PROCEEDINGS OF THE SEMINAR ON

RESEARCH AND DEVELOPMENT OF COCONUT IN LATIN AMERICA AND THE CARIBBEAN

20 – 24 October, 1992
Kingston, Jamaica

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This seminar was organised jointly by IICA, BUROTROP and the Coconut Industry Board of Jamaica.

We wish, in particular, to extend our acknowledgements to the French Ministry of Research and Education, DG XII of the EEC, AGCD of Belgium, IICT of Portugal.

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Chairman of BUROTROP welcoming address

Hon Minister,distinguished guests,

It is with great pleasure that I welcome you all,on behalf of the Bureau for Research on Tropical Oilseed Perennial Crops to this important meeting on coconuts in the Latin American and Caribbean Region. BUROTROP is extremely grateful to IICA, the Government and the Coconut Industry Board of Jamaica for their valuable assistance in the organisation of the meeting,and for the hospitality which we have already began to enjoy here in Kingston.

BUROTROP may not be entirely familiar to all of you, so I would like to say a few words of introduction and to clarify the objectives of this meeting. BUROTROP was formed in March 1990 at the initiative of a small group of European aid donors who recognised that tropical perennial oilseed crops,particularly coconut and oil palm,were neglected by multilateral aid agencies,and that most bilateral agencies tended to afford these crops low priority in their aid programmes. The initiative was taken by the French IRHO, but it rapidly was found to be attractive by other European donors, including Belgium,Germany,the Netherlands,Italy,Portugal and the UK. The informal group commissioned studies of the issues, which resulted in the tabling of several options for the way forward. For further information I draw your attention to the BUROTROP 1990-1991 report which is in your conference papers. At the same time the ACIAR in Australia was working with the World Bank and the Consultative Group on International Agricultural Research (CGIAR) to determine whether and how the CGIAR might address coconut in its mandate. The initiative had much to do with the enthusiasm of Dr Gabrielle Persley; who is lovingly now known as Miss Coconut. We are sorry that she is unable to be with us today.It is a pleasure to recognise her devoted work which has paid off in the form of her book which is about to be published "Replanting the Tree of Life:towards an International Agenda for International Coconut Research", and the establishment of the CGIAR's International Network for the Conservation,Characterisation and Utilisation of Coconut Genetic Resources.

BUROTROP has signed a memorandum of Understanding with the International Board for Plant Genetic Resources(IPBGR), which manages the Network on behalf of the CGIAR. This MOU officially enables BUROTROP to assist IPBGR in its management role, and recognises that the Bulletin BUROTROP is the official medium for disseminating news and information about network activities. The Network has started its activities through funding by France and the UK, and Hugh Harries (who like myself had his introduction to the world of the coconut here with the Coconut Industry Board in Jamaica) has been appointed consultant. It is a pleasure to welcome Hugh to this meeting and later in the meeting we look forward to

his explanation of the programme. The Network was established following a meeting held last year in Cipanas, Indonesia.

BUROTROP has been active since its inception, particularly in Africa where meetings,similar to the present one,have been held on coconut in Tanzania and Oil Palm in Côte d'Ivoire. At those meetings information was obtained on both crops for the BUROTROP data-base, problems common to the region were identified and discussed, research priorities were established and projects formulated, many of which are now being funded with BUROTROP,s help.

BUROTROP is not a funding agency, rather it is the centre of a global network for information on its mandated crops, and is now in position to assist in the fostering of networks to implement research in priority areas. BUROTROP cannot itself exist without donor support, and I take this opportunity to especially thank the EEC, which through its Science and Technology for Development Programme has provided the essential core funding to enable it to commence work, and the Government of France for funding our office facilities in Paris and our director, Olivier Dufour. I also thank our other donors whose contributions in cash and in kind are very much appreciated.

BUROTROP works hand in hand with regional organisations where they exist: I mention in particular the Asian Pacific Coconut Community, the South Pacific Commission , AFOPDA ,the African association of oil palm producers, and last but not least IICA. BUROTROP and IICA expect to sign a memorandum defining how we shall cooperate on our two mandated crops in this region following the present meeting.

In closing may I thank all delegates for coming to this meeting, and for their presentations, both the country papers which will further help BUROTROP build its data-base and identify research priorities, and for the scientific interventions which will help us move forward.I thank all of you for your expected participation in the working groups later in the week. I wish the meeting every success, and hope that its outcome will result in the development and adoption of appropriate new technologies for the benefit of coconut farmers and the economies of coconut growing countries throughout the region.

R.W.Smith
Chairman, BUROTROP.

PRESENTATION BY DR. E. TRIGO

Director, Programme II, IICA

1. In my presentation today I am not going to speak about coconuts in particular, its importance or its main problems. It would be presumptuous of me to do so in front of this audience. I am going to talk about the context (we economists always love to talk about the context!) in which we have to discuss coconut problems and research. This is the context of sustainable development and the role of agriculture within it.

2. I would like to refer briefly to some general issues about the sustainable development discussion in the post Rio (UNCED) era, then some of the particularities of the Latin America and the Caribbean situation, and the nature of the conflicts that we confront in this Region and finally make some comments about research priorities in general, which surely also apply to coconuts.

3. After UNCED, I don't think it is necessary to talk about the importance of the conservation of our ecological capital, better natural resources management, the protection of the environment, and sustainable development. I think we can say we are already past that stage, and the Rio Declaration, which was signed by 106 Heads of State and Government, is a clear political manifestation that this is so.

4. Over the UNCED preparatory process we have come to understand the magnitude and globality of the environmental crisis and the urgency of stopping and reversing the present resource degradation processes. We have also come to accept the fact that ecological and economic processes are interlinked and that what happens in one field has effects in the others, and ignoring one of them inevitably endangers the viability of the other.

   Since the Stockholm Conference we have accumulated mountains of information, and have evolved from a sectorial to an integral, global vision of the sustainability problem. We have gone from being concerned with environmental quality (air and water pollution, etc.) which could be achieved through regulation and command and control measures, to being concerned with our capacity to survive as a species. We have come to the acceptance that the problems are not just isolated, unwanted, or perverse effects, that can be solved or reversed with marginal adjustments. On the contrary,

resource degradation is the consequence of rational behaviors within the framework of our current development style, and the way in which natural resources use decision are made. Reversing the course is going to take major political, institutional, social, economic, and technological changes.

5. Up to now, although many of the undesired effects of our current schemes had become evident, they have still been manageable. In recent times, however, accelerated economic and demographic growth, as well as the widening of gaps in society, have brought to light with dramatic force the basic weaknesses of the model, and the difficulty -or even the impossibility- of resolving the imbalances within the existing structures and strategies. If economic growth was a feasibly road to resource conservation the today developed economies of the north would not have the resource degradation problems that they have. Western life styles and technological strategies are not replicable, at the risk of exploding the situation (population 3/4 poor < $1000, only small % > $4000, energy use balances, income effects).

   The challenge that lies ahead is how to generate enough economic activity to solve the poverty problem without further complicating the already dramatic resource degradation situation that exists in many cases.

6. In the Latin America and the Caribbean, and from the agricultural point of view this challenge is of particular importance.

   First because of the obvious physical relationship that exists between agricultural production and the natural resources base, and the fact that agriculture in many cases is one of the worse environmental offenders (soil degradation, water pollution, etc.).

   Second, because given the relative abundance and quality of its natural resources, agriculture plays a strategic role in the region's economy. Role that is enhanced even further in the present economic and international context (debt crisis, liberalization and opening of the economies, etc.).

   Third, because of the poverty issue. The vicious circle between poverty and resource degradation is at the heart of the sustainability issue, and even if we accept that the region has natural resources of a tremendous wealth and diversity, another of its characteristics is a very large mass of poor peasants farmers (usually located on

the poorest lands) who are forced to over-use their resources in order to survive. Poverty overall is on the rise in the region and the rural poor are the poorest of the poor (some statistics). If we don't tackle the poverty issue in agricultural development it will be impossible to revert the degradation pattern that exists.

7. Solving this problems will require profound transformations in development styles, values, institutions and policies. A new different way of visualizing the relationship between man and nature and the way in which human societies relate to the natural resources base (western societies view man above nature and ecological capital as possible of been substituted perfectly by man-made alternatives, we have to evolve to a situation where human societies are viewed as an interdependent part of the natural world/ the relation between the natural and the economic system).

However, moving toward a sustainable world will no be possible unless a new technological path with a more benign impact on the environment and the natural resources is developed.

8. Here we have to talk about technology in a very general sense, even starting with product/commodity choice. This is important because it gives the discussion about technological development for coconuts -and the other so called "orphan" commodities a very different perspective. Maybe the very fact that we refer to them as "orphan" is one of the causes of resource degradation and the lack of sustainability that affects the developing countries' agriculture.

9. Technological development in the post-Wold War II period has evolved along two distinctive paths. One is its concentration on a very marrow set of commodities -20 species constitute practically 90% of food supply, and six: wheat, potatoes, rice, beans, plantains and cassava represent almost 50%; the other is the fact that modern technology has increasingly made agricultural production more independent from resource conservation practices. Traditional systems viewed diversity and conservation practices as a basic requisite for maintaining production levels. The "green revolution" approach on the contrary is based on single commodities, and the intensive use of energy inputs (agrochemicals, fertilizers, machinery, etc.).

This approach is now reaching its limits. Not only because of the opportunities that are lost, and its

ecological costs, b ut also because the high costs of energy inputs are making it economically unfeasible.

10. In this context, the nature of the challenge of sustainable agricultural development is clear. In reviewing this challenge, the importance and potential role for crops such as coconuts, also becomes clear.

In Latin America neither production no productivity (of resources) can be sacrificed to achieve sustainability. In view of growing population, and the increased demands on agriculture to reactivate the economies of the region, log-term objectives can not include production cutbacks, and must combine resource and environmental conservation with higher levels of economic activities and growth.

11. To achieve this we have to start by looking at the globality of the resources, and the role that different products play within the production system. The region has a tremendous potential for making food and income available to the entire population (aspects which are both definitely key elements for sustainable development) however, most of its resources go unexploited. Furthermore, many important ecosystems in the region are already started to show signs of decay, particularly in the tropical areas, where there is both the greatest potential but also the greatest fragility. It is in this context that coconuts are of extreme importance and truly one of the "orphan" crops (maybe more in LAC than in other areas of the world).

12. The region has a tremendous potential in coconuts (large areas appropriate ecological and climatic -daylight, temperature and precipitation- conditions for cultivation and generally well placed in terms of access to markets), but most important of all because its characteristics in many ecosystems is almost a necessary crop for sustainable agricultural systems (perennial crop bringing soil stability plus an inexhaustible source of food and non-food by-products (charcoal, activated carbon, coir, fibers, construction materials, etc.) important for the diversification of activities of the rural areas. However, coconut development in the region is incipient. In part it is because the presence of alternative oil crops, in part it is because the lack of appropriate technologies to realize its production/productivity potentials and control some of the factors limiting production at commercial scale, mainly the disease problems affecting the crop in many important production areas. It is for these reasons that a renewed research and development effort is of foremost importance. In the following paragraphs I review some areas for R&D, which

although they apply to coconuts they can be seen as general areas for all tropical crops development.

13. First, is to assure a better knowledge about the ecosystems. This is not about coconuts but a general priority. Agricultural sciences are built upon the available knowledge and experiences from the temperate climates. This is only logical given the pattern we have followed in our agricultural development. But to improve the tropics we have to "tropicalize" our knowledge base. We can not expect the needed basic knowledge to be developed by the research institutions of the DC, except in a very limited matter. From the point of view of our capacities this maybe seen as a far out priority, but its is undeniable that without improved basic knowledge about the tropical environment it would be very difficult to move forward in the areas we need to.

14. Second, the production systems in which coconut production takes place and their management. This is a key area given the role that this crop can play in solving some of the sustainability issues affecting many of the areas where its production could be improved. The "green revolution" has left us with a "commodity" emphasis, which needs to be overcome. Resource management research in coconut based systems should be a research area of renewed emphasis. Two barrier for this are the structure of the agricultural sciences and the organization of research institutions, neither of which are well suited for the type of research needed in this case. Agronomic and cultural practices research is proving very profitable in other parts of the world; in LAC it is very important both to increase the efficiency of the crop itself as well as to better exploit the potential role of coconuts in the production systems prevailing in the region.

