CARIBBEAN FOOD CROPS SOCIETY

Sociedad Caribeña de Cultivos Alimenticios
Association Caraïbe des Plantes Alimentaires

Vol. XX

PROCEEDINGS

OF THE 20th ANNUAL MEETING – ST. CROIX, U.S. VIRGIN ISLANDS – OCTOBER 21-26, 1984

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THE EASTERN CARIBBEAN CENTER, COLLEGE OF THE VIRGIN ISLANDS *and* THE CARIBBEAN FOOD CROPS SOCIETY

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Foreword

Arthur A. Richards
President
College of the Virgin Islands

In October of 1984 I had the distinct pleasure of welcoming a record number of participants to the annual meeting of the Caribbean Food Crops Society on St. Croix. I express a great deal of pride on behalf of all the dedicated people of the College of the Virgin Islands who organized and hosted the meeting activities. Further I express particular pride in the fact that the 1984 conference was extremely successful in its objective to provide a forum for knowledge to be shared among the region's professional work force concerned with the problems of human welfare through agricultural improvements.

The College of Virgin Islands is very pleased to sponsor the publication of the proceedings of the 1984 meeting. It is hoped that this document would be of benefit in carrying forward the concept of the Caribbean community as an interdependent entity striving to resolve quality of life problems for all the citizenry. This document also represents a milestone for the College because its publication represents the first formal output of CVI's Eastern Caribbean Center.

The Center will be a collaborative endeavor between CVI and the people of the island nations of the Eastern Caribbean, offering cooperative programs of study, research, and training. The Center, as proposed, is designed to address problems of the region by working within the framework of established regional institutions, including the University of the West Indies, by encouraging cooperation between the nations of the Eastern Caribbean and the United States through this collaborative endeavor.

Documentation proves that the similarity of culture and language, the commonality of problems, the existing family ties with the people of the Eastern Caribbean and a diversity of expertise available at CVI, combine to make the Center uniquely suited to contribute meaningfully to the educational, economic, and social development of the Eastern Caribbean, supplementing the efforts of the governments, other institutions and the people of the region.

To accomplish this task, the College supports for the Center initiatives in five interdependent areas: agriculture and natural resources, human resource development training and education, social and environmental research and development, telecommunications, and scholarship assistance.

We look forward with great anticipation to the role of the College of the Virgin Islands and its Eastern Caribbean Center to serve as a catalyst for educational, technical, scientific and cultural interchange among the Caribbean Nations.

Presidential Address:

Innovative Technologies for Enhancing Food Production Capabilities in the Caribbean

Darshan S. Padda
Vice-President for Research and
Land-Grant Programs
College of the Virgin Islands

Fellow agricultural scienrists, it is a grear privilege and honor for me ro deliver this presidential address at the 20th annual homecoming meeting of the Caribbean Food Crops Society. The first general meeting of the Society was held on St. Croix from October 7 to 11, 1963 under the leadership of the late Dr. R.M. Bond.

Since the first meeting of the Society, rhe Caribbean region has undergone major changes—changes rhat are political, economic, social, demographic and rechnological in nature. There has been welcomed economic and political progress in rhe Caribbean. This progress is generally expressed in statistics that are macroeconomic descriptions. Bur in acruality, rhese sratistics translate into human problems, problems of people: lack of opportunity for growrh and inability to share the prosperity.

In spite of a tremendous growrh in tourism and tourist related industries, the majority of the Caribbean people still live in rural areas that depend on agriculture. Their numbers are growing each year. They seek a secute food supply, srable employmenr and rhe hope for upward mobility so that rhey can have decent housing, education for their children and economic independence for their families. They are looking for a road thar will lead them toward these goals. For rural people who love the land, agricultute can provide a stable, respectable, dignified and independent pursuit leading ro the attainmenr of these goals. However, the Caribbean farmer, like any other farmer in the world, cannot do it alone. He needs help. And we, the agricultural scientisrs, have the obligation and opporrunity ro provide thar help. The goal for us is clear. The food import bills for Caribbean countries have mote than doubled since 1975, while rhe average growth rate in the agriculrural sector has slumped to approximately 2% a year compared to 4 ro 6% in the 1970s. With half of the exporr earnings of 27 countries included in the Caribbean Basin Initiative (CBI) coming from agricultute and wirh most of the population living in rural areas, a sound farm economy is essential.

