

Report on a Workshop to

IMPROVE COFFEE PRODUCTION IN AFRICA BY THE CONTROL OF COFFEE WILT DISEASE (Tracheomyces)



(Workshop Participants, Nairobi)

Prepared by:



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Abstract

The Common Fund for Commodities (CFC) has offered to commit \$3.5 million to assist in combating coffee wilt in the field, and thereby help safeguard coffee production in East and Central Africa.

However, for this to be effective, associated support and funding is required to enable the development of appropriate technologies, and immediate survey work is required to establish the extent and severity of the disease across the region. For these activities different sources of financial support have been sought.

Given the multi-locational and multi-stakeholder nature of the Programme, the Nairobi Workshop established the Programme as a series of inter-linked and interdependent sub-projects each addressing different facets of the disease and its management.

Introduction

In 1997 a Project Proposal was submitted to the Common Fund for Commodities (CFC) in Amsterdam for funding of a project to improve coffee production in Africa by controlling the spread of Coffee Wilt Disease (CWD). Survey work by Dr. Julie Flood of CABI Bioscience in 1996 had identified that CWD was affecting both Zaire (now Democratic Republic of Congo (DRC)) and Uganda - a resurgence of the devastating disease that had affected the region in the 1950s. The severity of the disease, in that unlike other coffee diseases it actually kills coffee trees, and has the potential to wipe out entire coffee plantations, encouraged the CFC to approve US\$3.5 million worth of funding for the project in March 1998.

Since 1998 the Project Executing Agency (PEA), CABI Bioscience, has been working towards implementation of this Project in East and Central Africa in discussion with various donor agencies and national programmes. Additional funds have been sought from a number of different sources (including the EU through STABEX, INCO-DEV and CORNET, and from the UK's DFID-CPP) in order to underpin and complement the funds previously committed by the CFC. However, it became apparent that key issues mitigated against sourcing additional non-CFC funds. Most notably these have concerned:

- The practicalities re: divisions of labour and funding as detailed in the initial CFC approved Project Proposal;
- The complexities of co-financing processes involving different sources of funds and missing or unclear financial commitments from project participants.

Understandably, prospective donors have felt reluctant to participate in, and commit funds to, a Project without a review of its continued validity and feasibility.

To this end, on February 15th and 16th 2001, the PEA, through its Africa Regional Centre in Nairobi, hosted a Workshop to finalise the modalities of this Project, and develop a fully integrated programme of activities.

The current report provides an overview of the discussions at that Workshop, and details the *modus operandi* that was agreed for the further development of a Coffee Wilt Disease Programme from the original Project Proposal. This will involve the implementation of four independent Sub-Projects each supported by separate funding agencies, namely the CFC, the EU through ASARECA/CORNET, the EU through INCODEV and the UK Department for International Development's Crop Protection Programme (DFID-CPP).

In recognising that this disease has already had a severe effect in both Uganda and DRC over the past few years, and is a current threat to coffee production in the rest of the region, the CFC and EU representatives at the workshop reached a mutually acceptable compromise to ensure that measures to combat the disease are not further delayed. In order to address the areas of concern and ensure that a co-ordinated programme of work is achievable and can be implemented without further delay, the following were agreed in principle:

- That the original Project Proposal remains technically valid. This is important as resubmission of a new project proposal to the CFC and ICO Consultative

Committee and Executive Board would entail a delay of a further 18 months, while the CFC have already approved a total of US\$ 3,516,888 over 5 years;

- That the original Project Proposal would be developed into a set of separate, smaller, technically independent and chronologically cogent Sub-Projects forming part of an overall CWD Programme;
- Each Sub-Project will be funded by separate donors to facilitate clear project management and co-ordination;
- That the CFC would be flexible in its co-financing criteria and would view the commitment of other funds to different Sub-Projects within a Coffee Wilt Programme as sufficient for release of its funds for in-country activities and co-ordination.

This document should thus be regarded as an addendum to the original Project Proposal and read in conjunction with the scientific rationale underpinning that document's proposed activities and objectives. It should be noted from the outset that Objectives 6 and 7, Component 1 and Objectives 3, 4, and 5, Component 2 of the original Proposal are not considered in this revision as they pertain to non-Year One activities and would chronologically follow-on from them. In the Sections that follow, this Report establishes:

- Interactions between the new Sub-Projects and originally proposed components and objectives
- Funding sources
- Recommendations that account for regional developments in the disease since 1996
- Draft workplans for Year One

The following two diagrams outline the new split between Sub-Projects and how these now relate to individual funding sources and the previous Component/Objectives split as detailed in the original CFC Appraisal Report of 4th January 1999.

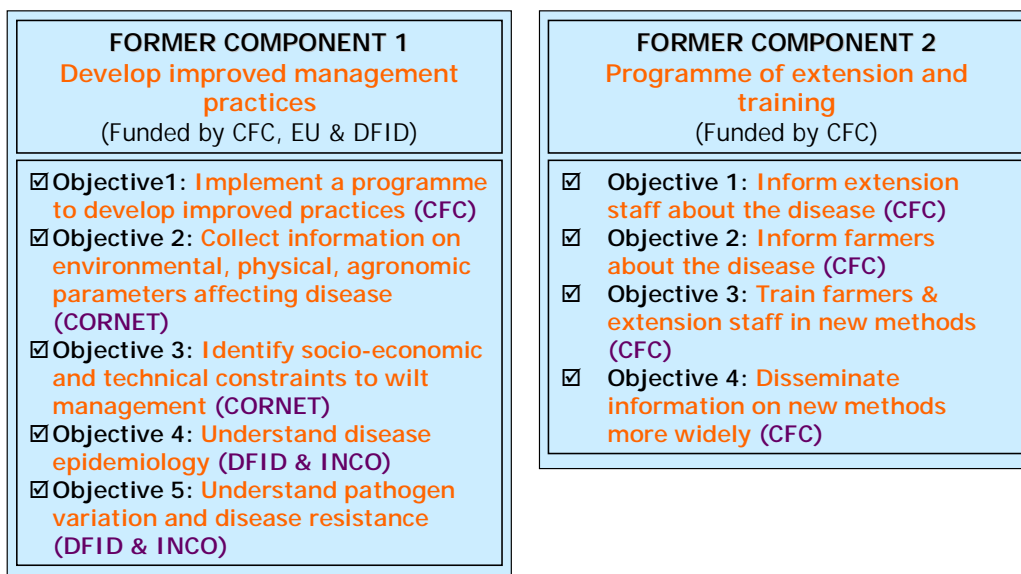


Diagram 1 – Relationship Between Original Components, Objectives and Funding Sources

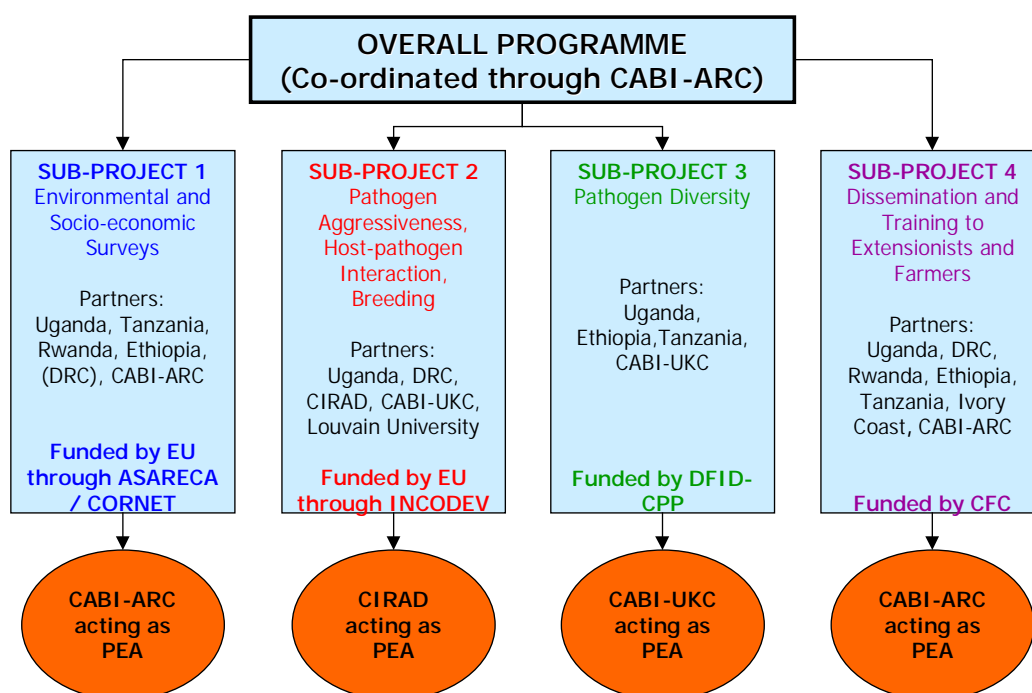


Diagram 2 – Revised Sub-Projects, Partners and Funding Sources

CFC Sub-Project Workplans and Budgets

During the Workshop, CABI, as Project Executing Agency (PEA) for the Coffee Wilt Programme, prepared individual Year One country budgets with each of DRC, Ethiopia, Rwanda, Tanzania and Uganda to reflect the changes regarding the split of independent Sub-Projects from the original Project Proposal. Effectively this means that the budgets discussed in individual sessions with each country were based on the following assumptions:

1. CFC will provide funds for co-ordination of the project through CABI. CFC will also provide all funding for training and dissemination to farmers and extensionists, workshops etc. The CFC will also provide what may be considered the provision of basic infrastructure to the NARS in providing vehicles and equipment that will facilitate the other 3 Sub-Projects of the programme
2. EU through ASARECA and CORNET would fund baseline surveys (including remote sensing) in Year One (*Objectives 2 and 3 of original Coffee Wilt Project*). Please refer to the Draft Workplan detailed under the 'Details of Revised Coffee Wilt Programme' section of this Report.
3. EU-INCODEV, on the other hand, will fund some of the basic science (especially aspects of breeding, host-pathogen interaction and some epidemiology). Funding sought from DFID-CPP will support other complementary aspects of basic science (mainly pathogen variation and molecular marker-assisted epidemiology). (*Objectives 4 and 5 of original Coffee Wilt Project*).
4. Discussions were limited to Year One budget requirements on the understanding that budgets and project work for subsequent years will be contingent on the outcome of baseline work in the first year.

Firm commitments (in cash to a total value of approximately US\$ 3.5 million over 5 years) for funding from CFC and EU-INCODEV. The exact amount to be funded by EU-INCODEV is under discussion and negotiations are taking place with DFID-CPP. Therefore, the discussions with each country at the meeting in Nairobi solely reflected funds available, or proposed, from the CFC, DFID-CPP and INCODEV. Essentially, the budget discussions excluded survey work as this would obviously be subject to separate discussions/submissions to ASARECA/CORNET. Clarification following submission of this Report is awaited from ASARECA/CORNET as to the modalities required to make project submissions for the funding of survey work.

Similarly, the details of survey protocols, methodologies and timings are yet to be determined, but are being developed by the Project Co-ordinator at CABI-ARC for later circulation. In lieu of these items a Draft Workplan is detailed under the Details of Revised Coffee Wilt Programme section of this Report.

In meeting with representatives from each participating country, outstanding requirements for compliance with disbursement criteria for CFC funds were also discussed, as well as proposed Year One budgets. In the sub-sections that follow issues that arose are detailed, and Draft Workplans for those countries that have signed Project Implementation Agreements with CABI Bioscience are detailed in Annex 5 to this report.

1. - Democratic Republic of Congo

The DRC will benefit from CFC and INCODEV funds, and under Year One will contribute national counterpart funding to cover staff salaries and some publicity materials. These funds are enough to ensure that work can be undertaken under Sub-Projects 2 and 4.

However, despite being a member of both ASARECA and CORNET, the DRC is currently excluded from receiving EU EDF funds that have been earmarked for coffee wilt related activities under these networks. As such either other funds have to be sourced for Sub-Project 1 survey work or a modality has to be found to allow the geographical restriction on the DRC benefiting from these funds. It is strongly recommended that this latter option is pursued. Justification for this position is made in the Conclusions and Recommendations section of this Report.

DRC representatives indicated that discussions are ongoing with the Belgian Government concerning additional funding to the project.

2. – Ethiopia

Ethiopia will benefit from CFC funds, and a small amount of DFID-CPP funding relating to activities under Sub-Project 3. Additionally, STABEX funds are also *apparently* available to the project, covering national counterpart contributions to staff costs and some consumable items. Thus Sub-Projects 3 and 4 are covered by funding for the first year. It is proposed that Ethiopia will also benefit from CORNET routed funding for Sub-Project 1 survey work.

However, no CFC related disbursements can be made to Ethiopia until a signed Project Implementation Agreement (PIA) between CABI Bioscience and EARO is received. The Ethiopian representatives agreed to follow up on this and to additionally confirm the availability of STABEX related funds to the Programme. Finally, details of a specific US\$ Bank Account for receipt of CFC funds is also required and this is awaited by the PEA.

3. – Rwanda

Currently, Rwanda will benefit from CFC funds for activities under Sub-Project 4 and will support project activities through counterpart funding of staff salaries and consumables. It is proposed that Rwanda will also benefit from CORNET funding for Sub-Project 1 survey work. Rwanda currently has no involvement in the INCODEV or DFID-CPP funded Sub-Projects 2 and 3.

Before any disbursement of CFC funds can take place details of a specific US\$ Bank Account for receipt of CFC funds is also required and this is awaited by the PEA. It was also noted that Rwanda would continue to investigate the possibilities of sourcing additional funds for activities in subsequent years.