15. Third is making full use of the potential of biotechnology. Because of its nature this is a crop that can benefit in a significant way from the new technologies in this field. This is true both in terms of disease control an area of extreme importance in our region (lethal yellowing) as well as to improved breeding (time) for product quality and productivity. This is an area where cooperation with specialized advanced centers from the DC will be extremely important.

16 Finally the post-harvest area is also important. Not only storage problems, but also product quality (fatty content) and improved traditional and non traditional uses -tacking full advantage of the variety of uses that the crop offers for the small farmer and the cottage industries.

17. It is our hope that as we discuss during this week many of this issues will become more clear and at the end of the meeting we have a better idea of how we should proceed to harness the potential contribution of coconut production to the sustainable development of the countries of our region. For IICA is an honor to be collaborating with the Government of Jamaica and BUROTROP in this workshop, and we hope that we would be able to find ways to continue this already highly profitable relation.

SESSION 5: SUMMARIES OF COUNTRY STATEMENTS

REPORT FOR SESSION NUMBER 1

Rapporteur : Kenneth Joseph

This session consisted of presentations from Jamaica, Colombia and Costa Rica and Brazil.

JAMAICA

Coconut is the only oil crop in Jamaica. An approximate 20 000 hectares of coconuts are cultivated in Jamaica by 95 000 coconut farmers. There is only one coconut extraction factory in Kingston, and eleven operational copra factories. Coconut products include: soap, oil, coconut cream, dessicated coconut and animal feed from copra meal. Coconut is under-utilized in Jamaica. Only 7-14% of the crop goes to copra production. Most of the crop is used for fresh nuts. The main themes of research are: Botany/plant breeding, Agronomy/crop physiology and pathology. Due to the limited resources available, research has been limited and confined to those areas that are vital to the survival of the industry and where significant gains can be made. The major problems are : lethal yellowing, hurricanes, low productivity and under-utilization of coconut. There is need for strengthening of current programmes and embarking on new ones. Training at different levels and technical and financial assistance are required. There is evidence of commitment towards the development of the industry.

BRAZIL (paper contributed by Dr Lafayette, EMBRAPA)

Coconut is mainly grown in the North East region, along the coastal area which includes the states of Bahia, Sergipe, Alagoas, Pernambuco, Paraibo, Rio Grande do Norte a Ceara. Coconut is economically important to this region, which contributes with more than 85% of the total national coconut production estimated at 709 million nuts per year. The total surface covered by coconut is estimated at 238 000 ha, by 29.1 million trees whereof 17.8 million are bearing. Coconut is a smallholder crop in Brazil, 81% of the farms cover less than 10 ha.

Brazil has a low productivity 25-30 nuts/tree/year. The reasons for this low rate are, among others, water deficit, lack of high yield varieties/cultivars and the occurence of pests and diseases. Insect pests that cause huge damages are the "coleobrocas" (coconut borers or palm weevil), Rhinostomus barbirostris L., Rhynchphorus palmarum, Homalinothus coreaceus and Ammerhynus ynca. Coconut leaf diseases are one of the limiting factors in Sergipe State. Two parasites, at least, are associated to the disease development, Sphaerodotis torrendiella, a primary

parasite, and Lasiodiplodia theobromae. The damages caused by these parasites to coconut are estimated at approx. 40%. It causes reduction in the leaf area and, consequently, premature nutfall and general weakness of the palm.

The country's coconut production is basically used in household consumption for culinary purposes. Thirty five (35) percent of the national coconut production is destined to the industry to process coconut food products, like coconut milk, grated coconut, coconut cream, etc.

In order to contribute to the improvement of coconut production, a coordinated coconut reasearch programme, started in 1983 with the formulation of National Coconut Research Programme by EMBRAPA followed by the creation in 1985 of the National Coconut Research Center (CNPCo) when the programme was finally institutionalized. The Coconut Research Center is operating some 43 research studies in Genetics and Breeding, Plant Protection, Physiology, Agronomy and Ecology and has two experimental stations in Aracaju, namely Caju and Betume which comprise 800 ha and 1000 ha respectively. There is also an experimental station in the state of Rio Grande do Norte, 1000 km from the Coconut Research Center, where, a small seed garden produces local coconut hybrids (Brazilian Tall x Green Dwarf).

COLOMBIA

In Colombia 15 830 hectares of coconut are cultivated, 95% of which are cultivated by small farmers. Eight thousand nuts per hectare per annum are produced. The principal problem of coconuts in Colombia is of social origin. Colombia imports coconut oil mainly for use in the soap industry. Although coconut is not included in the oil and fats requirements of the population, there is great potential for development due to the existence of extensive areas with favourable conditions for crop development, but there is need to seek solutions to the technical and socio-economical problems that exist. Due to this, Colombia requires technical and financial assistance and training. The major obstacles to the development of coconut in Colombia are lack of knowledge in the processing and utilization of products and by-products, and lack of long term development plan. The main technical factors which limit development are : unavailability of improved hybrid seeds, pest and disease management, nutrition, physiology, and processing of products and by-products. Research projects are directed towards these areas.

COSTA RICA

Activities of the coconut industry in Costa Rica are mainly the export of fresh nuts and hybrid and commercial seeds. Emphasis in research is placed mainly in the direction of hybrid seed production. There has been some research in cropping systems in

relation to planting distances. Priorities in research programmes include : improving basic services, implementation of a national plan and hybrid seed exportation. The development of hybrid seed exportation is being affected by not being able to guarantee the adaptability of hybrid varieties to micro-climatical systems distinct to that of Costa Rica. Area of coconut production is 5000 hectares.

General session 1 brought into evidence the need for research in developing other products for coconut besides copra and oil.

REPORT FOR SESSION 2

Rapporteur: Enio Soto

CUBA

Plantations are concentrated in the area of Baracoa, whose climatic advantages include well-distributed heavy precipitation and no marked dry season.

Small farmers account for the bulk of production, mostly dry nuts. The secondary sector is limited to two oil extraction plants for soap production.

Economic assistance and scientific exchanges are needed for breeding activities, as is increased training for technical personnel in Cuba in areas related to the production and use of the fungus Hirsutella for the biological control of coconut pests and diseases.

In general, a well-defined research program is in place, with 40 general objectives. It involves 14 researchers and 12 technical experts.

DOMINICAN REPUBLIC

Approximately 50 626 hectares are used for coconut production. There is no lethal yellowing. Most of the coconut groves are old and there is no replanting or fertilization. Most producers have less than 100 ha. Yields are considered to be low, approximately 6,000 nuts/ha.

Most coconut production is used for copra, dried naturally or artificially.

Hybrids have been introduced from Côte d'Ivoire and nationally produced hybrids show great promise for making up the island's fat deficit. The government gives little priority to this crop. Since lethal yellowing is present in the Dominican Republic, there are great expectations about learning more about the disease through resistent genotypes that could be tested on the island and about the general etiology of the disease.

BARBADOS

Barbados has low precipitation and slightly alkaline soils. Coconuts are produced for food, not for copra. The private sector does not produce coconuts, and the public sector does not conduct research. There are no agronomists involved in coconut research and development. There are serious marketing problems since copra production is not profitable. There is also a lack of interest on the part of farmers. Priority research should include the study of ecotype tests to produce coconut water and dwarf types.

In general, there is a need for training, the exchange of information and organisation of the coconut industry.

ECUADOR

In Ecuador, coconuts are cultivated on approximately 5,000 hectares, which compete with shrimp production. Most coconut farms are larger than 10 hectares. The government does not provide incentives for coconut development. The only by-product is candy. There is a marked fat deficit in the country.

Practically no research is carried out. Research on the following is recommended: agronomy, genetic breeding, phytosanitary matters and industrialization.

REPORT FOR SESSION 3

Rapporteur : C. Vargas

EL SALVADOR

Total area under cultivation is 6,000 hectares, which produce 30.2 million nuts.

The principal obstacles to coconut development are:

Institutional

- Insufficient budgetary resources allocated for research.
- Limited dissemination of the technology generated for this crop.
- Limited dissemination of information on the compatibility of associating this crop and other crops.

Technologies

- Almost total absence on plantations of appropriate cropping practices.
- Presence of pests and diseases (weevil, red ring, mites and pestalotia).
- Lack of knowledge on and/or unavailability of early maturing and high-yield hybrids in the country.
- Inadequate crop management, from seed selection to production.

Credit

- Insufficient or lack of credit lines for rehabilitation, improvement, expansion and establishment of the crop.
- Lack of reliable market information.
- Land tenure problems.
- High cost and limited availability of inputs.

Given the limited technology generated for this crop and the need to respond to the needs of farmers, more research must be conducted in the following areas: agronomic management (particularly the association of coconut with other crops), plant protection (continue research on pests and diseases) and fertilization.

GRENADA

Coconut is of declining importance in Grenada typified by the closing down of the sole copra processing plant in 1988 for economic reasons.

There are 2200 acres of coconut and most of the farms are smaller than 10 ha.

Factors which have adversely affected the industry are :

- Low yields
- Poor markets for copra
- Lack of interest by farmers because of the absence of a market for copra
- Lack of vibrant research

It was suggested that the following could help revive the industry:

- A meaningful marketing strategy
- Improvement of agronomic practices
- Improved disease and pest management
- Implementation of a programme for training coconut workers.

HONDURAS

Approximately 3,500 hectares are planted in coconut, of which 2,500 are used for commercial purposes; the rest is scattered throughout the country and distributed as ornamental trees.

Total production is estimated at 40 million nuts per year.

Most farms are small and coconuts grow naturally.

The principal problems related to coconut production in Honduras are:

a. insufficient government assistance
b. lack of statistical data on the crop
c. low yields
d. deficit of edible fats (in 1991, the deficit stood at 8,815 MT)

In June, the National Coconut Program was established by government decree.

Lastly, with regard to research, the major concern is in providing follow-up for hybrid materials imported from Costa Rica, given the possible threat of lethal yellowing.

REPORT FOR SESSION 4

Rapporteur: E. McLaren

NICARAGUA

Eighty percent of coconut production is located in the south Atlantic region of the country.

Principal problems:

- The need to rehabilitate 2,000 ha.
- Lack of resources for rehabilitation, storing large amounts of production and for maximizing the profits of the coconut processing plant.
- There is limited training for producers
- The presence of principal coconut pests (*R. Palmarum* and *Strategus*)
- The presence of red ring, a principal disease.

A germplasm bank is being set up, which includes 7 varieties; an evaluation is being made of the performance of fertilizers, associated crops and an entomological inventory is being prepared, which includes the identification of the species of *Myndus* and *Strategus*; studies are being conducted on trapping, for *R. Palmarum*.

HAITI

Coconuts are grown mainly in the coastal regions.

Principal problems:

- The presence of lethal yellowing
- Hurricanes
- Low production (4,000 nuts/ha/yr)
- Pests (mites: *E. Guerreronis* and coconut leaf scale)
- Coconut production cannot meet the needs of the country
- There is no coconut processing plant.

International cooperation is being requested to solve problems related to pests and diseases.

PANAMA

Principal problems:

- Low production
- Very old and abandoned plantations

- Low prices
- Paralyzed industry
- Lack of training
- Natural coconuts growing areas have serious drainage problems
- Pests (R. Palmarum and Strategus)
- Diseases (red ring, wilt and little leaf)

Assistance and cooperation is needed to solve some of the above mentioned problems, particularly for "little leaf."

PERU

Approximately 1,000 hectares are planted in coconuts

Principal problems:

- Primitive industry
- Low level of technology, in general
- Low production

Questions

Mr. Illingworth asked the participant from Panama for more information on "little leaf" (Porruca). The following causes were considered:

- Nutritional problems
- Nematodes

No conclusions were reached.

Mr. Illingworth also asked the participant from Haiti about the performance of certain hybrids (Pb111, Pb121 and Pb131) with regard to pests.

REPORT FOR SESSION FIVE

Rapporteur : L. BRERETON

VENEZUELA

The main crops are sugar, rice corn and some oil crops. In recent times some greater importance has been given to coconut in terms of stimulating greater production. Some protectionist programmes have been implemented for coconuts : minimum guaranteed price, control of imports and exports until last year's crop has been canceled. Coconut production is used for several purposes: 80% is used for copra. 20 000 metric tons of copra are produced and the production has been stabilized over the past few years. The market share of coconut is 25%. Coconut farms do not exceed 5 - 10 ha, but are increasing in number.

