividades a desarrollar se encuentran:

1) un conocimiento más profundo de los problemas de producción de orden técnico en cada país para transmitirlo a los científicos del CIAT, para que ellos puedan buscar soluciones adecuadas.

2) Coordinar la distribución de materiales de CIAT, o sea los viveros internacionales de manera que lleguen a los colaboradores a tiempo para la siembra; ayudar en su evaluación, y hacer que los datos finales lleguen a CIAT para su procesamiento y publicación.
3) Propiciar reuniones regionales mediante mesas redondas, talleres o seminarios para un mejor intercambio de ideas, de materiales, y de conocimiento entre los técnicos de la región.
4) Propiciar cursos cortos de adiestramiento en producción, y, dar consultoría técnica necesaria en determinados proyectos o directamente o con la ayuda de técnicos del Programa respectivo.
5) Estimular la formación de equipos de trabajo mediante adiestramiento a varios niveles: cursos cortos, adiestramiento en servicio, o a nivel de post-grado..
6) Hacer que los servicios del Centro de Documentación sirvan realmente a los técnicos de la región, y, que las ayudas audiovisuales existentes sean utilizadas para una mayor difusión de conocimientos.
7) Colaborar en la organización anual de las reuniones del Proyecto Cooperativo Centro Americano para el Mejoramiento de Cultivos Alimenticios, PCCMCA, en arroz y fríjol.

En cuanto al Programa de Sistemas de Producción de Fríjol cuenta con personal científico en los áreas de Recursos Genéticos, Fitomejoramiento, Fitopatología, Entomología, Fisiología, Microbiología, Agronomía y Economía Agrícola. Tiene 12 investigadores principales a nivel de PhD, 5 post-doctorados, 1 científico visitante, 9 investigadores asociados a nivel de M.S., y, 30 investigadores asistentes a nivel de Ingeniero Agrónomo o su equivalente. Además, 2 Coordinadores Regionales, 1 en Brasil, y 1 en Costa Rica; y, 2 investigadores asociados con ICTA en Guatemala.

El Comité Técnico Asesor del Grupo Consultivo para Investigación Agrícola Internacional solicitó al Programa de Frijol de CIAT el establecimiento de una red de colaboración dedicada a la investigación sobre fríjol en América Latina y el Caribe. Asimismo la Junta Internacional de Recursos Genéticos Vegetales (IBPGR) solicitó que el programa se responsabilizara del mantenimiento y caracterización del germoplasma de Phaseolus. La capacidad del banco es de 60.000 introducciones, y, hasta ahora existen unas 14.000.

El Programa tiene los siguientes viveros internacionales al servicio de los técnicos que los requieran:

1) IBYAN, International Bean Yield and Adaptation Nursery, existe uno con solo frijoles negros, y, otro con frijoles de varios colores;
2) IBRN, International Bean Rust Nursery;
3) IBGMN, International Bean Golden Mosaic Nursery;
4) IBWBN, International Bean Web-blight Nursery;
5) IBCBN, International Bean Common Bacterial Blight Nursery;
6) IBALN, International Bean Angular Leaf spot Nursery;
7) IBAN, International Bean Anthracnose Nursery;
8) IBDN, International Bean Empoasca Nursery;
9) IBApN, International Bean Apion Nursery; and
10) "elite" nurseries, de fitomejoramiento que contiene progenies que se distribuyen con base en las preferencias y necesidades de los programas nacionales.

El Programa ha utilizado unos 180 cultivares en las hibridaciones de fríjol, y, se han efectuado unas 6.000 combinaciones con progenitores diferentes.

Se ha desarrollado un sistema integrado de información, SIFFRI, el cual no solamente define los orígenes de muchos cruzamientos realizados y los factores que son deseables para la selección en cada población híbrida, sino que también mantiene en forma computable y actualizada los resultados de las evaluaciones de progenie.

El Programa mantiene unos 40 becarios en adiestramiento por año en varias disciplinas, y, además tiene dos cursos intensos de adiestramiento en producción de fríjol, uno en febrero-marzo, y otro en agosto-septiembre con cupo limitado, en cada uno, a 30 investigadores que deben tener título de Ingeniero Agrónomo, Master o PhD.

La dirección de los Coordinadores para Centro-América y el Caribe es:

CIAT-Departamento de Fitopatología
Ministerio de Agricultura y Ganadería
San José, Costa Rica.

Para una mayor información sobre CIAT favor dirigirse a :

CIAT
Apartado Aéreo 6713
Cali, Colombia.

EL CENTRO INTERNACIONAL DE INVESTIGACIONES PARA EL DESARROLLO (CIID)

El Centro Internacional de Investigaciones para el Desarrollo es una corporación pública creada por el Parlamento canadiense en 1970; como tal es una entidad autono
por un consejo de 21 miembros o gobernadores del Centro. Su sede principal esta en Ottawa.

Sus orígenes se remontan a 1967 cuando el entonces Primer Ministro del Canadá, Lester B. Pearson, esbozo en la Universidad de Carleton, Ottawa, la idea de hacer participes a los países en desarrollo de la capacidad de investigación científica y técnica de los paises avanzados. Mas tarde, en su informe a la Comisión sobre Desarrollo Internacional, propuso una estrategia de desarrollo que, en su condición de presidente del Consejo de Gobernadores del CIID, tuvo la oportunidad de orientar a partir de octubre de 1970. A su muerte en 1973, le sucedió en tal cargo el señor Louis Rasminsky. Desde su fundación el presidente del Centro ha sido el doctor W. David Hopper.

Sus propositos

Los propósitos del Centro son apoyar, estimular, iniciar y realizar investigaciones sobre los problemas de desarrollo y sobre la ampliación y adaptación del conocimiento científico al mejoramiento económico y social del mundo en desarrollo.

En el cumplimiento de tales propósitos :

- Se emplean científicos y técnicos de diferentes países;
- Se ayuda a los países en desarrollo a fortalecer sus capacidades investigativas e innovadoras;

- Se estimula la coordinación internacional de la investigación para el desarrollo;
- Se fomenta la cooperación para la investigación sobre problemas del desarrollo entre países avanzados y aquellos en proceso de desarrollo.

Sus politicas

En la realización de los propósitos enumerados, se observan las siguientes políticas básicas :

- Apoyo preferencial a los científicos de los países en desarrollo dentro del marco de los proyectos de investigación.
- Determinación de problemas y prioridades investigativas por parte del propio país receptor y sin intervención del Centro.
- Equilibrio entre la calidad científica de la investigación y la formación y capacitación del personal responsible de ella. Con frecuencia el Centro auspicia proyectos en que intervienen diversas instituciones de una misma región - redes de investigación - con el fin de compensar las deficiencias individuales y activar el estimulo mutuo delos participantes. El énfasis en la capacitación no excluye que necesidades investigativas del más alto nivel cientifico se confíen, en ocasiones, a organismos internacionales de investigación o instituciones científicas de países desarrollados.

- Apoyo preferencial a investigaciones de alcance multinacional o global en contraposición a las de caracter puramente nacional.

- Apoyo preferencial a investigaciones que ayuden a reducir las diferencias en los niveles de vida dentro de los países y atenuen el desequilibrio entre las zonas rurales y las urbanas.

- Preferencia a la investigación que busca soluciones a problemas específicos del desarrollo en contraposición a la investigación básica de carácter académico.

Su Organizacion

La diredción central del CIID, como ya se dijo, esta en manos del Consejo de Gobernadores que traza sus politicas y aprueba los proyectos. Regularmente, el Consejo celebra dos reuniones plenarias el año y su comité ejecutivo cuatro. Por disposición legal tanto el presidente y el vice-presidente del consejo como nueve de sus miembros deben ser can dienses.

En la actualidad los gobernadores extranjeros provienen de Jamaica, México, Etiopia, Zaire, Irán, Indonesia, Gran Bretaña, Francia, Estados Unidos y Australia.

Los recursos financieros del CIID son asignados por el Parlamento canadiense. Para sus primeros siete anos de operación este ha destinado una cantidad aproximada de cien millones en dolares del país.

La organización central comprende tres departamentos. El Parlamento de programas con las cinco divisiones respectivas del CIID a saber : ciencias agricolas, alimentos y nutricion; ciencias de la salud; ciencias sociales y recursos humanos; ciencias de la información; y publicaciones.

El segundo departamento, relaciones y enlaces externos, cuenta con un vicepresidente para las relaciones nacionales y con las agencias donantes, y un vicepresidente internacional. Finalmente, la vicepresidencia administrativa con un director de administración, un secretario y asesor legal, y un tesorero. Internamente estos departamentos se coordinan mediante su participación en los comités de proyectos y de administración.

A través de oficinas regionales las operaciones del Centro se se extienden por cinco areas geograficas extensas; Africa Occidental, con sede en Dakar, Senegal; Africa Oriental, con sede en Nairobi, Kenia; América Latina y el Caribe, con sede en Singapour; y Oriente Medio, con sede en Cairo, Egipto.

Estas oficinas establecen contactos directos con países y entidades proveyendo a la oficina central de Ottawa con la información necesaria para una adecuada aplicación de politicas a nivel regional. Su dirección esta a cargo de un representante regional oriundo del área y tienen asignado, ademas, un representante de cada división de programa.

Su funcionamiento

La tarea de apoyo a la investigación cientifica y técnica destinada al desarrollo se realica a través de proyectos especificos cuya ejecución es responsabilidad de las entidades solicitantes. Tales proyectos son presentados al Centro por los organismos del caso, bien ante la sede en Ottawa, o en las oficinas regionales donde los representantes de programa orientan a los interesados en la preparación de las propuestas.

En príncipio, corresponde al Consejo de Gobernadores el estudio y la aprobación de los proyectos de investigación. Sin embargo, según la cuantia, este delega la aprobación de proyectos en ins-

tancias decisorias como el comité ejecutivo del Consejo, el presidente ejecutivo del Centro, los vicepresidentes, y los directores de programa, respectivamente.

Los fondos aprobados para los proyectos de investigación de investigación tienen carácter de donación y son fondos "no atados" a contratación de personal, adquisición de equipos canadienses u otras condiciones. A su torno, las entidades beneficiarias aportan contrapartidas considerables, en particular de tipo administrativo.