4. – Tanzania

Tanzania will benefit both from CFC funds and a small amount of DFID-CPP funding relating to activities under Sub-Project 3. Thus Sub-Projects 3 and 4 are covered by funding for the first year. It is proposed that Tanzania will also benefit from CORNET routed funding for Sub-Project 1 survey work. Tanzania has no involvement in Sub-Project 2 of the Coffee Wilt Programme.

The Tanzanian representatives agreed to confirm the availability of STABEX funds that had been previously indicated were available for Coffee Wilt work, and to indicate in writing the support of in kind national counterpart contributions to the programme (in terms of staff salaries and office expenses).

5. – Uganda

Uganda will benefit from CFC funds, DFID-CPP funding relating to activities under Sub-Project 3, INCODEV funding relating to Sub-Project 2 and will provide national counterpart funding in terms of national programme staff costs, some consumables and a greenhouse. Thus Sub-Projects 2, 3 and 4 are covered by funding for the first year. It is proposed that Uganda will also benefit from CORNET routed funding for Sub-Project 1 survey work.

The Ugandan representatives agreed to confirm the availability of STABEX funds that had been previously indicated were available for Coffee Wilt work, and to indicate in writing the support of in kind national counterpart contributions to the programme (in terms of staff salaries, consumables and a greenhouse).

Details of Revised Coffee Wilt Programme

Introduction

In the original project proposal, funding was split across components and activities but given due consideration from other donors, including the EU, as to the management of such a proposal, and to each donor's need to have its own management and administrative systems in place, the Workshop decided that the project should be redesigned into a Programme comprising clearly delineated component parts.

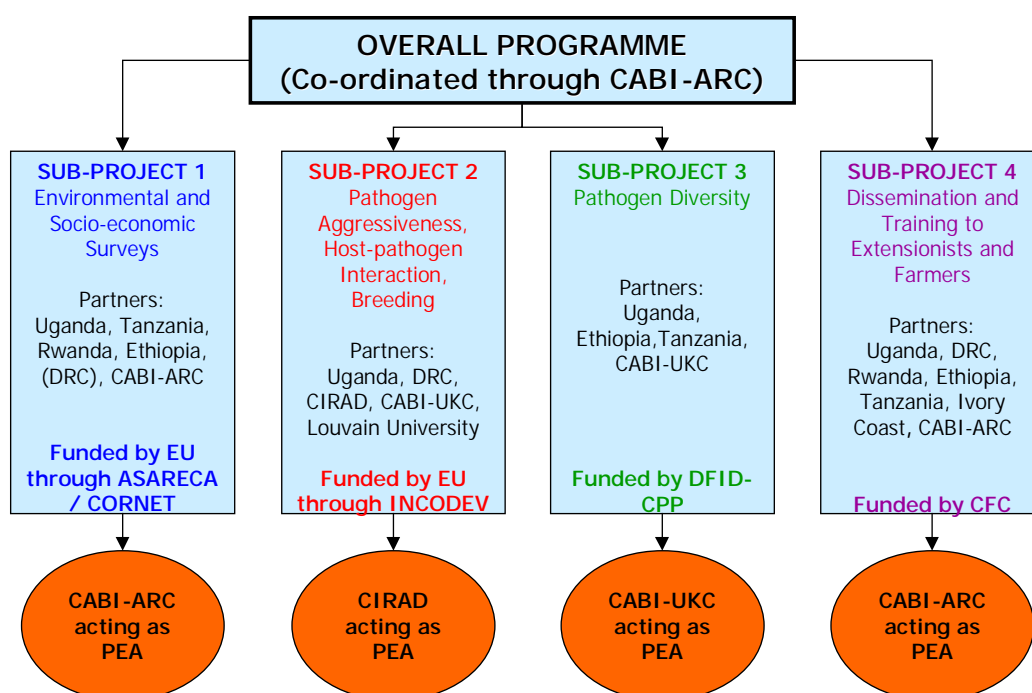


Diagram 3 – Revised Sub-Projects, Partners and Funding Sources

In Year One this will now consist of four separately funded, but complementary, projects. Thus in Year One, the EU, via ASARECA and CORNET, are requested to fund surveys to allow baseline data to be collected on environmental, physical and agronomic parameters affecting disease incidence as well as socio-economic and technical constraints to management of coffee wilt.

EU representatives have previously indicated the need to conduct an immediate assessment of coffee wilt in the East African region to establish the precise extent and severity of the disease. This data will also have much wider implications than simply underpinning a regional Programme to control coffee wilt, and forms a core *raison d'être* for the creation of CORNET.

This project (now called Sub-Project 1) will provide essential baseline data as to the extent of the disease in partner countries allowing other parts of the Coffee Wilt

Programme to be more effectively focussed in particular countries and activities in subsequent years. A draft Workplan outlining this work is presented later in this section.

Existing survey data is now clearly incomplete and out of date. The extent of the wilt problem in Uganda, for example, has no doubt changed and further surveys will be required. The disease is now more common and is apparent in easily accessible areas that can be studied more readily with regard to environmental and physical factors as well as socio-economic factors.

The situation in Tanzania and Rwanda needs clarification. Does the pathogen exist in these countries, and if so, to what extent? The findings of this project will have direct relevance to the other projects within the Programme. For example, in countries where the pathogen exists and appears to be spreading, such as in Uganda, raising awareness of the disease has already begun and efforts will concentrate on the training of extensionists and farmers in phytosanitary practices. In countries where the disease is not detected then emphases in Year One would include risk assessments, as well as raising awareness of the potential threat.

The need for a pathogen identification workshop for scientists and extensionists was discussed in Nairobi and thought to be critical. The ability to identify the disease and differentiate it from diseases of coffee caused by other *Fusarium* species is limited within the region (with the exception of Uganda). *F. stilbioides* and *F. solani* can cause similar symptoms to the untrained eye, and this causes enormous levels of confusion and misidentification. A berry rot and a seedling rot have been described in Malawi and Zimbabwe and the pathogen was identified as *F. xylarioides* but the causal agent was actually identified at CABI-ARC as *F. stilbioides*. This illustrates a serious problem - samples are sent to CABI-UKC from Eastern, Central and Southern Africa because the expertise to identify the different *Fusaria* affecting coffee is not available locally. There is much confusion between *F. xylarioides*, *F. stilbioides*, *F. solani* etc. We plan to address this problem by conducting an identification workshop during the course of the Coffee Wilt Programme to allow capacity building within the region. Regional scientists would not only benefit from identification of the *F. xylarioides* but of all other *Fusaria* affecting coffee too.

The CFC will be funding all training activities and the dissemination of results obtained from surveys as part of Sub-Project 4. Additionally, the CFC will contribute toward capital equipment (i.e. vehicles) that are essential to conducting these surveys.

Sub-Projects 2 and 3 deal explicitly with the core scientific research work on the pathogen and are to be funded through EU-INCODEV and DFID-CPP. The following sections outline the workplans for these two Sub-Projects and show how the two sources of funding, though focussed on separate investigations, will nonetheless provide a significant improvement in the overall understanding of the pathogen. Draft Workplans for Sub-Projects 2,3, and 4 are presented in Annex 5.

Equally, work will be conducted in four countries and cover not just pathogen diversity (in Uganda, Ethiopia and Tanzania), but also pathogen aggressiveness, host-pathogen interaction and breeding (in Uganda and DRC). The relative strengths of CABI Bioscience (pathogen variation) and CIRAD (breeding) will be utilised for the benefit of the Programme as a whole.

EU-INCODEV and DFID-CPP Sub-Projects

Description of EU-INCODEV Work Programme

The EU-INCODEV work programme is for four years, and involves five partners:

- Partner 1: CIRAD
- Partner 2: University of Louvain
- Partner 3: CORI (Uganda)
- Partner 4: University of Kinshasa (DRC)
- Partner 5: CABI

There are five identified work packages:

- WP 1 - Pathogen Diversity: All partners are involved : CABI to co-ordinate the work package
- WP 2 - Host Pathogen interaction: Partners 1-4
- WP 3 - Breeding: Partners 1-4
- WP 4 - Epidemiology: Partners 1,3,4
- WP 5 - Co-ordination of the project (CIRAD)

WORK PACKAGE 1: Pathogen Diversity.

The objectives are to acquire a knowledge of the pathogen, its genetic diversity, variation in aggressiveness and links between aggressiveness and toxin production. Specifically:

- Isolates will be collected from various regions and their diversity examined using a range of molecular and mycological techniques
- The role of the sexual phase in the life cycle and in the evolution of this genetic diversity will be investigated
- An evaluation of this diversity of geographical location to establish if a new strain has arisen
- Quantification of the production of ascospores and measure aggressiveness in pathogen generations
- Identification and purification of toxins and relationship to isolate aggressiveness.

CORI and University of Kinshasa (with help from CIRAD and CABI if required) will collect isolates of the fungus from all parts of infected trees and from as many parts of the country as possible. These isolates will be placed in culture and sent to CABI for identification, and storage in a designated facility (at CABI-UKC). Isolates can be distributed to other European partners (if DRC and Uganda agree) but not to African partners to prevent the introduction of putative new strains. A database will also be set up (at CABI-UKC) to maintain information about these strains, as results from all partners are received.

Uganda, DRC, Louvain and CIRAD will evaluate the variation of these strains in terms of aggressiveness by using standardised inoculation tests. Isolates from DRC will be tested in Louvain, and those from Uganda in CIRAD (through the training attachment

of Mr. Musoli). Uganda, DRC, Louvain and CIRAD will also investigate the life-cycle of the pathogen.

An evaluation will be made (CABI and CIRAD) of the genetic variation of these strains using range of molecular and mycological techniques. CIRAD will develop protocols to use micro-satellites to link strains with pathotypes for breeding work, whilst CABI will use vegetative compatibility groups (VCGs) and mating tests. CIRAD will be funded by EU-INCODEV to evaluate the aggressiveness of the isolates collected by the other partners and will help the other partners with a description of the life-cycle. CIRAD will develop protocols for micro-satellite work to link with breeding.

The University of Louvain will identify the toxins involved in pathogenicity. CABI will be responsible for the synthesis of the above tasks and writing the various reports.

WORK PACKAGE 4: Epidemiology

The objective is to understand the epidemic and the role of various environmental and human factors in its spread. Specifically work will:

- Identify various types of farming systems, cultural practices and socio-economic constraints in the affected regions
- Relate the epidemic to the above

Uganda and DRC, in conjunction with CIRAD, will identify benchmark sites where the epidemic can be mapped over the next 4 years. These sites will be characterised regarding soil, climate, type of farm etc. Uganda and DRC partners will conduct spatio-temporal mapping of the spread of the disease both at these sites and more widely in affected areas. Ugandan and DRC partners will define the conditions conducive to the appearance of the sexual phase and make an assessment of the scale of ascospore production in the field. They will also evaluate the methods of survival and duration of survival of the pathogen in the field using mycological plating methods. DRC is responsible for this work package and will elaborate a simplified model of the epidemic and develop suitable recommendations for control based upon this model.

In summary, CABI is not funded for any epidemiological work under EU-INCODEV, and the other three work packages within EU-INCODEV do not involve CABI inputs.

Description of DFID-CPP Work Programme

The DFID-CPP work programme is proposed for two years, and involves four partners:

- Partner 1: CABI
- Partner 2: Uganda - CORI
- Partner 3: Ethiopia - EARO
- partner 4: Tanzania - ARTI

To ensure complementarity, the proposal to DFID-CPP required some amendment now that approval has been given to the EU-INCODEV Proposal.

Description of the work following discussions in Nairobi in light of successful funding of EU-INCODEV. (NB Awaiting approval of DFID-CPP as still under negotiation).

Under CPP funding, it is proposed that CABI would work with Tanzania (ARTI) and Ethiopia (EARO) to collect samples of the pathogen from their respective countries. Under EU-INCODEV funding, CABI would receive isolates collected from Uganda (CORI) and DRC (The University of Kinshasa). CABI would then establish suitable molecular protocols for 'fingerprinting' populations and determining variability of the pathogen from all countries using CPP funds. A range of molecular techniques such as MtrRFLPs, AFLPs, β -tuberlin will be used.

In this way studies of genetic variation in the pathogen population would be extended to cover 4 countries (Uganda, DRC, Tanzania and Ethiopia) which will represent a significant improvement on the overall understanding of the pathogen for the Coffee Wilt Programme.

The previously proposed attachment at CIRAD, and work in CORI, by Mr. Musooli, would be funded from the EU-INCODEV proposal. He would develop screening

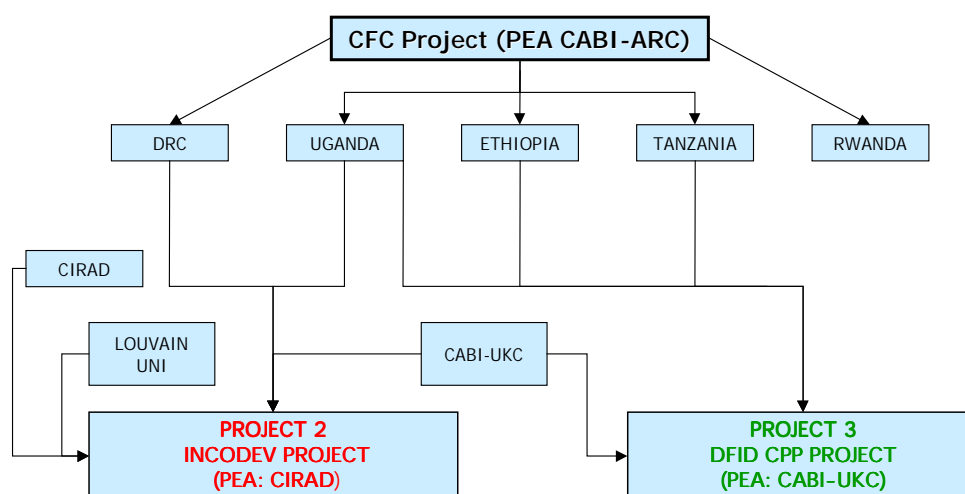


Diagram 4 – Interrelationship between Sub-Projects 2 and 3

methods and pathogenicity tests and use an appropriate selection of pathogen isolates (representing the spectrum of aggressiveness) to screen *C. canephora* germplasm for resistance (at CIRAD). This is considered to be a more logical procedure since all the breeding work is to be conducted between CIRAD and the other partners.