Approximately 1 million nuts are consumed as fresh fruit. A small production of coconut milk has also started. Trading is slow on the whole but on the rise with Colombia. There is no market in the USA yet.

Research programmes are primarily based on pathology and entomology. The main pests are mites, which are being worked on in collaboration with Cuba. A few hybrids have been introduced and they have had a favorable impact on production.

TRINIDAD & TOBAGO

Agriculture represents 3.5% of GDP. Petroleum still constitutes a significant percentage of GDP. The main agricultural products are sugar and cacao, but both are on the decline. Commercial coconut prduction surface is 16 000 ha. with 98.2% of the producers producing 19% of copra and 0.19% producing 45%. In 1958 an intrnational agreement was signed and export prices were fixed. This was renewed every five years. There were no exports until local demands were met. The coconut industry is subsidized. Coconuts are mainly grown around the coastal areas and most of the trees are 45 years or older. The average yield is 10-12 thousand nuts per hectare. Livestock is reared under coconuts, in particular water buffalo which is reared for meat production. Currently most farms have cracking machines.

Red ring is under control, but there are mites in some parts of the country.

The needs expressed were : greater mechanization, more improved varieties for higher yield, coordinated research programmes on etiology of some diseases, improvement of processing capacities.

MEXICO

Mexico produces corns, beans, etc. Coconut does not have the same importance although it is grown on 200 000 hecatres and concerns some 50 000 families. Coconut is processed into oil, soap and consumed as fresh fruit for its water content. It is also used as ornamental plants in gardens. Coconut is grown all over Mexico, with a preference for the Malayan Dwarf variety.

In the area of pest and diseases, the most serious problem is lethal yellowing, red ring disease also occurs. Lethal Yellowing occurs in particular in the Yucatan area.

There is a considerable coconut research programme in Mexico. A germplasm bank has been established, there are breeding and selection programmes for lethal yellowing. And currently there is a programme in collaboration with Wye College on the control of lethal yellowing.

SURINAM

A policy to expand acreage to facilitate processing of soaps, detergents, oils etc. has recently been implemented. The main oil crops are oil palm and coconut. The domestic market for edible oils is 6 million litres . Government support is still required in this sector, although the private sector is encouraged to take a greater initiative. There are three major oil palm plantations, but several smallholders grow coconut. In Surinam there are 40 varieties of coconut - some imported from Jamaica and St. Lucia. The total planted surface was 12 million ha. in 1991. Coconut is typically a smallholder crop in Surinam. There are three main companies for processing.

The Government's coconut programme has permitted to build a new oil factory and import the Malayan Dwarf. The main problems remain the lack of mechanization and labour problems in nut harvesting. There has been no export of coconut products in the last five years.

Research is conducted mainly under the auspices of the Ministry of Agriculture. The University of Surinam is also instrumental in agronomy and breeding research programmes. The research priorities in Surinam are breeding for hartrot disease and introduction of natural enemies to Castnia.

All the country papers are available in their unedited version at IICA or BUROTROP headquarters for a minimal fee which covers printing and mailing costs.

SESSION 7 : REPORT FOR SESSION 6
TECHNICAL REPORT

Rapporteur: F. Chavez

The country reports presented during this session provided material for discussion in the working groups, with a view to finding solutions to problems associated with coconut production in our countries. The first two reports presented possible ways to organise and fund research on these problems. One paper was given on alternatives for controlling black weevils and red ring; two papers presented experiences with lethal yellowing and the last paper described possible uses of hybrid seed as a means for controling or preventing diseases.

The first paper was presented by Mr. Hugh Harries, who described the IBPGR program. The IBPGR held a meeting last year, during which it was agreed to establish a germ plasm bank. Mr. Harries also mentioned that by the end of the year we would have information on genetic material available in each country. He indicated that the next meeting would be held in Washington, D.C. during which research projects can be submitted and funding can be sought. He therefore requested the participants to submit the corresponding projects. In closing, he urged the participants to join the Coconut Growers Association.

The second paper was presented by Mr. P. Punchihewa, from the Asian and Pacific Coconut Community (APCC). He talked about the Program for which he serves as Executive Director, indicating that the goal of this organisation, which consists of 14 countries, is to coordinate and organize the activities of the coconut industry, with a view to increasing self-sufficiency in developing countries, and to organizing and coordinating the development of cooperatives.

The third speaker, Mr. Carlos Chinchilla, presented a paper on the control of the African palm weevil and red ring disease in African palms through the use of pheromone-based trapping. He clearly explained the development of tests on this method, and the preliminary results. This could be viewed as an innovative option to control the vector of the nematode which causes red ring. This system is in line with the new trend of using natural enemies and biological control to reduce insect populations and minimize the use of agrochemicals.

The fourth paper was presented by Mr. Basil Been, Director of the Coconut Industry Board. Mr. Been discussed lethal yellowing in Jamaica, describing its symptomology, the history of the disease in Jamaica and causal agents.

The following presentation was made by Mr. Eden-Green and two collaborators, one of whom works in Tanzania and the other in Ghana. The researchers talked about their work on lethal yellowing

in Africa and indicated that, since the vector of the disease has has not been identified, the epidemiology of lethal yellowing is being studied and several materials, which can be used to control the disease, have been tested for resistance. This in Tanzania. In Ghana, studies are being conducted on the nature, control and transmission of the disease by Myndus, sp. Work is also being conducted to identify hosts that could transmit the disease.

The last speaker was Mr. Richard Illingworth, a representative of SACRAC, S.A., who talked about the production of hybrid seed in Costa Rica for distribution in the region. He highlighted the advantages of his products as compared to other materials that already exist in the area.

All the technical reports are available in their unedited version at IICA or BUROTROP headquarters for a minimal fee which covers printing and mailing costs.

WORKING GROUP REPORT

TOPIC: AGRONOMY (Farming Systems)

MODERATOR: J. Cueto (Cuba)

RAPPORTEUR: T. Wilson (Jamaica)

PARTICIPANTS: Fifteen (15) LAC Countries (100 percent participation)

OBJECTIVE: To analyse the problems currently affecting and limiting coconut production in the region and suggest solutions.

PROBLEMS:

1. Coconut farmers set no specific goal (production).
2. Lack of sufficient high yielding varieties in the region.
3. Lack of access to available high yielding varieties due to cost constraints.
4. Coconut not given the research priority given other crops in some areas.
5. Farmers do not think coconut require much attention.
6. Existence of old plantations of inappropriate materials.
7. Location of some plantations.
8. Poor early management of planted coconut.
9. Few research personnel available in this subject.
10. Soil technicians inadequate.
11. Extension personnel inadequate for transfer of technology
12. Lack of financial resources for purchasing inputs for fertilizing,
    weed control, pest control.
13. Marketing insecure.
14. Farmers lack motivation.
15. Intercroppping (crop association) mostly unplanned.
16. Limited land space (for small farmers).
17. Lack of sanitation in fields.
18. Labour unavailable.
19. Lack of well defined farming systems.
20. Under-utilization of coconut and its byproducts.
21. Low coconut production and low income to farmers.

EFFECT

1. Existing varieties (Pacific tall and Atlantic tall) in some areas give low yields even after several (10) years of weed control and fertilizing.
2. Fertilizer is not applied in some areas.
3. Weed control is not done in some areas.
4. No control of pests (and diseases) is done in some areas.
5. Coconuts produced in some areas cannot be marketed.

6. Reduced interest in coconut farming.
7. Low overall production per palm in the region.

SOLUTION/RECOMMENDATIONS:

1. Identify the varieties existing in the region at present and exploit their production potential.
2. Grow coconuts in association with other crops to increase productivity.
3. Identify and utilize the services of existing coconut technicians.
4. Identify and/or train extension personnel for transfer of technology.
5. Identify and employ well defined sustainable farming systems for the different areas.
6. Identify and introduce suitable high yielding hybrids into the areas.
7. Identify and train research technicians.
8. Continue research on well defined coconut production problems.
9. Identify reliable markets for the coconuts produced.
10. Identify, investigate and support any meaningful international programme to improve coconut production in the region.

INSTITUTIONS IN REGION THAT WILL COLLABORATE:

1. Citrus Research Centre in Cuba
2. Coconut Industry Board in Jamaica
3. National Harvestry Research Institute in Mexico
4. Ministry of Agricultural Development in Panama

IMPLEMENTATION

It was agreed that IICA should be the implementing agency in the region.

THE PROJECT

The project should involve demonstration plots with known crop associations in areas, and experimental plots with other crops.

PROJECT PROPOSAL

GROUP: Agronomy and Farming Systems

GROUP LEADER: Mexico and Cuba

TITLE: Adapting sustainable coconut farming systems to Latin America and the Caribbean

PROPOSER: Cuba, Jamaica, Haiti and Mexico

ASSOCIATES: Venezuela, Colombia, Ecuador, El Salvador, Panama, Dominican Republic, Costa Rica and Trinidad & Tobago

CONCERNED: Lands growing coconut in Latin America and the Caribbean are under-utilized resulting in low returns and disencentive to farmers.

LINKAGE: IHRO-Côte d'Ivoire, IICA.

BACKGROUND: In this region some countries have encouraging results from crop associations involving coconut, cocoa, banana, paw paw, coffee, vegetable and root crops.

PROBLEMS:

- Diversity of the crops associated with coconuts.
- Different agro-ecologic requirements.
- Lack of knowledge in suitable crop combinations in some areas.
- Lack of technical personnel in the area.

STATUS: Results of the economic advantage of the association of coconuts with other crops in the region such as paw paw, cocoa, banana, aroids and vegetable are positive and available

OBJECTIVES:

To increase the income of farmers through increased productivity of the land.

TIME: Five years.

NB: The estimated cost of this project was considered by the group but no amount could be arrived at due to the diversity of the countries involved.

SUMMARY OF THE DISCUSSIONS AND RESOLUTIONS OF THE PLENARY MEETING

Agronomy

The Plenary Assembly decided that a Committee comprising Cuba, Mexico and Brazil will establish a draft feasability study of a duration of a couple of months : review ofthe situation of several countries in the region with the aim of setting up a research-development project for intercropping with coconut in the medium term for which IICA and BUROTROP will try to find funds. This project will in particular deal with the problems of dissemination of information and training.

WORKING GROUP: AGRONOMY FARMING SYSTEMS

THURSDAY 22 - FIRST SESSION
8:00 - 10:00 hrs.

ROOM: No. 5

MODERATOR:	**J. Cueto**	**Cuba**
RAPPORTEUR:	**T. Wilson**	**Jamaica**

MEMBERS:	**F. Chávez**	**Ecuador**
	D. Guesler	**Haiti**
	L. Brereton	**Barbados**
	A. Gowdie	**Jamaica**
	R. Reyes Cuesta	**Colombia**
	R. Smith	**United Kingdom**
	L. Muñoz	**Panama**
	E. McLaren	**Costa Rica**
	F. Chinchilla	**El Salvador**
	E. Spratt	**Jamaica**
	C. Vargas	**Dominican Republic**
	C. Chinchilla	**Costa Rica**
	R. Griffith	**Trinidad and Tobago**
	D. Williams	**Jamaica**

WORKING GROUP ON PESTS AND DISEASES

MODERATOR: R. Griffith (Trinidad and Tobago)
RAPPORTEUR: W. Rohde (Germany)

Discussions in this work group resulted in establishing five projects of priority for funding by interested agencies. These projects were selected on the basis of their common interest to the region and by their feasibility with respect to exploiting already existing facilities as well as technological approaches in the identification and control of those pests and diseases that cause the greatest losses in coconut production.

Four different topics were discussed in detail regarding their impact on improving the momentary situation in the Latin-American and Caribbean (LAC) region. These included:

1. Identification of the most important pests and diseases.
2. Available knowledge on epidemiology.
3. Disease and pest control research and institutions involved.
4. Technology transfer and training.

Topic 1: IDENTIFICATION OF THE MOST IMPORTANT PESTS AND DISEASES

Differences in the impact of pest and diseases on coconut production not only exists in the various countries of the LAC region, but also within a given country regarding the individual coconut-producing areas. Despite these regional variations, the existing pests and diseases were recognised for their potential impact on coconut production in all LAC countries and are summarized in Table 1.