While discussing agriculture in the Caribbean, the important concept of "microstate" must be recognized. Simply put, the concept brings to focus problems and opportunities connected with small size. An idea of the small nature of the economies in the English-speaking Caribbean can be obtained from the fact that the total population of the 12 nation CARICOM is a little over 5 million. Only three members have populations exceeding the 250,000 mark: Guyana with over 800,000, Jamaica with 2 million and Trinidad and Tobago with a little over 1 million. Under the microstate situation every function must be inter-dependent, and an integrated approach has to be pursued to achieve results. This concept will help us to understand why farming system approach is the most appropriate for the small farms. When we discuss small farms we cannot think only of introducing agricultural technology, but we should be concerned with the economic, social and educational status of these farm families. We have to look at the total picture with respect to the farm and farm family as a unit. Low incomes, teenage pregnancy, school dropouts, juvenile delinquency, and disintegration of families into single-parent households are some real concerns of the farm families and must be addressed as a part of the total package.

This paper discusses, in a broader sense than the title may imply, innovative technologies for enhancing food production. The question before us is how to define innovative technology. It can be defined as the introduction of new or unique methods to bring about change. But, it can be asked—Why do we need innovative technologies; and what is wrong with our traditional technologies? The necessity for innovation is dictated by two facts:

1. Our land and water resources are limited and under increasing competitive pressure from developers; and
2. Food needs are increasing due to growth of resident and visitor populations.

Since we cannot enhance our natural resources we must enhance their productivity. Due to limited land and water resources, competition and animosity has developed between agriculture and non-agriculture industries in the Caribbean. What needs to be understood is that no single industry can survive alone under microstate situations. Agriculture is needed to provide a stable economy and employment for indigenous populations. Non-agricultural industries, especially tourism, are needed to provide necessary capital for economic development and a ready market for agricultural products.

Before discussing specific technologies that are appropriate for the Caribbean, permit me to list some of the food and agricultural issues that, in my opinion, are priorities in the Caribbean. These are:

1. Strengthening and diversification of agriculture;
2. Market identification and development;
3. Human resource development;
4. Natural resources and forestry;
5. Integrated rural development;
6. Appropriate mechanization and irrigation technology;
7. Pest and pesticide management; and
8. Development and transfer of technology.

The Caribbean area is very heterogeneous in nature. In addition to water that separates our island nations, there are language differences, political differences and economic differences. However, there are great similarities in agro-climatic factors, socio-cultural factors and ecological factors.

The College of the Virgin Islands, through its Experiment Station and Extension Service, has worked on these priority issues that I have mentioned and has developed appropriate technologies to improve small and commercial farming systems in the Virgin Islands and other Caribbean islands. I would like to share with you some of our work that has bearing on these priority issues.

Agriculture is no longer a simple enterprise involved in raising crops and animals. Modern agriculture is an art, a business, a technology, and a way of life. Therefore, any strengthening and diversification efforts should be in keeping with these factors. In 1972, we started with a series of economic feasibility studies covering various agriculture enterprises. We selected certain enterprises which have stood the test of time and we initiated research and educational efforts to improve those enterprises. For example, Senepol cattle were developed on St. Croix in 1917 by a layman farmer. It was considered to be a good breed of cattle due to its docile nature, its resistance to tropical pests and diseases and its excellent growth rate without any supplemental feeding. However, due to the lack of characterization of the breed, it was sold for beef purposes for $200 to $500 per head, depending on the age. Our programs have helped to organize the farmers into a Senepol Association and have collected scientific data on the breed through performance and carcass evaluation. Within three years, St. Croix farmers exported their first shipment of Senepol cattle at $2,000 to $5,000 per head. The innovation here was to develop the cattle as a breeding stock.

Other factors adversely affecting the local livestock industry were the high cost of imported feed and lack of roughage during dry months. We started developing new technologies to alleviate these problems. Grain and forage sorghum cultivars were introduced and tested. Within the first three years a cultivar was recommended that yielded four times more than the locally grown one. Production studies showed that spring planting produced significantly higher yields than fall planting. Additionally, sudan grass was found to be quick in regrowth, high yielding and to have good

resistance to lodging and insect pests. The roughage shortage during dry seasons was solved through improving the forage value of local guinea grass that grows as a weed everywhere. An application of 30 pounds nitrogen per acre improved the yield 1.5 times, with 4% higher digestible proteins. We invited a U.S. company to come here to try bailing guinea grass, an endeavor which proved to be highly successful. These may not look like sophisticated technologies, but they produced problem-solving results.

Agricultural Diversification

We explored the possibilities of growing grapes in the Virgin Islands, since only an intensive crop with high income possibilities could prove profitable in such a location with high land value and costly labor. With the introduction of tropical cultivars and proper vine management, encouraging results have been achieved. However, additional testing is needed before profitability can be determined. There are many other crops that can be explored for possible commercial production.

