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TECHNICAL ADVISORY COMMITTEE

Ninth Meeting, Rome, Italy, 3 - 7 February 1975

TROPICAL FRUIT IMPROVEMENT PROJECT  
(Agenda Item 7)

TAC SECRETARIAT  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
Rome, 1975

THE UNIVERSITY OF THE WEST INDIES  
DEPARTMENT OF CROP SCIENCE

CABLES: "STOMATA" PORT-OF-SPAIN



ST. AUGUSTINE,

TRINIDAD, W.I.

In reply please quote  
OUR REFERENCE: 126/74

30th October, 1974.

Mr. B.N. Webster,  
Assistant Secretary,  
Technical Advisory Committee,  
Research Development Centre,  
Food and Agriculture Organisation,  
Via delle Terme di Caracalla,  
ROME.

Dear Mr. Webster,

It has been learnt that at the meeting of the Technical Advisory Committee of the Consultative Group on International Agricultural Research scheduled for next February there will be a discussion of work on tropical fruits. You may, therefore, be interested in the enclosed draft of a proposal of a "Tropical Fruit Improvement Project" for the Caribbean/Latin American region.

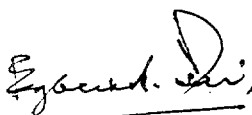
Acknowledging that fruit is not universally regarded as essential for the diet, I still hold that tropical fruit production can be of considerable help in feeding the populations of developing countries, directly by supplying much-needed vitamins and minerals when consumed locally, and indirectly by providing the wherewithal to purchase tools, other foods, medicines and necessary consumer goods when produced for sale. I have in mind mainly the small growers with holdings on second and third class lands.

The project is intended to cover research and development of six fruit crops believed to be of high potential in the Caribbean/Latin American region and entails an appreciable degree of 'self-help' from the agricultural institutions of the region. It is firmly believed that, given a reasonable start, it will

gather sufficient momentum to continue progressing on its own so that the initial push of partial financing over the first five years should be entirely adequate.

I commend the project for consideration and, in any event, should welcome your candid criticism of it.

Sincerely,



EGBERT A. TAI

Professor of Agriculture -  
Crop Production  
Head, Department of Crop Science  
&  
Chairman  
Technical Committee on Horticultural  
Development in the Caribbean.

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PROPOSAL OF A  
TROPICAL FRUIT IMPROVEMENT PROJECT

Introduction

It is a well known fact that the demand for tropical fruit throughout the world has been growing steadily over the years and, because of inadequate organisation of production, far exceeds the supply on a global scale although seasonal gluts occur locally and alternate with periods of extreme scarcity. There is little doubt of the advantage that would accrue to the producing areas, in terms of financial benefit, and to the consuming areas, in terms of satisfaction of dietary demands, from a stabilised supply/demand situation. This can be established by application of sound horticultural practice based on knowledge gained from well-planned research. To quote from a paper presented by Dr. Boysie E. Day at the Symposium held at North Carolina State University in August, 1973, on Industry's Role in Funding Horticultural Research, "The need now is for efficient and abundant production. This can be accomplished through intensive research to find more efficient production methods".

The following statement occurs in the "Handbook of Tropical and Sub-Tropical Horticulture" prepared by E. Mortensen and E.T. Bullard for issue by USAID in 1964:

"There is a shortage of reliable research data on many of the crops in the Tropics. Experimentation is much needed on most of the important tropical fruits."

Its truth is indisputable. Despite the existence of much scattered information on tropical fruits there is a lack of the concentrated and co-ordinated effort which has resulted in the success attending production of temperate and some sub-tropical fruits like apple and citrus.