Table 1

A. DISEASES

Disease	Pathogen	Vector
1. Lethal yellowing	MLO	*Myndus crudus*
2. Red ring	*Rhadinaphylenchus cocophylus*	*Rhynchophorus palmarum*
3. Bud rot	*Phytophtora*	
4. Hart rot	*Phytomonas*	

B. PESTS

1. Coconut mite	*Eriophyes guerreronis*
2. Palm weevil	*Rhynchophorus palmarum*

Pests and diseases of minor importance include rats and fruit mite (as observed for Jamaica and El Salvador) or little leaf which contributes to yield loss in Panama and Colombia.

Topic 2: AVAILABLE KNOWLEDGE ON EPIDEMIOLOGY

While pathogens and their corresponding vectors as well as pests have been clearly identified, descriptions of the disease symptoms have not always been satisfactory, and participants to the work group indicated a need for training by the inspection of infected fields. This applies in particular to the visual diagnosis of lethal yellowing where MLO infection produces a well-described syndrome only in tall varieties. In this context, Dr. Harrison (University of Florida) pointed out that 34 different palm species were shown to be infected by MLO with the development of very similar symptoms. In contrast to lethal yellowing, symptoms for red ring disease are well described, and the epidemiology of Phytophthora causing bud rot is well-known, as is the distribution of the coconut mite.

Topic 3: DISEASE AND PEST CONTROL RESEARCH AND INSTITUTIONS INVOLVED

Priorities were given to those approaches to pest and disease control where experience has already been collected in LAC countries or other coconut-growing areas or where research programs have been initiated. The importance of exchanging information on the experience with different control measures was stressed (see also topic 4).

Institutions with research units in pest and disease control were identified for future cooperation by local as well as international interaction.

In lethal yellowing, research is conducted at the University of Florida with specific emphasis to:

1) Identifying vectors and alternate plant hosts.
2) Examine relationships among different coconut MLOs, and,
3) Index MLO in palms and palm seeds.

Mexico studies aspects of susceptible and resistant plants by the analysis of phloem morphology and in Cuba training in visual symptomatology is provided. These efforts are complemented by an EC-funded project on lethal yellowing in Africa which also takes advantage of molecular techniques for MLO diagnosis developed at the University of Florida, i.e. molecular hybridization by MLO-specific DNA probes or the polymerase chain reaction (PCR) with the use of MLO-specific oligodeoxynucleotide primers.

Studies on the control of red ring disease are being conducted in Florida and in Costa Rica where pheromone trappping in oil palm plantations has proven to be an effective and economic approach to control insect populations. It is anticipated that this method has

potential to control Rynchophorus palmarum, the vector of red ring disease in the coconut palm.

Cuba reported on the biological control of the coconut mite by infection with Hirsutella strains and expressed its interest in having this approach tested in other countries of the region besides the Yucatan area in Mexico where 5 different strains have been under investigation. It was suggested that indepth analysis of Eriophyes control by fungal infection should be conducted in the frame of an international LCA project, since chemical control has been abandoned.

Topic 4: TECHNOLOGY TRANSFER AND TRAINING

There was general agreement that the constraints in technology transfer and training apply to all aspects of coconut production. The lack of information is noticed to exist both between research units as well as between research unit and local producer due to distance and disperson of farms. Secondly, the lack of trained personnel demands for a more intensive means of presentation, e.g. by video and in the native language. It was suggested that inter-regional communication was intensified with specific efforts to overcome language barriers and that extension services in a particular region are provided.

Summary

Discussions on topics 1 to 3 led to drafting proposals for research projects covering lethal yellowing, red ring and coconut mite. Three projects (A, B and C) were directed towards the diagnosis and control of lethal yellowing, projects D and E concerned the biological control of coconut mite and red ring, respectively.

PROJECT A

"Application of detection and diagnostic techniques for Lethal Yellowing in the Caribbean."

Partners: University of Florida, Jamaica, Mexico,UK(NRI).
Associates: Any other interested regions or parties.
Proposed by: University of Florida (Dr. Harrison).
Background:

The project is analogous to the EC-sponsored project on lethal yellowing-like diseases in Africa. Sensitive and specific diagnostic techniques are required in order to identify vectors and alternative host plants, index palms and palm seeds, and for a study of the inter-relationships between MLOs in different regions and their host-parasite relations.

Linkages:

Linked to the EC LY in the Africa project and to other international groups working on MLO; also to a project on *in vitro* maintenance of MLO proposed by WYE College (project C).

Objectives:

1. To confirm the identity of vectors of LY by molecular techniques, and to control spread of LY.

2 To detect and identify alternative host plants, and investigate the ecology of LY and its vectors.

3. To develop and validate indexing techniques for palm germplasm.

4. To collaborate with the Africa LY project and pool resources.

Output:
1. Specific diagnostic techniques (PCR primer sets, etc.) developed and adapted for field use (6-12 months).

2. Vector and alternative host plant identification tests in progress (12-18 months).

3. Vectors and alternative host plants screened and identified (within 2 years).

4. Technology transferred and training provided (within 3 years).

5. Collaboration with African research groups (continuous).

Duration: 3 years
Financial support requested: US$200.000.

PROJECT B

ECOLOGY AND CONTROL OF *Myndus crudus* AND/OR OTHER VECTORS OF LETHAL YELLOWING DISEASE

PARTNERS: University of Florida, Mexico, Jamaica and other interested parties.

ASSOCIATES: United Kingdom (NRI), France (CIRAD), Ghana, Jamaica.
PROPOSED BY: University of Florida (Dr. F.W. Howard).

BACKGROUND:

There is strong evidence that *M. crudus* is a vector of LY in the Caribbean region, although transmission tests have only succeeded in Florida. Project A should provide confirmation that this, and possible other species, are vectors of the disease. Complementary research is needed to find ways to control vector populations or interfere with transmission of the disease. A start has been made on this work at the University of Florida.

LINKAGES;
This project is directly linked to proposal A, and activities and outputs may have direct application for the LY project in Africa.

OBJECTIVES;
1. To identify breeding hosts of *Myndus* and other putative vectors.
2. To investigate the ecology and life cycle of vector(s).
3. To disrupt the life-cycle/population dynamics of vectors, for instance by alternative ground covers, herbicides, cropping practices to reduce or eliminate alternative hosts, or by mating disruption signals.
4. To relate population dynamics to disease epidemiology, and predict the risks, and likely rates of spread of disease in different regions.

OUTPUTS:
1. Alternative host plants of putative vectors identified (within 1 year).
2. Alternative ground covers/cropping systems, capable of reducing population of *Myndus* or other vectors, identified (within 18 months).
3. Life-cycle and population dynamics determined in different regions, in relation to climate and plant ecosystems. Predators and parasites identified (2 years).
4. Infertility of vector populations related to disease severity, and predictive model developed (3 years).

DURATION: 3 years.
FINANCIAL SUPPORT REQUESTED: US$200,000.

PROJECT C

GROUP LEADER WYE COLLEGE (UK)/CICY (MEXICO)

TITLE: In vitro culture of lethal yellowing MLO.

PROPOSER: WYE College/CICY

ASSOCIATES: University of Florida, CIB (Jamaica).

PROBLEM: Lethal yellowing (culture of MLO in vitro).
LINKAGE: Horticulture Research Institute, East Malling Maidstone, Kent, UK

BACKGROUND: LY is a devastating disease which cannot be controlled whether or not we may be able to control it sometime, might depend on having a deeper understanding of the mode of action of the causal agent. This however, has been limited by the failure to culture the LY-MLO. An alternative approach is to co-culture the MLO in infected plant explants.

PROBLEMS:

STATUS: Attempts to obtain cultures have not been successful so far. However, cultures of MLO associated with other diseases have been obtained when co-cultured in infected plant tissue.

OBJECTIVES:
a) To obtain stable cultures of LY-infected explants.
b) Increase the concentration of MLO in the culture.
c) Ultrastructural studies to understand the association of MLO with phloem.
d) Studies on MLO physiology and biochemistry.
c) To attempt to obtain plant cell free-MLO cultures.

OUTPUTS: An in vitro model for the study of LY-MLO and a better understanding of MLO physiology and biochemistry and their association with plant tissue.

TIME SCALE: 3 years.

FINANCIAL SUPPORT REQUESTED: US$200,000.

PROJECT D

TITLE: Biological control of Eriophyes guerreronis in Latin America and the Caribbean with Hirsutella species.

GROUP LEADER: Cuba/IICA.

PARTNERS: Mexico, Venezuela

ASSOCIATES: Ecuador, Dominican Republic, Colombia, El Salvador, Ecuador, Panama, Haiti, Costa Rica.

PROBLEM: Various coconut producers in the LCA region agree that the coconut mite is a serious pest affecting coconut production.

LINKAGES: Cuba, Dominican Republic, Trinidad and Tobago, Tanzania.

BACKGROUND: The chemical control of E. guerreronis has been very limited by its practical application. There exists another scientific approach based on results with the control of E. guerreronis by the fungus Hirsutella. These experiments have been developed during several years by collaboration between Cuba and Mexico.

PROBLEMS:
1. Limited capacity for fungus production.
2. Cost.
3. Lack of trained personnel in fungus production and its application in the field.

ACTUAL SITUATION:

1. There is a large collection of Hirsutella in a perfect state of conservation.
2. There exist different methods of fungus replication that will facilitate its reproduction.
3. There is personnel as well as elementary installations sufficient to initiate the immediate training of personnel.

OBJECTIVES: To diminish the populations of the mite E. guerreronis in coconut plantations by 20%.

OUTPUT: Significant increase in coconut production as a result of the reduction of E. guerreronis populations.

DURATION: 3 years.

FINANCIAL SUPPORT REQUESTED: US$200,000.

PROJECT E

TITLE: Control of Rhychophorus palmarum by the use of attractants.

GROUP LEADER: Chinchilla (Costa Rica).

INSTITUTION: IICA

PROPOSERS: Colombia, Costa Rica, Panama, Ecuador, Haiti, Nicaragua and Mexico.

ASSOCIATES: Trinidad and Tobago, Florida, Venezuela.

BACKGROUND: Traditional control is based on plant material and chemicals and has not been efficient.

PROBLEMS/CONSTRAINTS:

a) Unavailability of pheromones.
b) Lack of trained personnel.
c) Lack of information, laboratories, consumables and equipment.

ACTUAL SITUATION:

There exists provisional basic information on the use of pheromone attractants for the management of Rhynchophorus palmarum in oil palm plantations. This technology should be transferable to coconut.

OBJECTIVES: Control of red ring by reduction of the insect vector population using traps combined with attractants.

DURATION: 2 years.

FINANCIAL SUPPORT REQUESTED: US$200,000.

SUMMARY OF THE DISCUSSIONS AND RESOLUTIONS OF THE PLENARY MEETING

Pests and Diseases

The three projects A,B and C on lethal yellowing, will be considered as one project with three components.

The project on biological control of Eriophyes guerreronis must concentrate its efforts particularly on the aspect of transfer of technology, because research is already very advanced on that subject.

The project on control of Rhychophorus palmarum must look into the problem of coordination of current research operations since several teams are already engaged in this research.

WORKING GROUP: PESTS AND DISEASES

THURSDAY 22 - SECOND SESSION
10:00 - 12:00 hrs.

ROOM: No. 5

MODERATOR: R. Griffith - Trinidad & Tobago

RAPPORTEUR: W. Rohde - Germany

Members:

F Chavez, Ecuador
A M Punami, Tanzania
D Guesler, Haiti
H Harries, Tanzania
S Fahsbender, Peru
E Soto, Venezuela
L Brereton, Barbados
A Gowdie, Jamaica
T Wilson, Jamaica
R Reyes, Colombia
R Smith, United Kingdon
L Munoz, Panama
E McLaren, Costa Rica
F de J Chinchilla, El Salvador
C Oropeza, Mexico
Sangare, Ivory Coast
E Arkhurst, Ghana
Eden-Green, United Kingdon
S Justin, United Kingdon
J Arellano, Mexico
M de Nuce, France
M Wallace, Jamaica
W Rohde, Germany
S Thienhaus, Nicaragua
J Cueto, Cuba
C Thomas, Jamaica
P Chung, Jamaica
F Edman, Jamaica
C Vargas, Dominican Republic
C Chinchilla, Costa Rica
D Williams, Jamaica
F Gordon, Jamaica

WORKING GROUP: GENETICS and BREEDING

Moderator: Michel de Nuce
Rapporteur: Carlos Oropeza

PRELIMINARY CONSIDERATIONS

a. There is a need to know what coconut germplasm is available in the region.

b. Taking into account phytosanitary and agroecological problems of the crop in the region, there is a need to increase the germplasm available for breeders.