According to Dr. Noel Vietmeyer of the National Academy of Sciences, of the 80,000 species of edible plants in the world, there are only 100 we grow to any reasonable extent and understand scientifically. And of those 100 crops, only 20 to 22, most initially domesticated in the Stone Age, basically feed the world. Rice, wheat and corn account for the bulk of calories and protein eaten. No new major crop has been domesticated in 10,000 years. Dr. Ferguson of the University of the West Indies echoed similar feelings through his paper entitled, "Some Underexploited Crops in the Caribbean" presented at the seminar on agricultural research and small farm productions held in Jamaica in December 1982. The participants at that seminar recommended that an agricultural development effort in the Caribbean emphasize the proper utilization of existing technology, create or adapt new technology when needed, and transfer this technology in the most effective manner to the small farmers of the region.

Another enterprise with a tremendous potential for enhancing food production in the Caribbean is aquaculture. In the Virgin Islands we have studied three methods of tilapia culture. Tilapia, a tropical, freshwater, food fish, is easily cultured in a wide range of systems. The culture of tilapia in cages is the best method in areas with existing farm ponds. This method promotes multiple use of a resource that is often under-utilized and allows diversification of a farming operation. Pond culture is the best method in areas with a good source of water. It involves the construction of shallow ponds that can be drained for harvesting. Pond culture of tilapia can be readily integrated into a farming operation. Tilapia, a filter feeding fish that prefers vegetable protein, will grow well on agricultural by-products and animal manure. The nutrient enriched water of fish ponds is ideal for irrigating crops. A third method being explored consists of a series of tanks in which the fish cultured water is continually purified and reused. This is a closed recirculating system whose by-products include sludge which can be used for composting and high waste nutrient levels that can be used as a nutrient source for vegetable hydroponics.

Market Identification and Development

A fundamental component of increased production of traditional crops or the development of under-exploited crops, is the assurance that markets exist or are being developed to accommodate such production. While developing marketing strategies in the Caribbean, overemphasis is given to export, and tremendous local markets are left open for importers. In some countries, what is produced is exported and what is consumed is imported. In the majority of cases, something has to be exported to keep a balance-of-payment, and agricultural commodities are the only items available for export. In the Virgin Islands, many years ago, we thought of developing 'Solo' papaya production for shipping to mainland markets. Our commissioner of agriculture took a sample to New York City and received an open offer from a broker to accept all that we could produce. When the story hit the newspapers, telephones started ringing. The manager of Caneel Bay Hotel on St. John questioned the need to ship to New York when he was importing large quantities of 'Solo' papayas for his guests.

Of course, we realize that as part of the U.S. we do not have to worry about balance-of-payment. In the case of other Caribbean nations, the Caribbean Basin Initiative has offered duty free access, since January 1984, to U.S. markets for certain goods produced in the Caribbean. I participated in a recent Agricultural Marketing Workshop for the Caribbean Basin held in Miami, Florida and observed a strong interest by U.S. importers to find out what agricultural commodities they can expect from the Caribbean. Development of much needed infrastructure for storage and processing of local foods is another avenue to explore in market development.

Human Resource Development

Development and transfer of technology at local levels is vital to any drive to modernize and diversify agriculture in the Caribbean. No matter how much money is invested in the agriculture sector, success or failure ultimately depends on the strength and development of human resource. It is imperative that, while innovative technologies are explored for use in the Caribbean, the most essential resource, the human factor, also be developed. Without it there can be no conversion of knowledge to technology, no translation of technology to productivity, and no application of productivity to an improved quality of life. In December, 1983, I participated in a UNICA-sponsored workshop on teaching agriculture and was impressed with the recommendations made by the group. I hope their recommendations can be implemented.

Natural Resources and Forestry

Most of the Caribbean nations have experienced tremendous growth in both permanent and transient populations. In the Virgin Islands our population has, for example, doubled in the last ten years. More and more land is being used for housing, roads and shopping centers. The natural landscape is changing and trees are disappearing. In many Caribbean areas, these land changes and clearing of vegetation are upsetting the ecological balance.

Preservation of genetic diversity in local plant and animal species is necessary to secure supplies of food and preserve our natural resources and wild life. It is also necessary to ensure that the loss of species does not impair the effective functioning of ecological processes. The preservation of genetic diversity is both a matter of insurance and investment, necessary to sustain and improve agricultural, forestry and fisheries production, to keep open future options as a buffer against harmful environmental changes, and as the raw material for much scientific and industrial innovation.