Los fondos son entregados a la entidad beneficiaria para su administración, sobre la cual debe informar regularmente al Centro. El personal cientifico y técnico del Centro, tanto en la sede como en las oficinas regionales, permanece informado sobre la marcha de los proyectos, prestandoles asesoria y visitandolos periodicamente.

TABLA 2. Proyectos aprobados durante el ano fiscal 1976-77 (en miles de dolares Canadienses).

Territorio de operaciones	Divisiones de Programas							
	CAAN	CI	CS	CSRH	PUB	C y AD	Total	% del total
Africa	4.888	248	203	416	-	216	5.971	22,34%
América Latina y Caribe	2.702	577	1.841	993	-	-	6.113	22,85%
Asia	3.417	2.640	604	1.880	42	-	8.619	32,34%
Global	583	1.015	1.310	1.246	-	-	4.154	15,52%
Canada	486	-	105	1.207	7	59	1.864	6,95%
Total	12.076	4.480	4.099	5.724	49	275	26.721	
% del total	45,19%	16,77%	15,34%	21,49%	0,18%	1,03%		100%

CAAN - Ciencias Agricolas, Alimentos y Nutricion
CI - Ciencias de la Informacion
CS - Ciencias de la Salud
CSRH - Ciencias Sociales y Recursos Humanos
PUB - Publicaciones
C y AD - Canada y Agencias Donantes

TABLA 1. Proyectos aprobados hasta el 31 de Marzo de 1977 (en miles de dolares canadienses).

Territorio de operaciones	Divisiones de Programas							
	CAAN	CI	CS	CSRH	PUB	C y AD	Total	% del total
Africa	13.166	1.591	2.582	3.053	-	216	20.608	21,92%
América Latina y Caribe	8.307	1.806	4.051	4.832	-	-	18.996	20,20%
Asia	16.830	4.616	5.368	9.743	114	-	36.671	39,00%
Global	864	2.417	2.554	4.711	-	-	10.546	11,21%
Canada	2.131	1.192	445	3.378	7	59	7.212	7,67%
TOTAL	41.298	11.622	15.000	25.717	121	275	94.003	
% del total	43,92%	12.36%	15,95%	27,35%	,13%	,29%		100%

PROYECTOS EN EL CARIBE IDRC/CIID

Red de Universidades UNICA (Caribe)

A la Asociación de Universidades e Institutos de Investigación del Caribe (UNICA) en Kingston, Jamaica, para mejorar la coordinación de la investigación conjunta y el intercambio de información y para fomentar el contacto permanente entre la Secretaría General y las instituciones afiliadas.

Forrajes Leguminosas (Caribe), Etapas I y II:

A la Universidad de las Antillas en San Agustín, Trinidad, para que su Facultad de Agricultura identifique en Antigua, Belice y Trinidad las especies de leguminosas forrajeras más productivas y adaptables a las zonas áridas de las Antillas Inglesas y que puedan combinarse con los pastos más comunes de dicha zona.

Etapa I - Agosto 1972, 3 años
Etapa II - Junio 1975 , 2 años

Prioridades investigativas en el Caribe

A la Universidad de las Antillas, para que estudie el potencial económico de las industrias alternativas de cultivo y ganado en Barbados, como modelo para el desarrollo agrícola del Caribe.

Julio 1971, 2- 1/2 años

Cultivos de raíces comestibles (Caribe)

A la Universidad de las Antillas, en Kingston, para que su Depto. de Ciencias Biológicas investigue sobre el cultivo y otros factores de la mandioca, las batatas y el ñame, con el objeto de promover una mayor producción.

Febrero 1972, 3-1/2 años.

Leguminosas de grano (Caribe)Etapas I y II

A la Universidad de las Antillas, en Kingston, para que investigue sobre el gundul y los granos secos, financie becas de entrenamiento y coordine el proyecto con otras investigaciones similares en Uganda, Indica y países latinoamericanos y para que en un segunda etapa, amplíe el programa de producción de guandul en Trinidad y Tobago, investigue sobre los sistemas de cultivo con leguminosas de grano, y desarrolle un programa para mejoramiento del caupí.

Etapa I - Febrero 1972, 3 años 3 meses
Etapa II- 2 años

Productos de la Pesca (Guyana)

Al Gobierno de Guyana, para que desarrolle medios de procesar y comercializar varias especies de pescado actualmente desechadas, en muchas partes del Caribe, durante la pesca rastreada del camarón.

Noviembre 1973, 3- 1/2 años.

Fotogrametría de los bosques (Surinam)

Al Departamento de Ambientes del Gobierno Canadiense, para apoyar su Instituto de Administración Forestal en la prueba de un altímetro radar que sirva en la toma de fotografías aéreas destinadas a completar los inventarios forestales y de los otros recursos.

Noviembre 1972, concluído

Estudios sobre políticas tecnológicas del Caribe:

Al Instituto de Estudios sobre Desarrollo de la Universidad de Guyana, en Georgetown, y al Instituto de Investigaciones Económicas y Sociales de la Universidad de las Antillas en Kingston, Jamaica, para estudiar los métodos empleados en la transferencia tecnológica a la mancomunidad del Caribe, evaluar sus efectos, y sugerir formas de incrementar los beneficios económicos y sociales.

Mayo 1975, 2 años

Catálogo ICTA:

A la División de Ciencias de la Información del Centro Internacional de Investigaciones para el Desarrollo, para que conjuntamente con la Universidad de las Antillas, auspicie la publicación del Catálogo de ICTA (Imperial College of Tropical Agriculture) en beneficio de las bibliotecas de países en desarrollo.

Agosto 1974, 8 meses

Deshidratación osmótica de bananos y mangos:

A la Universidad de las Antillas en San Agustín, Trinidad, para que en cooperación con pequeñas industrias locales aplique los resultados de un estudio previo sobre Deshidratación Osmótica (realizado por el Instituto de Investigaciones sobre Alimentos, Ottawa, proyecto 250), utilizando frutos frescos recolectados en el país.

Abril 1972, concluido

Acaros de la mandioca (Trinidad):

Al Commonwealth Institute of Biological Control Station, en Trinidad, para las investigaciones destinadas a desarrollar controles biológicos sobre las plagas de ácaros que atacan la mandioca en Africa Oriental, por medio de la identificación y estudio de sus enemigos naturales en Trinidad y áreas vecinas.

Abril 1974, 2 años

Fundaciones nacionales para el desarrollo (América Latina):

Al Consejo Latinoamericano de Fundaciones para el Desarrollo (SOLIDARIOS), Santo Domingo, República Dominicana, para analizar el impacto social y económico que los programas de las fundaciones ejercen sobre la comunidad en Ecuador, México, Nicaragua, República Dominicana y Paraguay, evaluar las metas de las fundaciones y determinar si su organización y administración contribuyen positivamente a su realización.

Febrero 1976, 18 meses

Cultivo de raíces comestibles (Caribe). Etapa II:

A la Universidad de las Indias Occidentales, para continuar la investigación destinada a aumentar la producción regional de raíces comestibles, particularmente de ñame en Jamaica, para estudiar las prácticas en la producción de yuca, y para integrar el programa de yuca de la región a una red de pruebas internacionales recientemente desarrollada.

Diciembre 1975, 2 años

Leguminosas de Granos- Fase III

Para la Universidad de West Indiés, Kingston, Jamaica. Para hacer posible que el Departamento de Ciencias Biológicas se haga cargo de la Fase III de un Proyecto para el desarrollo de variedades de leguminosas comestibles para un producción alta y estable, con caracteristicas de desarrollo y mejoramiento de guandules y gran resistencia para las enfermedades y plagas y cualidades organolepticas aceptables. Esta fase continúa con un programa de desarrollo, combinados con una evaluación de nuevo sistema de producción para agricultores, basado en variedades mejoradas.

2 años.

Leguminosas forrajeras (Caribe)Suplemental

Para la Universidad de las Indias Occidentales, St. Augustine, Trinidad. Para hacer posible que la Universidad se haga cargo de análisis de datos recogidos en un Proyecto destinado a recolectar especies de leguminosas forrajeras adaptadas y productivas, y para cubrir el costo de aumento de salario.

Abril 1977

Leguminosas Forrajeras (Caribe)Fase III

Para la Universidad de West INdies, St. Augustine, Trinidad.
Para hacer posible que su Departamento de Ciencias de Suelo se haga cargo de la Fase III de un Proyecto para recolectar las especies leguminosas forrajeras más adaptadas y productivas para ser mezcladas con pastos nativos que crecen comunmente en las áreas más secas del Caribe Inglés. Esta fase continuará con la recolección de especies, y comenzará la distribución de semillas de las leguminosas más promisorias para ensayos de consumo y producción en predios de agricultores.

3 años.

Traducción

Leguminosas forrajeras (Belize)

Para el ministerio de Agricultura y Tierras, Belmopán, para identificar las especies de gramíneas y leguminosas forrajeras nativas más adaptables y productivas, y para desarrollar técnicas de manejo de pasturas con baja fertilisación, con vistas a aumentar la producción de leche y carne en tierras marginales, actualmente subutilzadas.

2 años

Insecto Harinoso de la yuca (CIBC)

Para el Instituto de Control Biológico de las Naciones Mancomunadas (Commonwealth) Curepe, Trinidad, para hacerse cargo de investigaciones en dinámica de poblaciones del insecto harinoso de la yuca y sus enemigos naturales, preliminar a programs futuros de control biológico de esta peste en Africa Occidental

Abril 1977

3 años

Acaros de la Yuca (CIBC) Fase II

Para el Instituto de Control Biológico de Naciones Mancomunadas (CIBC) Curepe, Trinidad, para hacerce cargo de la Fase II de Investigaciones sobre Control de los acaros Oligota minuta que infestan los cultivos de Yuca de pequeñcs agricultores en Africa Oriental.

Noviembre 1976

2 años y medio

CIID

M. JACKSON

What is the relationship of IRDC to CIDA and is there any duplication of activites?