Food production in the developing countries is currently being given very welcome attention by many organisations of the developed countries and they provide funds for the maintenance of special Centres like CIMMYT, CIAT, IITA, ICRISAT, CIP, etc. associated with selected commodities; there is no Centre for Tropical Fruits. While it is admitted that tropical fruits are not, per se, vital to the nutrition of people in the developing countries, it can not be denied that they can, and do, aid substantially in the provision of essential elements of the diet - sugars, proteins, fats, vitamins, minerals - can find a place in trade to earn foreign exchange necessary for the purchase of 'consumer goods' - other food items, clothing, medicine, tools, etc. - indispensable to maintenance of the general

well-being at the lowest levels and to raising the standard of living.

#### The Present Situation

At the University of the West Indies there has been some experimentation on a number of tropical fruits - avocado, banana, cashew, citrus, guava, mango, papaya - (list of references attached) but the work has, because of difficulty in obtaining funds, been limited largely to scattered experiments. Very encouraging results which show potential for application in commercial production have been obtained in a few instances: selections of avocado are now available for extending the season beyond the July to October period formerly accepted, cashew possessing high kernel/nut ratio has been identified, guavas and papayas of improved fruit quality have been selected and procedures for rapid vegetative propagation evolved. There has not, however, been an integration of the experiments into a special programme related to tropical fruits. It is now proposed that funding be sought to carry out a project to collate and build on the information already available to place the organised production of selected tropical fruit in the Caribbean area on a sound scientific footing by the planning and execution of relevant research together with wide dissemination of knowledge gained from the results of such research.

In co-operation with the Association of Caribbean Universities and Research Institutes (UNICA), the Department of Crop Science of the UWI has initiated a Horticultural Information Centre for the region (funding is problematic, however, and is at present assured only to 31st July, 1974). Data are being collected on institutions, individuals, programmes of research, education and development impinging on horticulture in the region with the aim of storing these for reference and making them available on request to any individual interested in horticultural production within the region. A register of workers according to specialisation will serve as a list of potential consultants and it will be a simple matter to effect direct contact between an enquirer and the specialists most likely to help with his problems. Work at the Centre commenced in January, 1974, with the provision of the services of a clerical assistant to the Professor of Agriculture (Crop Production). To date the programmes of 59 horticultural scientists working on fruit crops in 26 institutions have been indexed out of a total of 257 horticultural scientists in 55 institutions listed.

#### Land Utilisation for Fruit Growing

Because agriculture in the region developed under 'colonialism' most of the arable land with deep soil on the level or gentle slopes (classes I & II in conventional land classification) was used for the production of plantation export crops; little or no positive action

was taken in the location of fruit trees and these were relegated to backyards (introduced species like mango) or to the 'wilds or semi-wilds' on shallow soil and steep slopes of Classes III, IV and V land (indigenous species like cashew). Such conditions led to natural selection and those fruits which are best adapted to the environment have become feral in the region - avocado, cashew, guava, mango; it should not require too great effort to 're-tame' these species and coax from them highly satisfactory, profitable performance by the application of sound horticultural principles modified as necessary by the findings of relevant research conducted locally.

Even in the smallest of the populated islands of the Caribbean there is much unused land (Classes III, IV and V) capable of supporting fruit trees. Misguided efforts have been made at various times in the past to carry out intensive arable cropping in some of these areas, because of 'population pressure on the land', with disastrous results; despite application of conventional soil conservation measures there were losses due to erosion as can be seen in parts of Jamaica, St. Vincent, Montserrat. The land could, probably, have been retained without profit, if left under undisturbed natural cover, or made to produce profitably, with restricted temporary removal of the cover in sections and its replacement in time with orderly arrangements of permanent tree crops.

Though land-room may be limiting there is no shortage of manpower; unemployment is rife and labour should be available for horticultural work suitably presented. Much of the aversion to work in agriculture stems from the association of crop production with degrading labour of slaves and indentured persons under the 'old' plantation system; attempts to introduce 'advanced technology' at one fell swoop in the 'new' plantations has the effect of delaying acceptance of the existence of dignity in free manual labour in the fields. With horticulture involving production of crops which are easily assigned to an 'elite' class because of the exercise of 'voluntary' selection in growing them, it has proved much easier to secure the collaboration of workers as is evidenced in vegetable-producing areas of Trinidad, Barbados and Jamaica and also in the few instances where small fruit orchards have been established. The land likely to be available for extended fruit growing will not admit mass introduction of sophisticated field equipment of 'advanced technology'; this should facilitate improved management/labour relations while offering opportunities for the absorption of under-utilised labour and the relief of unemployment in many communities.