Integrated Rural Development

In order to bring about any meaningful change in agricultural production in the Caribbean, an integrated rural development is of paramount importance. Caribbean farmers live in rural areas and, in order to achieve success, priority must be given to involve them in policy making and implementation processes. Access of rural communities to land, water and other natural resources must be improved. Small rural farmers' access to inputs like seeds, plants, machines, chemicals, markets and services need to be improved. Delivery structures and institutions that are responsive to farmers' needs must be established. Special programs to meet rural women's education and training needs must be given priority. Non-farm rural activities and educational facilities for farm children and adults must be developed. Greater equity in economic opportunities must be insured in order to enable small farmers to play an important role in increasing food production. Skyrocketing land values are squeezing the small farmer out of business, and the national governments must take steps necessary to ensure that young people who choose to farm have access to land.

Appropriate Mechanization and Irrigation Technology

The use of large size machinery has proven to be inappropriate for most field operations on small farms and the shallow tropical soils of the Caribbean. Machinery and equipment for small farms need to be developed on a priority basis. Farmers need to be offered short training courses in operations and maintenance of farm machines and tools. Mechanization of farms will make farming more attractive to young people, for if we expect our youth to practice farming, the old traditional ways have to change and agriculture has to turn into a technology-based business enterprise.

The use of trickle or drip irrigation has revolutionized crop production in the tropics. Surface irrigation results in loss of water and sprinkler systems encourage disease development on crop foliage. Drip irrigation provides an optimum amount of water to the root zone on a continuous basis. Our irrigation specialist has produced unbelievable yields of 92.6 tons/ha of tomatoes and 103.6 tons/ha of watermelons.

Pest and Pesticide Management

People love the Caribbean for its year round warm climate and, in fact, the U.S. Virgin Islands are referred to as an American paradise. Unfortunately, pests also find it a paradise and love it. I remember a few years ago we were discussing priorities for agricultural research in the Caribbean and Mr. Dean Davis, a former Agricultural Research Service Area director, asked Jose Vincent Chandler, who is a highly respected agricultural scientist in Puerto Rico, as to what, in his opinion, is a priority issue in Caribbean agriculture. Jose thought for a while and said, "If somebody could develop a pill that could be put in the soil and all plant pests would be controlled I would be very happy." This illustrates the importance of plant protection in the Caribbean. Keeping in mind the need for pest control and a sensitivity to the use of chemicals that could hurt fragile ecosystems, integrated pest management is the most viable solution. Authoritative identification of pest, beneficial and non-target organisms is fundamental to effective pest management. We are providing diagnostic and referral services on insects, plant diseases, nematodes and weeds, to our clientele in the Virgin Islands. Also, in tropical climates pesticides deteriorate easily and proper storage use and disposal safeguards need to be developed.

Development and Transfer of Technology

Effective research and extension are vital to any drive to modernize agriculture in the Caribbean. Whereas we must be aware of the large body of knowledge available at major universities and international agricultural research centers around the world, we must awaken to the fact that testing that knowledge under local conditions, demonstration of new technology, and finally the adoption of new practices by the Caribbean farmer is our responsibility. We need to develop regional research efforts in certain areas. However, the experimental and demonstration work on each island is still the basic need. Additionally, continuing education of the farmer in all areas of agriculture, including production, post-harvest technology and marketing, is of paramount importance. We need vocational agriculture schools, junior colleges, and internship programs for senior undergraduates and graduate students. Most of the students from the Virgin Islands go to mainland universities for advanced college educations in agriculture and home economics, but we

keep in touch with them and encourage them to return home for summer jobs every year. This provides mutually beneficial interaction and local experience for prospective research and extension workers. Another area needing immediate attention is improving communication berween scientists and extension workers in the region. Teleconferences and other modern communication technologies need to be used.

In conclusion, let me emphasize that Caribbean agricultural scientists need to have a broad awareness which includes areas like biotechnology, electronic technology, technologies and production systems to encourage increased efficient use and conservation of natural resources, new food preservation and storage techniques, understanding the ecological components of rhe agricultural production system and increasing awareness of social implications in technology development.

However, the need of the day is an interdisciplinary approach to solve farm problems. We need to look at the whole without over-emphasizing the parts. We need to improve the whole farm rather than just crop production, animal production or marketing. In view of this need, farming system approach and on-the-farm testing approach are the mosr appropriate srrategies for upgrading agriculture in the region. The agricultural development effort ar the national level should include formation of an Agricultural Development Council. This Council should serve as an umbrella to cover all aspects of agriculture in research, extension, education, marketing, regularion and policy issues. Agriculture Developmenr Councils should develop a national agenda for agricultural development. In the same way, there has to be regional coordination effort to mulriply our limited resources and avoid costly duplication. The UNICA's commission on agriculture drafted a plan of action along these lines.