RECOMMENDATIONS

According to these considerations the following recommendations are proposed.

a. The group strongly supports the creation of the coconut genetic resources network with a Latin American and Caribbean sub-network,

b. The group requests from the two regional members of the Steering Committee to link with the data base to retrieve and feed information.

c. The group recommends studies on genetic diversity as a priority and also on cryopreservation techniques.

d. The group recommends that people from the region be trained for embryo-culture and cryopreservation techniques.

e. The group recommends that the network helps to increase the germplasm in the region.

PROJECTS

I. Multilocation tests

Justification: There are phytosanitary and agroecological constraints for the coconut crop in the region. Therefore, there is a need to test different varieties and hybrids (which might include some from outside the region) against the most important limiting factors in the region:

a. Lethal yellowing
b. Lixa
c. Eryophies guerreronis
d. Phytophtora palmivora
e. Drought
f. Others

Objective: To select material suitable to satisfy the different needs of coconut producer countries in the region.

TYPES OF GERMPLASM: About 10 types to be defined.

LOCATIONS: Eight to 10 locations (10 ha. each) in 6 to 8 countries

DURATION: Five years (to be extended as required).

FINANCIAL REQUIREMENTS:

a. Those provided by the country: lands, staff and labor.

b. Those provided by the donor:

- Planting material
- Inputs
- Visits and consultant services
- Special studies
- Documents and publications

EVALUATION: After 5 years if proven successful, the project should be extended as required.

COST: U.S $800 000 - 1 MILLION

II. Technical and financial support for coconut seed gardens

JUSTIFICATION: Coconut seed gardens are required in the region to answer as soon as possible the demand of farmers and make use of the results of the miltilocation tests (Project 1) as soon as they are available.

OBJECTIVE: To help the countries or group of countries in the region to establish seed gardens as soon as possible, so when they start bearing we can start using the results of Project 1.

LOCATIONS: We envisage to stablish seed gardens in countries with big seed demands such as Brazil, Jamaica and Mexico.

This project could help the existing seed garden in Costa Rica (a free LY Zone) to be in a good position to supply seed to other countries in the region.

COSTS: The exact requirements and cost are to be defined but we can estimate on the basis of the US$3.000/ha. Till bearing stage the cost of the project could vary from US$60 000 - 300 000 per country (20-100 ha).

SUMMARY OF THE DISCUSSIONS AND RESOLUTIONS OF THE PLENARY MEETING

Breeding

The Assembly unanimously showed its support for the COGENT (Coconut Genetic Resources Network) which is being established in cooperation with IBPGR.

Most of the country representatives expressed the desire to be directly implicated in the two projects which were proposed.

The two projects will be elaborated with the support of IICA and BUROTROP, and the interested countries will be contacted at a later date.

WORKING GROUP: GENETIC BREEDING

THURSDAY 22 - FIRST SESSION
8:00 - 10:00 hrs.

ROOM: CAUCUS ROOM

MODERATOR:	**M. de Nuce**	**France**
RAPPORTEUR:	**C. Oropeza**	**México**

MEMBERS:	**A. Mpunami**	**Tanzania**
	H. Harries	**Tanzania**
	C. Zacarías	**Honduras**
	S. Fahsbender	**Perú**
	R. Illingworth	**Costa Rica**
	B. Been	**Jamaica**
	P. Punchihewa	**APCC**
	H. Russell	**Jamaica**
	K. Joseph	**Grenada**
	A. Sangare	**Ivory Coast**
	E. Arkhurst	**Ghana**
	S. Eden-Green	**United Kingdom**
	S. Justin	**United Kingdom**
	J. Arellano	**México**
	M. Wallace	**Jamaica**
	W. Rohde	**Germany**
	S. Thienhaus	**Nicaragua**
	E. Soto	**Venezuela**
	E. Goedhart	**Surinam**

GROUP ON MARKETING AND PROCESSING OF COCONUT

1. Marketing and Processing

Main problem:

a. Absence of proper market information and intelligence for strategic development planning.

b. Sub-utilizatin of the coconut

c. Low product quality in general

Causes:

a. Lack of coherent policies for coconut in general

b. Depends on how the coconut industry is structured. They can be public, quasi-public and private institutions. It varies from country to country.

c. Research priorities must be established in function of country and regional needs. Among the most important areas are demand, supply, quality and prices of the various coconut products. Research is highly needed to achieve maximum processing efficiency in all areas of the industry and for product diversification.

d. Training is very important for all aspects of the coconut industry. There should be a short and long term approach. For short term import of expertise to carry out training within the region and for sending people abroad for on the job training. In the long run a regional specialized training center should be established to satisfy the needs of the coconut industry. All effective means at disseminating the information should be utilized.

e. The private sector organisations must be convinced that their participation and contribution to research and training will result in increased profits for them.

f. We agreed that there is an urgent need to have coherent and appropriate coconut development policies. Assistance should be sought from the International Food Policy Research Institute, based in Washington, D.C., for the formulation of such policies. The group felt that the role of the government should only be that of a facilitator.

2. Technology Transfer and Extension

A. Dissemination	Validation	Research
Non kernel products including manufacturing of: charcoal, coconut wood, peat substitution, Mosquit coil improved copra processing Industrial and food uses of coconut	Wet process from oil extraction - Palm heart Packaging of fresh coconut water	------- Packaging of fresh coconut water

B. Constraints for Technology Transfer

- Lack of proper institutional framework
- Lack of funding
- Shortage of technicians
- Lack of appropriate linkages

C. Most effective and efficient extension and training programs (large, medium and small)

- Depend upon the type of production in each country

- Depends upon the means availabe in each country

D. Organisation Conducting Coconut extension training program and their participation in a collaborative program

Organisations vary from one country to another. Collaborative programs can be implemented through regional networks.

E. Participation of non-governmental organisations in technology transfer and dissemination

Education Sector: Agricultural Colleges and Universities can participate by stimulating post-graduate thesis work in crucial areas of the coconut industry.

Traders and Industry: By convincing them that economic return can be attained by their participation and contributions in technology transfer and desssimination.

F. Training needs and priorities : needed at all levels.

PROJECT PROPOSAL

Title: Product Diversification Processing - Efficiency and Quality Improvement.

Background: Low prices and income are received by coconut producers due to product industrialization and lack of value added products.

Problem: Lack of producer incentives brought about as a consequence of low prices and depressed income. This may lead to stagnation and decline of the industry.

Objective: Improve income of coconut production through product diversification, processing efficiency and quality improvement.

Output:

a. Develoment of improved production and processing technology.

b. Establishment of an integrated processing plant for training and demonstration purposes.

Time Scale: Three years for establishment, and evaluation of performance of plant.

Linkage: IICA

Activities:

a. Setting up the plant

b. Evaluation of plant results

c. Establishment of dissemination and training procedures (visit to countries)

Cost: To be determined.

PROJECT PROPOSAL

Title: Marketing of Coconut and Coconut Product.

Background: There is inter-regional and intraregional trade in coconut and coconut products.

Problems: Lack of marketing information for the formulation of effective marketing strategies and policies.

Objectives: Obtain critical information regarding products, demand, supply, prices and trade, cost of production quality, import and export requirements.

Outputs: Proper production processing and marketing strategies and policies. A written report is expected (draft for discussion).

Duration: Six Months.

Linkage: IICA.

Activities: Collection and analysis of relevant information from all primary and secondary sources. Training of competent personnel (visit to countries).

Costs: To be determined.

SUMMARY OF THE DISCUSSIONS AND RESOLUTIONS OF THE PLENARY MEETING

Marketing and Processing

The Assembly emphasized the lack of man power which many farmers suffer from and wanted that aspect to be included in the project.

The Assembly insisted on the importance of the project "Marketing of coconut and coconut products" which should further the future development of the coconut industry in the region.

WORKING GROUP: MARKETING AND PROCESSING

THURSDAY 22 - SECOND SESSION
10:00 - 12:00 hrs.

CAUCUS ROOM

MODERATOR: B. Been, Jamaica

RAPPORTEUR: C Zacarias - Honduras

PARTICIPANTS:

R Illingworth	Costa Rica
P C Punchihewa	Asian and Pacific Coconut Com.
H Russell	Jamaica
K Joseph	Grenada
E Spratt	Canada
M John	Jamaica
E Goedhart	Surinam

SESSION 9

DISCUSSION OF THE PROJECT PROFILE FOR THE ESTABLISHMENT OF AN OIL PALM AND COCONUT RESEARCH AND TECHNOLOGY TRANSFER NETWORK FOR LATIN AMERICA AND THE CARIBBEAN (LAC)

1.Mr Guillermo Villanueva, the Technology Generation and Transfer Specialist of IICA who introduced the project profile briefed the meeting on its various componenets. He said that the specific objective was to improve the quality of and access to oil palm and coconut research in LAC, through the establishment of a regional technology generation and transfer network. While the primary beneficiaries of the project would be small and medium scale farmers and processors in LAC, the expected products he said, would include (a) the establishment and operation of network, technology transfer and support institutions, (b) development and promotion of sustainable agricultural systems, (c) strengthening of national institutions and, (d) human resources development. He also mentioned the project profile was still in draft form and called for the views of the participants.

2.In the course of the discussion that followed suggestion was made that studies on diversification of products, marketing strategies and small post-harvest activities be included in the project profile. A number of participants expressed their view that the project be confined to coconut only, while some felt that it would be better if the network incorporates both oil palm and coconut. After a lengthy discussion it was decided to postpone decision on this issue, pending discussion with oil palm organisations in the region.

3.The meeting was of the opinion that the project would meet a long felt need in the region and unanimously endorse it, subject to the formal approval of their respective governments.

RESOLUTION

4.The representatives of the 19 countries from Latin America and the Caribbean present at the International Seminar on Coconut Research and Development for Latin America and the Caribbean - Kingston, Jamaica 20 - 24 October 1192.

Recognising that in Latin America and the Caribbean, the consumption of oils and fats should increase considerably in the coming years, and

Realizing the important role that oil palm and coconut industries play in meeting this demand, as well as in providing employment and regular potentially significant income to small farmers, and

Convinced that a regional approach to technology generation and transfer would be a particular appropriate means of adressing the agriculture technology needs of LAC,

RESOLVE

1. To endorse unanimously the project profile for the establishment of an oil palm and coconut research and technology network for Latin America and the Caribbean, and

2. Request BUROTROP and IICA to proceed with the preparation of the proposed project.

Chairman of BUROTROP Closing Remarks

Hon Minister, Hon Representatives of IICA, the Coconut Industry Board, distinguished delegates, ladies and gentlemen.

As we approach the end of the formal sessions of this International Seminar on Coconut Research and Development for the Latin American and Caribbean Region, it is time to present the results of our deliberations.

I am sure that I speak on behalf of all our distinguished delegates when I say that we believe we have had a very successful meeting, and have achieved our objectives. We have drawn conclusions and have made recommendations which, when acted upon will have far-reaching impacts on improving the profitability and productivity of coconut growers and the economises of all countries in the region.

We have benefitted from the detailed information provided by delegates concerning the coconut industries in the countries of the region,the problems and constraints to the future development of those industries and have identified and prioritised the requirements of future research and development activities. This information will now be added to the data-base established by BUROTROP in co-operation with our colleagues in the Asian and Pacific Coconut Community, the IICA and elsewhere. I shall shortly ask M.Dufour, BUROTROP's director, to up-date us on the status of the data-base,and how it can be used.

Our time has been limited, and we recognise that several subjects of importance have not been fully explored. However, our discussions will not end here and we do have mechanisms in place to deal with those outstanding issues. For example, we have not fully debated the quarantine requirements for the safe movement of germplasm. This issue will be taken forward with the framework of the International Coconut Genetic Resources Network, and the regional sub-network which we have agreed will operate in this region. Due account will be taken of the guidelines recently established by the FAO and the IBPGR.

Before I invite Dr Griffiths to present our recommendations, which emerged from the working groups and were adopted by the Seminar,I will read the recommendation which resulted from the IICA proposal to establish a regional coconut and oil palm network. As was recorded in the report from the rapporteur of session 9 yesterday, we have left open the option of establishing either a coconut network, or a network for both coconut and oil palm. BUROTROP will need to discuss this issue with the regional oil palm interests, which were not represented here this week.