### The Project

Objectives: It is proposed that a project be mounted with the aim of securing and disseminating information for direct use by growers of tropical fruit in the Caribbean area. The planning,

organisation, execution and interpretation of relevant research will be indispensable to the project and may lay the foundation for establishment in the future of an international centre for tropical fruit crops.

While the range of crops showing potential in the Caribbean area is an extensive one, it is proposed to direct attention to avocado, cashew, guava, mango and papaya without completely ignoring others. Research is to be conducted under five broad heads:

- (1) collection, assortment and selection of cultivars for their adaptability to profitable production, breeding to satisfy special needs may require consideration also;
- (2) propagation techniques for rapid multiplication of selected cultivars;
- (3) cultural practices, involving the use of experiments in growth analysis, to determine optimum nutrition, population density, protection from pests and diseases etc., for maximum efficiency of production;
- (4) marketing, storage and transport of the fresh produce for distribution locally within the region and export outside of the region;
- (5) processing to extend utilization, absorb surpluses of fresh produce and facilitate regulated distribution.

In addition, an important aim is establishment of a source of reference for information and physical material, by proxy or directly.

Concentration of attention will be on areas served directly by UWI and those countries in which a liaison exists or can be established with institutions associated with horticulture - Venezuela, Colombia, Panama, Costa Rica, Honduras, Guatemala, Mexico and Southern United States.

Duration: A period of five years is envisaged as adequate for a lasting, beneficial impact. The project is to be regarded as determinate and during its lifetime it will become clear whether or not it will be desirable to establish an international centre for tropical fruit crops. In any event arrangements will be made to hand over, before its end, the component parts to co-operating institutions and government departments in the region in order to ensure continuity wherever this is required.

Siting: Headquarters should be in the Department of Crop Science of the University of the West Indies at St. Augustine, Trinidad, but the nature of the project necessitates the location

of experiments in several areas and distribution of members of staff at strategic points in order to obviate the need for frequent long journeys by more than a very few. Beside St. Augustine, the following locations come readily to mind:

Universidad de Oriente, Josepin, Venezuela;

Instituto Agropecuario Colombiano, Palmira, Colombia;

Instituto Interamericano de Ciencias Agrícolas,  
Turrialba, Costa Rica;

Colegio Superior de Agricultura Tropical, Gardenas,  
Mexico;

because of the existence of interest in fruit crops of the tropics and also trained scientific personnel whose co-operation with project staff members can be secured.

Staff: Suitable, competent personnel can be drafted from institutions in the region. Several of these may, reasonably, be on a part-time basis with the project contributing a fraction of their emoluments, the remainder coming from their home institutions; others should be on a full-time basis and receive all of their emoluments from the project. It should be made clear that no responsibility can reasonably be attached to the project to provide employment for staff beyond the stated duration - a maximum of five years.

Over-all direction and co-ordination of activities, general administration and upkeep of the Information Centre may well be assigned to a Project Director provided with headquarters staff consisting of 1 Administrative Assistant, 2 Clerical Assistants and 1 Messenger/Janitor; executive assistance should devolve on 2 Senior Horticultural Specialists - one for Research and the other for Extension and Education; there should then be two Research Horticulturists - one for field experiments and the other for post-harvest studies. These members of the "senior staff" should be provided full-time by the project and the institutions in the region expected to supply without charge collaborating specialists in Agronomy, Plant Pathology, Entomology, Virology, Nematology, Economics, Biometrics, Agricultural Chemistry, Food Processing on a part-time basis with full-time Research Assistants paid by the project. The regional institutions may also be requested to furnish basic office and laboratory accommodation for the various members of staff of the project and land where this is needed for experiments.