My friends, the secret of keeping the agriculture industry in the Caribbean alive is integrarion and coordinarion. Let us work together, as out task is big and choices limited. In a region where there is quite enough that divides us, let us cherish wharever unites us and work as partners in progress towards satisfying the food needs of our people, while protecring the environment and conserving our natural resources of soil, water, flora and fauna.

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

OCT 2 3 1984

Dr. Darshan S. Padda
President, Caribbean Food Crops Society
Director, Land-Grant Programs
College of the Virgin Islands
P.O. Box L, Kingshill
St. Croix, Virgin Islands 00850

Dear Dr. Padda:

I have asked Assistant Secretary Bentley to extend my personal greetings to you and the members of the Caribbean Food Crops Society on the occasion of the twentieth annual meeting of the Society.

For two decades the Society has provided important leadership in the development of agriculture in the Caribbean. There have been many changes in this area in the past twenty years. It is appropriate to note that the challenges of change have been met by the agricultural leadership of the area.

The progress which has been made is the result of a team effort. The U.S. Department of Agriculture's Science and Education Agencies, the Caribbean Association of Universities, the Food Crops Society and the farmers have worked together for the common goals of improving agriculture.

Thank you for your efforts in the past and I know we can look forward with great confidence to the future.

Sincerely,

John R Block

Keynote Address:
A New Era of Agriculture

Orville G. Bentley
Assistant Secretary for Science and Education
U.S. Department of Agriculture

It is an honor to represent my colleagues in the Science and Education agencies of the U.S. Department of Agriculture and Secretary Block at this 20th Annual Meeting of the Caribbean Food Crops Society here in St. Croix. Secretary Block has asked me to bring his special greetings to your group, and I am pleased to read this statement from him now.

Program planning and coordination are critical steps in developing a sound, effective system of research, teaching, and extension education in agriculture and our food production system. Our system of publicly-supported programs in agricultural research is a joint undertaking, involving the federal, state, and local governments. This week-long conference is an outstanding demonstration of the vitality of this approach and of its dedication to public service. These efforts are made all the more impressive when they include active and viable linkages to the private sector as well. We salute the Agricultural Experiment Station, the Extension Service, the College of the Virgin Islands, and members of the Caribbean Food Crops Society on their past contributions and the leadership these groups are giving to agriculture in the Caribbean Basin Region.

I want to say that this cooperative effort involves several agencies of the Department of Agriculture, including, of course, the Agricultural Research Service (ARS), the Animal and Plant Health Inspection Service (APHIS), and undoubtedly others.

True, these occasions are for reflection, and perhaps a bit of self-indulgence on our part. But most importantly, this is a time for a realistic stock-taking and a time to direct our thoughts to the future and the opportunities and challenges it holds.

My personal involvement with the programs in the Caribbean region is limited, but I did have the opportunity to work with the fine people at the College of Agriculture at the University of Puerto Rico in Mayaguez. This was when I was Dean of the College of Agriculture at the University of Illinois.

The University of Puerto Rico was a partner with Illinois University in the International Soybean Research Program (INTSOY) and provided a valuable tropical and semi-tropical component for the program. One of the side benefits of this program to me was the opportunity to know and work with Chancellor Sol Alemany and Dean Ayala.

I have also visited the Agriculrural Research Service's Tropical Research Station at Mayaguez, and note rhere has been exrensive involvemenr in this week's session of Agricultural Research Service (ARS), Cooperative State Research Service (CSRS), and Extension Service (ES) personnel, reflecting their participarion in plans to strengthen the President's Caribbean Basin Iniriative. Dr. Darshan Padda, Direcror of the Experiment Sration, and Vice-President for Research and Land Grant Program at the College of the Virgin Islands, has an important role in these activities.

In the brief 25-year history of the College of the Virgin Islands, I'm told there have been only two presidents, and thar Dr. Arthur Richards, rhe current president, is native-born. The college is part of the land-grant system—in rhe 1862 category—and, along with rhe Experiment Starion is performing a valuable service as a part of the nation's research and education system.

This seems to be a most appropriate time to recognize the importance of agricultural research and educarion. Almost 200 years ago President George Washington said: "I know of no pursuit in which more real and important services can be rendered to any country, than by improving on its agriculture—its breed of useful animals—and orher branches of a husbandman's cares." We find similar statements by Jefferson, and others right on through the years.

Today we are aware of the importance of continually training skilled scientisrs and technicians in the agricultural sciences so that we can improve production efficiency—bottom line profitability—in agriculrure. We are well aware that we can no longer focus all of our attenrion on localized problems and situarions. We operate in a worldwide marketplace, and we face reality.