In addition to examining pathogen variability across these countries, several sites would be identified in Uganda and isolates would be collected by CORI and CABI. These would be the same sites that would be characterised by soil type and other agronomic factors by CORI and CIRAD under EU-INCODEV funding (Work Package 4, see above). Thus, CORI, plus CIRAD, would examine the agronomic factors affecting epidemiology and CORI would conduct mycological isolations whilst DFID-CPP funding

to CABI would allow complementary work on mapping affected plants with molecular markers to determine the spread of individual isolates across a designated site.

Additionally, CORI would make isolations from alternative hosts, putative vectors funded by DFID-CPP, and this would also be complemented by essential molecular studies. For example, information from the mycological plating from alternative hosts/vectors would be improved if it were known that the same genotypes existed in coffee and these alternative hosts. Similarly determinations of the survival of the pathogen in soil would be greatly improved by molecular labelling to determine the range of genotypes present at the start of the epidemic at the sites, while after a given length of time, only one or two genotypes remain. Similarly, is it always the same genotypes that remain at different sites? This knowledge may be useful in the selection of isolates for breeding programmes.

As well as Uganda, sites in Ethiopia and/or Tanzania could also be mapped (using DFID-CPP funds) and molecular marker assisted epidemiology conducted.

Sub-Project 1 – Baseline Information on Factors Affecting Incidence and Severity of Coffee Wilt

SUB-PROJECT 1 - SUMMARY

The re-emergence, in the ASARECA Region, of Coffee Wilt Disease (Tracheomyces) in the Democratic Republic of Congo, Uganda, Ethiopia and Tanzania, poses a major threat to the millions of small-holder farmers who depend on coffee production for their livelihood. In order to manage this disease effectively, baseline information on the incidence and severity of the disease in the ASARECA region, together with farmers' perceptions on the economic impact of the disease is required. To this end, two surveys are proposed:

1. A biological survey including mapping of the disease using remote sensing
2. A socio-economic survey which will be undertaken as a work programme under CORNET, the Coffee Research Network under the auspices of ASARECA

The participating national programmes include CORI, Uganda; EARO, Ethiopia; ONC, DRC; ARTI, Tanzania; and ISAR, Rwanda. The Project Executing Agency is CAB International – Africa Regional Centre, together with the project Assisting Agency, CIRAD. Total cost is estimated to be 600,000 over two years.

INTRODUCTION

Tracheomyces, or vascular wilt disease of coffee, is caused by the fungus *Fusarium xylarioides*, which also has a sexual stage (*Gibberella xylarioides*). This pathogen was first described in Democratic Republic of Congo (ex-Zaire) in 1948 (Steyaert, R.L. 1948) although the disease had already been identified for two decades. During the 1940s and 1950s, the disease became a serious problem of Robusta coffee (Fraselle, J. 1950) in several countries of West and Central Africa, but the establishment of effective breeding programmes in several countries (DRC ex-Zaire and Côte d'Ivoire) reduced its impact to that of a minor disease. *Coffea arabica*, *C. canephora*, *C. excelsa* and wild Coffee species are all susceptible.

Recently, it was reported that the disease is again causing considerable losses to Robusta coffee in North East Democratic Republic of Congo and Uganda. Some reports also indicate that the disease may have spread to Rwanda and Tanzania adjacent to Ugandan frontier. The disease continues to be a problem of Arabica Coffee in Ethiopia.

The full extent of losses due to this disease has not yet been quantified precisely but its presence has been confirmed in 22 of the 30 coffee growing districts in Uganda. It is estimated that 5% of the crop has already been lost due to wilt disease in Uganda alone. In the North East of DRC during 1996, it was observed that an increasing number of plantations were being abandoned in an area from Isiro to Beni and that some plantations had over 90% infection (J. Flood *Pers. Comm*). In Kivu North, the current epidemic has already destroyed 60% of the coffee.

In order to develop an effective management strategy for coffee wilt disease in the

ASARECA Region, there is an urgent need to obtain quantitative information on the current status of the disease in terms of its geographical distribution and farmers perceptions of the economic impact of the disease. To this end, two surveys are proposed: a biological survey including mapping of the disease using remote sensing, and a socio-economic survey which will be undertaken as a work programme under CORNET, the Coffee Research Network under the auspices of ASARECA.

PROJECT OBJECTIVES AND ACTIVITIES

Objective 1 **To gather baseline information on environmental, physical and agronomic parameters affecting disease severity and importance**

Output 1 A comprehensive report produced using quantitative baseline data showing the correlation between disease severity and environmental, physical or agronomic factors.

Survey data will be analysed and a comprehensive document including a map of coffee wilt disease incidence and severity in the ASARECA region, will be produced. The baseline information will be used to assist in the formulation of on-farm and on-station research experiments.

Activity 1.1 Identify survey sites and survey details planned for Uganda, DRC, Ethiopia, Rwanda and Tanzania. Sites chosen to examine disease incidence and severity in relation to rainfall, soil type management practices including inter-cropping, pruning, fertilizer use and sanitation. (Timing 3 months)

Activity 1.2 Standardised data request forms (DRFs) formatted and produced. (Timing 3 months)

Activity 1.3 Surveys conducted by staff of collaborating agencies in conjunction with extension workers. (Timing 9 months)

Activity 1.4 Analysis of Survey data. (Timing 3 months)

Activity 1.5 A feasibility study of the potential of remote sensing to assess the disease in Uganda (Timing 12 months)

Objective 2 **To identify socio-economic and technical constraints to the improvement of coffee management and marketing.**

Output 2 A report, which outlines the improvement of coffee management, taking into account socio-economic and technical limitations. The report will act as a baseline on which progress can be measured. Interviews and data obtained will be carefully analysed and a comprehensive document will result. All the information gained will enable more appropriate training of extension workers to reach more effectively the smallholder population as well as

women and particular smallholder. Also, information gained will allow more appropriate disease management practices to be devised both for extension workers and, consequently, for smallholder farmers.

Activity 2.1 Target farmer groups to be identified by extension workers and collaborating agencies (Timing 3 months)

Activity 2.2 Details of questionnaires planned on common protocols agreed between participating institutions. (Timing 3 months)

Activity 2.3 Targeted farmer groups interviewed. (Timing 6 months)

Activity 2.4 Analysis of data obtained in interviews. (Timing 3 months)

BENEFITS AND BENEFICIARIES

The immediate beneficiaries will be researchers and extensionists in the participating national programmes, together with policy makers working in the coffee sector in ASARECA member countries. The knowledge acquired from both the biological and socio-economic surveys will be used to assist in the formulation of effective research strategies, which will ensure the effective management of the disease. The ultimate beneficiaries will, therefore, be the ~10 million smallholder coffee farmers in the ASARECA region whose livelihoods are threatened by this devastating disease.

PROJECT MANAGEMENT

This proposal is one of the research activities co-ordinated by CORNET, (Coffee Research Network established under the auspices of ASARECA) in order to provide effective management of coffee wilt disease in the ASARECA region. The programme will be implemented by CABI – Africa Regional Centre and CIRAD will be the assisting agency.

PROJECT LINKAGES

This proposed CORNET funded Sub-Project 1 of the regional Coffee Wilt Programme will link closely with three other independent but related projects (two confirmed and one proposed) on different aspects of coffee wilt as follows:

- **Sub-Project 4 - Improvement of coffee production in Africa by the control of coffee wilt disease (Tracheomyces)** - Funded by Common Fund for Commodities. This is five year project with a primary focus on providing dissemination and training to extensionists and small-holder coffee farmers (Uganda, DRC, Ethiopia, Tanzania, Rwanda, Cote D'Ivoire and Cameroon)

- **Sub-Project 2 - Development of a long-term strategy based on genetic resistance and agro-ecological approaches against coffee wilt disease in Africa** - Funded by EU-INCODEV. This is a four-year upstream research project aimed at developing a pre-breeding strategy for coffee wilt (Uganda, DRC, Belgium, France and UK). Please refer to previous section entitled 'EU-INCODEV and DFID-CPP Sub-Project Interaction'.
- **Sub-Project 3 - Epidemiology and variability of *Gibberella xylarioides*, the coffee wilt pathogen** - This proposal has been submitted to the Crop Protection Programme of DFID. This is a three-year project, which aims to characterize pathogen diversity (Uganda, Tanzania, Ethiopia and UK). Please refer to previous section entitled 'EU-INCODEV and DFID-CPP Sub-Project Interaction'.

Draft Workplan Sub-Project 1 - Years One and Two

Activities	Year 1				Year 2			
	1	2	3	4	1	2	3	4
1.1 Survey sites identified and details planned		X						
1.2 Standardised data request forms produced			X					
1.3 Survey conducted				X	X	X		
1.4 Data analysis						X		
1.5 Remote Sensing				X	X	X	X	
2.1 Farmer Groups identified				X				
2.2 Questionnaires					X			
2.3 Interviews Conducted						X	X	
2.4 Interviews Analysed								X

EU-INCODEV and EU-CORNET Sub-Project Interaction

A further area of clarification involves the relationship between proposed survey work under Sub-Project 1 (EU-CORNET) and activities to be funded by EU-INCODEV under Sub-Project 2. Under Work Package 4 of the original EU-INCODEV proposal, Uganda and the DRC will identify, in conjunction with CIRAD, sites where the epidemic can be mapped over the course of four years. Isolations will be made to determine the spread of the disease through molecular markers (funding by DFID-CPP under negotiation).

This long-term mapping activity will involve spatio-temporal analysis of the spread of the disease at the chosen sites, and in that respect differs substantially from the nature of the rapid surveys to be funded in the region by EU-CORNET. These initial surveys will be designed to provide the swift collation of data to give a 'snapshot' of disease incidence and severity in the region, from which baseline data can be drawn and subsequent Coffee Wilt Programme activities determined.

The Role of Côte d'Ivoire

During the course of the Nairobi meeting discussions took place between Dr. Julie Flood, Mr. Julius Jackson and Dr. Kébé Boubacar Ismaël of the Centre National de Recherche Agronomique (CNRA) in Côte d'Ivoire. In the original formulation of the Project Proposal both Côte d'Ivoire and Cameroun were included in project activities, but had to date not been able to secure additional funding to that agreed by the CFC.

The involvement of Côte d'Ivoire is predicated on their previous experience of coffee wilt and the development of a breeding programme in the 1950s to combat Tracheomyces, helping to reduce its impact to that of a minor disease. Since 1966 important collections of African coffee trees have been introduced to Côte d'Ivoire with some 7,500 genotypes. Wild forms of cultivated species are well represented with 1,300 *Coffes arabica* and 700 individual *Coffea canephora*, including clones selected for resistance to Tracheomyces. It would therefore be of great benefit to the Programme to work with CNRA to examine different material and screen a number of Robusta coffee varieties for resistance to *Fusarium xylarioides*.

To this end, and with the agreement from Mr. Caleb Dengu (CFC), a draft work programme was discussed that would utilise solely CFC funds for a duration of one year to undertake surveys and the collection of samples in three different zones. The same survey methodologies and protocols being used for the rest of the Programme would also be employed in Côte d'Ivoire, and involve the collection of fungal isolates from the field.

A workplan and budget utilising CFC funds will be drawn up in due course in consultation with CNRA.

Conclusions and Recommendations

The central **conclusions** of this Workshop Report are re-presented here:

1. As from 16th February 2001, Dr. George Oduor is the Coffee Wilt Programme Co-ordinator, based at CABI-ARC in Nairobi. This will facilitate regional co-ordination of Programme activities.
2. The original Project Proposal remains technically valid as an operational document but has been revised into a Coffee Wilt Programme containing four Sub-Projects is based on activities for Year One, and will need to be reviewed in light of Year One outputs and appropriate follow-on actions in light of those results.
3. The CFC as the main donor agency to the Programme have relaxed co-financing requirements in favour of recognising that the commitment of other funds to different Sub-Projects within a Coffee Wilt Programme is sufficient, and recognise that in some cases the promised funds might not be forthcoming in the form that was originally expected.
4. Funds will be sought from EU-CORNET for survey work in the regional to establish disease incidence and severity and produce baseline data for future project activities (Sub-Project 1 – refer to section above).
5. There exists a clear demarcation between work funded by different donor agencies, and with regard to pathogen and epidemiological investigations (Sub-Projects 2 and 3 – refer to section above), but final agreement of DFID-CPP and EU-INCODEV will be required.
6. Improved regional co-ordination, transparency and project management can be maintained by CABI-ARC by having four separate Sub-Projects utilising separate administrative and financial processes rather than one super-project attempting to satisfy a mixture of donor requirements.