Ans : CIDA is a bilateral agency representing the Canadian Government. IDRC is a parliament created research funding Centre, which allows for greater independence in our work. There is no formal linkage although there are good relations and Cassava Research money initially came from CIDA. CIDA gives traditional technical assistance, IRDC only finances research projects.

Does IRDC have a research team in Canada?

Ans : Not as such. Technical staff in Ottawa and the Regional Offices come from a background of research and some are still based at universities. However IDRC has no research activities performed by its staff. Their technical capacity helps them to do some sort of monitoring on the projects.

THE INTERNATIONAL POTATO CENTER:

Objectives and Program Development in the Caribbean

M. JACKSON
Regional Research Scientist

The International Potato Center (CIP), which has its headquarters in Lima, Peru was founded in 1971, when a agreement was signed between the Government of Peru and North Carolina State University. As one of the group of International Agricultural Research Centers, CIP receives funding through the Consultative Group for International Agricultural Research, which is sponsored by the World Bank, FAO and UNDP.

During the mid 1960's, N.C State University established an agricultural mission in Peru. CIP's Director General, Dr. Richard L. SAWYER, was co-leader of the potato program, and during this period plans were developed for an international center for potato research. After its foundation, CIPwas fortunate to inherit the Rockfeller Foundation Potato Program in Mexico which has provided a basis for potato improvement not only in Latin America but throughout the world.

CIP was founded in Peru because, amongst other reasons that country is one the centers of origin of this important crop. The basic objectives of CIP are:

1. To increase the potato's adaptability to enable it to be grown more extensively and more efficiently in high cold regions, and hot, humid low regions of the tropics.

A major justification for CIP's work is the potential value of the potato as a food crop in developing countries. In pursuing these objectives, a major portion of CIP's research involves exploitation of the vast untapped genetic resources of the potato which exist in the Andean region of South America. Although potatoes originated in the Andes, the principal modern development of the crop has taken place in northern latitude conditions have been limited by ecological and socio-economic constraints. CIP's research aims at developing potential new varieties and complementary technology which are appropriate for tropical regions.

The Director General is assisted by a deputy director general a Director of Research and a Director of Regional Research and Training. CIP has a ten member Board of trustees, of which the Director General is a member.

CIP scientists (aproximately 80 professional staff) are assigned to one of the five departments but research is organised into nine thrusts which cut across disciplines, integrating research activities around major problem areas. The nine thrusts are:

1. Systematic collection and classification of the tuberbearing Solanums;
2. Maintenance and utilization of tuber-bearing Solanums;
3. Control of important fungal diseases of potatoes;
4. Control of important bacterial diseases of potatoes;
5. Control of important potato viruses and their vectors;
6. Control of important nematode pests of potatoes;
7. Development of potatoes adapted to environmental stress;
8. Development of post-harvest technology and improvement of nutritional quality;
9. Seed production technology for developing countries.

Some 40 research projects are currently being carried out. CIP's research objectives are defined in association with world experts in various disciplines of potato research and production, and 16 planing conferences have been held, at which 5 year planswere developed. Not all research is carried out in Lima, but on contract with other institutes and universities throughout the world.

The Regional Research and Training Program is charged with the transfer of potato production technology. As such it provides an indispensable link between Source Research and the potato programs of developing countries. Among the International Agricultural Research Institutes, the International Potato Center has pioneered a regional approach into technology transfer. CIP has divided the tropical and sub-tropical world into 7 regions, and has stationed regional teams in each of these. CIP's Region 11 covers Mexico, Central America and the Caribbean.

There a number of ways in which CIP is helping the countries of Region 11, principally through sending genetic material for evaluation, through training activities, and trough program development with the resp ective countries, especially in the area of seed production. A number production problems are commons throughout the region. Potato diseases are important eg. late blight, caused by Phytophthora infestans, but also appropriate technology is not utilised in many of the countries.

Training is an important contribution to research development, and CIP has trained a number of candidates from the Dominican Republic in potato production . Training activities have been concentrated in Mexico and the Central American isthmus and the participation of candidates from the Dominican Republics reflects only the linguistic and cultural ties of that country to those of Central America.

Candidates are also chosen for graduate programmes leading to M.S or Ph.D degrees, and they are encouraged to carry out projects which will make a direct contribution to program develoomment in their respective countries.

Potatoes are a relatively minor crop in the CAribbean even in countries such as Jamaica and Dominican Republic. Montserrat does produce some potatoes. However, climatic and ecological conditions for potato production are generally not favourable inthe majority of the Caribbean islands. The development of clones adapted to hot conditions, which can yield in 60-75 days, and which are resistant to bacterial wilt (caused by Pseudomonas solanacearum) could lead to potatoes assuming greater importance in the future.

CIP's association with the Caribbean countries has been limited until this year. In February and March, my regional colleague and myself visited 4 countries in the Caribbean: The Dominican Republic, Jamaica, St Kitts and Barbados, following requests from these countries, either for germ plasm for evaluation or for help in particular production problems. In 1976, the CIP International Yield Trial of high yielding clones resistant to late blight was sent to the Dominican Republic and to St Kitts.

In the Dominican Republic, selected clones significantly out yielded North American varieties which are commonly cultivated. Unfortunately, the trial was not a success in St Kitts, as there was a serious drought. Both Jamaica and Barbados have contracted CIP with regard to obtaining potatoes suitable for hot lowland conditions. Granada is also interested in bacterial wilt resistant lives for hot conditions. Genetic materials resistant to Pseudomonas solanoceanum have been sent to Dr Ralph Phelps, CARDI, in Trinidad.

Undoubtedly, the nutritional value of potatoes is for greater than generally realised. Socio-economic studies have shown that potatoes are readily in corporated into traditional diets based on cereal or other roots and tubers. But, there are major names to expanded potato production in the tropic, such as:

1. Inadequate production technology;
2. Distribution problems

In most areas, production costs are high relative to yields, and as a result, potatoes remain a high-cost source of energy and vegetable protein for human consumption -"a luxury vegetable". The bulkiness and perishability of potato tubers cause serious storage and distributional problems in developing countries where temperatures are high, pests abound and transport networks are poor. Potatoes consequently become a seasonal product, associated with price instability. In the Dominican Republic, a system of price stabilization in association with INESPRE based on cold storage of potatoes is functioning. However, in the majority of the countries of the region such facilities do not exist, and certainly could not be contemplated on the basis of current production.

Decisions must be taken concerning the role of potatoes in the role of potatoes in the economies of the countries of the region. Should each country try to become self-sufficient in potatoes, or they should buy potatoes from those country which can produce the crop more efficiently. Until this month CIP had a 2 man team in the region. Only one CIP scientist is located in the region now, and priorities will have to be determined as far as human and financial resources permit, because the potato area of the Caribbean is small compared to other countries of Region 11.

I hope that from this meeting we will be able to organise better our resources, so that CIP can be of the best service to the Caribbean countries, and I would like to examine the potential of CIP coordinating its program with those of the regional agencies, such as IICA and CARDI, so that the benefits of improved potato technology reaches a wider clientele.

CENTRO INTERNACIONAL DE PAPA

1. CASSAGNOL, Robert (Haiti)

What is CIP's assesment of potatoes cultivation in Haiti where small farmers have been growing the total amount of potatoes consumed in the country for a number of years ?

ANS. - I'm afraid I do not have any knowledge of potato production in Haiti. As I mentioned in my talk, in many countries, the level of production technology used is very low, and consequently production costs are high. Without knowledge of yields etc... in Haiti, I cannot make any comment on this, except to say that probably production could be nationalized and made more efficient.

2. DIAZ, Juan (Rep. Dominicaine)

Si Usted considera que en Rep. Dominicana existen condiciones óptimas para la producción de semillas de papá, sobre todo en en la zona de Constanza o próximo a ella?

ANS.- TheGerman Govt. is funding a seed production program in the Dominican Republic and a technician from that country was trained in seed production technology in CIP-Mexico during 1977. An area at high elevation between San José de Ocoa and Constanza has been chosen for seed production, and all the signs are that the program will be successful. Such conditions are ideal for seed potato production.

3. LEGAGNEUR, Dr.Salmon (Guadeloupe)

Do you feel that the Peruvian Government or institutions correctly use materials and technologies from CIP ?

ANS.- Relations between CIP and Peruvian Institutes are extremely good. CIP actively collaborates with the Peruvian National Potato Program in a number of fields. Also the close proximity of CIP to the National Agricultural University is mutually

beneficial. CIP funds a number of graduate students for MSc. programs, and a number of UNA cientists have research contracts with CIP or are visiting scientists at CIP.
The Vice-Minister of the Ministerio de Alimentación is a member of CIP's Board of Trustees.

4.- SPENCE, John, (Trinidad-Tobago)

1) If CIP does not do breeding, where is the breeding work done to produce varieties for the Lowland Tropics?

ANS.- CIP does have breeding programs, but does not release varieties. Instead, genetic materials - either tuber families, dones, segregating populations in the form of botanical seed or multiple meristems, are distributed to collaborating programs, and each is responsible for evaluation and selection and eventual varietal release. CIP will help in the evaluation of these materials.

2) Do you use to see any great difficulties in other International Institutes adopting the CIP appro ch of "contracting out" the research ?

I believe that CIP has been commended for this approach and others, and the other International Centers urged to emulate CIP.

3) Does CIP accept invitation from Regional Universities or only from National Governments?

ANS.- CIP responds to all reasonable requests for technical assistance. For example, materials resistant to bacterial wilt, caused by Pseudomonas solanacearum , have been sent to Dr. Phelps of CARDI in Trinidad, so I foresee no problems of responding to a request from a regional University.

SOME ADDITIONAL INFORMATION
ON
INTERNATIONAL RESEARCH DEVELOPMENT

1. FAO was invited to expose the Organisation's involvement in research development specifically in the region. Its representative stated that his intervention should not be considered as a report but rather as an additional information for the meeting.