Let's look at some of the things we are doing right now ro help meet research and education needs in this important Caribbean area. Publicly supported agricultural research in the United States' part of the Caribbean is conducted mainly by the U.S. Department of Agriculrure's Science and Education research arm, the Agricultural Research Service, and rhe agricultural experiment stations operated by local governments.

Through the Cooperative State Research Service (CSRS)—also one of the Science and Education agencies—the Department helps support high priority tropical and subrropical agricultural research. This is accomplished through a Special Research Grants program to agricultural experiment srations in the Caribbean area.

The CSRS Tropical and Subtropical Research Grants are, with your cooperarion, helping ro solve high priority research problems that will not only assisr the Caribbean area roward becoming more self-sufficient in feeding itself, but will also have a spill-over effect of assisting other tropical and subtropical areas of the world.

You will recall that tropical and subtropical research is authorized under the Agriculrural Trade Assisrance Act of 1966. During the World Food Conference in Rome in 1974, U.S. policy statements made clear that the United States cannot feed the world, but rhat it would assist developing countries in strengthening their own production capabilities.

In keeping with this commirment, we are working together to develop two principal research centers. One operates in the Western Region and principally involves the Universities of Hawaii and California and the Guam Agricultural Experimenr Station and is known as the Pacific Basin Advisory Group.

Studies on vaccine development for ruminant anaplasmosis and identification and characterization of geminiviruses occurring in rhe Caribbean Basin are being made at the Florida Agricultural Experiment Sration.

There is a cooperative grant to rhe Puerro Rico and Florida Agricultural Experiment Stations on improving tomatoes under high remperature and humidity. These are parr of 42 grants toraling $1,490,000 awarded to the Caribbean area in 1984 by CSRS.

Cooperative Extension programs began in the Virgin Islands in 1972, when the University received land-grant status. Before that there was a federal extension program. All Extension programs in the area are active—agriculture, natural resources, community and rural development, 4-H, and home economics and human nutrition.

Home gardening continues ro grow in popularity because of contrinued rising cosrs of food, plus the desire for fresh, high quality produce. About 200 families planted gardens for the first time last year.

Whole milk is the only agricultural producr where supply nearly meets demand on Sr. Croix and it generates the largest part of agricultural receipts for rhe territory. Rangeland consritutes about 75% of all land now devoted to agricultural production in rhe islands. Most rangelands are poorly managed, and Extension is working with producers to survey rhese lands and determine their condition.

Pest management scouting services and training programs have been available in rhe Islands only a few years. Local agriculture is rebuilding, and farm enterprises have increased 80% since 1970. Pests typically reduce yield as much as 35 to 70%. Extension is involved in developing pest management systems.

The National Agricultural Library (NAL) in Beltsville, Maryland, provides many useful services to rhe Caribbean Basin countries. Under a mutually beneficial program, NAL exchanges USDA publicarions for publications from insticurions in a number of Caribbean countries. As a part of irs general inrernational services, ir also provides phorocopies of journal articles, and answers reference questions from agriculturalisrs in rhese countries. As a major participant in rhe FAO-sponsored AGRIS information sysrem, NAL is working with rhese countries to build a major international database. Irs single most important contract, however, comes in cooperation wirh the Agency for International Development (AID).

NAL administers funds from AID ro provide a heavy volume of library services, especially current awareness service and document delivery, to AID missions, individual scientists, and major institutions in the Caribbean, such as the Caribbean Agricultural Research and Development Institute. We hope you will rake advantage of this agriculrural information source.

I hope this brief sketch of the Department of Agriculture's cooperative endeavors in the Caribbean Basin is enough to whet your appetites to learn more abour programs of benefit to us all. And I hope you are convinced of USDA's keen interest in and sustained support for agriculrure in the Caribbean Basin.

Closing Remarks at the CFCS Banquet October 25, 1984

Alejandro Ayala
Chairman, CFCS Board of Directors

Master of Ceremonies, former Commissioner Henry, Mr. President of CFCS, Lieutenant-Governor Brady, President Richards, Commissioner Williams, Under-Secretary Bentley, other members at the head table, ladies and gentlemen: it has been, indeed, a real privilege to share this extraordinary St. Croix Homecoming Week with all of you. It has been very fitting to celebrate this Twentieth Annual Meeting of the Caribbean Food Crops Society on this beautiful island. After all, St. Croix was the cradle of the Caribbean Food Crops Society. We were born here, and here we are after 21 years, celebrating our coming of age.

