Enhancement of Coffee Quality through the Prevention of Mould Formation

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Final Management Report

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This project was funded with grants from the Common Fund for Commodities and the Government of the Netherlands, and support from the European coffee industry.

It was implemented under the supervision of the International Coffee Organization, and executed on behalf of the above by the Food Quality and Standards Service of the Food and Agriculture Organization of the United Nations.

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Acknowledgements

Many people have been involved in the development and implementation of this project, and it would probably be unwise to try and acknowledge them all individually for fear of omission.

However, we would like to thank all of our counterparts in participating countries, the various national and international project consultants and colleagues in the coffee industry for their hard work, patience and resilience over the past few years – the project would not have been completed without them.

FAO, Rome, May 2006

Abbreviations and Acronyms

AEKI	Indonesian Coffee Exporter's Association
AGMARK	Agriculture Produce (Grading & Marketing) Act (India)
AGNS	Food Quality and Standards Service, FAO (after 1st January 2006)
ANECAFÉ	Asociacion Nacional de Exportadores de Café (Ecuador)
APEDA	Agricultural and Processes Food Products Export Development Authority (India)
ASIC	Association Scientifique Internationale du Café
A_w	Water activity
BIS	Bureau of Indian Standards
CBB	Coffee Berry Borer
CBD	Coffee Berry Disease
CBI	Coffee Board of India
CBK	Coffee Board of Kenya
CCFAC	Codex Committee of Food Additives and Contaminants
CCP(s)	Critical Control Point(s)
CENICAFÉ	Centro Nacional de Investigaciones de Café (Colombia)
cfu	Colony Forming Units
CI(s)	Collaborating Institution(s)
CIRAD	Centre de coopération Internationale en Recherche Agronomique pour le Développement (France)
CMB	Coffee Marketing Board
CNRA	Centre National de Recherche Agronomique (Côte d'Ivoire)
CORI	Coffee Research Institute (Uganda)
CRF	Coffee Research Foundation (Kenya)
CTO	Chief Technical Officer

db	Dry Basis (when referring to moisture content)
DTU	Danish Technological University
EAFCA	East African Fine Coffees Association
EC	European Commission
ECF	European Coffee Federation
EDABO	Portuguese acronym for DEWOB - Direct Evaporation of Water in Oil Bath
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária (Brazil)
ERH	Equilibrium Relative Humidity
ESNS	Food Quality and Standards Service, FAO (prior to 1st January 2006)
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FAQ	Fair Average Quality (unsorted, hulled green coffee)
FOB	Free On Board
FUNARBE	Fundação Arthur Bernardes (Brazil)
FY	Financial Year
GAP	Good Agricultural Practice
GHP	Good Hygienic Practice
GMP	Good Manufacturing Practice
GPS	Global Positioning System
HACCP	Hazards Analysis and Critical Control Points
HPLC	High Pressure Liquid Chromatography
IACO	InterAfrican Coffee Organization
ICA	International Coffee Agreement
ICO	International Coffee Organization
ICCRI	Indonesian Coffee Cocoa Research Institute
ICT	Information and Communications Technology

ILSI	International Life Sciences Institute
IPM	Integrated Pest Management
IPSM	Integrated Phytosanitary Management
ISIC	Institute for Scientific Information on Coffee
ISO	International Standards Organization
ITAL	Instituto de Tecnologia de Alimentos (Brazil)
ITIPAT	l'Institut pour la Transformation et l'Industrialisation des Produits Agricoles Tropicaux (Côte d'Ivoire)
JECFA	Joint FAO/WHO Expert Committee on Food Additives and Contaminants
KCC	Kenya Coffee College
KCTA	Kenya Coffee Traders Association
KEBS	Kenya Bureau of Standards
KEPHIS	Kenya Plant Health Inspectorate Service
KIRDI	Kenya Industrial Research and Development Institute
LAB	Lactic Acid Bacteria
LACQSA	Laboratório de Controle de Qualidade de Segurança Alimentar (Brazil)
LCs	Local Councils
LGA	Local Government Act
LoA	Letter of Agreement
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries (Uganda)
MAPA	Ministério da Agricultura, Pecuária e Abastecimento (Brazil)
m.c.	Moisture Content
MRS	De Man, Rogosa and Sharpe (medium)
MOB	Portuguese acronym for Official Brazilian Method (for measurement of moisture content in coffee)
MoU	Memorandum of Understanding
NAADS	National Agricultural Advisory Services