2. As the organizers of the meeting propose to establish a group which studies ARS external relations at international level, he intended to give a short brief on international developments in the field of agricultural research and technology. He referred mainly to the preparation of the UN Conference on Science and Technology for Development (UNCSAT) which will be held in August/September 1979. The Secretary General of the Conference invited the UN Agencies to prepare an overview paper that will describe the manner in which their respective programmes have linked science and technology to socio-economic and international cooperation related to the agenda of the Conference. At the same time regional conferences have been held the determine priorities for research in the different regions. Dean Spence already mentioned the Conference for Latin America which was organised by ECLA and took place in Mexico last month. What does UNCSAT have to do with this meeting? Besides the agency contributions and the regional conferences, the Secretariat also asked for contributions from Member Countries concerning their agricultural research organization more or less in the form of the country reports presented here. The deadline

for these papers in May 1978, but preparations of the country papers have been delayed for various seasons, mainly due to little action in the concerned countries. Therefore he took the opportunity to draw the attention of the meeting to certain agenda items of UNCSAT as for example :

- The choice and transfer of technology for development.
- Elimination of obstacles to the better utilization of knowledge and capabilities in science and technology for development.
- The building up and expansion of institutional systems in developing countries for science and technology.
- Mechanics for the exchange of scientific and technological information and experiences significant to development.
- The strengthening of international cooperation among all nations and the design of new and concrete forms of international cooperation in the field of science and technology for development.

If one compares the UNCSAT agenda with the objectives of IICA for this meeting close relationship must be noted.

3. To turn to FAO's programme he said that :

FAO's programme is predominantly to the assessment, evaluation, choice and transfer of technology to enhance agricultural and food production in the developing countries through a series of action programmes to strengthen national research systems, to reinforce inter-country cooperation, to promote international support to agricultural research, and to accelerate the adoption of research results. It has become apparent that for technology transfer to be broadly successful, four major steps are involved.

4. The first is an advanced research capability to generate new knowledge and improved technologies (innovation-research function). The second is an adaption research capacity to enable this knowledge to be modified to suit local conditions including the socio-economic environment (experimental and adaptive research function). The third is an effective transfer-communication system at the grass-root level, involving a blend of hard sciences and soft sciences implemented through a large network of field development centers at national level (extension-training-demonstration-communication functions). Finally, the fourth is a comprehensive infrastructure of delivery services and facilities to producers (farmers) to enable them to accept and apply new technology when it has been developed and tailored to suit their needs.

5. Research projects of FAO in the six attending countries of the Caribbean are scarse. The Jamaica project has been mentioned, but there is also a Pasture and Livestock Development Project in the Dominican Republic which has a strong research component as well as the Project for Food Production in Barbados. The speaker also draw the attention of the meeting, to some conferences for research development which FAO has or will organize in the region and elaborated on their objective. He referred to the :

   a. FAO Expert Consultation on Agricultural Research in Latin American (in cooperation with IICA);

   b. Expert Consultation for Improving the Reproductive Efficiency of Cattle in Latin America;

   c. FAO/UNEP Expert Consultation for the Evaluation and Con-

servation of Animal Genetic Resources in Latin America.

6. He further observes the world wide sumulating in problems of research development. This is reflected in recommendations made at these conferences. Moreover the achievements in this direction have not been significant during the last ten years or more. An enhanced follow up and implementation of the recommendations in needed.

7. On the other hand one notes a strong interest in the role of research in development. Investment in research to give a high return thereby reducing food stockages.

8. FAO is actively participating in research development all over the world. The speaker believes that most of the participants of this meeting are awere of the avenues of approach to request assistance. If a country believes that research development has a priority in its overall development, it will ask the organization for assistance in the formulation and execution of the project.

QUESTION FROM - JOHN SPENCE

Could the speaker expand how he sees recommendations from this workshop done tailing with the 1979 UN conference and all the other initiatives now take place in Science and Technology?

-REPONSE-

The theme is similar in striving for strengtheming science and technology. Specific emphasis is seen to be with strengthe-ming national research and the country statements presented here can serve as basic documents for the national papers which the UNconference on Science and Technology for Development is asking for by May 1978. Refering to recommendations from this meeting I hesitate to anticipate any deliberations of the working groups of tomorrow

LINEA DE ACCION III del IICA

INVESTIGACION Y TRANSFERENCIA DE TECHNOLOGIA AGROPECUARIA

Introducción

La mayoría de los gobiernos latinoamericanos y del Caribe, han realizado intensos esfuerzos para crear, ampliar y consolidar el Sistema Nacional de Investigación Agrícola; con el propósito de que los productos de la investigación respondan cada vez mejor a los objetivos del Desarrollo Rural del sector. Tales esfuerzos han sido dirigidos hacia la solución de problemas que van desde la infraestructura física, el fortalecimiento institucional, la ampliación y el mejoramiento de los recursos humanos y financieros dedicados a la investigación. No obstante, serios problemas de enfoque, planificación, ejecución y evaluación, además de la tradicional falta de coordinación con los mecanismos de difusión tecnologica, créditos y similares, han dificultado grandemente el alcanzar logros mas sign ficativos en este campo.

Entre los problemas de enfoque está la orientación poco coherente entre la demanda real de technologia por una puerte y la oferta y transferencia de la misma al productor por otra parte. La investigación debe responder cada vez mejor a los delineamientos de politica y objetivos nacionales de producción, productividad, generación de empleo y mejores estandares de vida para el agricultor, en particular el de menor renta. La divergencia entre necesidad y oferta de technologia no solo conduce a diluir los escasos recursos disponibles, sino que perpetúa la dependencia tecnológica de los países, en lo concerniente a modelos y paquetes de producción que no siempre son adaptables al medio en que se pretende introducir e institucionalizar los cambios positivos conducentes al Desarrollo Rural de los paises.

Otro factor que ha incidido negativamente en los logros de la investigación, es la falta de coordinación entre los diversos organismos que participan en el Desarrollo Rural y la investigación y transferencia de tecnologia, dentro de cada país o entre paises de la región. Esto ha impedido o por lo menos dificulta en alto grado, el intercambio de información y experiencias entre instituciones del mismo país y entre países con iguales o similares condiciones. La verdadera cooperacion reciproca se hace prioritarias del Desarrollo Rural.

Línea III : Investigación Agrícola y Transferencia de Técnologia

La linea de Acción III de IICA, concibe el fortalecimiento del Sistema Institucional de Investigación como un mecanismo positivo para la generación, adaptación y difusión técnologicas, comprometidas con el Desarrollo Rural de los países de América Latina y el Caribe.

Objetivo de la Linea

El objetivo de la línea es promover y apoyar los esfuerzos dirigidos a convertir la investigación y la transferencia de técnologia agrícola en un instrumento efectivo para el Desarrollo Rural a través de la producción y difusión de técnologias sobre sistemas de producción, que consideren distintas categorias de productores y que tomen en cuenta la disponibilidad relativa de los factores de producción. Se debe dar especial atención en el periodo del plan, a la tecnologia intermedia y a los sistemas de producción para pequeños agricultores.

La línea de Acción III, tiene dos grandes programas que a su vez de dividen en varios proyectos y actividades. Estas dos últimas figuras programaticas deben ajustarse a las necesidades de los países, a la vez de interés para los mismos y para la política general del IICA.

Programa III.1 - Investigacion y transferencia de tecnologia

Justificación : Un amplio respecto tecnológico puede ser cubierto en cada país dentro del marco de referencia de sus prioridades y necesidades, contando con sus propios recursos técnicos, humanos y financieros. Esta contribución para el desarrollo productivo debe ser estimulada, dirigida e intensificada. Paralelamente aquella tecnologias creadas en otras latitudes, en diferentes circunstancias y tal vez con diferentes finalidades pero que se relacionen con la problematica local o pudieran conducir a solucionarla, deben ser cuidadosamente analizadas para sumarlas al acervo de conocimientos tecnológicos del país y eventualmente usarse para resolver o ayudar a resolver los problemas del país.

Lo anterior exige un proceso previo de identificación de prioridades de indole tecnológica, por lo menos en los campos físico - biológicos y económico-social. Este proceso se sigue con la formulación de planes; la ejecución, evaluación y selección de alternativas y la diseminación de resultados promisorios.

Objetivos del Programa : El IICA coopera con los paises a crear las condiciones que conduzcan al cumplimiento de los objetivos del Desarrollo Rural a través del fortalecimiento del Sistema Nacional de investigación y difusión tecnológicas; para ello es necesario :

a) Generar los conocimientos y adaptar la tecnológia que las necesidades de la sociedad en conjunto y de los productores en particular demandan e indican como prioritarios y desarrollar los mecanismos apropiados para la difusión y adopción de dicha tecnológia.

b) Ajustar permanentemente las acciones a las necesidades del país, de la sociedad y de los agricultores.

c) Identificar las areas prioritarias para la investigación, físico-biológica, social y económica y para la transferen-

cia de tecnológia en función de las necesidades actuales y potenciales de los beneficiarios de la misma.

d) Elaborar o reformular el plan nacional de investigación y transferencia de tecnológia, con sus respectivos programas y proyectos como un subsistema del plan sectorial.

e) Ajustar la estructura interna del organismo para llevar acabo el plan nacional de investigación y de transferencia de tecnológia.

f) Mejorar la calidad de los recursos humanos con que cuenta el sistema de investigación mediante políticas adecuadas de incorporación y promoción de personal y a través de la creación o fortalecimiento de mecanismos permanentes de capacitación.

g) Asegurar un flujo de recursos financieros ajustados a las necesidades de ejecución del plan nacional de investigación y transferencia de tecnologia mejorando tanto la eficiencia (costo por unidad de producto) como la eficacia (calidad, oportunidad, accesibilidad y ajuste a las limitaciones de los beneficiarios) de las operaciones o servicios.

h) Establecer o fortalecer las vinculaciones del organismo con las unidades administrativas que otorgan poder y autoridad; las unidades administrativas que asignan y controlan los recursos; los organismos que permiten aprovechar la capacidad instalada del país para el cumplimiento del plan; los organismos que aseguren la difusión y aplicación de la tecnológia y los destinatarios o beneficiarios de los servicios del organismo.