The following **recommendations** are made by CABI in light of discussions in Nairobi:

1. Despite the clear distinction between funding and the four newly delineated Sub-Projects one exception exists. Although the DRC is both a member of ASARECA and CORNET, it does not qualify for funds for Coffee Wilt related work that has already been approved from EDF for these networks. This is because there currently exists a geographic restriction on these funds.

Although the DRC is seeking bilateral funds from the Belgian Government it is strongly recommended by CABI Bioscience, with support from the International Coffee Organization (ref: letter between C.P.R Dubois and Yves Gillet dated 28th March 2001), that the DRC be included as a beneficiary of EU funds earmarked for the Wilt Programme. There are a number of sound justifications for this recommendation, specifically that:

- Tracheomycosis does not respect frontiers and has been evidenced as a cross-regional problem

- The disease re-emergence epicentre was in North Eastern DRC – and this should be regarded as East African in terms of the spill-over effect that has occurred to neighbouring countries
- The DRC has nine contiguous international borders and is thus in the invidious position of becoming the key disease distribution node in the region. The size of the country almost defies geographical restrictions falling in part in Eastern, Southern and Central Africa, thus making any geographic restriction somewhat academic
- Involvement of the DRC through access to EU funds would also help to improve relations between DRC, Rwanda and Uganda and could be regarded as a non-substantive confidence building measure at a grass-roots level that would feed into the wider political rapprochement process (viz. recent agreements and discussions between protagonists on pulling back troops in the region)
- Having the CFC fund DRC Sub-Project 1 activities and the EU fund all other Sub-Project 1 activities in the region does not engender a clear delineation of responsibilities of donor agencies and project activities, making regional co-ordination more complicated than required.

It is felt that this represents a good opportunity for inclusion of the DRC in regional EU funds for the Coffee Wilt Programme, and would enable all participating countries to enter the project on an equal funding footing vis à vis crucial, baseline survey work to be undertaken in Year One.

This recommendation notwithstanding, CABI also urges the Belgian Government to financially support the National Programme in DRC in working on project activities to combat coffee wilt in the country.

2. That the CFC and EU draft a letter to appropriate Governmental contacts in countries neighbouring the Eastern border of the DRC requesting that safe passage be accorded to Programme personnel whilst undertaking survey work in the region should the politico-military situation in the area not improve.
3. Standardised survey forms will be developed by the Programme Co-ordinator for distribution to all participating countries as and when EU-CORNET funds become available for these activities.
4. All participating countries are urged to fulfil as quickly as possible the requirements of opening bank accounts, examining draft budgets and workplans and signing Project Implementation Agreements with CABI Bioscience where these conditions have not already been met.

Annexes

- Annex 1 Workshop Participants**

- Annex 2 Participant Contact List**

- Annex 3 Workshop Agenda**

- Annex 4 Project Chronology 1996-2001**

- Annex 5 Draft Workplans Year One
(Sub-Projects 2, 3, and 4)**

- Annex 6 Workshop Discussions**

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Prof. G.C. Mrema	Executive-Secretary, Association for Strengthening Agricultural Research in East and Central Africa (ASARECA)
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Mme Josefa Sacko	Secretary General, InterAfrica Coffee Organisation (IACO)
Mr. Denis Seudieu	Chief Economist, International Coffee Organisation (ICO)
Ms. Lilian Volcan	Economist, International Coffee Organisation (ICO)
Dr. Jean-Paul Bitoga	Director-General, Institut des Sciences Agronomiques du Burundi (ISABU)
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Dr. Fabrice Pinard	Plant Pathologist, CAB International, Africa Regional Centre
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Dr. Sarah Simons	Regional Bioscience Co-ordinator, CAB International, Africa Regional Centre
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Annex 3 – Workshop Agenda

Thursday 15th February (Morning Session)

08.30 - 09.00	Registration
09.00 - 09.20	Welcome & Introductions - Mr. Dennis Rangi, Regional Representative, CABI-ARC
09.20 - 09.50	Coffee in Africa – Madame Josefa Sacko, Secretary-General, IACO
09.50 - 10.30	Coffee Wilt in Africa: Evolution of Coffee Wilt Project - <i>Dr. Julie Flood, Project Scientist, CABI-UK</i>

10.30 – 10.50 COFFEE BREAK

10.50 - 11.20	Regional Coffee Wilt Project: Objectives, Activities & Role of CABI - Dr. George Oduor, Project Co-ordinator, CABI-ARC.
11.20 - 12.00	Overview of CFC and Coffee – Mr Caleb Dengu, Associate Project Manager, CFC
12.00 - 12.30	Discussions

12.30 - 14.00 LUNCH

Thursday 15th February (Afternoon Session)

14.00 - 15.30	Coffee Wilt Project – Roles of Participating Organisations: <ul style="list-style-type: none"> • ICO - <i>Dr. Denis Seudieu, Senior Economist</i> • EU - <i>Mr. Yves Gillet, Rural Development Advisor</i> • ASARECA - <i>Prof. Geoffrey Mrema, Executive Secretary</i> • ACRN - <i>Dr. Ronald Onzima, Director, Research & Development Coordinator</i> • CORNET - <i>Dr. Dinah Masaba, Director, Coffee Research Foundation (CRF) & CORNET Co-ordinator</i> • CIRAD - <i>Dr. Dominique Berry, Head of the Coffee Programme</i>
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15.30 - 16.00 COFFEE BREAK

16.00 - 17.15	Presentations from participating NCRS, Uganda (30 mins), DRC (15 mins), Ethiopia (10 mins), Tanzania (10 mins) & Rwanda (10 mins)
17.15 - 17.30	Concluding Remarks – Professor Geoffrey Mrema, Executive Secretary, ASARECA
19.00 - 21.00	Cocktail Reception (Landmark Hotel)

Friday 16th February (Morning Session)

08.00 – 08.50	Workplan and Budget – Uganda (Attendance by Ugandan delegation, CABI, CFC)
08.50 – 09.40	Workplan and Budget – DRC (Attendance by DRC delegation, CABI, CFC)
09.40 – 10.30	Workplan and Budget – Ethiopia (Attendance by Ethiopian delegation, CABI, CFC)

10.30 – 11.00 COFFEE BREAK

11.00 – 12.00	Workplan and Budget – Rwanda and Tanzania (Attendance by Rwandan and Tanzanian delegations, CABI, CFC)
12.00 - 13.00	CFC Financial Procedures - Mr. Julius Nwankpa, Project Assistant (Attendance by all country Project Administrators)

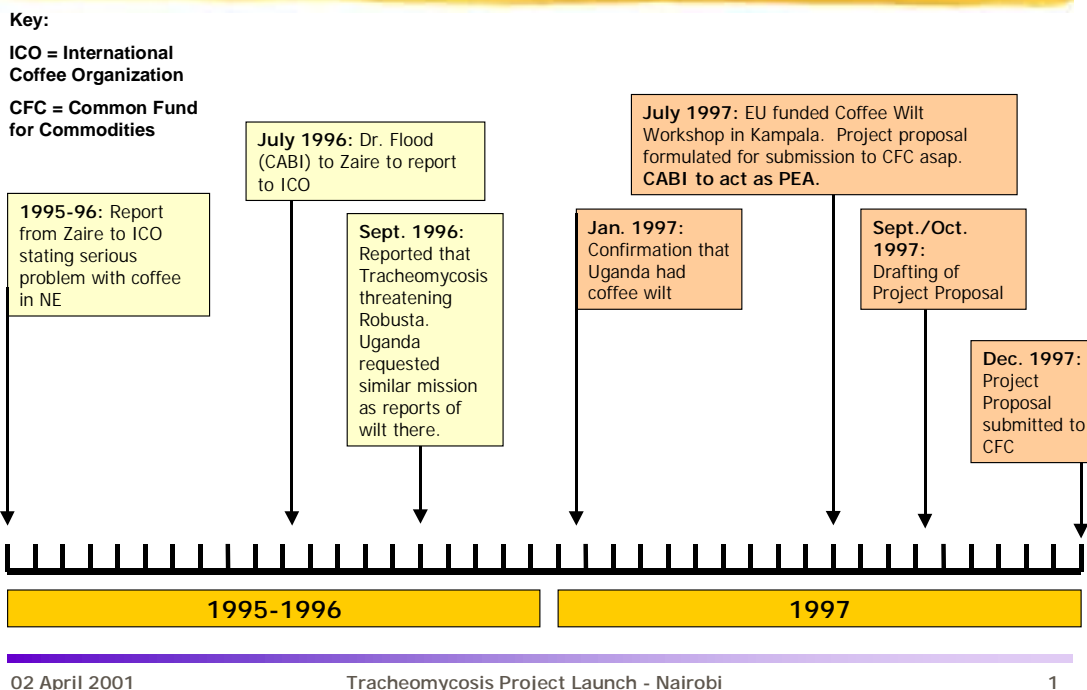
13.00 - 14.00 LUNCH

Friday, 16th February (Afternoon Session)

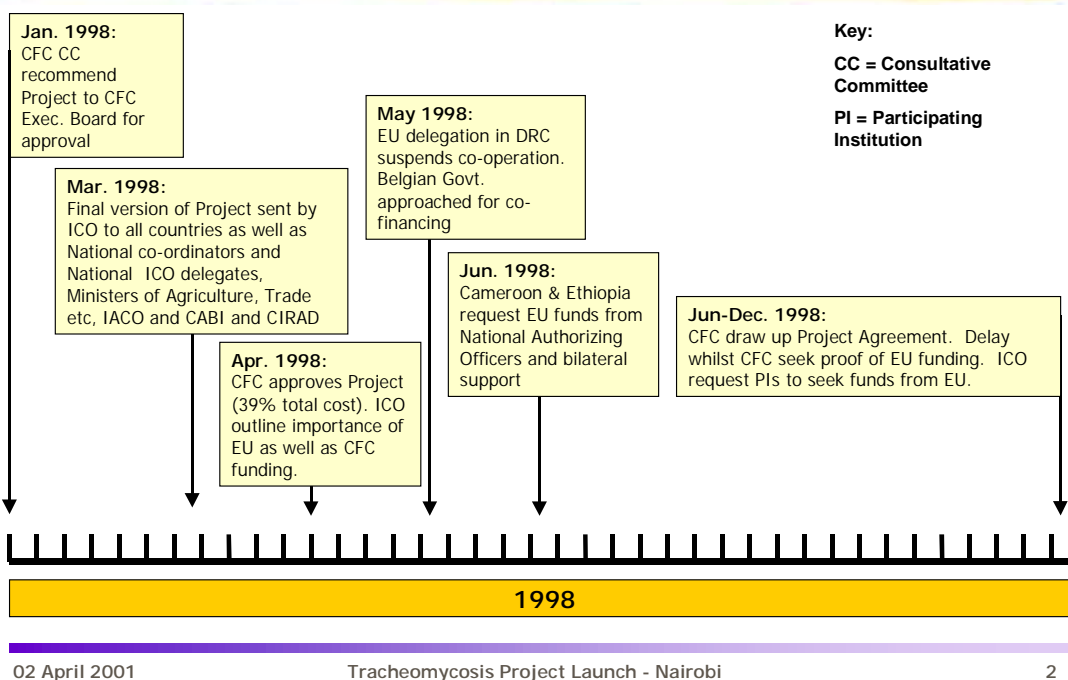
14.00- 15.30	Project Administration Procedures - Mr. Julius Jackson, Coffee Wilt Project Administrator (Attendance by all country Project Administrators)
15.30 - 16.00	Closing Remarks – Mr. G. Mrema, Mr D. Rangi