Facilities: Much of what is required for the project is already available at the University of the West Indies; there are cold storage rooms and with adjoining space which may be converted



into a fruit packing shed, a field laboratory and machine workshop, arrangements can be made without difficulty to secure land on long or short-term tenure for field trials. It is reasonable to assume that similar facilities will be obtainable elsewhere in the region also when required. Transport of experimental fruit by sea or air should not present any problems.

Initiation: The sooner such a project can be initiated, the greater the ultimate benefit will be. There should be very few obstacles to making a start at this time when the personnel can be readily located and in all the countries of tropical America there is growing interest in fruit production.

A feasibility survey of the region need take no longer than a few weeks and the most suitable time of year will be between June and November when the fruits listed earlier are likely to be 'in full season'.

Reporting: It will be imperative for satisfactory success that co-ordinated reporting on every facet of the project be given close attention and it is suggested that detailed semi-annual progress reports be an accepted condition. In addition a quarterly summary is advisable and a comprehensive report on each 'experiment' included in the project whenever it is completed. Other reports in the form of scientific papers for selected journals of conferences should within the customary limits be encouraged.

Budget: A rough estimate of the cost of the project over the five years of its duration is given below.

Salaries & Allowances

<u>Post</u>	<u>Per annum</u>	<u>Total</u> <u>5 Years</u>	<u>Project</u>	<u>Local</u> <u>Institution</u>
1 Director/Co-ordinator	36,000	\$180,000	\$180,000	-
2 Senior Horticulturists	40,000	200,000	200,000	-
2 Horticulturists	30,000	150,000	150,000	-
10 Specialists	150,000	750,000	-	750,000
10 Research Assistants	75,000	375,000	375,000	-
1 Administrative Assistant	6,000	30,000	30,000	-
2 Clerical Assistants	9,000	45,000	45,000	-
15 Technical Assistants	67,500	337,500		337,500
Part-time Clerical Assistance	1,000	5,000		5,000
Total US \$	414,500	2,072,500	980,000	1,092,500

<u>Capital</u>	<u>Per annum</u>	<u>Total 5 Years</u>	<u>Project</u>	<u>Local Institution</u>
Office Furniture & Equipment	\$	\$ 25,000	\$	\$ 25,000
Special Research Equipment		75,000	75,000	-
Land Rent	2,000	10,000		10,000
Buildings (offices & Laboratories)		150,000		150,000
Total US \$		260,000	75,000	185,000

Operating Costs

Research Materials	20,000	100,000	50,000	50,000
Stationery, Printing, Postage	15,000	75,000	75,000	-
Telephones, Electricity, Water	7,000	35,000	-	35,000
Field Labour	100,000	500,000		500,000
Travelling & Transportation	30,000	150,000	150,000	
Total US \$	172,000	860,000	275,000	585,000

Expectations: It is anticipated that financial returns ascribable to the results of project activities should commence within a short time of initiation of the project. Assessment of the economic value of these is not attempted here; it is conservatively estimated, however, that the project should ensure, before its end, the establishment of

1,000	ha.	avocado worth \$1,500/ha.	total value	\$1,500,000
1,500	ha.	mango \$1,000/ha.	total value	1,500,000
2,000	ha.	papaya \$1,200/ha.		2,400,000
500	ha.	guava \$1,000/ha.		500,000
2,000	ha.	cashew \$ 250/ha		500,000
200	ha.	annonas \$1,000/ha		200,000
Total US \$				6,600,000

Of this total value about 50% may, perhaps, be taken as net increase and, therefore, a measure of the visible direct benefit of the project costing \$3,192,500 in all with \$1,862,500 coming from the regional institutions and \$1,330,000 from external funding.

The momentum generated during the five years of the proposed project should ensure continuation of development at an increasing tempo without further injection of capital from external sources, until economic equilibrium is attained between demand and supply of tropical fruits.

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at UWI

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