NARO	National Agricultural Research Organization (Uganda)
NGO(s)	Non Governmental Organization(s)
NMR	Nuclear Magnetic Resonance
NUCAFE	National Union of Coffee Agribusiness and Farm Enterprises (Uganda)
OTA	Ochratoxin A
PEA	Project Executing Agency (FAO)
PFA	Prevention of Food Adulteration Act (India)
PMA	Plan for Modernization of Agriculture
ppb	Parts Per Billion
PROMECAFÉ	Programa Cooperativo Regional para el Desarrollo Tecnológico de la Caficultura en Centroamérica, Panamá, República Dominicana y Jamaica
RDC(s)	Resident District Commissioner(s)
RH	Relative Humidity
s.d.	Standard Deviation
SB	Soft Bean
SB	Supervisory Body (ICO)
SPS	Sanitary and Phytosanitary Measures
TCP	Technical Cooperation Programme (FAO)
TLC	Thin Layer Chromatography
ToT	Training of Trainers'
UCDA	Uganda Coffee Development Authority
UCTF	Uganda Coffee Trade Federation
UFLA	Universidade Federal de Lavras (Brazil)
UFV	Universidade Federal de Viçosa (Brazil)
UN	United Nations
UNBS	Uganda National Bureau of Standards
UNDP	United Nations Development Programme

USAID	United States Agency for International Development
UV	Ultra Violet
wb	Wet Basis (when referring to moisture content), also termed 'as is'
WCC	World Coffee Conference
WFP	World Food Programme (UN)
WTO	World Trade Organization

Project Summary

Project Title:	Enhancement of Coffee Quality through the Prevention of Mould Formation
Project Descriptor:	CFC/ICO/06 and GCP/INT/743/CFC
Project Executing Agency (PEA):	Food Quality and Standards Service, Food and Agriculture Organization (FAO)
Location:	Brazil, Colombia, Côte d'Ivoire, India, Indonesia, Kenya, Uganda, CIRAD (Montpellier), University of Surrey (UK) Ecuador (Project CFC/ICO/25FT)
Starting Date:	13th September 2000 (Disbursement of Authorised Allocation by CFC)
Completion Date:	October 31st 2005 (CFC Funds)[1] October 31st 2005 (Dutch Govt. Funds)[2]
Total Project Cost:	US$6,242,000
CFC Financing (Grant):	US$2,526,000 (under CFC/ICO/02), and US$60,000 (under CFC/ICO/25FT)
Co-financing (Grant):	European coffee industry (ISIC) - US$367,000 Dutch Government - US$1,500,000
Counterpart Contributions:	CIRAD - US$200,000 EMBRAPA (Brazil), Cenicafé (Colombia), CNRA (Côte d'Ivoire), CBI (India), ICCRI(Indonesia), CRF (Kenya), UCDA (Uganda) US$227,000 each (US$1,589,000 total)

[1] CFC funds available for disbursement until 31st May 2006.
[2] Dutch Govt. funds available for disbursement until 31st March 2006.

1. Introduction

This project, from its origins in a pilot project in the second half of the 1990s, to its conclusion in 2005, spanned a period of massive upheaval, difficulty and change in the coffee world.

Indeed, these few years have probably seen the global coffee industry transformed forever. This period has certainly had a marked impact on coffee farmers and their families, farmer extension services, coffee research authorities and institutes, as well as on the technical services and support that they provide.

Although this management report is not the place for a detailed analysis on the causes and factors behind the recent 'coffee crisis', it is nevertheless instructive to outline the context in which the project operated from the outset. Some of the issues encountered in implementing a research and capacity building project across seven countries and three continents invariably stemmed from the global coffee situation. Additionally, some of the original project targets, or assumed project outcomes, were based on assumptions vis-à-vis the world coffee market which no longer held true over the course of project implementation.