Annex 4 – Project Chronology 1996-2001

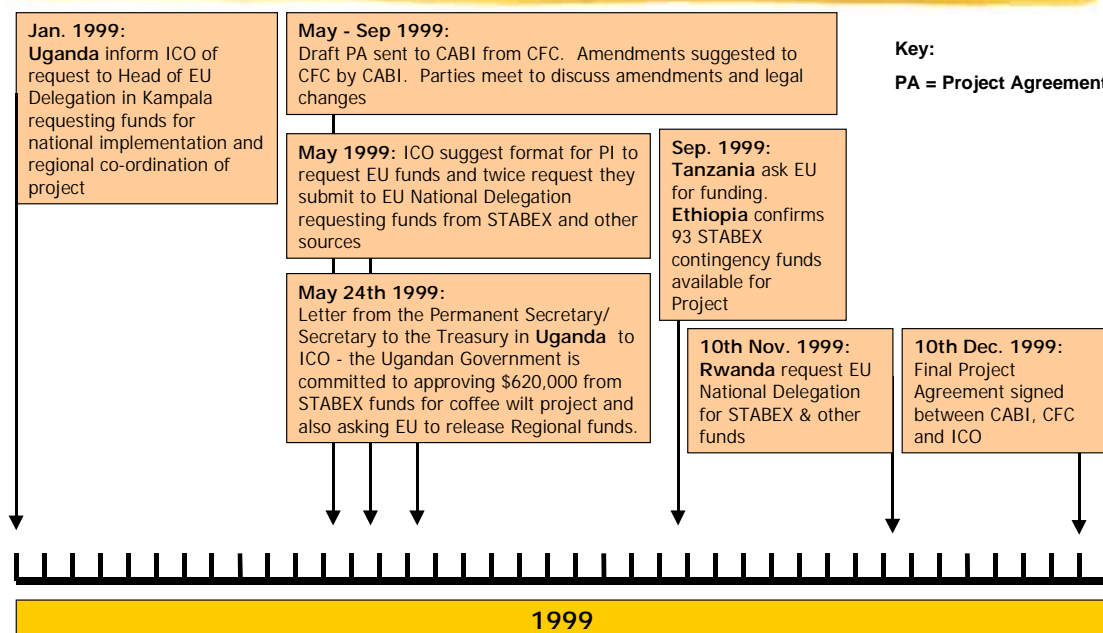
CFC/ICO Tracheomyces Project - CABI



CFC/ICO Tracheomyces Project - CABI



CFC/ICO Tracheomycosis Project - CABI

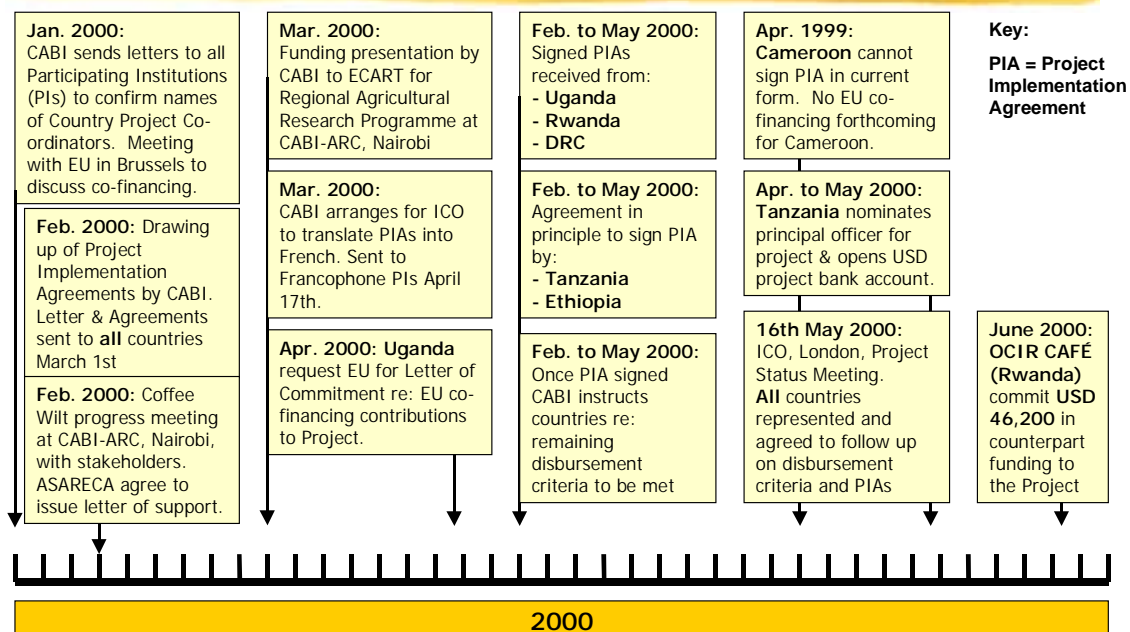


02 April 2001

Tracheomycosis Project Launch - Nairobi

3

CFC/ICO Tracheomycosis Project - CABI

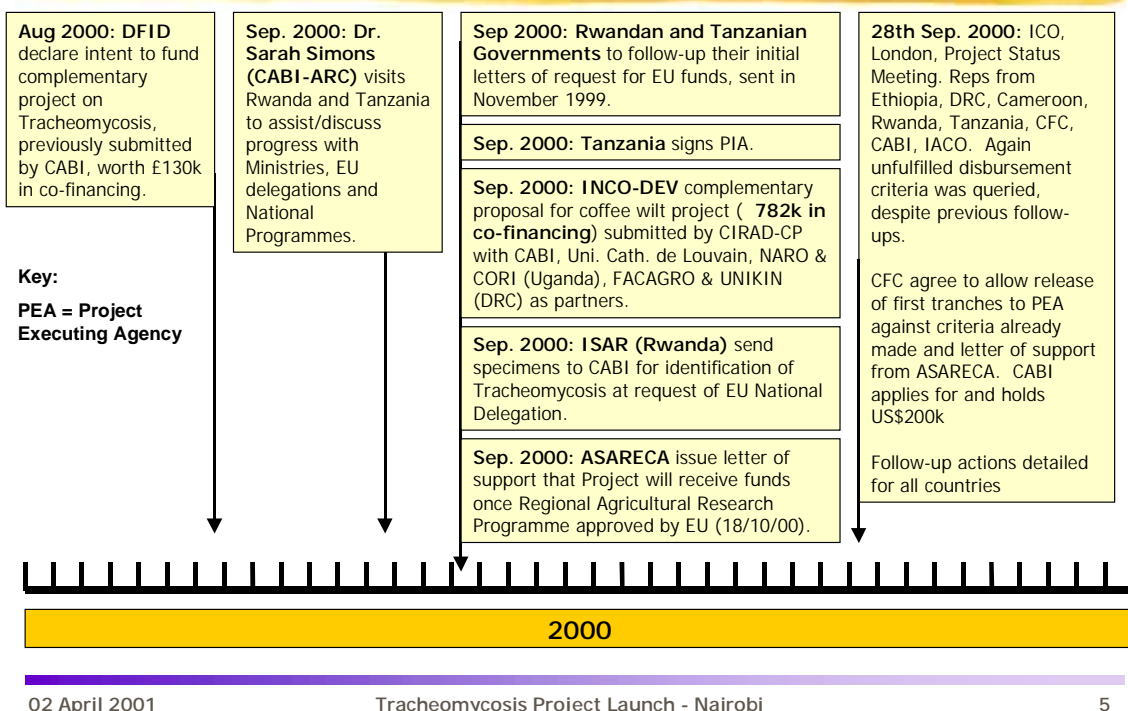


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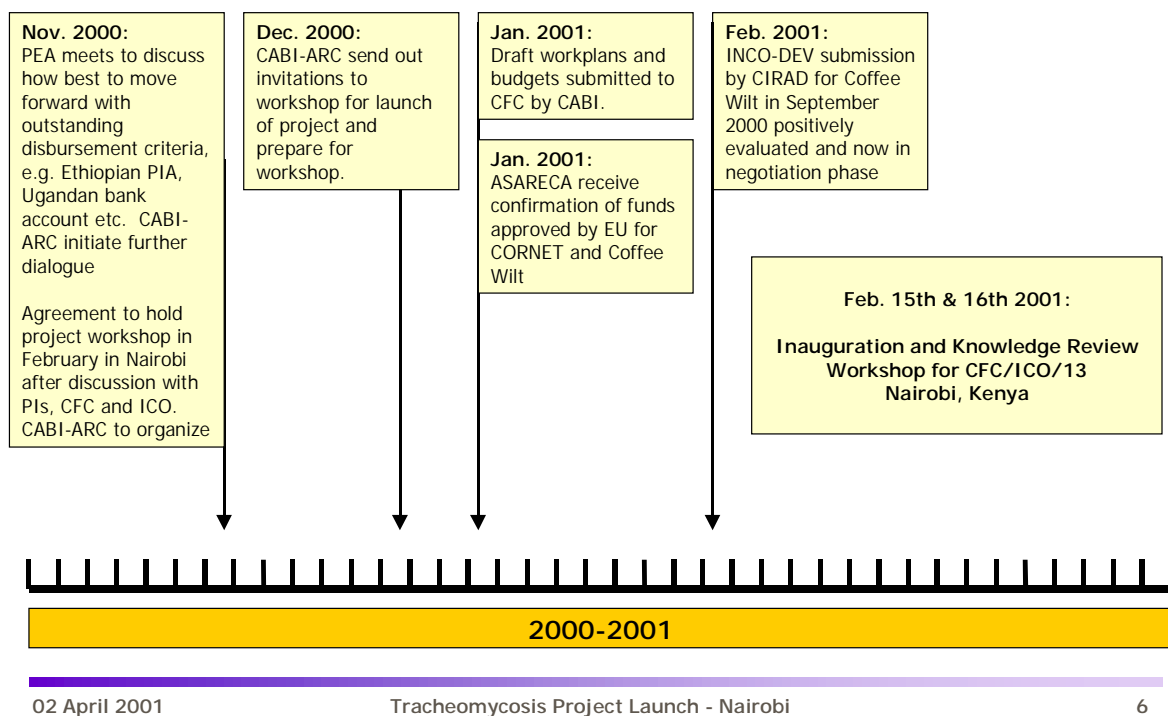
Tracheomycosis Project Launch - Nairobi

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CFC/ICO Tracheomyces Project - CABI



CFC/ICO Tracheomyces Project - CABI



Annex 5 – Draft Workplans Year One

Annex 5.1 – Workplan for DRC

1. The programmes for DRC in Year One involve a range of activities including surveys (Sub-Project 1 – EU-CORNET), pathogen aggressiveness, H-P interaction, spatio-temporal spread and breeding (Sub-Project 2 - INCODEV) as well as the training and dissemination of results that are funded from CFC (Sub-Project 4). Many of the activities in Year One will involve baseline work such as the development of techniques for surveying and for screening for resistance as well as the identification of sites for subsequent intensive work in the following years.
2. Discussion is required by collaborators in DRC with the CORNET co-ordinator and with CABI-ARC and the providers of funds for surveying (EU-CORNET) as to the eligibility of DRC to receive CORNET funds (please refer to the recommendations section of this report). However, in the absence of these funds, CFC funds will be used. The activities and methodology involved in the surveys needs further development by the project co-ordinator at CABI-ARC, but a draft workplan is presented in the section of this Report entitled 'Sub-Project 1 – Baseline Information on Factors Affecting Incidence and Severity of Coffee Wilt'.
3. Under Work Package 4 of the INCODEV proposal (Sub-Project 2 of the Coffee Wilt Programme) sites have to be identified (in conjunction with CIRAD and CABI) that can be surveyed over 4 years. These sites have to be characterised with regard to climate, soil type and farm type. Trees on these sites will be mapped at the start of the investigation and at regular intervals. From this information, spatio-temporal spread of the disease at these sites will be determined and ultimately the data will be analysed in subsequent years.
4. Under Work Package 1 of the INCODEV proposal (Sub-Project 2 of the Coffee Wilt Programme), isolation will be attempted from collaborators at the University of Kinshasa from:
 - all parts of infected trees at the above sites
 - from soil
 - from possible alternative hosts in the field and from any vectors found at the sites
5. Any *F. xylarioides* isolated will be dispatched to CABI for formal identification and storage in a designated facility.
6. In order to gain an idea of the general variation of the pathogen population within DRC, isolations should be made (University of Kinshasa) from a wide geographical area as possible and dispatched to CABI-UKC for storage. Mycological and molecular tests will be conducted to determine the variability on the pathogen population.

7. Also under Work Package 1 of the INCODEV proposal (Sub-Project 2 of the Coffee Wilt Programme), and in conjunction with CIRAD and the University of Louvain, isolates collected in the field should be tested in terms of aggressiveness using standardized tests and from this a range of isolates will be selected for screening tests with the host. In subsequent years this will allow the evaluation of the host germplasm for resistance and source(s) of resistance to be identified.
8. Coffee plantations in affected areas should be visited and any immune trees noted and seeds collected for further work.
9. The breeding work will need to be discussed with Dr. Fabrice Pinard (CABI-ARC/CIRAD) and other breeders from CIRAD as well as the University of Louvain.
10. In addition, to the scientific component, activities for training of extensionists and farmers should be planned in Year One in conjunction with CABI - ARC. This will include preparation of materials, development of curricula for farmers and trainers and publicity to raise awareness of the issues. All this is funded by CFC under Sub-Project 4 of the Coffee Wilt Programme.
11. Guidelines of the activities proposed and guidelines for the timing of the activities are given in subsequent pages. These should be discussed in collaboration with the Project Co-ordinator at CABI-ARC.

DRAFT WORKPLANS FOR DRC

YEAR ONE

MONTH

COMPONENT 1 ORIGINAL PROPOSAL (SCIENCE)		1	2	3	4	5	6	7	8	9	10	11	12	
1. (Formerly Objective 2) Collect information on environmental, physical factors and disease incidence (CORNET)	Sub-Project 1													
Activity 1.1 – Survey sites identified and details planned					X	X	X							
Activity 1.2- Standardised Data Request Forms produced									X	X	X			
Activity 1.3- Survey conducted												X	X	X
Activity 1.4- Data Analysis (Year Two)														
Activity 1.5- Remote Sensing												X	X	X
2. (Formerly Objective 3) Identify socio-economic and technical constraints to the improvement of coffee wilt (CORNET)														
Activity 2.1- Farmer Groups Identified												X	X	X
Activity 2.2- Questionnaires (Year Two)														
Activity 2.3- Interviews Conducted (Year Two)														
Activity 2.4- Interviews Analysed (Year Two)														

DRAFT WORKPLANS FOR DRC

YEAR ONE

MONTH

COMPONENT 1 ORIGINAL PROPOSAL (SCIENCE)		1	2	3	4	5	6	7	8	9	10	11	12
2. Disease epidemiology (WP4 INCO)	Sub-Project 2												
Identify sites where the disease can be surveyed over 4 years.				X	X	X	X						
Characterize the sites with regard to climate, soil, farm type etc.						X	X	X	X				
Collect isolates from these sites and map the sites with regard to diseased trees.					X	X	X	X	X	X	X	X	X
<i>Send isolates to CABI for storage and for molecular work (marker assisted epidemiology)</i>										X	X	X	X
<i>Start to describe the spatio-temporal spread of the disease.</i>													X
5. Pathogen variation (WP1 INCO)	Sub-Project 2												
Collect isolates from sites in all areas in DRC & from various parts of coffee trees.			X	X	X	X	X	X					
Collect isolates from alternative hosts such as bananas and weeds in coffee fields.			X	X	X	X	X	X					
Dispatch to CABI for pathogen population diversity studies									X	X			
Describe the fungal life cycle asexual and sexual phases.						X	X	X	X	X	X	X	X