The resolution adopted reads:

" The representatives of the 19 countries from the Latin American and Caribbean region, present at the International Seminar on Coconut Research and Development, held in Kingston, Jamaica from October 20-

24th,1992,

Recognising that in Latin America and the Caribbean,that the consumption of oils and fats should increase considerably in the coming years,and

Realizing the important role that the oil palm and coconut industries play in meeting this demand, as well as in providing employment and regular potentially significant income to small farmers, and

Convinced that a regional approach to technology generation and transfer would be a particularly appropriate means of addressing the agriculture technology needs of the Latin American and Caribbean region,

RESOLVES:

a) To endorse unanimously the project profile for the establishment of an oil palm and coconut research and technology transfer network for Latin America and the Caribbean and

b) Requests BUROTROP and IICA to proceed with the preparation and implementation of the project proposed.

BUROTROP and IICA will produce the report of this symposium for presentation to the BUROTROP programme and executive committees at their meeting in April, 1992. Subject to its acceptance, implementation will commence as soon as funds have been secured for the various projects which have been identified this week.

BUROTROP and IICA would like to announce that a draft memorandum of understanding has been agreed, under which the two organisations will work together in the interests of promoting the development of coconut and oil palm in the Latin American and Caribbean region. We expect that this draft will be ratified by both organisations, and will be signed during the BUROTROP board meeting in December 1992.

BUROTROP will participate in a meeting of ECART (European Consortium for Agricultural Research in the Tropics) in Montpellier, France, in September 1993. This meeting will explore how developed countries in Europe can strengthen cooperation with Institutes in coconut growing countries in the area of agricultural research. BUROTROP will try to obtain funds for delegates to attend from various parts of the world.

I now invite M.Dufour to tell us about the present status of the BUROTROP database.

Mr DUFOUR's statement:

"One of the main objectives of BUROTROP is to establish a data base for on-going research operations in the world regarding coconut and oil palm.

Since it is intended that this data base be world-wide, we have decided to carry out the project by the technique of networking.

For coconut, the project will be handled jointly by BUROTROP and the APCC (which already has 175 files on its base) and for oil palm our partner will be AFOPDA.

The goal of this project is to create an accessible tool which will allow us to answer the questions: Who is doing What and Where?

Rather than create a new programme, BUROTROP committee members preferred that this data base use a programme which might enable it to join an already existing network, thus rendering access to it that much easier.

UNESCO and FAO which have installed a programme called CDS-ISIS and its application CARIN used in the CARIS international network were therefore contacted.

These organisms gave us their programmes and permission to use them.

This powerful programme is in fact a repertory of rather simple programmed files (see the model and examples attached), manageable and allowing selective print-outs.

The distribution of the information can be done via diskettes or of course, in print.

The programme is already well mastered, now the big work of typing in the existing data collected from the seminars and sent to us by research institutes remains to be done.

The data base should be effective by the end of 1993."

In closing may I say, on behalf of BUROTROP how much we have benefited from the full participation of the Government of Jamaica, the Coconut Industry Board of Jamaica, and IICA in the conduct and success of this seminar. The results would not have been possible without the help of all these parties. We thank those concerned for providing the excellent facilities of the meeting and very much appreciate the kind hospitality we have received.

R.W.Smith
Chairman,BUROTROP

Concluding remarks by Minister of State Lawson

Today brings to a close four days of stimulating interchange of ideas on diverse topics which affect the coconut industry. It is pleasing that this conference was devoted to an examination of the problems connected with coconut research and development in Latin America and the Caribbean and hopefully will result in larger acreages of coconuts to contribute to the economic development of the region.

During your working groups you have examined the following topics which affect the coconut industry, namely:

- Plant breeding
- Agronomy and cropping systems
- Pests and disease control
- Marketing and processing.

I observe also that each country has been asked to submit a technical report and I know that the information generated at this conference will redound to the benefit of all the countries which participated.

Over the years the world's population of coconut trees has declined for a myriad of reasons. Firstly, lethal yellowing and other similar diseases have killed a number of palms and new varieties and hybrids are being developed.

In Latin America and the Caribbean, the disease has affected palms in Jamaica, Haiti, Dominican Republic, Cuba, Cayman Islands, Bahamas and Mexico.

Much work has been done on this disease in the past and continued work is still being undertaken in Jamaica, Mexico and in Florida. However, in the meantime emphasis has to be placed on developing new hybrids to replace those which are dying from the disease.

Secondly, coconut oil has during the last three decades been promoted as a health hazard and many people who are health conscious have stayed away from this oil. Fortunately, research has now shown that it is not as bad as it is made out to be and a gradual drift back to coconut oil is being done.

A third case for the decline of coconut trees has been hurricanes and similar disasters which have destroyed millions of trees in the Far East and in the Caribbean.

Our own experience in 1988, when we were recovering from the onslaught of lethal yellowing disease, resulted in a loss of 54% or approximately 2.5 million of our bearing trees.

Undoubtedly, in the Caribbean and Latin America, we are at a critical juncture. The sign posts that point in the direction of sustainable development, indicate that many of our policies and actions will have to be pursued vigourously if we wish to have a viable coconut industry.

The world does not stand still, and we must come up with ideas with regard to coconut research and advanced technology which will allow the industry to respond to new directions and opportunities.

It is commendable that one of the topics which has been discussed is the proposal to establish a regional research and technolgy transfer network on coconut cultivation in Latin America and the Caribbean.

At the end of the seminar, you will have come to the conclusion that coconut is a very important crop. Indeed, coconut can be harvested at any time and provide a regular source of income. In addition to this, the trees are very hardy and contribute to land value appreciation.

In Jamaica we have been fortunate to have the benefit of the Coconut Industry Board which is entrusted with the task of investigating techniques to enhance production.

I observe that the Bureau for the Development of Research on Tropical Perennial Oil Crops (BUROTROP) is establishing a data base and directory on research institutions' programmes and teams working on coconut and oil palm, to answer the question "Who does what and where?"

The collection of the data, the management of the data base and its utilization is a joint activity with regional associations such as the Asian and Pacific Coconut Community (APCC) and the African Association for Development of Oil Palm (AFOPDA). Once established, the data base will continuously be updated and made available to people and institutions working with coconut and oil palm.

Indeed, most participants will agree that they have been in a privileged forum which will result in lasting cooperation between their respective countries.

Undoubtedly, if the agricultural sector is to maintain growth, there must be rapid dissemination of information to coconut farmers. Consequently, it is imperative that the information gleaned at this conference be used to foster the development of the coconut industry in the respective countries and result in the diffusion of new production techniques.

I hope that this conference will prove beneficial to all the participants and I wish all the participants a safe journey to your respective countries.

Once again, I wish to reiterate that it was a pleasure for the government of Jamaica to co-host this international seminar on coconut research and development for Latin America and the Caribbean in conjunction with BUROTROP and the Inter-American Institute for Cooperation on Agriculture.

I wish to convey special thanks to the Coconut Industry Board, the Officers in the Ministry of Agriculture, and the efficient secretariat and all those who assisted in ensuring the success of this conference.

IICA BUROTROP

INTERNATIONAL SEMINAR ON COCONUT RESEARCH AND DEVELOPMENT FOR LATIN AMERICA AND THE CARIBBEAN

SEMINARIO INTERNACIONAL SOBRE INVESTIGACION Y DESARROLLO DEL CULTIVO DEL COCO PARA AMERICA LATINA Y EL CARIBE

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INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE

PROJECT PROFILE

FOR

THE ESTABLISHMENT OF AN OIL PALM AND COCONUT RESEARCH AND TECHNOLOGY TRANSFER NETWORK FOR LATIN AMERICAN AND THE CARIBBEAN

TECHNOLOGY GENERATION AND TRANSFER PROGRAM

PREPARED BY

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NOVEMBER 1991

WORKING PAPER

1. BACKGROUND AND JUSTIFICATION

In Latin America and the Caribbean (LAC), the consumption of oils and fats should increase considerably in the coming years inasmuch as per capita consumption remains far below nutritional requirements. Oil palm provides a good alternative to meet part of these requirements, together with coconuts, which for many countries are consumed fresh in their place of origin by local inhabitants, are processed for oil, oil cake, fiber, and fuel products for domestic consumption. The rest of the coconut production enters world trade as copra, coconut oil, copra cake, dried coconut, coir and shell products.

Coconuts are grown predominately by smallholders and as a subsistence crop. A large proportion of world production still comes from small holdings. It is a crop suitable for these groups of farmers, especially when intercropped, since it provides family employment and produces a regular, potentially significant income. There is also considerable employment associated with processing and marketing coconut products.

In LAC, some of the factors that affect production include:

- poor crop management, practices not appropriately carried out, especially with the production of hybrids which differ from traditional varieties in their response to factors such as plant density and fertilizer requirements;
- losses due to diseases, particularly bud rot, nut fall and phytophthora species, which have become increasingly important with the large-scale production of coconut hybrids. Also, lethal yellowing disease in Mexico and the Caribbean is of concern;
- losses due to pests, particularly coconut mites (Eriophyes guerreronis), a major pest in the Caribbean area since 1965, spreading to infest almost all of the Americas; coconut beetle; and palm weevil (Rhyncophorus spp.);
- economic factors, prices and policies;
- Institutional factors, inadequate dissemination of information and feedback regarding feasible technologies, inadequate agricultural infrastructures to allow for the use of technology or to market the product;
- lack of location adaptation of potentially high-yielding hybrids and rapid propagation systems for elite palms.

In most producing countries, research and development activities are based on national institutions funded by government and industry. Growers unable to afford expensive research programs sufficiently usually depend on uncertain and short-term government intervention.

Human resources, economies of scale, and budget constraints make the establishment of adequate research capabilities in oil palm and coconut impossible for many Latin American and Caribbean countries. Therefore, a regional approach to technology generation and transfer would be a particularly appropriate means of addressing the agricultural technology needs of LAC. An organizational development program has recently been established by the EC, with the secretariat in Paris (BUROTROP), to coordinate European support for research on coconut and oil palm, and to improve linkages between research and bilaterally funded development projects in producing countries. This EC activity is designed

to complement CGIAR initiatives in coconut research, inter alia, facilitating collaborative international research.

Tables 1-9 present the participation of the Region in worldwide production and trade of coconut, palm kernel and palm oil from 1987-1989.

Table 10 presents the total area registered for coconut production in Central America.

The absolute values on which all of these tables are based can be found in the appendix of this document.

CA = Central America
SA = South America
LAC = Latin America and the Caribbean

II. PROJECT DESCRIPTION

2.1 Overall Objective

To increase the production and productivity, as well as the income, of palm oil and coconut farmers.

2.2 Specific Objective

To improve the quality of and access to oil palm and coconut research in LAC, through the establishment of a regional technology generation and transfer network.

2.3 Expected Products

2.3.1 Establishment and operation of network, technology transfer and support institutions. Identification of priority needs.

2.3.2 Development and promotion of sustainable agricultural systems, for maximum use of human resources, efficient use of other resources, and environmental balance.

2.3.3 Strengthening of national institutions, by enhancing their capabilities to test and disseminate advanced and economically appropriate technology developed y the network.

2.3.4 Human resource development, to produce competent researchers, extension agents and leaders in the countries of LAC.

2.4 Project Components

2.4.1 Management

This component consists of general coordination of research and extension activities among participating countries; meetings, conferences, information exchange and training. The objective is to assure that oil palm and coconut research and extension activities in LAC are carried out on a collaborative and cooperative basis rather than simply by providing a mechanism for information interchange among separate programs.

2.4.2 Research

This component will concentrate on the development of varieties and extensive field testing in a range of environmentally different locations; validation trials carried out by national institutions; disease control; cultural practices; and post-harvest technology.

a. There are several disease and pest problems in LAC which seriously affect yield and farm profits: phytophthora species; bud rot; nutfall; and lethal yellowing, coconut mites.

Disease control research will concentrate on understanding the epidemiology of phytophthora, laboratory and field studies on the nature of resistance/susceptibility; research would include development of integrated control methods, particularly applicable to small holdings; and a study of those aspects of intercropping systems that might significantly reduce the incidence of disease.

In the case of lethal yellowing, there is an urgent need to expand the genetic base for resistance to the disease in order to complement Malayan Dwarf material, due to indications of possible reduction in current resistance.

Field trials will analyze the most efficient mode and timing of application, the economic threshold, minimum effective concentrations, and use of alternate sanitation systems.

National programs will provide research and extension personnel working in oil palm and coconut areas to establish field trials and/or demonstration plots, local logistical support and field sites, and training facilities, when necessary.