Coffee price volatility has historically been a fact of life (e.g. due to weather events in Brazil), and it is not the sole source of the recent crisis. It is clear, however, that significant structural changes in coffee markets in recent years are creating new paradigms which will have both permanent and significant effects on the livelihoods of millions of coffee farmers and their families – and which will also, indirectly, influence how effectively projects such as this can be implemented and followed-up.

The years 2000 to 2004 were characterised by historically low prices for green coffee, which are only now (albeit to a modest degree) being reversed. When this project initiated activities on the ground during the early 2000s, the international price for green coffee was at its lowest level (in real terms) for more than a century. Indeed, "...this level was even lower than that reached in the worst previous conjuncture (after the First and before the Second World War."[3] Between 1980 and 1989 (i.e. before the collapse of the International Coffee Agreement (ICA)) the ICO Composite Indicator Price for coffee averaged 127.92 US cents per lb. In the five years between 2000 and 2004 the average price had dropped to 54.33 US cents per lb.

The impact of this decline in value on coffee farmers and producer countries has been well documented. Obviously, the consequences of the crisis in each country and region have been different according to the structure of the industry in the country concerned. At the height of the crisis Oxfam[4] reported cases in Uganda where coffee farming families were unable to pay to send their children to school. In El Salvador, the World Food Programme distributed emergency food rations for 10,000 coffee farming families. Karnataka in India saw a 20% drop in the number of plantation

[3] Daviron, B. & Ponte, S. 2006. *The coffee paradox: global markets, commodity trade and the elusive promise of development*. Zed Books: London. p.113.
[4] Oxfam International. 2002. *Mugged: poverty in your coffee cup*. London.

workers between 2000 and 2002[5]. At a macro level, the ICO[6] estimated that for several countries in Africa, Asia and Latin America, where coffee accounts for a high percentage of export earnings, losses in earnings from coffee exceeded aid inflows in value terms during this period.

There are, of course, a number of factors behind the recent crisis, and the causes of it are complex. Clearly supply outstripping demand in the global coffee market over successive coffee seasons has been significant – one of the causes of which, ironically, was the drive to increase export earnings under market reform strategies. Other factors include the collapse of the ICA system which, although it had its problems, was at least successful in raising and stabilising coffee prices. It is also evident in the liberalization of domestic coffee markets, and in the recent concentration of roasters and international traders "...that has led to a situation of oligopoly"[7].

Furthermore, market liberalization in producing countries resulted in the breakdown of quality control measures in the domestic trade, and in declining overall levels of coffee quality. Lower prices, combined with reduced access to credit for smallholders as support systems collapsed, resulted in lower inputs by producers.

The point being made here, from a project management perspective, is that the years coinciding with project implementation on the ground were the very years in which coffee-producing countries were hit hardest by a decline in prices, whatever the underlying structural or systemic reasons happened to be.

Minor, but necessary, modifications to the wording and interpretation of the original project appraisal report were proposed by the PEA, and accepted by the CFC, to reflect a more realistic and pragmatic project delivery in light of the prevailing environment. These changes involved the activities and outputs anticipated under the different objectives listed in the original Project Appraisal Report, and constituted a refinement of those activities and outputs rather than a radical alteration. Indeed, none of the alterations constituted a material or substantial change to the project's aims, nor did they require an increase in the overall budget. The project's objective remained to prevent mould formation and consequent mycotoxin contamination in coffee, and to improve the quality of the final product.[8]

Additionally, from the perspective of project coordination through national institutions in seven coffee producing countries, this period also coincided with the ongoing impact of readjustment to the post-ICA regime. Simply put, market liberalization policies weakened both domestic and international institutional frameworks. At the national level this was generally manifested in the closure of coffee institutions, or in the scaling back of their responsibilities. Combined with reduced revenues due to low prices, coffee institutions are under funded, sometimes critically, and often quite inadequate (on a number of levels) to perform the tasks expected of them under projects such as this.