Estrategia : La forma en que se procurara alcanzar los objetivos identificados sera mediante la aplicación de las estrategias que se mencionan :

1) Trabajar conjuntamente con los equipos técnicos de los organismos del sistema existentes o a crearse, en la elaboración o adopción de criterios y metodológias validos para identificar y asignar prioridad a distintas areas posibles de investigación, y en el establecimiento de un orden de prioridades a corto, mediano y largo plazo.

2) Ayudar a los organismos de investigación para que orienten su acción hacia la identificación, adaptación y creación de innovaciones tecnologicas para resolver los problemas identificados. Estas innovaciones deben ser compatibles con las condiciones físico-biologicas y socio-económicas en que se realiza la producción, en el momento actual y en un futuro previsible.

3) Trabajar con el personal técnico de dichos organismos para que esa orientación se realice a partir de una identificación de la clientela hacia la que va dirigida la investigación, atendiendo especialmente a los estratos de menores recursos en el sector rural.

4) Identificar, conjuntamente con los organismos productores y difusores de tecnológia, los canales a través de los cuales las clientelas escogidas usualmente reciben (o pueden recibir) información sobre innovaciones tecnologicas y las condiciones socio-economicas de la aplicación de tales innovaciones.

5) Apoyar a dichos organismos, u otros pertinentes, para mejorar, adaptar o crear los canales adecuados para transmitir las innovaciones necesarias, en un lenguaje accesible a los distintos tipos de usuarios.

6) Promover que los organismos que realizan investigación físico-biologica y socio-económica conjuguen sus esfuerzos para

definir de manera clara cual o cuales son los problemas a los que se debe dar solución mediante la innovación tecnológica y la adopción de la misma y cuales con las investigaciones basicas que deben conducirse para sustentar tales innovaciones, dando lugar a la formulación y ejecución del plan nacional de investigación y transferencia de tecnologia.

7) Trabajar, conjuntamente con los organismos pertinentes, en el desarrollo de modelos normativos de organización interna. Se cuidará especialmente que estos modelos reúnan condiciones de simplicidad adecuadas a la cantidad y calidad de recursos disponibles y previsibles, que se ajusten a las exigencias organizacionales de los planes de investigación y transferencias existentes y que sean lo suficientemente flexibles para adaptarse a la evolución de los mismos.

8) Apoyar a los organismos pertinentes en el ensayo y ajuste de estos modelos, y en el establecimiento de enlaces adecuados con otros organismos del sector.

Programa III.2 Coordinación multinacional de la investigación y de la transferencia de tecnológia

Justificación

Los procesos de investigación y de transferencia de tecnológia se pueden consolidar solamente en la medida en que exista un medio de relacion e intercambio entre sistemas de diferentes paises. El establecimiento de tal relación requiere un coordinado esfuerzo de comunicadión y estudio que determine las areas de intercambio, la profundidad y extensión del mismo.

Este esfuerzo cooperativo multinacional debe comprender el entrenamiento y la capacitación de los recursos humanos, así como la busqueda de programas conjuntos e integrales en los que inclusive se establezcan mecanismos de contribución financiera común y

participación en el financiamiento de programas y proyectos con recursos externos. Un enfoque de tal naturaleza reduciría costos de operación y permitiria una acción mas extensa de apoyo técnico, asesoria y capacitación.

Objetivos del programa

Para orientar las acciones del IICA en cada uno de los países miembros, en lo concerniente a la cooperacíon multinacional, se formulan los siguientes objetivos :

a) Apoyar, mediante participación directa, a los organismos nacionales de investigación y transferencia de tecnológia, en la identificación de áreas de común interés con otros países en forma tal que se generen gestiones cooperativas, complementarias y de intercambio reciproco.

b) Consolidar y ampliar la cooperación entre organismos nacionales, regionales e internacionales de investigación y transferencia de tecnológia agrícola, extendieno la relación con los organismos de cooperación financiera

Estrategía

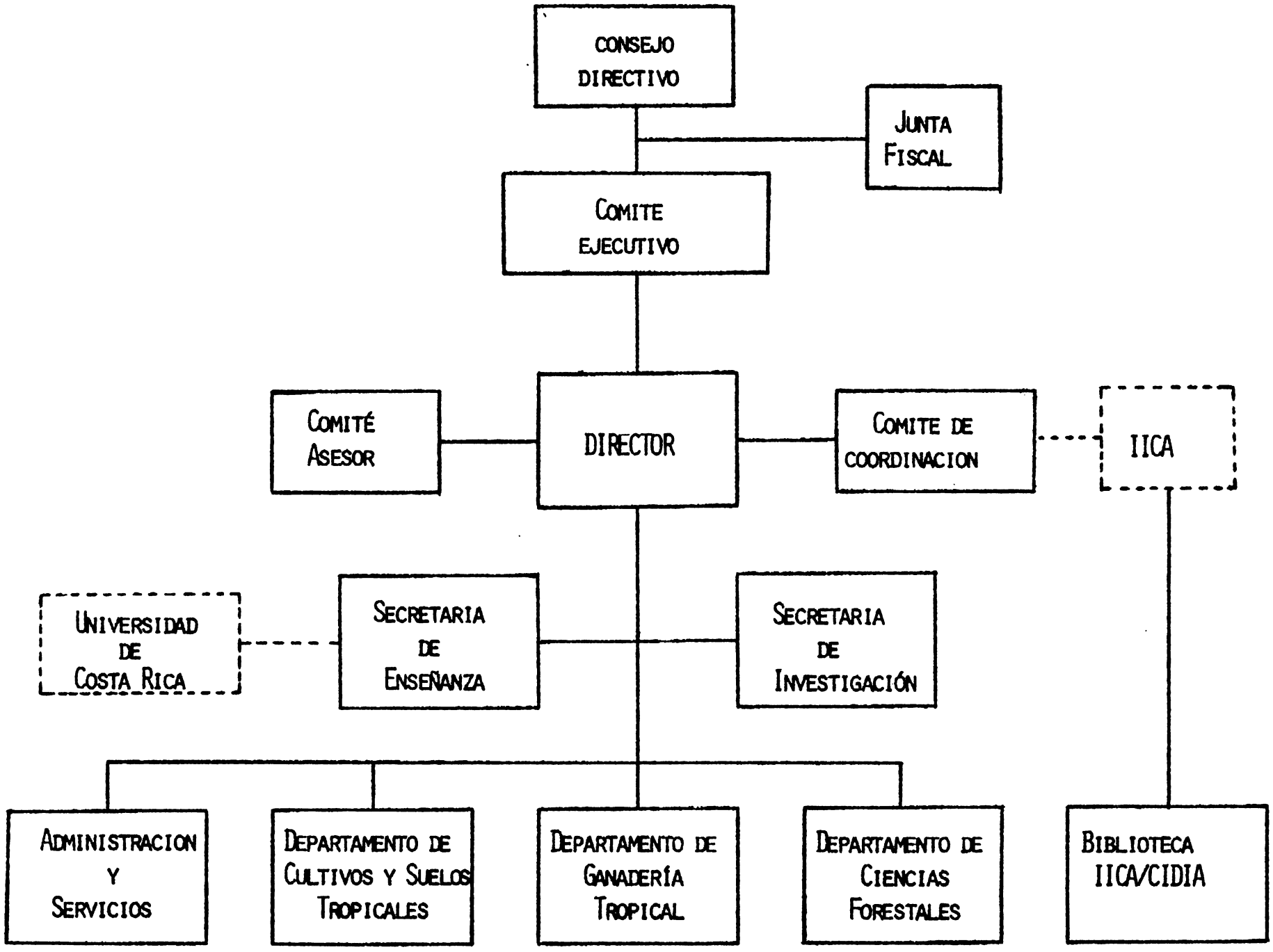
El IICA tratará de alcanzar los objectivos a través de los siguientes medios :

1) Promover, a través del organismos multinacional integrado por los organismos nacionales, que los países de cada región asignen prioridad a las áreas de cooperación técnica reciproca en la investigación y transferencia de tecnológia agrícola.

2) Desarrollar y difundir conjuntamente con el organismo multinacional propuestas y modelos de cooperación técnica regional, para que esta opere en un esquema coherente de cooperación entre los organismos nacionales, regionales e in-

ternacionales en los campos de investigación y transferencia de tecnológia agrícola, asi como su integración con los programas nacionales y regionales de inversión para el desarrollo rural.

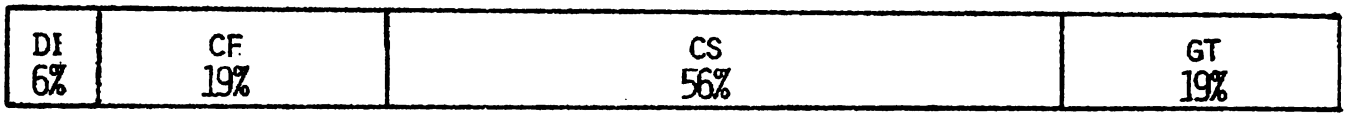
ORGANIZATION



PERSONAL PROFESIONAL

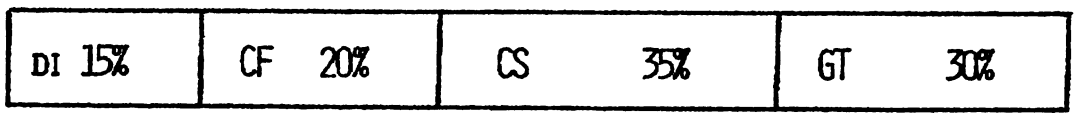
DISTRIBUCION DE LOS RECURSOS HUMANOS

POR DEPARTAMENTOS



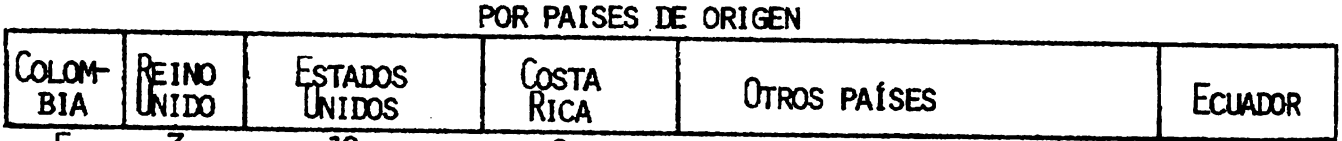
POR FUENTE DE FINANCIACION

PRESUPUESTO BASICO



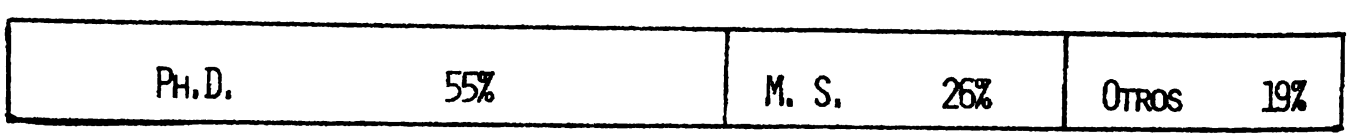
CONVENIOS

POR PAISES DE ORIGEN



OTROS PAÍSES: ALEMANIA 1, BOLIVIA 1, CHILE 3, EL SALVADOR 2, GUATEMALA 2, HAITÍ 1, HOLANDA 2, MÉXICO 1, NORUEGA 1, PERÚ 3, SUIZA 1, URUGUAY 2 Y VENEZUELA 1

POR GRADOS ACADEMICOS



DR PINCHINAT

SPENCE, John - Trinidad-Tobago

1. The brochure entitled "What is IICA" refers to "National Committees", could you say something about these? Are they part of the IICA administrative structure?