DRAFT WORKPLANS FOR DRC

YEAR ONE

MONTH

COMPONENT 1 ORIGINAL PROPOSAL (SCIENCE)		1	2	3	4	5	6	7	8	9	10	11	12	
<i>5. Interaction between pathogen variation and disease resistance</i>	Sub-Project 2													
(WP1 INCO) Evaluation of variability in isolates aggressiveness using standardized tests.									X	X	X	X	X	
(WP2 INCO) Identify isolates of <i>Fusarium</i> representing wide range host susceptibility/resistance in screening tests														X
(WP2 INCO) Field trials prepared and set up to evaluate inoculation methods.		X	X	X	X	X	X	X	X	X	X	X	X	X
(WP3 INCO) Identify sources of resistance through field assessments.														X
Collect seeds from genotypes representing the available germplasm.										X	X	X	X	X
Visit coffee plantations in affected regions and look for immune trees.						X	X	X	X	X	X	X	X	X
Collect seeds and cuttings and dispatch to local nurseries and European laboratories for screening.						X	X	X	X	X	X	X	X	X

DRAFT WORKPLANS FOR DRC

YEAR ONE

MONTH

COMPONENT 2 ORIGINAL PROPOSAL - TRAINING		1	2	3	4	5	6	7	8	9	10	11	12
<i>1. Training for extensionists</i>	Sub-Project 4												
Preparation of materials - TBC													
Development of curricula for training - TBC													
Training of extension staff - TBC													
Information developed for radio broadcasts - TBC													
Radio broadcasts planned and implemented - TBC													
<i>2. Training for farmers</i>													
Raising awareness of the disease (radio, leaflets etc) - TBC													
Identifying farmer groups - TBC													
Developing of curricula for farmers - TBC													

Annex 5.2 – Workplan for Rwanda

1. The programme for Rwanda in Year One involves surveys (Sub-Project 1 – EU-CORNET) as well as the training and dissemination of results that are funded from CFC (Sub-Project 4).
2. Those parts of the work plan that involve surveying techniques (funded by EU-CORNET) and the activities and methodology therein need to be agreed with the CORNET co-ordinator and with CABI-ARC, but a draft workplan is presented in the section of this Report entitled 'Sub-Project 1 – Baseline Information on Factors Affecting Incidence and Severity of Coffee Wilt'.
3. In addition to the scientific component, activities for training of extensionists and farmers should be planned in Year One in conjunction with CABI-ARC. This will include preparation of materials, development of curricula for farmers and trainers and publicity to raise awareness of the issues.
4. Guidelines of the activities proposed and guidelines for the timing of the activities are given in subsequent pages. These should be discussed in collaboration with the Project Co-ordinator at CABI-ARC.

DRAFT WORKPLANS FOR RWANDA

YEAR ONE

MONTH

COMPONENT 1 ORIGINAL PROPOSAL (SCIENCE)		1	2	3	4	5	6	7	8	9	10	11	12	
1. (Formerly Objective 2) Collect information on environmental, physical factors and disease incidence (CORNET)	Sub-Project 1													
Activity 1.1 – Survey sites identified and details planned					X	X	X							
Activity 1.2- Standardised Data Request Forms produced									X	X	X			
Activity 1.3- Survey conducted												X	X	X
Activity 1.4- Data Analysis (Year Two)														
Activity 1.5- Remote Sensing												X	X	X
2. (Formerly Objective 3) Identify socio-economic and technical constraints to the improvement of coffee wilt (CORNET)														
Activity 2.1- Farmer Groups Identified												X	X	X
Activity 2.2- Questionnaires (Year Two)														
Activity 2.3- Interviews Conducted (Year Two)														
Activity 2.4- Interviews Analysed (Year Two)														

DRAFT WORKPLANS FOR RWANDA

YEAR ONE

MONTH

COMPONENT 2 ORIGINAL PROPOSAL - TRAINING		1	2	3	4	5	6	7	8	9	10	11	12
<i>1. Training for extensionists</i>	Sub-Project 4												
Preparation of materials - TBC													
Development of curricula for training - TBC													
Training of extension staff - TBC													
Information developed for radio broadcasts - TBC													
Radio broadcasts planned and implemented - TBC													
<i>2. Training for farmers</i>													
Raising awareness of the disease (radio, leaflets etc) - TBC													
Identifying farmer groups - TBC													
Developing of curricula for farmers - TBC													

Annex 5.3 – Workplan for Tanzania

1. The programmes for Tanzania in Year one involve a range of activities including surveys (Sub-Project 1 – EU-CORNET), disease epidemiology (Sub-Project 3 – DFID-CPP) and breeding programmes (Sub-Project 2 - INCODEV) as well as the training and dissemination of results that are funded from CFC (Sub-Project 4). Many of the activities in Year One will involve baseline work such as the development of techniques for surveying and for screening for resistance as well as the identification of sites for subsequent intensive work in the following years.
2. Those parts of the work plan that involve surveying techniques (funded by EU-CORNET) and the activities and methodology therein need to be agreed with the CORNET co-ordinator and with CABI-ARC, but a draft workplan is presented in the section of this Report entitled 'Sub-Project 1 – Baseline Information on Factors Affecting Incidence and Severity of Coffee Wilt'.
3. Under DFID funding (Sub-Project 3 of the Coffee Wilt Programme), isolations of the pathogen will be attempted from affected coffee bushes in Tanzania. Any suspected *F. xylarioides* isolated will be dispatched to CABI for formal identification and storage. In order to gain an idea of the general variation of the pathogen population within Tanzania, isolations should be made (by ARTI and CABI) from as wide a geographical area as possible. Mycological and molecular tests will be conducted to determine the variability on the pathogen population within Tanzania and compared with the pathogen from DRC and Uganda.
4. Collections of isolates will also be made (in conjunction with CABI) from a) all parts of infected trees; b) from soil, and c) from possible alternative hosts in the field and from any vectors found at the sites. Molecular techniques will be developed by CABI to fingerprint these isolates and molecular markers identified. If *Fusarium xylarioides* is positively identified in Tanzania, then these molecular markers will allow further epidemiological work in subsequent years of the project.
5. Once the pathogen has been positively identified, soil samples should be collected at regular intervals at selected sites during the year and isolations of the pathogen made to allow the survival of the pathogen in soil to be investigated.
6. In addition to the scientific component, activities for training of extensionists and farmers should be planned in Year One in conjunction with CABI-ARC. This will include preparation of materials, development of curricula for farmers and trainers and publicity to raise awareness of the issues.
7. Guidelines of the activities proposed and guidelines for the timing of the activities are given in subsequent pages. These should be discussed in collaboration with the Project Co-ordinator at CABI-ARC.

DRAFT WORKPLANS FOR TANZANIA A

YEAR ONE

MONTH

COMPONENT 1 ORIGINAL PROPOSAL (SCIENCE)		1	2	3	4	5	6	7	8	9	10	11	12	
1. (Formerly Objective 2) Collect information on environmental, physical factors and disease incidence (CORNET)	Sub-Project 1													
Activity 1.1 – Survey sites identified and details planned					X	X	X							
Activity 1.2- Standardised Data Request Forms produced									X	X	X			
Activity 1.3- Survey conducted												X	X	X
Activity 1.4- Data Analysis (Year Two)														
Activity 1.5- Remote Sensing												X	X	X
2. (Formerly Objective 3) Identify socio-economic and technical constraints to the improvement of coffee wilt (CORNET)	Sub-Project 1													
Activity 2.1- Farmer Groups Identified												X	X	X
Activity 2.2- Questionnaires (Year Two)														
Activity 2.3- Interviews Conducted (Year Two)														
Activity 2.4- Interviews Analysed (Year Two)														
5. Pathogen variation	Sub-Project													
Collect isolates from sites all affected areas in Tanzania and from various parts of coffee trees.										X	X	X		
Collect isolates from alternative hosts such as bananas and weeds in coffee fields.										X	X	X		
Dispatch to CABI for identification and pathogen population diversity studies.												X	X	

DRAFT WORKPLANS FOR TANZANIA

YEAR ONE

MONTH

COMPONENT 2 ORIGINAL PROPOSAL - TRAINING		1	2	3	4	5	6	7	8	9	10	11	12
<i>1. Training for extensionists</i>	Sub-Project 4												
Preparation of materials - TBC													
Development of curricula for training - TBC													
Training of extension staff - TBC													
Information developed for radio broadcasts - TBC													
Radio broadcasts planned and implemented - TBC													
<i>2. Training for farmers</i>													
Raising awareness of the disease (radio, leaflets etc) - TBC													
Identifying farmer groups - TBC													
Developing of curricula for farmers - TBC													

Annex 5.4 – Workplan for Uganda

1. The programmes for Uganda (CORI) in Year 1 involve a range of activities including surveys (Sub-Project 1 – EU-CORNET), pathogen aggressiveness, H-P interaction, spatio-temporal spread, breeding (Sub-Project 2 – INCODEV), pathogen variation and marker assisted epidemiology (Sub-Project 3 - DFID-CPP), as well as the training and dissemination of results that are funded by the CFC (Sub-Project 4). Many of the activities in Year One will involve baseline work such as the development of techniques for surveying, for screening for resistance etc. plus identifying sites for subsequent intensive work in the following years.
2. Those parts of the work plan that involve surveying techniques (Sub-Project 1 – EU-CORNET) and the activities and methodology therein need to be agreed with the CORNET co-ordinator and with CABI-ARC, but a draft workplan is presented in the section of this Report entitled 'Sub-Project 1 – Baseline Information on Factors Affecting Incidence and Severity of Coffee Wilt'.
3. Under Work Package 4 of INCODEV (Sub-Project 2 of the Coffee Wilt Programme), sites have to be identified (in conjunction with CIRAD and CABI) that can be surveyed over 4 years. These sites have to be characterised with regard to climate, soil type and farm type. Trees on these sites will be mapped at the start of the investigation and at regular intervals. From this information, spatio-temporal spread of the disease at these sites will be determined and ultimately the data will be analyzed in subsequent years.
4. Under Work Package 1 of INCODEV (Sub-Project 2 of the Coffee Wilt Programme) and in conjunction with DFID-CPP funding (Sub-Project 3 of the Coffee Wilt Programme), isolation will be attempted (by CORI) from:
 - all parts of infected trees at the above sites
 - from soil
 - from possible alternative hosts in the field and from any vectors found at the sites

Any *F. xylarioides* isolated will be dispatched to CABI for formal identification and storage in a designated facility. Molecular techniques will be developed to fingerprint these isolates and molecular markers identified. In later years, these markers will allow the tracking of given isolates in the field. Are all the trees infected with the same strain of the pathogen, or different strains? Complementary studies between CORI (mycological plating of samples) and CABI-UK (molecular markers) should also allow us to know if the same strain is present in alternative hosts or vectors and thus further knowledge of pathogen spread and survival gained.

5. Also, at the designated sites, soil should be collected at regular intervals during the year and isolations of the pathogen made. Complementary studies between CORI (mycological plating of samples) and CABI-UK (molecular markers) should allow the survival of the pathogen in soil to be investigated. Are some strains (from the pathogen population) better at surviving in soil than others?
6. In addition, in order to gain an idea of the general variation of the pathogen population within Uganda, isolations should be made (by CORI) from a wide geographical area as possible and dispatched to CABI-UKC for storage. Mycological and molecular tests will be conducted to determine the variability on the pathogen population.
7. Also under Work Package 1 of the INCODEV proposal (Sub-Project 2 of the Coffee Wilt Programme), and in conjunction with CIRAD, isolates collected in the field by CORI should be tested in terms of aggressiveness using standardized tests and from this, a range of isolates will be selected for screening tests with the host. Work Package 2 of the INCODEV proposal (Sub-Project 2 of the Coffee Wilt Programme) will allow field sites to be prepared for inoculation with the isolates (from point 6 above). In subsequent years this will allow the evaluation of the host germplasm for resistance and source(s) of resistance to be identified. Much of this work will be conducted by Mr. Musooli as part of his Ph.D. training programme.
8. Coffee plantations in affected areas should be visited by CORI and any immune trees noted and seeds collected for further work.
9. The breeding work will need to be discussed with Dr. Fabrice Pinard (CABI-ARC/CIRAD) and other breeders from CIRAD as well as Professor Caligari (University of Reading, UK – Mr. Musooli's supervisor).
10. In addition, to the scientific component, activities for training of extensionists and farmers should be planned in Year One in conjunction with CABI-ARC. This will include preparation of materials, development of curricula for farmers and trainers and publicity to raise awareness of the issues.
11. Guidelines of the activities proposed and guidelines for the timing of the activities are given in subsequent pages. These should be discussed in collaboration with the Project Co-ordinator.