[5] Business India, May 2002.
[6] ICO submission to the UN General Assembly Summit to review the Millennium Development Goals, New York, 14-16th September 2005. ICO Document ED 1966/05.
[7] Daviron, B. et al. 2006. *op. cit.* p. 121.
[8] Refer to Annex 2, 'Activities, Outputs and Objectives' where variances from the original project appraisal report are noted.

In summary, then, this was the general climate in which the project operated and was conceived. Such a backdrop undoubtedly had an impact on the way in which the project was implemented, both centrally by the PEA, and in each project country. We shall return to this during the course of the report, outlining some of the constraints and issues faced, and explain how they were addressed and overcome. These issues are also addressed, from a technical perspective, in the project's Final Technical Report.

In the first part of this report we describe the background and rationale to the project, and outline the project approval and design cycle. Next, we turn to project implementation matters, discussing the efficiency and effectiveness of project management, reporting and supervision, and indicate some lessons that should be learned for the implementation of future activities. In addition, we make some pertinent comments on institutional and staff capacity to execute this project. As noted above, a detailed Final Technical report has also been prepared as part of the final project documentation. Technical details relating to the project's activities and achievements can be found in that volume, as can a discussion of specific technical management and supervision issues.

Financial management and administration of the project is dealt with in Section 4, and covers various procurement, resource utilisation, audit and financial monitoring issues that arose during the course of the project.

Next, we summarise the key achievements and outputs of the project under various broad headings. A matrix of activities, categorised under top level project component descriptors, is also provided, detailing targets set and their status at project completion. The dissemination of project results and training material is dealt with in the penultimate Section.

The report ends by summarising key conclusions that can be drawn, and suggests various recommendations for future project design, implementation, supervision and management, based on the PEA's experiences and operational lessons learned.

2. Project Background and Rationale

At the 1996 International Life Sciences Institute (ILSI) conference on ochratoxins, the occurrence of ochratoxin A (OTA) in a number of coffee samples from various origins was reported. In addition, it was noted that neither roasting nor extraction appeared to completely eliminate this mycotoxin.

A year earlier, the Joint FAO/WHO Expert Committee on Food Additives and Contaminants (JECFA), the international body charged with evaluating health risks associated with the presence of chemical additives and contaminants in food, carried out a toxicological evaluation of OTA and concluded that it was nephrotoxic, and possibly carcinogenic, to humans.

These findings raised concern amongst consumer representatives over the potential health implications of drinking coffee, and among coffee producers, processors and distributors over the possible negative consequences of OTA contamination in coffee on trade.

In response to this, the European Coffee Federation commissioned and funded[9] a 'Pilot Study on the Prevention of Mould Formation in Coffee', completed by the Technical University of Denmark and the University of Surrey, United Kingdom. Two reports came out of this industry funded study: one by Dr. Gerrit van der Stegen on the '*Evaluation of Available Data on Ochratoxin A (OTA) in Raw Coffee*', and the other by Dr. Mick Frank entitled '*Report on a Fact Finding Pilot Study for Mould Prevention*'.

The van der Stegen report indicated that not only was OTA contamination in coffee problem a universal one concerning all origins, but that the introduction of limits on OTA in coffee imports would invariably entail an increase in rejection rates of shipments. It was projected that with a limit of 5ppb on green coffee[10], an average rejection rate of 7% of traded lots could be expected, a rate which could be as high as 18% for African producers.

While identifying that OTA contamination resulted from certain fungal species, particularly during processing and storage, the Frank report concluded that only a comprehensive prevention programme based on good practices would be effective in reducing OTA contamination in coffee. It thus appeared that certain poor harvest and post-harvest practices could lead to poor quality, off-flavoured and OTA-contaminated coffee (e.g. poor drying, re-wetting or bad storage). The focus of any intervention thus had to be on avoiding the formation of OTA in the first place.

Indeed, key stakeholders in the coffee industry, and bodies concerned with international food safety, noted that financing a physical control mechanism for OTA based at ports themselves would be far more expensive, and less effective, than financing a project to investigate prevention measures in selected countries of origin.

[9] Total cost of the pilot project was approximately US$1.25million.
[10] A limit of 5ppb on green coffee was envisaged by some coffee importing countries at the time.