Ans: They are not part of the IICA administrative structure. They are selected by the National Government to collaborate with the local IICA Office in formulating IICA's plan of action for the country.

2. Some of the strategies of IICA which you have outlined seem to suggest IICA involvement in National Agricultural policy and execution of such policy. Do you not consider that this is not a suitable role for an outside agency to perform but rather such agency should, by financial aid and provision of technical staff to the local institutions, build up their capacity to carry out such functions?

Ans: IICA does not dictate the national agricultural policy but rather cooperates with the national Government in strenghtening the institutions that are responsible for orienting and implementing the policy.

PROPOSED WORKING GROUPS

Group No 1

Structure of Agricultural Research System

1. Louis A. BELL
2. Rowland FLETSCHER
3. Percy JEFFERS
4. Emmanuel S. LEGAGNEUR
5. Juan DIAZ
6. Julio BARTHELEMY
7. John SPENCE
8. César FRANJUL
9. Claude GRAND PIERRE
10. Claude WROY
11. Ariel AZAEL
12. Abdul WAHAB
13. William GARVEY

ANNEX -I-

LIST OF PARTICIPANTS IN
WORK GROUP SESSION II.

BARKER, Glennis
BAZAN, Rufo
CAMPBELL, Lewis
DOWNER, Alfred
FORDE, St Clair
FORSYTHE, Warren
JACKSON, George
LOUIS, Marie Thérèse
MATELIER, Antoine
@ PIERRE, Réginald
SANON, Jacqueline
@@ SPENCE, John

@ moderator
@@ in attendance part time

SUBGROUP III

Relationship with International Supporting Agencies

1. Godfrey NURSE
2. Robert CASSAGNOL
3. Alvaro GARTNER
4. Muller HAYE
5. Patricia Castano de MERMELSTEIN
6. Dr. Michael T. JACKSON
7. Guillermo GALVEZ
8. Antonio PINCHINAT
9. Georges WERLEIGH
10. Roosevelt COMPERE
11. Volny PAULTRE
12. John SPENCE

QUESTIONS FOR WORK SUBGROUP 1

AGRICULTURAL RESEARCH SYSTEMS: NATIONAL INTERNAL STRUCTURE

1. Premises

- Research is a means, not an end in itself. The function of agricultural research is to support the objectives and goals of national rural development policy.
- Development means both increasing production and productivity and increasing people's capacity to control the productive process and thier participation in the results of that increase.
- Development should not be limited to a few but should benefit the majority of the people, especially those who need it most.

2. Questions

1. What should be the products (results of Agricultural Research Systems in order to fulfill their functions?

2. What main institutions should Agricultural Research Systems maintain relationships with in order to perform their functions?

3. What types of relationships should Agricultural Research Systems maintain with other institutions and Agencies in order to perform adequately their expected functions?

4. What resources (human and financial) should Agricultural Research Systems have to be effective and efficient?

5. What scope or coverage should Agricultural Research Systems have to be able to effectively support rural agricultural development policies, especially regarding :

   a. Geographical area
   b. Clients
   c. Problems?

6. Taking into account both premises and answers given, what kind of structure should national Agricultural Research Systems have in order to be able to support national agricultural development policies?

QUESTIONS FOR WORK SUBGROUP 2

AGRICULTURAL RESEARCH SYSTEMS. EXTERNAL RELATIONS

Regional level

1. Premises:

- - Regional Agencies in bringing about innovations within hin technology and production systems must seek to complement and enlighten, not dictate national agri-research systems objectives and goals.

- Regional Agencies, both technical and financial, should work through, not independently, from existing Agricultural Research systems in supporting countries objectives and goals for rural development via agricultural research.

2. Questions:

1. What kind of approach or strategy should the regional agencies adopt to fulfill their expected roles?

2. What should be the means and mechanisms used to implement that approach?

QUESTION FOR WORK SUBGROUP 3

AGRICULTURAL RESEARCH SYSTEMS, EXTERNAL RELATIONS

International level

1. Premises :
   - International Agencies in bringing about innovations within technology and production systems must seek to complement and enlighten, not dictate national agri-research systems objectives and goals;
   - International Agencies, both technical and financial, should work through, not independently from existing Agricultural Research Systems in supporting countries objectives and goals for rural development via agricultural research.

2. Questions :
   1. What kind of approach or strategy should the international agencies adopt to fulfill expected roles?
   2. What should be the means and mechanisms used to implement that approach?

R E P O R T

OF

WORK GROUP SESSIONS II AND III

AGRICULTURAL RESEARCH SYSTEMS

AND

INTERNATIONAL REGIONAL LEVELS

Port-au-Prince, Haiti,
Nov. 28 - Dec. 2. 1977

The Participants in Group I - Internal Structure of Agricultural Research systems agreed with the following :

1. PREMISES

- Research is a means, not an end in itself. The function of agricultural research is to support the objectives and goals of national rural development policy.

- Development means (a) both enhancing production and productivity and (b) increasing people's capacity to control the productive process and their participation in the results of that increase, thereby improving the quality of life socially, economically and culturally.

- Development should not be limited to a few but should benefit the majority of the people, especially those who need it most.

2. ANSWERS TO THE QUESTIONS

Answer to Question 1 :

ARS should give supporting service with reference to providing solutions to problems in crop and livestock disciplines within the developmental framework of the National Agricultural Policy. Research itself cannot achieve the ultimate objective of production and productivity. It is therefore necessary to consider other related institutional systems such as extension, credit, training and marketing to name a few. Research should be geared to generate and diffuse appro-

priate technology that is relevant to the National Agricultural Policies e.g. methodologies, training, biological materials, social information.

Priority areas for research within the member countries of the Antillean Zone include :

1) Agricultural Engineering
   - Drainage and Irrigation
   - Small farm mechanization

2) Crops and Cropping Systems, including Basic Seed Production Technology

3) Hillside Farming Systems and appropriate technology for hillside and marginal lands

4) Land use and Soil Capability Surveys

5) Soils and Soil Conservation

6) Forest Improvement

7) Distribution and Marketing Systems

8) Post Harvest Loss and Utilization

9) Animal Health and Husbandry

10) Fisheries and Apiculture

11) Credit Systems

Answer to Question 2 :

The committee considers that within the region the National ARS should maintain close relationships with the following institutions :

1. National Science Councils
2. Commodity Research Boards
3. Commodity Marketing Associations
4. State Agricultural Research Institutions
5. Universities and training institutions
6. Extension and training departments
7. Inter-regional institutions e.g. CARDI, CFCS
8. Resident International or Regional Organizations
9. International Organizations
10. Non-Governmental Service Organizations
11. Philanthropic organizations
12. Credit Institutions
13. Commercial agricultural agencies - e.g. oil companies etc...
14. Agricultural Societies
15. Data collection and storage Institutions
16. Mass media Institutions
17. State Planning and programing units

These institutions are not listed in order of priority.

Answer to Question 3 :

The type of relationship that Agricultural Research Systems will maintain with their institutions depends largely on the state of development and sophistication of the territory/country involved.

Three types of relationships with various degrees of overlapping relative to the stage of development can be identified.

1- At the lowest level the Research System will be entirely dependent on organizations outside its system for Research inputs. The exchange with and between other institutions enjoys direct contact.