Many changes have taken place throughout the Caribbean during this interval. Agricultural science, in particular, has grown enormously. The potential for increased food production in the Caribbean Basin has been duly recognized. During this period, our Society has been actively pursuing its objectives and has been filling a gap by providing a mutually beneficial interchange of knowledge, by creating institutional linkages, and by strengthening working relationships among scientists and agriculturalists who are often isolated. This relative isolation arises mostly from geographical factors, but also sometimes from differences in culture and language, or because of financial limitations. The Caribbean Food Crops Society has been, over the years, overcoming these constrains and creating the needed environment for collaborative efforts.

We can all feel very proud of CFCS achievements throughout the years. The small group that the late Dr. Richard Bond, Hugh Miller, Arnold Krochmal and others among the founding fathers gathered together in 1963, has become the core of a truly great professional society, unique in many ways. The society that they envisioned has grown to productive maturity. I am happy that some of the founding fathers have been here during this homecoming week to share and enjoy the harvest of the blessings forthcoming from the seed they planted 21 years ago. They should feel proud of their achievement. I am particularly happy that we have been able to pay them our respects and our tribute on this memorable occasion. Those that followed them, and in due time took over the leadership of the Society, also deserve our recognition. I am happy that President Padda provided for that since the very inception of this Twentieth Annual Meeting.

A review of the history of CFCS, including the financial constraints under which it has operated, reveals that reaching this age has required tremendous inputs and insight from some particular individuals. This reaching of age is, by itself, an amazing achievement. Just looking at the program of this meeting and at the number and quality of the papers presented, one can assess the substantial and sustained growth and strength of CFCS. More important yet is the recognition that CFCS has achieved throughout the years: the high regard that it commands and the esteem that it has earned. In the Caribbean Basin, in Canada, in the United States of America and elsewhere, the CFCS has indeed earned a valuable reputation. In the years ahead, I expect that as a group, we will be looking into further opportunities for regional interchange and cooperation. This will involve technology development and technology transfer and other items stemming from this pool of talent and resources that is today the Caribbean Food Crops Society.

This may be the best time to publicly and collectively recognize and commend the efforts of one of our foremost and outstanding Caribbeanists in putting our Society on the front pages, so to speak. He comes as a gift from ancient, historical India to the Caribbean. He has done wonders, in a short span of time, with the Agricultural Research and Extension programs at the College of the Virgin Islands. He has developed, together with President Arthur Richards, a conceptual approach leading to the more encompassing and broader role of the College of the Virgin Islands in the Eastern Caribbean. I can assure this man that, at the University of Puerto Rico, we stand ready to cooperate with him in this task. I can also assure him that CFCS will be ready to provide the required assistance and support. I am firmly convinced that in his new role as Vice-President of Research and Land-Grant Programs of the College of the Virgin Islands, he will be able to provide the leadership necessary to successfully pursue that concept. Ladies and gentlemen, as you realize, I am referring to our distinguished President, Dr. Darshan Padda.

We might as well take advantage of this opportunity to express our sincere appreciation to Dr. Padda, to Commissioner Williams, and to all of those in the College and in the Department of Agriculture who worked so hard in planning and conducting this excellent meeting. I am sure that all of your agree that it has been a remarkable meeting, with more than 120 papers and a record attendance of 210, including 152 from outside of the U.S. Virgin Islands. A most memorable meeting, we should call it. It is a fitting celebration of a Twentieth Annual Meeting which at the same time, involves the elements of homecoming, of really coming back to our roots. And, this is precisely the way we have been feeling while here: that we are home, at the home of CFCS. We all have enjoyed not only the meeting as such, but the gracious hospitality of a wonderful people. May I express, on behalf of the members of CFCS, our appreciation to all of them.

Mr. President, members and guests of CFCS: it has been my privilege to participate in this meeting and in this banquet. Thank you.

Minutes
20th Annual Meeting of the Caribbean Food Crops Society

(Plenary Business Session)
Held at Hotel-on-the-Cay
St. Croix, U.S. Virgin Islands
October 26, 1984

The 20th Annual Meeting of the Caribbean Food Crops Society (Plenary Business Session) was held at Hotel-on-the-Cay, Christiansted, St. Croix, October 26, 1984. The meeting was brought to order by 1983-84 CFCS president Dr. Darshan S. Padda at 11:15 a.m. Minutes of the 19th CFCS Annual Meeting held in Puerto Rico in September 1983, were presented by Dr. Miguel Lugo-Lopez, moved for acceptance by M. Alam (Barbados) and seconded by A. Petersen (St. Croix).