Pest research will focus on biological control of mites (Eriophyes guerreronis); combined approaches to agronomic practices, resistance characteristics, use of chemicals and biological control agents (fungus Hirsutella), which can effectively control mite infestation. Also, control of Rhyncophorus (weevil) is a major factor in minimizing the incidence of red ring disease in both oil palm and coconuts.

b. Testing of high-yield, disease-tolerant germplasm. Chemical control and sanitation research is important for managing disease problems in existing oil palm and coconut plantations. For future plantings, however, the use of high-yield, resistant hybrids will be necessary to reduce production costs and make small-scale farmers more competitive.

IRHO work in Côte d'Ivoire and research by other countries has shown that Malayan Dwarf, West African Tall and other hybrid coconuts are capable of much higher yields than those recorded for most traditional varieties. Reports indicate that introduced coconut varieties are often severely damaged by indigenous pests and diseases, leading technicians to recommend local, rather than exotic, parents for hybrids.

Research will include laboratory studies, field tests, and regional trials to select the best materials for each ecological zone in the region.

Laboratory studies will include the development of appropriate screening methods for major diseases, screening existing and new recombinant germplasm for resistance, and monitoring potential disease mutations.

Alongside the need to test the yield potential of coconut hybrids, there is a need to collect and study existing varieties, together with measures to ensure that germplasm is not lost (collection, characterization, and conservation).

c. Improving cultural practices includes farm management, planting density and fertilizer requirements, especially for the introduced coconut hybrids, which differ from traditional varieties in their response to those cultural practices.

Intercropping with coconut will need more experimental work and practical demonstrations, at the national and local levels.

Research is needed on sustainability of intercropping systems, since many factors are involved, such as light interception, soil degradation and competition for nutrients and water. Where intercrops and coconuts are properly managed, there can be substantial additional production, without affecting long-term productivity. However, sufficient research has not been conducted on this aspect.

2.4.3 Technology Transfer and Training

a. Technology Transfer

The transfer of improved production and processing technology to coconut and oil palm producers is limited by the shortage of trained personnel and by inadequate extension methodologies, which rely heavily on one-on-one contact and do not make adequate use of group mechanisms or media channels.

Another major factor limiting technology transfer is the lack of viable research and extension linkages; typically, research and extension are

administered separately and function independently. As a result, only a small percentage of oil palm and coconut producers use improved production and processing practices, leaving productivity at inadequate levels. In order to improve technology transfer to oil palm and coconut farmers, a prototypical technology and transfer and communications material package will be developed. The first step in this process will be to identify available agricultural technologies which are ready for dissemination, and assess them as to farmers' perspective, perceived dependability; economic cost-benefit similarity to previous practices; farmers' resource constraints; and possible negative consequences of adopting or not adopting.

b. Training

The training program will concentrate on upgrading the technical capabilities of research and extension workers, with regard to research and extension methodologies. Strengthening research and extension linkages will be established through joint participation of researchers and extension agents in training programs and through the establishment of joint on-farm trials in each country.

III. STRATEGY

The project strategy is to set up a regional research and technology transfer network in oil palm and coconut to increase efficiency and the impact of agricultural research and technology transfer programs. This network will create regional economies of scale through collaborative research programs, development of extension materials and methods, sharing of existing technologies and plant varieties, and training. At the regional level, a significant contribution has been made by the FAO/UNDP project to assist small-scale national activities on specific aspects of coconut research and development. There must be closer coordination with existing structures such as FEDEPALMA.

IV. IMPLEMENTATION

The project will be implemented in three phases:

Phase one: each participating producer country will prépare a document, which briefly describes the current oil palm and coconut situation and the national needs and priorities for agricultural research and development. In order to achieve this, working group meetings, training seminars and workshops will be offered through IICA's cooperative agricultural research programs - Cooperative Agricultural Research Program for the Andean Subregion (PROCIANDINO); Cooperative Agricultural Research Program for the Southern Cone (PROCISUR); the Regional Network for Cocoa Technology Generation and Transfer (PROCACAO)- and the FAO/UNDP regional project. These activities will focus on issues related to coconut production, such as: biological control of Oryctes, genetic improvement, Integrated Pest Management (IPM), coconut replanting, diseases of unknown cause/origin, nutritional deficiencies, coconut farming systems, and a video documentary on coconut management processing technologies. This phase will last six months.

Phase two consists of the implementation of several workshops to discuss country reports, and will be held in each: Andean, Southern Cone, Caribbean and Central American. Phase two will last six months.

These two phases will be organized with the participation of the Bureau for the Development of Research on Tropical Perennial Oil Crops (BUROTROP).

Phase three consists of the selection of the project coordinator and/or the establishment of multinational teams.

The responsibility for implementing the project will be assigned to the project coordinator, who could be located at BUROTROP headquarters and/or in any participating country of LAC.

Policy and operational management of the project will be the responsibility of an executive committee, which will include representatives and observers from donor agencies, along with senior representatives from national research and extension institutions (one or two from each region). The committee will meet at least once a year to approve the annual work plan and budget and to set research and training priorities. A technical committee will be established in each subregion to coordinate the implementation of the work plan.

Phase three would be carried out during the second year of the project. It is expected that the project document will be ready during this period.

V. EXECUTION

The project will be executed over a period of five (5) years.

VI. BENEFICIARIES

Primary project beneficiaries will include small- and medium-scale farmers, as well as oil palm and coconut growers and processors in LAC.

VII. PROJECT COSTS

The total project cost is US$3,045,000. Table 1 shows contributions from donor agencies.

Table 11: Detailed Budget for External Sources (US$1000)

CATEGORY	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTAL
Technical Assistance	70.0	80.0	85.0	90.0	90.0	415.0
Technical and Support personnel	60.0	80.0	80.0	80.0	80.0	400.0
Travel and Perdiem	50.0	60.0	70.0	70.0	65.0	315.0
Conferences	40.0	45.0	60.0	60.0	70.0	265.0
Publications/Materials	35.0	45.0	60.0	70.0	50.0	260.0
Equipment	-	40.0	60.0	50.0	50.0	200.0
Vehicles	-	70.0	50.0	-	-	120.0
Supplies, Operating costs	70.0	80.0	90.0	90.0	90.0	420.0
Regional Trials	60.0	70.0	70.0	70.0	60.0	330.0
Training	-	50.0	65.0	75.0	90.0	280.0
Studies, evaluation	-	20.0	-	-	20.0	40.0
TOTAL	405.0	640.0	680.0	655.0	665.0	3045.0

VIII. REFERENCES

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APPENDIX

TABLE 1 :NORTH,CENTRAL AND SOUTH AMERICA,COCONUT PRODUCTION (1000 MT)

COUNTRIES	YEAR		
N and CA	1987	1988	1989
BARBADOS	2	2	2
BELICE	3	3	3
COSTA RICA	27	28	28
CUBA	24	24	24
DOMINICA	14	15	16
DOMINICAN RP	71	129	118
EL SALVADOR	75	75	75
GRENADA	8	8	8
GUADELOUPE	3	3	3
GUATEMALA	3	4	4
HAITI	37	38	36
HONDURAS	6	9	9
JAMAICA	192	205	200
MARTINICA	2	2	2
MEXICO	1042	1159	1006
NICARAGUA	3	3	3
PANAMA	20	20	22
PUERTO RICO	7	6	7
ST KITTS NEVIS	2	2	2
SAINT LUCIA	29	29	29
ST VINCENT	24	25	26
TRINIDAD Y TOBAGO	62	62	62
SUB TOTAL	1636	1851	1685
SOUTH AMERICA			
BRAZIL	603	695	686
COLOMBIA	88	78	79
ECUADOR	42	47	42
GUYANA	43	45	45
PERU	15	15	15
SURINAME	11	10	11
VENEZUELA	179	181	180
TOTAL SOUTH AMERICA	981	1071	1058
TOTAL LAC	2637	2922	2743

SOURCE:FAO,PRODUCTION YEARBOOK 1989.

TABLE 2 :NORTH,CENTRAL AND SOUTH AMERICA,PALM KERNEL PRODUCTION (1000 MT)

COUNTRIES	YEARS		
N and CA	1987	1988	1989
COSTA RICA	10000	13000	10050
GUATEMALA	10000	7500	10000
HONDURAS	6000	7200	7200
MEXICO	3000	3000	3000
NICARAGUA	950	950	990
SUB TOTAL	29950	31450	31240
SOUTH AMERICA			
BRASIL	205000	202000	205000
COLOMBIA	26980	42000	48000
ECUADOR	20628	20224	19300
PARAGUAY	17000	19000	19400
PERU	2000	4000	5000
SURINAME	960	1000	1000
TOTAL SOUTH AMERICA	272568	288224	297700
TOTAL LAC	302518	319674	328940

SOURCE :FAO,PRODUCTION YEARBOOK 1989.

TABLE 3 :NORTH,CENTRAL AND SOUTH AMERICA,PALM OIL PRODUCTION (1000 MT)

COUNTRIES	YEAR		
N and CA	1987	1988	1989
COSTA RICA	47800	59200	50000
GUATEMALA	7920	5800	8000
HONDURAS	73800	73500	74300
MEXICO	2000	2000	2000
NICARAGUA	3360	3450	3500
SUB TOTAL	134880	143950	137800
SOUTH AMERICA			
BRAZIL	40000	46000	63000
COLOMBIA	147000	198725	210100
ECUADOR	123779	121347	120130
PARAGUAY	3619	6200	6200
PERU	21000	24000	30000
SURINAME	6600	6800	6800
TOTAL SOUTH AMERICA	341998	403072	436230
TOTAL LAC	476878	547022	574030

SOURCE :FAO,PRODUCTION YEARBOOK 1989.

TABLE 4 :NORTH,CENTRAL AND SOUTH AMERICA,CARIBBEAN [illegible]

COUNTRIES	IMPORTS MT			IMPORTS 1000 US$			EXPORTS MT			EXPORTS 1000 US$		
N and CA	1987	1988	1989	1987	1988	1989	1987	1988	1989	1987	1988	1989
BAHAMAS	10	12	12	16	20	20						
COSTA RICA							1895	2181	3305	795	826	1285
DOMINICA							250	225	124	75	51	26
DOMINICAN REP							19447	26546	25496	3670	4531	4605
EL SALVADOR	9568	10174	10500	148	166	160	91	7		1		
GUADELOUPE	20	6	6	32	17	17						
GUATEMALA							9800	11000	11000	150	175	165
HONDURAS							1134	1160	1000	232	225	170
JAMAICA							4	169	100	3	98	50
MARTINICA	65	89	80	77	64	55						
MEXICO							3846	5081	2700	358	693	300
ST KITTS NEVIS							3			1		
SAINT LUCIA							10	40	40	2	8	8
ST VINCENT							1005	885	1000	323	289	300
TRINIDAD & TOBAGO	1210	2028	1930	261	404	489	5	7	14	2	1	5
SUB TOTAL	10873	12309	12528	534	671	741	37490	47301	44779	5612	6897	6914
SOUTH AMERICA												
ARGENTINA	344	106	14	172	49	7						
BRAZIL							367	174	27	182	78	12
TOTAL SOUTH AMERICA	344	106	14	172	49	7	367	174	27	182	78	12
TOTAL LAC	11561	12521	12556	878	769	755	38224	47649	44833	5976	7053	6938

SOURCE :FAO,TRADE YEARBOOK 1989

TABLE 5 :NORTH,CENTRAL AND SOUTH AMERICA,COCONUT DESICCATED IMPORTS AND EXPORTS.(MT AND 1000 US$)

COUNTRIES	IMPORTS MT			IMPORTS 1000 US$			EXPORTS MT			EXPORTS 1000 US$		
N AND CA.	1987	1988	1989	1987	1988	1989	1987	1988	1989	1987	1988	1989
EL SALVADOR							317	200	200	242	160	140
GUADELOUPE	2	30	30	3	41	40						
HONDURAS	1			2								
MARTINICA	27	78	80	36	106	100						
MEXICO							778	265		624	290	
PANAMA	21	2	10	50	6	22						
TRINIDAD & TOBAGO	57	13	31	88	25	54	41	5	7	15	3	2
SUB TOTAL	108	123	151	179	178	216	1136	470	207	881	453	142
SOUTH AMERICA												
ARGENTINA	995	972	1000	874	1224	1000						
BOLIVIA	46	109	100	51	142	130						
BRAZIL	169	170	1400	113	120	1300	33	37	19	112	90	90
CHILE	284	550	600	265	520	450						
COLOMBIA	32	35	30	63	73	63						
FR GUIANA	1	2	5	4	5	10						
URUGUAY	173	402	286	164	430	255						
TOTAL SOUTH AMERICA	1700	2240	3421	1534	2514	3208	33	37	19	112	90	90
TOTAL LAC	1808	2363	3572	1713	2692	3424	1169	507	226	993	543	232

SOURCE :FAO,TRADE YEARBOOK 1989.