DRAFT WORKPLANS FOR UGANDA

YEAR ONE

MONTH

COMPONENT 1 ORIGINAL PROPOSAL (SCIENCE)		1	2	3	4	5	6	7	8	9	10	11	12	
1. (Formerly Objective 2) Collect information on environmental, physical factors and disease incidence (CORNET)	Sub-Project 1													
Activity 1.1 – Survey sites identified and details planned					X	X	X							
Activity 1.2- Standardised Data Request Forms produced									X	X	X			
Activity 1.3- Survey conducted												X	X	X
Activity 1.4- Data Analysis (Year Two)														
Activity 1.5- Remote Sensing												X	X	X
2. (Formerly Objective 3) Identify socio-economic and technical constraints to the improvement of coffee wilt (CORNET)														
Activity 2.1- Farmer Groups Identified												X	X	X
Activity 2.2- Questionnaires (Year Two)														
Activity 2.3- Interviews Conducted (Year Two)														
Activity 2.4- Interviews Analysed (Year Two)														

DRAFT WORKPLANS FOR UGANDA

YEAR ONE

MONTH

COMPONENT 1 ORIGINAL PROPOSAL (SCIENCE)		1	2	3	4	5	6	7	8	9	10	11	12
3. Disease epidemiology (WP4 INCO and DFID-CPP)	Sub-Project 2/3												
Identify sites where the disease can be surveyed over 4 years.			X	X	X	X							
Characterize the sites with regard to climate, soil, farm type etc.						X	X	X	X				
Collect isolates from these sites and map the sites with regard to diseased trees.						X	X	X	X	X	X	X	X
Send isolates to CABI for storage and for molecular work (marker assisted epidemiology)									X	X	X	X	X
Start to describe the spatio-temporal spread of the disease.													
4. Pathogen variation (WP1 INCO and DFID-CPP)	Sub-Project 2/3												
Collect isolates from sites in all areas in Uganda & from various parts of coffee trees.			X	X	X	X	X	X					
Collect isolates from alternative hosts such as bananas and weeds in coffee fields.			X	X	X	X	X	X					
Dispatch to CABI for pathogen population diversity studies									X	X			
Describe the fungal life cycle asexual and sexual phases.					X	X	X	X	X	X	X	X	X

DRAFT WORKPLANS FOR UGANDA

YEAR ONE

MONTH

COMPONENT 1 ORIGINAL PROPOSAL (SCIENCE)		1	2	3	4	5	6	7	8	9	10	11	12
<i>5. Interaction between pathogen variation and disease resistance</i>													
(WP1 INCO) Evaluation of variability in isolates aggressiveness using standardized tests.									X	X	X	X	X
(WP2 INCO) Identify isolates of <i>Fusarium</i> representing wide range host susceptibility/resistance in screening tests													X
(WP2 INCO) Field trials prepared and set up to evaluate inoculation methods.	Sub-Project 2	X	X	X	X	X	X	X	X	X	X	X	X
(WP3 INCO) Identify sources of resistance through field assessments.													X
Collect seeds from genotypes representing the available germplasm.									X	X	X	X	X
Visit coffee plantations in affected regions and look for immune trees.						X	X	X	X	X	X	X	X
Collect seeds and cuttings and dispatch to local nurseries and European laboratories for screening.						X	X	X	X	X	X	X	X

DRAFT WORKPLANS FOR UGANDA

YEAR ONE

MONTH

COMPONENT 2 ORIGINAL PROPOSAL - TRAINING		1	2	3	4	5	6	7	8	9	10	11	12
<i>1. Training for extensionists</i>	Sub-Project 4												
Preparation of materials - TBC													
Development of curricula for training - TBC													
Training of extension staff - TBC													
Information developed for radio broadcasts - TBC													
Radio broadcasts planned and implemented - TBC													
<i>2. Training for farmers</i>													
Raising awareness of the disease (radio, leaflets etc) - TBC													
Identifying farmer groups - TBC													
Developing of curricula for farmers - TBC													

Annex 6 – Summary of Workshop Presentations and Discussions

Session 1: Welcome & Overview of Coffee Wilt Project to Date

Chairpersons – Mr. Denis Seudieu (ICO) &
Dr. Dinah Masaba (CRF)

Item 1 - Welcome Address – Mr. Dennis Rangi (CABI Bioscience ARC)

Dennis Rangi welcomed the participants to the meeting. He was optimistic that with continued support from the countries affected by wilt, the elimination of the disease was possible. Mr. Rangi thanked the organisations and collaborators who have been in the forefront of the fight against this disease, including the Common Fund for Commodities (CFC), International Coffee Organisation (ICO), the European Union (EU), CABI (Project Executing Agency), CIRAD (Assisting Agency) and the various National Coffee Research Systems (NCRS) in the ASARECA region, whose advice and support show their commitment to improving coffee production in their countries through the control of coffee wilt.

Mr Rangi emphasized the value of coffee as a cash crop within the African continent. However, he noted how over the years the coffee industry has been adversely affected by civil strife, natural disasters and internal wrangles slowing the improvement and production of coffee. He noted that it is the smallholder farmer who is mostly affected by these negative aspects, and yet it is this very farmer whose livelihood depends on coffee.

Coffee is central to the economy of many countries in this region of Africa. For example, in Uganda, the President recently recognised the important role of coffee when he stated that coffee farmers were leaders in the country's economic recovery. In Tanzania, the government's plan to embark on a nation-wide survey, in a move aimed at salvaging the ailing industry, is a clear indication of the priority that the government has decided to accord the industry in order to revive coffee production. In Ethiopia, coffee is referred to as 'the backbone of the economy' and, recently, the state owned Coffee and Tea Development Authority stated that the crop earned the country US\$ 55.8 million (July-September 2000).

In launching the coffee wilt projects a milestone in the fight against the disease had been reached, and this meeting was a crucial step towards the elimination of Tracheomyces within the continent. However, this will only be possible if there is sufficient political will.

CABI has over the years been involved in the development of both this project and that of the **Coffee Research Network (CORNET)**. This, he noted was due to CABI staff's expertise and knowledge of the coffee sector.

In conclusion, Dennis Rangi thanked the CFC for their financial assistance and acknowledged the support of the EU and ASARECA and stated that although controlling the coffee wilt disease is not an easy goal, it is achievable.

Item 2 - Coffee in Africa – Madame Josefa Sacko (IACO)

Madame Sacko provided an overview of coffee in Africa – its history, current activities and how InterAfrican Coffee Organization (IACO) was formed. It became clear that following the sudden increase in coffee production at the end of the Second World War, there was a need for African countries to join together to deal with coffee problems on a regional level as well as defend African producers interests at international fora. Thus on 7th December 1960 IACO was officially founded by 11 countries in Tananarive, Madagascar. Today IACO has a membership of 25 countries and its main objectives include:

- The creation of a forum for members to discuss and exchange issues related to coffee
- The need to have a united policy on marketing coffee
- Improvement of the African coffee industry and the promotion of coffee consumption through national, regional as well as international bodies

It was, however, noted that there were many challenges ahead facing IACO, and it was emphasized that there is need for increased co-operation between the coffee producing countries in Africa and networks such as ASARECA and ACRN so as to strengthen research.

Item 3 - Coffee Wilt in Africa: The Evolution of the Coffee Wilt Project – Dr. Julie Flood (CABI Bioscience UKC)

Tracheomycosis (Coffee Wilt Disease) was first observed in *Coffea excelsa* in the Central Africa Republic in 1927, and has been known for over 70 years. In the 1940s and 1950's, the disease spread to Côte D'Ivoire, infecting *Coffea canephora*, and to Ethiopia, infecting *Coffea arabica*.

One crucial characteristic of wilt, which differentiates it from many other coffee diseases, is its ability to kill coffee trees once infected. A well-maintained plantation of 280 hectares in Central African Republic was completely destroyed by wilt in one year. Plantations of 1500 and 2000 hectares in Grand Lahoo and Bingerville were completely destroyed and the variety L'Indénié completely disappeared.



Figure 1 – Coffee plantation affected by Tracheomycosis

Over a period of 25-35 years in the immediate post-War period, the impact of coffee wilt was felt as it destroyed millions of coffee trees throughout Africa. In an effort to contain the spread of the disease, it was agreed during an International Conference held in 1956 that

all affected coffee plants be eliminated and resistance be investigated both in wild populations and in cultivated varieties. Following the implementation of recommended phytosanitary strategies, coffee wilt became considered a minor disease.

However, the disease had actually re-surfaced in the late 1970's in North Eastern Zaire (now DRC), and had become a widespread problem around the town of Isiro by 1986. The disease spread down through a corridor of Robusta coffee which stretches from Mambasa to Komanda to Beni over the next two years and by 1992 was widespread in that region.

By 1993, coffee wilt was reported in Bundibugyo district (approximately 100 km from Beni) and Rukungiri Districts of South Western Uganda.

OZACAF (Office Zaireois du Café) prepared a detailed report during 1995 for the International Coffee Organisation (ICO) which outlined the extent of the problem and its effects on the economy of N. E. Zaire.

In March 1996, ICO facilitated contact between OZACAF and CABI Bioscience and OZACAF requested CABI to send a plant pathologist to Zaire to prepare an independent report on the nature and extent of the problem. A survey was undertaken in 1996/7 in both Zaire and Uganda by Dr. J. Flood of CABI Bioscience at the request of the ICO in conjunction with OZACAF (Zaire) and COREC/UCDA/MAIFF in Uganda, which found the following:

- In N.E. Zaire up to 90% of affected small-holder trees had died;
- In Uganda 12 of 27 districts were affected in 1997;
- In DRC and Uganda only Robusta coffee had been attacked. The assumption being that Arabica in Uganda and elsewhere was safe;
- However, in Ethiopia, Arabica coffee is attacked, a different strain is may affect Arabica; this host specialization requires confirmation.

A chronology of events tracing the development of the project from the 1996/7 surveys to the present workshop was then presented by Dr. Flood (please refer to Annex 4 of this Report). Finally, the role of Project Co-ordinator was officially handed from Dr. Flood to Dr. Oduor of CABI Bioscience's African Regional Centre.

Item 4 - Regional Coffee Wilt Project: Objectives, Activities & Role of CABI – Dr. George Oduor (CABI Bioscience ARC)

Dr. George Oduor, taking over in the role of Coffee Wilt Programme Co-ordinator from Dr. Julie Flood, described the regional Coffee Wilt Programme, approved by the CFC, highlighting the various objectives, activities and CABI Bioscience's role. The International Coffee Organisation (ICO) is designated as the supervisory body, with CABI as the Project Executing Agency (PEA) and CIRAD as the Assisting Agency (AA) to the CFC project component. Various National Coffee Research Systems are involved including Uganda (CORI), the Democratic Republic of Congo (ONC), Ethiopia (EARO), Rwanda (ISAR), Tanzania (LARTI), Côte D'Ivoire (CNRA) and Cameroun (IRAD).

In the original Project Proposal there were two components to the Programme, viz., (i) to develop improved technologies for the management of coffee wilt disease and, (ii) to train farmers and extension workers, and subsequently disseminate research

findings. This component set is still technically valid, as are the main objectives that are to:

- Establish a coherent project co-ordination system
- Gather information on environmental and agronomic factors that influence disease incidence and severity
- Identify socio-economic and technical constraints to coffee wilt management
- Study coffee wilt disease epidemiology
- Determine the interaction between pathogen variation and disease resistance
- Evaluate different coffee wilt management strategies in on-farm trials
- Adapt control measures to suit local farmer situations
- Improve knowledge of farmers & extension workers on coffee wilt and management options
- Disseminate research findings

CABI's role as the Project Executing Agency will cover the following areas:

- Provide technical input into surveys
- Identify socio-economic and technical constraints to wilt management
- Develop techniques for establishing pathogen identity, spread and survival using molecular techniques
- Train farmers, extension workers and scientists, and disseminate information
- Prepare work plans and budgets with partners, and administer project finances
- Co-ordinate national counterparts' project activities in collaboration with NCRS'
- Produce progress reports

Without prejudice to subsequent sections of this report, Dr. Oduor outlined the broad sweep of the Wilt Programme in his presentation, the detail of which has been subsequently reviewed to take into account the concerns outlined in the Introduction above.

Item 5 - Overview of CFC and Coffee – Mr. Caleb Dengu (CFC)

Mr. Caleb Dengu provided an overview of the Common Fund for Commodities (CFC) and its role in coffee. The CFC is an intergovernmental development finance institute established 11 years ago, which currently has over 104 countries and 3 regional organisations as members. The Fund's mandate is mainly to assist developing countries that are commodity-dependent to advance economically, improve their structural market conditions and to enhance the long-term competitiveness and prospects of particular commodities. The Fund's approach is based on a commodity rather than country focus, which enables projects under CFC funding to address general commodity problems affecting several countries simultaneously.

It was noted that this was the right forum to discuss critical issues related to coffee production, processing and marketing. However, it was pointed out that while the Coffee Wilt project focused on a particular problem, it was not always easy to separate a particular issue from the rest of coffee politics. There was, therefore, need for this meeting to come up with a way which would maximize the income of small-holder coffee farmers by introducing highly effective but affordable technologies for controlling the coffee wilt disease. Current coffee projects supported by CFC provide a clear insight into the different problems affecting coffee production and the regions that are affected. Current projects include:

- Development of Gourmet Coffee
- Study of the Marketing and Trading Policies and Systems in Selected Coffee Producing Countries
- Coffee Market Development and Trade Promotion in Eastern & Southern Africa
- Enhancement of Quality in Coffee through Prevention of Mould Formation
- Improvement of Coffee Production by Control of Coffee Wilt Disease
- Pilot Rehabilitation of Coffee Plantation into Small Family Production Units in Angola
- Workshop on Input Credit to Small & Medium Scale Coffee Farmers

Session 2:

Roles of Participating Organisations & Country Reports

Chairperson – Prof. J. Mukiibi (NARO)

Item 6 - Coffee Wilt Project – Roles of Participating Regional and International Organizations

6.1 - Coffee Wilt Disease: Role of the International Coffee Organization - Denis Seudieu

Denis Seudieu gave an overview of the role of the International Coffee Organisation (ICO), highlighting its collaboration with CFC and its activities vis-à-vis the coffee wilt project. One of ICO's primary concerns is to work for a healthy world economy through international co-operation. The ICO recognises that primary commodities play a vital role in Africa as they are a means of employment and a source of livelihood for many people. It was noted that the ICO is the world's designated commodity body for coffee whose responsibilities include the formal submitting of projects to the Common Fund for Commodities for approval.