President Padda greeted those assembled and thanked officers of the CFCS and members for making the meeting such a success for the 228 persons registered. He pointed out that part of the success could also be attributed to the flexibility of the organization which allowed for changes and adaptations to be made where necessary. He said there had been many volunteers to host Annual Meetings in the future.

Secretary Carlos Cruz's report was delivered in his absence by organizing chairman Walter Knausenberger. Information included:

1. For the first time in years, all *Proceedings* volumes for recent past meetings are available. Thanks to the assistance of the College of Agricultural Sciences, Univetsity of Puerto Rico, three volumes have been published for the 17th, 18th and 19th annual meetings held in Caracas ('81), Barbados ('82) and Mayaguez ('83) respectively.
2. The new constitution has been corrected and retyped in accordance with the changes made at the business meeting during the 19th Annual CFCS Meeting in Puerto Rico.
3. The Secretary and Treasuter attended a meeting of the organizing committee held on St. Croix in February 1984. It was most helpful.
4. The Secretariat contacted CARDI about serving as 1985 host for CFCS since it was that organization's 10th anniversary.
5. As a result of a drive by the St. Croix organizing committee, there were many new members enrolled.
6. Only a single issue of a Newsletter was issued, because the St. Croix organizers were doing a fine job in keeping the membership informed.

The Treasurer's Report follows.

REPORT OF THE TREASURER
August 1, 1983 - September 30, 1984

Balance: August 1, 1983		$ 6,517.88
Receipts:		
Sale of Proceedings	8.00	
Sustaining Membership	124.88	
Dues	1,465.55	
IICA Contribution	5,000.00	
Interest	686.79	
Barbados CFCS Committee Contribution	1,250.00	
		8,535.22
		$15,053.10
Expenses:		
Postage	450.00	
Office Supplies	102.25	
Secretarial Help	110.25	
Travel	250.00	
Office Expenses	104.20	
Contribution to St. Croix Organizing Committee	2,000.00	
Publication of Proceedings (Venezuela, Barbados, Puerto Rico)	3,828.00	
Miscellaneous	32.96	
		$ 6,877.66
Balance September 30, 1984		$ 8,175.44

Miquel A. Lugo-Lopez
Treasurer

Patrick N. Williams, the V.I. Commissioner of Agriculture, served as co-host and vice president of CFCS. After greeting members, he suggested that the by-laws be amended to include provision for the election of a president-elect who would also serve as a board member, to work closely with the incumbent president, thus giving continuity and stability to the organization. Some discussion of the pros and cons followed. No appropriate provision is in rhe present constiturion, and the general concensus was it should be pursued, but no action was taken.

Dr. St. Claire Forde of Trinidad announced that CARDI has offered to serve as the 1985 host. This offer was accepted by enthusiastic acclamation.

Nominations were received for Board of Directors membership and officers. The new slate by acclamation comprised the following for 1985:

Officers
St. Claire Forde, President, Trinidad
Carlos Cruz, Secretary
Miguel Lugo-Lopez, Treasurer

Board of Directors
Darshan S. Padda, Chairman
Alejandro Ayala, Puerto Rico
Ronald Baynes, Barbados
Lucien Degras, Guadeloupe
Freddy Leal, Venezuela
Ivan A. Nicholaas, Aruba
Joseph R. Suah, Jamaica

A special report was delivered by John Cropper (Barbados) on the Caribbean Agriculture Information Needs special interest meeting held Tuesday evening, Ocrober 23, 1984, atrended 45 members of CFCS. The main thtust was the need to improve interchange of information between countries of the Caribbean. This interchange would include information on research personnel, current information projects of member countries, an up-to-date bibliography and information outreach to agriculturists. Working tecommendations included:

1. In recognition of the importance of promoting the interchange of information between agricultural workers in the Caribbean, the Caribbean Food Crops Society will prepare a ditectory of research workers and their projects as a first step towards a comprehensive Caribbean Agricultural Information Sysrem.
2. The information unit of INRA in Guadeloupe has agreed to coordinate this activity and to seek financial support for its completion.
3. We wish to recommend that two volunteers in each country who are members of rhe Society undertake the compilation of national directories using a standardized format.
4. The INRA Documentation Center has agreed to collate, index and distribute the directory to all countties reptesented in CFCS.

For the Caribbean Aquaculture Society (whose annual meeting was held jointly with rhe CFCS meeting), newly elected president Andtew S. McGinty thanked members of the plenary business meeting for the opportunity to meet with CFCS and ptoposed that the two societies continue to meet concurrently.

The CFCS gavel, newly prepared by the St. Croix organizers to commemorate the 20th Annual Meeting, was passed by 1984 president Darshan S. Padda to president St. Claire Forde. The meering was adjourned at 12:30 p.m.