2- At a median stage where the system contributes part of the input, and

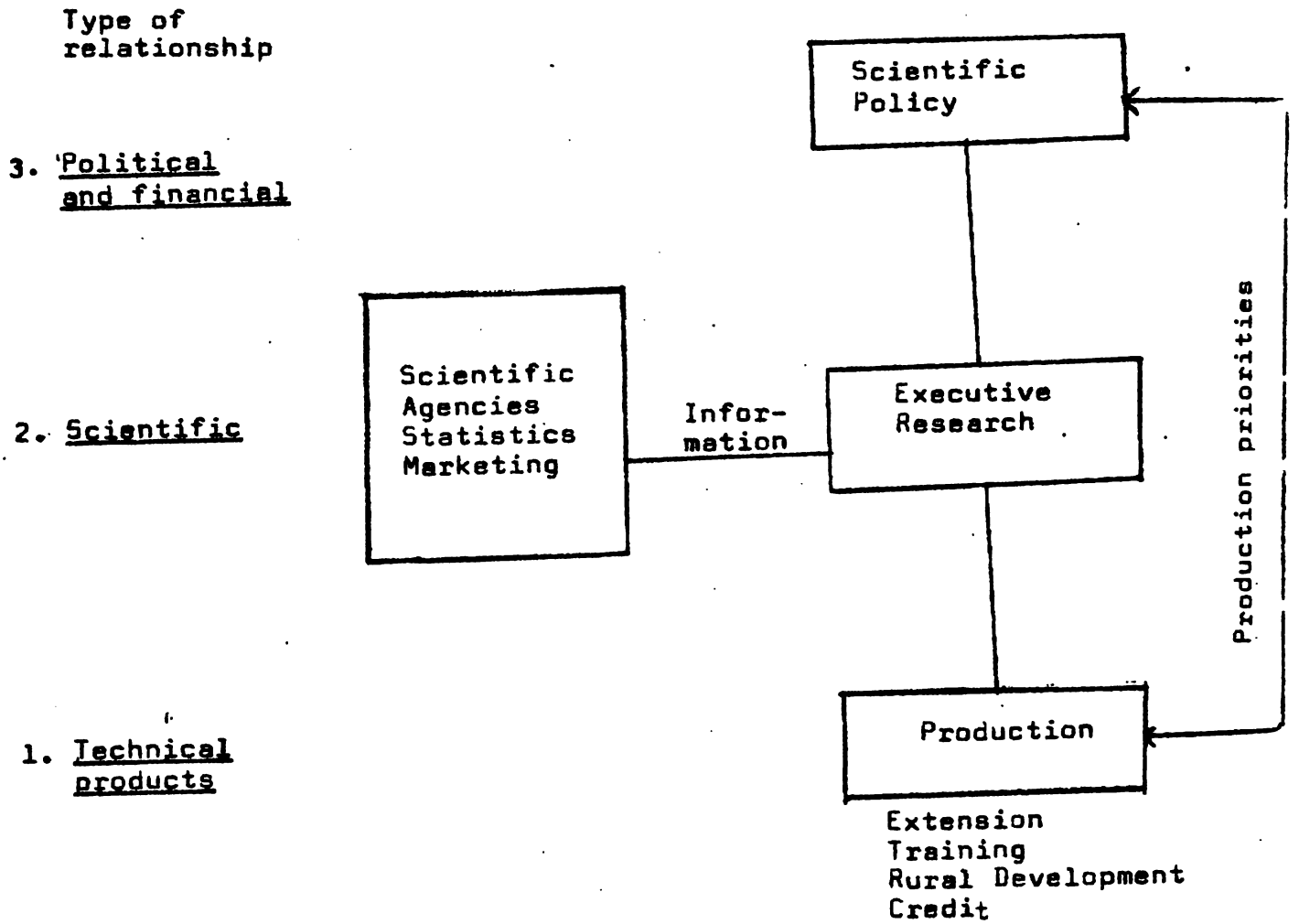
3- At the highest level of development and sophistication the territory/countries can provide all the inputs as it may desire. It is desired and recommended that at whatever level of development a territory/country considers itself, the Agricultural Research System should seek to have the fullest access to research work in progress. Results and Services available through reports and publisher literature, personal contacts and familiarization with the nature of the problems on the project is of utmost importance.

At the level of higher development the type of relationship should ensure continued intercourse and identification of problems, priorities and exchange of information as these have the

greatest tendency at this point to become muddle constrained by bureaucratic practices.

The attached chart serves to illustrate the different types of relationship as related to (1) financial, (2) exchange of information, (3) delivery of research products and (4) choice of priorities. It will be seen that the type of relationships becomes increasingly difficult to organize as we progress from 1 to 4.

SUGGESTED RELATIONSHIP BETWEEN
THE ARS AND OTHER INSTITUTIONS



Relationships are related to (1) financial, (2) exchange of information, (3) delivery of research products, (4) and choice of priorities. They flow according to the above chart the organizational difficulties in relation to financial and technical dependence of the developing territories and countries increase form 1 - 4.

Answer to Question 4 :

a. Human Ressources

i. To have well qualified staff throughout the system, Leadership should be of the highest quality. Seniority should not be the major criterion for leadership.

ii. The need for adequate technical support staff. This is a real problem in the Government Services where bureaucratic and financial constraints hinder this objective.

iii. Training and experience of the staff is particularly important to the job they are assigned. Timeliness and relevance of training are also important considerations.

iv. Levels of job satisfaction, attitudes, staff moral and commitment to rural development are important elements for the success of the system.

v. Within the region significant deficiency exists in the area of middle management expertise in Agricultural Research Systems. This deficiency needs to be corrected.

vi. A severe drain on top level technical expertise is being experienced by the movement of highly qualified and experienced research officers to administrative positions to obtain a higher level of finan-

cial remuneration. The salary structure of research and extension staff should be such that officers are not forced to leave their areas of speciali a-tion whether it be extension or research to go in-to an administrative post to achieve financial and personal satisfaction.

b. Financial resources

Adequate financial provision should be made available. International Organizations could play an important role in this area.

Physical and financial resources will be largely determi-ned by the resources of individual territories countries. It is recogni ed that land resources should reflect the ecological topographical and cropping systems they serve. As far as possible however, financial support for the ARS should be tailored to existing and potential resources within the scope op the region and territory.

Answer to Question 5 :

a. The geographical area should be interpreted as an ecologi-cal zone. A major consideration would be the production systems and objectives relevant to each zone which will have an influence on :

i. the level of research or investigation

ii. the use of on-farm research in a micro-ecological zo-ne especially within larger ecological areas and where

the chances of changing the practices of the farmer are low as a means of achieving very specific objectives.

The question of technology transfer on a regional basis was discussed. A regional ecosystem map would of necessity, be a basis for implementation of such a proposal

b. Clients

The majority of clients are those in need of agricultural technological support in their farming pursuits. There are the clients with minimal production resources.

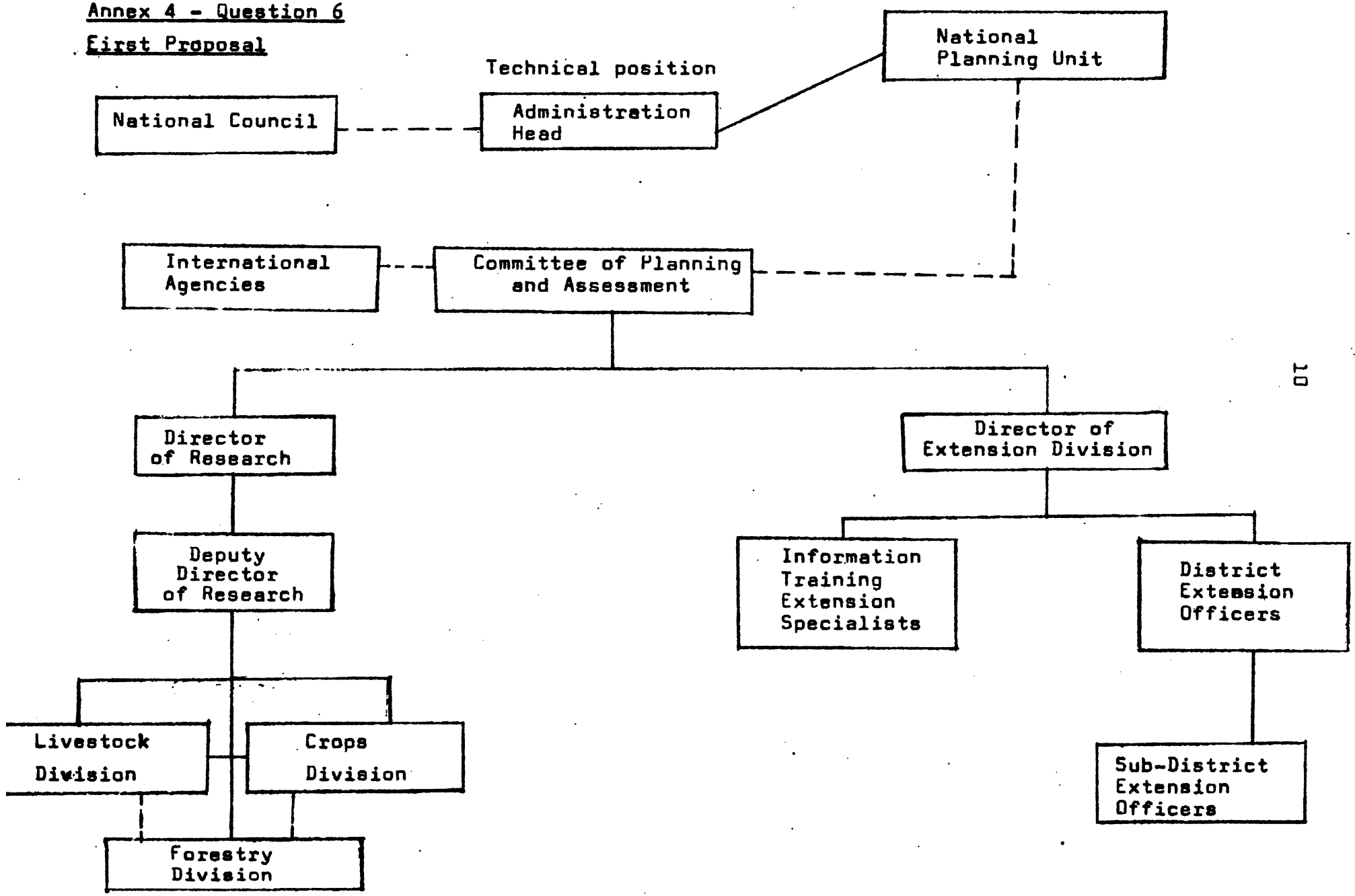
c. It is accepted that the problems to be solved are intimately related to the national developmental objectives.

The integrated or multidisciplinary approach should be employed in the attempt to handle or solve problems identified. The system should therefore be adequately equipped to use such a technique.