Regarding the coffee wilt project, it was noted that together with the expertise from CABI and CIRAD, ICO has equally played a proactive role in the preparation and submission of the coffee wilt project. It was through ICO following ACRN's initiative that Dr. Julie Flood was able to undertake surveys in DRC in 1996 and Uganda in 1997.

CABI's and CFC's efforts in getting the project started were acknowledged. To conclude, African coffee producing countries were urged to seize opportunities for loans provided by CFC for their countries' development needs.

6.2 - EU Perspective - Yves Gillet

Yves Gillet, the EU Representative in Uganda, presented the EU's position on funding for the Coffee Wilt Project. It was noted that there were delays in the wilt project due to lack of commitment of collaborating countries, whose political leaders underestimated the seriousness of the disease. Mr. Gillet posed the following questions:

- Do the affected countries have a clear knowledge of the seriousness of the wilt in their respective countries and, given this, are the objectives to combat the disease perhaps too ambitious?
- What is the impact of the disease on the economies of the affected countries? There is a need to allocate funds by the countries to contain the problem.
- Do we have any practical immediate solutions to extend to farmers? Is there a consensus on what to do and when?
- What is the involvement of the current partners? There is clearly a need for more involvement and the EU feels that earnings from the coffee should be channelled back to research to support agricultural research in the region.
- The EU will channel its support through the ASARECA regional network.

It was further noted that:

- The overall objective of the EU is primarily poverty alleviation. In the ASARECA region, coffee is grown by a large number of small-scale farmers, for whom it provides the only source of income. This in turn explains why the issue of the Coffee Wilt Disease is extremely important and thus, smallholder coffee production fits the EU profile to support and justify funding for the project.
- Furthermore it was noted that European Development Funds (EDF) could be either National Indicative Programme (for individual countries) or Regional Indicative Programme (for regions, and these could be channelled through regional bodies like ASARECA). STABEX funds are another possible source of project funding, although project countries need to provide more than just a letter of intent from their ministries of finance to prove that STABEX funds have been committed to project activities.

Mr. Gillet proposed that the originally constructed CFC Wilt Project now be split into two or more independent Sub-Projects under a regional Coffee Wilt Programme. These should be funded from individual donors as far as possible, but with a clear regional co-ordination from a specialised institution like CABI.

6.3 - Role of African Coffee Research Network (ACRN) - Ronald J. Onzima

Mr. Onzima gave an overview of ACRN's role in the implementation of the coffee wilt project. It was noted that through ACRN's initiative, the wilt project was formulated and this led to a workshop which identified other collaborating agencies, i.e. CABI, CIRAD, ICO, EU, CFC, CIFC, IRD (ORSTOM), ASIC including National Boards and Research institutions. Current studies and literature point to diseases and pests as the major causes that have led to yield/crop losses with wilt becoming more prevalent and the level of disease more severe. It was noted that ACRN has been involved in many collaborative achievements with other research institutions and organisations including NARS. In areas of dissemination, ACRN is involved in activities to provide project outputs to vulnerable coffee growing countries in Africa. In countries like Angola, Central Africa Republic, Kenya, Malawi, Zambia and Zimbabwe the focus is on preventive measures. ACRN is also charged with the task of sensitising and creating awareness of coffee wilt in the affected countries as a means of containing the spread, and at the same time encouraging the necessary application of coffee wilt disease control measures through:

- Short-term regional training
- Exchange of information
- Exchange of scientific visits
- Re-inforcement of regional plant quarantines
- Phytosanitary and disease surveillance including management practices

It was agreed that with the dissemination of project outputs, the rapid spread of coffee wilt epidemic in Africa will be reduced, thereby leading to both the sustainability of coffee production and marketing of good quality coffee which will result in an increase in income for the small-holder coffee farmer.

6.4 - ASARECA: An Overview – Geoffrey Mrema

ASARECA was established in 1994 through a series of consultations, which evolved into a formal association, with a secretariat based in Entebbe, Uganda. At the time of its establishment in 1994, there was a limited implementation programme through the first generation networks which had been brought under the umbrella of ASARECA. These were:

- PRAPACE (potatoes and sweet potatoes)
- AFRENA (agro-forestry)
- EARRNET (root crops)
- ECABREN (beans)

Subsequently, a three-year operational framework was approved at the 5th Committee of Directors meeting held in Entebbe in 1996 for the period 1997 to 1999. Development of an implementation framework for the strategic plan in 1997 to date was laid out. A 3rd phase covering the period 2000 - 2004 was to have taken place last year to consolidate the achievements of phases 1 and 2 respectively.

The CORNET network (coffee) is one of the commodity based ASARECA networks which was approved as a 3rd generation network, with CABI-ARC as the implementing agency. In November 2000 ASARECA issued a letter of support for the Coffee Wilt Project to receive funds once the Regional Agricultural Research Programme was approved by EU.

6.5 - Role of Coffee Research Network (CORNET) in the Coffee Wilt Project – Dinah Masaba

Dinah Masaba gave an insight into the activities of CORNET (the Coffee Research Network under ASARECA) and emphasized CORNET's importance in addressing researchable constraints which cross national boundaries, as in the case of coffee wilt. It was noted that co-ordination among the regional networks was vital for CORNET'S success towards achieving its goal. CORNET aims for a sustainable increase in coffee production, productivity and profitability leading to increased incomes for farmers. This will contribute to poverty alleviation through economic growth. CORNET's other objectives include:

- The establishment of a training programme for NCRS scientists
- Developing an information exchange mechanism for the dissemination of research findings to other countries in the region.

6.6 - CIRAD-CP Programme Café – Proposed Contribution to Coffee Wilt Disease - Dominique Berry

CIRAD, as the assisting agency in the Coffee Wilt Disease Project, is to co-ordinate INCO-DEV (EU) funds whose partners comprise CABI-UKC, Louvain Catholic University of Belgium, NARO/CORI of Uganda and FACAGRO of Democratic Republic of Congo. CIRAD is also expected to assist CABI in its role as the Project Executing Agency as well as the participating institutions. Other areas that CIRAD is expected to cover include:

- Remote sensing survey of the coffee wilt disease in the region
- Position for a visiting Ugandan socio-economist for a period of 19 months

6.7 - Enhancing Use of Coffee Germplasm: An African Perspective - Ehsan Dulloo

Ehsan Dulloo, a germplasm conservation scientist working with IPGRI, gave a presentation on enhancing the use of coffee germplasm. It was noted that in relation to the coffee wilt disease, enhancing production of quality coffee in Sub-Saharan Africa through conservation and use of improved germplasm would improve the welfare of both coffee small-holders and countries.

Item 7 - Presentations from Participating NARS

7.1 - Status of Coffee Wilt in Uganda - Dennis Kyetere

Dennis Kyetere (Director of Coffee Research Institute) gave a brief history of coffee wilt disease in Uganda. Coffee wilt was first reported in Uganda in 1993 in the district of Bundibugyo and the severity of the spread of the disease was worrying, with 22 out of the 30 coffee growing districts currently affected. As with other coffee growing countries in the region, coffee plays a vital role in the national economy of Uganda and its production is seen as one of the key methods of poverty eradication.

The seriousness of the disease, which has claimed about 9 million trees countrywide, is still seen as a big challenge and led to the formulation of a national strategy and action plan spearheaded by the National Agricultural Research Organisation (NARO). A National Research Programme was also formulated and implemented in 1997, whose overall objective was to control the epidemic of coffee wilt and restore coffee production in the country. Various activities were also put in place to ascertain the impact of CWD on the national economy and on the lives of the farmer. To stop the spread of the disease, one of the major activities implemented has involved the introduction of coffee trees in traditionally non-coffee producing areas. The programme is also expected to create awareness of the importance of control measures of coffee wilt disease to stakeholders.

7.2 - Significance of Coffee Vascular Wilt Disease in Ethiopia – Taeme Gebrezgi

Teame Gebrezgi gave a brief outline of the importance of the coffee wilt disease in Ethiopia. It was pointed out that coffee plays a very important role in the national economy but in spite of favourable factors, the yield was not as high as it should be, and this can be attributed to constraints such as diseases and pests. It was noted that the importance of Coffee Wilt Disease was only seen in economic terms but whereas in the past, CWD was considered a minor threat in Ethiopia, it was rapidly gaining importance, especially within coffee plantations and research centres, with an increased loss of coffee trees. In recognition of the serious threat now posed to the coffee industry in Ethiopia, and as part of the fight against the wilt, the government had recently commissioned a nationwide survey to determine the extent of the

damage. Extensive studies into wilt are also being carried out, and results are expected to help to address the situation.

7.3 - Coffee Wilt in Rwanda – Jean Baptiste Muhinyuza

Jean Baptist Muhinyuza reported that the presence of an unidentified coffee disease was first reported in the Lake Kivu area in 1999. Although subsequent surveys in other areas did not positively identify the disease as wilt, all the symptoms were synonymous with those of Coffee Wilt. What is evident from the studies carried out between 1991 and 2000 is that the disease is spreading rapidly and over a wide area. In 2000, samples of diseased coffee were submitted to CABI-UK Centre for further evaluation, but were not positively identified as being *Fusarium xylaroides*.

7.4 - Coffee Wilt Disease in Democratic Republic of Congo – Jean Kalenda Mukuna

Jean K. Mukuna gave a presentation on the history and current situation regarding Coffee Wilt Disease in the Democratic Republic of Congo. Coffee Wilt is one of the major factors that have led to a decline in coffee production and loss in quality. It was noted that the disease, which is now deeply entrenched in the country, was first reported in the 1940s and 1950s. The severity of the outbreak led to a high mortality of coffee trees.

The disease re-surfaced in 1986 in the N.E. of the country and spread southwards. It is now firmly entrenched in the Provinces of Kivu, Haut Congo and Equateur. This outbreak led the DRC to look into its research potential and expertise so as to come up with a new strategy to combat the spread of coffee wilt. Some of the activities included general surveys on epidemiology to evaluate the level of infection and analysis of wilt progression in the affected areas. This survey indicated that the disease originated from the Nepoko valley, and recent surveys indicate the spread of coffee wilt in the region of Bas-Congo (near to Kinshasa). Following the survey, the Democratic Republic of Congo has put the following control measures in place:

- Organisation & establishment of a team for mechanical control of the disease in a limited area with a restricted personnel
- Training sessions of groups who visit coffee growing areas to train farmers on ways of identifying coffee wilt at an early stage before infection sets in
- The uprooting and *in situ* burning of diseased plants
- Distribution of an identification guide booklet

Surveys have not yet been carried out in other areas (namely Bumba and Ikele) due to lack of funds and personnel, and the programme has also been stopped in North Kivu and Eastern Province due to the current military situation.

7.5 - Presentation on Coffee Wilt Disease in Tanzania - Deudesdit Kilambo

Deudesdit Kilambo gave a presentation on coffee wilt situation in Tanzania highlighting wilt occurrences, the current situation and future strategies to control coffee wilt disease. The disease was first reported in Northern Tanzania as early as the 1930s. At the time, control measures put into place laid emphasis on proper management,

farmer training and creating awareness. As with other coffee growing countries in the region, coffee plays a very important role in the economy of Tanzania and is the leading foreign exchange earner in the country representing about a third of the country's foreign exchange. It also accounts for 20% of the domestic exports with 420,000 small holder farmers dependant on the commodity as a major source of income.

However, it was not until the 1980s that the focus shifted from Coffee Berry Disease and Leaf Rust as disease problems to Coffee Wilt, which started to be seen as a threat to coffee production. Coffee production in Tanzania has, over the last ten years, been on the decline and this is attributed to the general ageing of trees, poor management as well as pests and diseases. It was noted that Coffee Wilt Disease is increasingly becoming of economic importance. To correct the situation, it was agreed that:

- Research programmes be put in place and surveys carried out with a view to establishing the extent of the disease severity
- Coffee resistant to *Fusarium* and other pathogenic species be evaluated
- Farmers should be provided with information to assist them identify the symptoms of Coffee Wilt. It was recommended that this training be conducted at research centres at Lyamungu, Ugano and Maruku.

Session 3:

CFC Workplans and Budgets

Item 8 – CFC Workplans and Budgets

These are discussed in the main report under the section above entitled 'CFC Sub-Project Workplans and Budgets'.

Session 4:

CFC Administrative & Financial Procedures

Item 9 – CFC Administrative and Financial Procedures Training

Mr. Caleb Dengu (CFC) outlined the broad project financial operating procedures of the CFC. This was followed by a training session in which Mr. Julius Jackson (CABI-UKC):

1. Showed the functional administrative relationship between CABI Bioscience, the Project Executing Agency (PEA), Participating Institutions (PI) and the CFC
2. Familiarised Project Administrators with CFC disbursement and funding processes covering:
 - Purchasing procedures
 - Preparing a reimbursement claim
 - Audit requirements
 - Reporting requirements
 - Withdrawal procedures
 - Copy documentation requirements
 - Budgetary control procedures
 - Tax and duty exemptions
3. Reiterated those requirements that are still outstanding for each country before CFC funds could be disbursed (please refer to previous section for details)

Each participating country was provided with an individualised information pack containing hardcopies of the CFC Financial Procedures Manual, relevant administrative and financial forms, copy of the presentation and a CD-ROM containing all the above information electronically. Further copies of this information are available upon request from CABI-UKC.