TABLE 6 :NORTH,CENTRAL AND SOUTH AMERICA,PALM OIL IMPORTS AND EXPORTS.(MT AND 1000 US$)

COUNTRIES	IMPORTS MT			IMPORTS 1000 US$			EXPORTS MT			EXPORTS 1000 US$		
N AND CA	1987	1988	1989	1987	1988	1989	1987	1988	1989	1987	1988	1989
COSTA RICA	3600	3000	1600	3200	2700	1350	79	9200	4330	50	4128	2021
EL SALVADOR	94	400	780	34	370	660						
GUADELOUPE		3	12		4	13						
GUATEMALA	2500	3000	3000	860	1400	1300						
HONDURAS							27808	18000	16000	9364	7200	5900
JAMAICA	5021	3533	7100	1648	4431	2300	507			235		
MARTINICA	23	86	20	22	106	20						
MEXICO	2371	10362	35000	815	5134	13000						
SAINT LUCIA	256	16	16	123	20	20						
ST VINCENT												
TRINIDAD & TOBAGO	16	108	198	16	102	104						
SUB TOTAL	14081	20508	47726	6718	14267	18767	28394	27200	20330	9649	11328	7921
SOUTH AMERICA												
ARGENTINA	1	53	610	10	34	250		1			2	
BRAZIL							3376	5027	5232	729	1627	1689
COLOMBIA	8			3								
PARAGUAY							100	100		33	40	
SURINAME							1000			140		
TOTAL SOUTH AMERICA	9	53	610	13	34	250	4476	5128	5232	902	1669	1689
TOTAL LAC	14090	20561	48336	6731	14301	19047	32870	32328	25562	10551	12997	9610

SOURCE:FAO,TRADE YEARBOOK 1989.

TABLE 1: World Coconut PRODUCTION (1000 MT) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD PRODUCTION MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	40231	4.12	2.44	6.55
1988	37624	4.92	2.85	7.77
1989	38091	4.42	2.78	7.20

SOURCE: FAO, YEARBOOK PRODUCTION, 1989.

TABLE 2: World Palm Kernel PRODUCTION (MT) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD PRODUCTION MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	2680843	1.12	10.17	11.29
1988	2869460	1.10	10.04	11.14
1989	3014313	1.04	9.88	10.91

SOURCE: FAO, YEARBOOK PRODUCTION, 1989.

TABLE 3: World Palm Oil PRODUCTION (MT) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD PRODUCTION MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	8432133	1.60	4.06	5.66
1988	9141447	1.57	4.41	5.98
1989	10165042	1.36	4.29	5.65

SOURCE: FAO, YEARBOOK PRODUCTION, 1989.

TABLE 4: World Coconut IMPORT (MT AND 1000 US$) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD IMPORT MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %	WORLD IMPORT 1000 US$	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	127349	8.54	0.27	9.05	28740	1.56	0.06	3.05
1988	136418	9.02	0.08	9.18	37520	1.79	0.13	2.05
1989	121636	10.30	0.01	10.32	32909	2.25	0.02	2.29

SOURCE: FAO, YEARBOOK TRADE,1989.

TABLE 5. World Coconut . EXPORT (MT AND 1000 US$) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD EXPORT MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %	WORLD EXPORT 1000 US$	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	123631	30.56	0.30	30.86	19647	28.56	0.93	30.42
1988	134623	35.14	0.13	35.39	23279	29.63	0.34	30.30
1989	133458	33.55	0.02	33.59	25788	26.81	0.05	26.90

SOURCE: FAO, YEARBOOK TRADE,1989.

TABLE 6: World Dessicated/ Coconut WORLD IMPORT (MT AND 1000 US$) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD IMPORT MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %	WORLD IMPORT 1000 US$	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	183037	0.06	0.93	0.99	135511	0.12	0.99	1.10
1988	167175	0.07	1.34	1.41	164003	0.11	1.53	1.64
1989	177403	0.09	1.93	2.01	152717	0.14	2.10	2.24

SOURCE: FAO, YEARBOOK TRADE,1989.

TABLE 7: World Dessicated Coconut EXPORT (MT AND 1000 US$) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD EXPORT MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %	WORLD EXPORT 1000 US$	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	189253	0.60	0.02	0.62	142397	0.62	0.08	0.70
1988	173658	0.27	0.02	0.29	144645	0.31	0.06	0.38
1989	187142	0.11	0.01	0.12	138451	0.10	0.07	0.17

SOURCE: FAO, YEARBOOK TRADE, 1989.

TABLE 8: World Palm Oil IMPORT (MT AND 1000 US$) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD IMPORT MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %	WORLD IMPORT 1000 US$	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	5762094	14061	9	14090	2105233	6718	13	6731
1988	5914323	20058	53	20561	2786499	14267	34	14301
1989	6676321	47726	610	48336	2911336	18767	280	19047

SOURCE: FAO, YEARBOOK TRADE, 1989.

TABLE 9: World Palm Oil EXPORT (MT AND 1000 US$) AND LAC PARTICIPATION (%).1987-1989.

YEAR	WORLD EXPORT MT	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %	WORLD EXPORT 1000 US$	CA PARTICIPATION %	SA PARTICIPATION %	LAC PARTICIPATION %
1987	5781139	0.49	0.08	0.57	1892641	0.51	0.05	0.56
1988	5926551	0.46	0.09	0.55	2519837	0.45	0.07	0.52
1989	7173476	0.28	0.07	0.36	2622221	0.30	0.06	0.37

SOURCE: FAO, YEARBOOK TRADE, 1989.

TABLE 10 : CENTRAL AMERICA,COCONUTS,TOTAL AREA, AREA FOR EXPORTS (Hectares)

COUNTRIES	TOTAL AREA	AREA FOR EXPORTS	YEAR
COSTA RICA	4000	nd	1990
EL SALVADOR	5600	nd	1988
GUATEMALA	600	nd	1990
HONDURAS	3000	nd	1990
NICARAGUA			
PANAMA			
CENTRAL AMERICA	13200		

SOURCE:D.Kalmowitz,1991.Cambio Tecnologico y la Promocion de las exportaciones Agricolas No Tradicionales en CA.

Bureau for the Development of Research on Tropical Perennial Oil Crops (BUROTROP)

Inter-American Institute for Cooperation on Agriculture (IICA)

International Seminar on Coconut Research and Development for Latin America and the Caribbean

October 20-25, 1992

Kingston, Jamaica

PROGRAM

Monday 19	**Arrival of participants**	
Tuesday 20		
08:00 - 08:50	**Registration**	
09:00 - 09:35	**INAUGURAL SESSION**	
09:35 - 09:55	**Coffee break**	
10:00 - 10:20	**Presentation: The importance of Coconut in Agricultural Sustainability**	**EJTrigo, IICA**
10:20 - 10:45	**Introduction and guidelines**	**GEVillanueva,IICA** / **ODufour,BUROTROP**

Session 1: Country Reports

Moderator: JArellano/Mexico
Rapporteur:KJoseph/Grenada

10:45 - 11:10	**Jamaica**	**B. Been**
11:10 - 11:30	**Brazil**	**L.Franco**
11:30 - 11:50	**Colombia**	**R.Reyes**
11:50 - 12:10	**Costa Rica**	**CChinchilla**
12:10 - 12:30	**Discussion**	
12:30 - 13:30	**Lunch**	

Session 2: Country Reports

Moderator: CThomas/Jamaica
Rapporteur:ESoto/Venezuela

13:30 - 13:50	Cuba	JCueto
13:50 - 14:10	Dominican Republic	CVargas
14:10 - 14:30	Barbados	LBrereton
14.30 - 14:50	Ecuador	FChavez
14:50 - 15:10	Discussion	
15:10 - 15:30	Coffee break	

Session 3: Country Reports

Moderator: BBeen/Jamaica
Rapporteur: CVargas/Dominican Republic

15:30 - 15:50	El Salvador	FJChinchilla
15:50 - 16:10	Grenada	KJoseph
16:10 - 16:30	Honduras	CZacarías
16:30 - 16:50	Mexico	EDominguez
16:50 - 17:10	Discussion	
19:00	Reception	IICA/BUROTROP

Wednesday 21 **Session 4: Country Reports**

Moderator: HHarrison/USA
Rapporteur: EMcLaren/Costa Rica

08:00 - 08:20	Nicaragua	SThienhaus
08:20 - 08:40	Haiti	DGuesler

08:40 - 09:00	Panama	LMuÑoz
09:00 - 09:20	Peru	PCarrazco
09:20 - 09:40	Discussion	
09:40 - 10:00	Coffee Break	

Session 5: Country Reports

Moderator: CZacarias/Honduras
Rapporteur: LBrereton/Barbados

10:00 - 10:20	Surinam	EGoedhart
10:20 - 10:40	Venezuela	ESoto
10:40 - 11:00	Trinidad and Tobago	RGriffith
11:00 - 11:20	Mexico	COropeza

Discussion

Session 6: Technical Reports

Moderator: RGriffith/Trinidad & Tobago
Rapporteur: FChavez/Ecuador

11:20 - 11:40	IBPGR Program	HHarries
11:40 - 11:50	Discussion	
11:50 - 12:10	APCC Program in Asia	PPunchihewa
12:10 - 12:20	Discussion	
12:20 - 13: 20	Lunch	
13:20 - 13:40	Management of the American palm weevil and the red ring disease in oil palm by pheromone-based trapping.	CChinchilla
13:40 - 13:50	Discussion	
13:50 - 14:10	Lethal yellowing of coconut in Africa	S Eden-Green

14:10 - 14:20 Discussion

14:20 - 14:40 Lethal yellowing of coconut in Jamaica
BBeen

14:40 - 14:50 Discussion

14:50 - 15:10 Coffee break

15:10 - 15:30 Hybrid coconut seed from Costa Rica to the Region RIllingworth

16:00 - 16:20 Discussion

16:20 - 17:10 Session 7: Rapporteurs' reports on country and technical reports
Moderator: RGriffith

19:00 Cultural Evening

Thursday 22

08:00 - 11:00 Session 8: Formation of Work Groups

Group A:
Genetic Breeding
Moderator: de Nuce/France
Rapporteur: Oropeza/Mexico

Pests and Diseases
Moderator: RGriffith/Trinidad & Tobago
Rapporteur:Rohde/Germany

Group B: Agronomy and Cropping Systems
Moderator: Cueto/Cuba
Rapporteur: TWilson/Jamaica

Marketing and Processing
Moderator: BBeen/Jamaica
Rapporteur:CZacarias/Honduras

12:00 - 13:00 Lunch

13:00 - 15:00 Working groups continue

15:00 - 15:20 Coffee break

15:20 - 17:00 Session 9:
Chairman: RSmith/France
Rapporteur: Punchihewa/Indonesia

Plenary session on the proposal to establish a Regional Research and Technology Transfer Network on Coconut Cultivation in Latin America and the Caribbean

15:00 - 15:20 Coffee break

Friday 23

Session 10:
Chairman: De Nuce
Rapporteur: RGriffith

08:00 - 10:30 Report of the working groups

10:30 - 10:50 Coffee break

10:50 - 12:00 Session 10: continued

12:00 - 13:30 Lunch

Session 11: Closing ceremony

15:00 - 15:30 Conclusions and recommendations
RSmith/BUROTROP

GEVillanueva, IICA

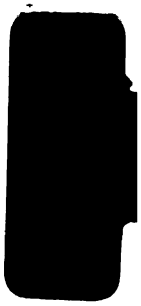
15:30 - 16:00 Official closing ceremony

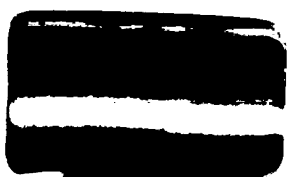
16:00 - 16:20 Coffee break

20:00 Dinner BUROTROP/IICA

Saturday 24 Field trip

FECHA DE DEVOLUCION			





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