PROPOSED STRUCTURE
OF NATIONAL AGRICULTURAL RESEARCH SYSTEMS
(PLAN I)

Annex 4 - Question 6

First Proposal



PREREQUISITES FOR THE EFFICIENT OPERATION OF THE ABOVE STRUCTURE

1. Properly trained personnel at all levels

2. Relationship of training to job assignment

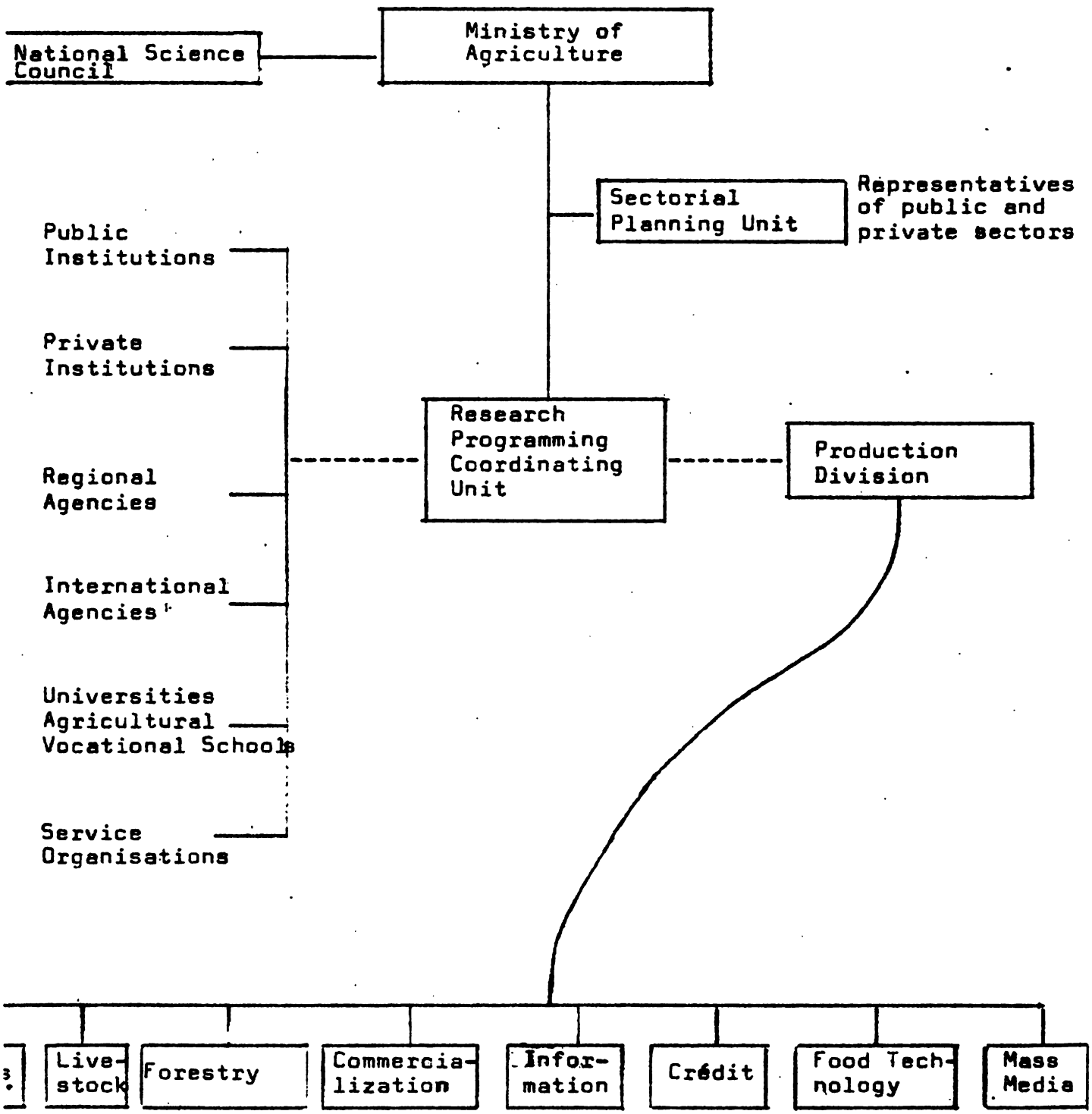
3. Salary and other social incentives

4. Availability of technical and mid-managment support staff

5. Job satisfaction

6. Leadership should be based on proven capability and performance

Second proposal :



Perequisites for the effecient operation of the above structure: Same as those outlined for plan 1.

Final Recommendations :

As proposed by Percy JEFFERS, the plenary session agreed with the following recommendation.

"Since working group I had put forward two Research structures and that an autonomous research system has been aimed, it is proposed that individual territories and countries adopt the system most adequate to fulfill their national development po - licies taking into account the merits by the autonomous of past civil structures."

The members of the Work Group Session concerned with the role of Regional and International Agencies in Agricultural Research Systems agreed to the premises that :

a) In bringing about innovations within technology and production systems Regional and International Agencies must seed to complement and support, but not to dictate objectives and goals in national agricultural research systems. All external agencies must be sensitive to government policies.

b) Both technical and financial agencies should work through and not independently of existing Agricultural Research Systems or other national agencies in supporting country objectives and goals for rural development through agricultural research.

c) The International Agencies have as their primary clients: governments, national institutions or Regional Agencies which have national support.

With regard to the kind of strategy that the regional and international agencies should adopt to fulfill their expected roles, and the means and mechanisms to be used to implement that strategy, the following recommendations are made :

1. There should be a National Body in each country responsible for the coordination of the national research activities in agriculture in keeping with national policies and goals.

2. Each National Body should invite to an annual meeting represen - tatives of Regional and International Agencies to determine how these could best strengthen and complement national programmes through :

   a) Technical cooperation - manpower and resources
   b) Participation in research and the transfer of technology
   c) Participation in training at all levels.

   In addition, the International Agencies should :

   i. Contract out research projects first to national or regional

bodies which are in a position to meet the project requirements. Also, wherever possible, professionals from the country or the zone should be given priority, in order to reduce the number of qualified professional seeking employment elsewhere to the detriment of national programs;

ii. Up-grade national institution management capacility through involvement in project design and execution.

3. An annual regional meeting should be sponsored to bring together representatives with a decision-making mandate of National Bodies referred to in 1. above, together with representatives of regional and international agencies to :

a) coordinate at a regional level, where appropriate, national activities that are of regional importance

b) identify the mechanisms whereby projects proposed in 2a above could be implemented, recognising in this process the existing and potential capacities of national and regional institutions

c) consider specific activities including

(i) technical cooperation

(ii) research and transfer of technology

(iii) training at all levels

Editor's note: A proposal for the establishment of such a regional committee is given on page .

4. It was noted that although there agencies such as AGRINTER and AGRIS, involved in documentation and dissemination of informa - tion on research, there is a need for :

a) Registration of on-going projects in the countries of the region, and

b) a translation and information dissemination service

It was suggested that these matters be considered at the first regional meeting referred to in 3 above.

REGIONAL TECHNICAL MEETING ON AGRICULTURAL RESEARCH SYSTEMS IN THE ANTILLES

Program for the Closing Session

1. Haiti's National Anthem
2. Introduction - Mr. Claude Grand-Pierre (Organizing Committee)
3. Summary of Conclusions and Recommendations presented by :
   - Dr. Antoine M. Pinchinat, Regional Coordinator of IICA - Antillean Zone
4. Comments by a representative of foreign participants :
   - Dr. Alfred Downer - Guyana
5. Remerciements by Michele Monoziet - Organizing Committee
6. Closing Remarks by His Excellency Agronome Joseph Bernard, Under-secretary of State of Agriculture/ Haiti.

RESUME DE LA REUNION

A.M. Pinchinat

Nous voici parvenus aux dernières minutes d'une semaine de travail intense durant laquelle:

1. Les comité nationaux de six pays où travaille l'IICA dans la zone des Antilles présentent et discutent, au niveau régional, les rapports de la situation des systèmes de recherche agricole dans chacun des pays individuels. A ce groupe s'ajoute le rapport de l'Institut National de Recherches Agricoles (INRA) sur le même sujet dans les Antilles Françaises.

2. Des professionnels de haut niveau et vaste expérience dans la matière purent comparer leurs notes et échanger leurs idées sur l'évolution de la recherche agricole dans la zone.

3. Tous les participants dans un vrai et désintéressé esprit de collaboration régionale purent formuler et approuver des principes généraux et des mécanismes concrets pour accélérer le renforcement institutionnel des systèmes de recherche agricole dans les pays participants.

L'invitation du Gouvernement Haitien en collaboration avec l'IICA a été honorée par tous les pays membres de l'IICA que comprend la zone des Antillles ainsi que par le Dépar-

tement Français de la Guadeloupe et de la Martinique. Aussi nous sommes très heureux d'avoir parmi nous les représentants de quatre organisations internationales et de six organisations régionales techniques et financières des plus prestigieuses qui opèrent dans les Antilles.

Les rapports des institutions nationales mirent à jour les bénéfices que la recherche agricole a apportés au développement rural des pays de la zone, mais par ailleurs ne manquèrent pas de souligner les faiblesses des systèmes nationaux de recherche agricole,,ni les mesures qu'il faudrait adopter pour rendre ces systèmes plus efficaces et efficients. De même, les institutions régionales et internationales tant techniques que financières indiquèrent leur contribution à la recherche agricole dans la zone ainsi que les stratégies et moyens qu'il faudrait implanter pour renforcer les systèmes nationaux de recherche agricole .

Deux groupes de travail chargés, l'un de l'étude de la structure interne des systèmes de recherche agricole et l'autre des relations entre les systèmes et les organisations régionales et internationales ont pu condenser dans leurs rapports respectifs des recommandations claires et aussi concrètes que possible pour améliorer la contribution de la recherche agricole au développement rural dans les pays de la zone des Antilles.

Comme produit de la réunion il a été possible de grouper dans un document les rapports originaux ou résumés de rapport des organisations nationales, régionales et internationales ainsi que les recommandations de chacun de ces trois

niveaux d'organisations pour le renforcement de la recherche agricole dans la zone.

A tous les participants, les organisateurs de la réunion présentent leurs plus sincères remerciements pour avoir si activement contribué à l'atteinte des buts et à l'obtention des résultats anticipés de la première assemblée de ce genre dans la zone des Antilles.

NOTE

The Organizing Committee of the Meeting thanks very much the remarkable labour of Secretaries and Operators who made possible the impression of this preliminary proceedings.

We also thank very much the Representative of Gesterner in Haiti (Maison Carlstroen) for the kind help that they provided for the impression of this document.

FECHA DE DEVOLUCION