It was against this background, and in order to address explicit food safety and public health concerns expressed by European regulatory authorities[11] at levels of OTA in green coffee beans and coffee products, that an initial project proposal for a global project to prevent mould formation in coffee was jointly formulated by the Food and Agriculture Organization of the United Nations (FAO), the International Coffee Organization (ICO) and the European coffee industry.

The Food Quality and Standards Service (AGNS, formerly ESNS) of FAO was selected as the Project Executing Agency (PEA), based on its expertise and international reputation in food quality and safety programme delivery. As part of the FAO programme to support countries in strengthening production systems and assure the safety of the food supply, the Food Quality and Standards Service works with government bodies, producers and the food industry in the definition and implementation of good practice recommendations, and in the development of appropriate tools to strengthen capacity building. Specifically, it also assists member countries in strengthening their capabilities to prevent and control the contamination of food by mycotoxins.

The project was designed on the fundamental premise, noted above, that any effort to reduce OTA contamination in coffee must be based on the application of good practices throughout the coffee chain to avoid the formation of OTA in the first place. Key objectives[12] of the project were:

- To understand better the factors causing mould in coffee, developing a Hazards Analysis and Critical Control Points (HACCP) based model for controlling mould formation, and determining CCPs in the coffee chain where the problem of OTA contamination of coffee is most likely to be introduced;

- To develop appropriate prevention strategies (in primary processing, drying, handling, storage etc.), with recommendations based on sound statistical and scientific information, trials and investigation;

- To apply a risk-based approach to reducing OTA contamination in coffee by introducing improved practices throughout the coffee production and processing chain;

- To promote sustainability and uptake, and thus to reduce levels of OTA contamination in coffee, through extensive capacity-building in producer countries, and to support national programmes for prevention and control of OTA-contamination of coffee.

Institutions in the following countries were selected to participate in the project: Brazil, Colombia, Côte d'Ivoire, India, Indonesia, Kenya and Uganda. In choosing seven countries across three continents, the aim was to ensure that the project covered the variety of climatic conditions and regimes under which coffee is grown and processed in order to best investigate the causes of mould formation and OTA

[11] The European Commission (EC) wanted to introduce physical limits on the levels of OTA permitted in coffee entering European ports. The development of a global project was a direct response to this concern by the EC, and, as a result of its development, the Commission agreed to a three-year moratorium before deciding on whether to impose limits or not.

[12] Refer to Annex 2 of this report for a detailed matrix of the project's overall Activities, Outputs and Objectives.

contamination, and determine which practices to avoid. Submitted for approval to the ICO, the project outline was endorsed by the ICO Executive Board in February 1997, and was recommended by the Executive Director of the ICO to the Common Fund for Commodities (CFC) for funding on 28th November 1997.

The Consultative Committee of the Common Fund for Commodities recommended the project for approval at its 22nd meeting in July 1998, and the Executive Board of the CFC approved the project on 28th October 1998. The project entered into force on November 22nd 1999, upon signature of the Project Agreement by representatives of CFC, ICO and FAO. Separate Project Implementation Agreements were concluded between FAO and each of the seven collaborating institutions[13] during 2000. Project activities commenced in January 2001[14].

[13] Empresa Brazileira de Pesquisa Agropecuária (EMBRAPA, Brazil); Centro Nacional de Investigaciones de Café (Cenicafé, Colombia); Centre National de Recherche Agronomique (CNRA, Côte d'Ivoire); Coffee Board of India (CBI, India); Indonesian Coffee and Cocoa Research Institute (ICCRI, Indonesia); Kenya Coffee Research Foundation (CRF, Kenya); Ugandan Coffee Development Authority (UCDA, Uganda).

[14] It should be noted that a FAO funded Technical Cooperation Programme (TCP) project in Uganda commenced in mid-1999 in order to initiate work on the issue. Over two phases (TCP/UGA/8923 and TCP/UGA/2801) the value of this input was US$422,000. The global project funded activities in Uganda from April 2003 onwards.

3. Project Management: perspectives and constraints

From the unique position of being PEA, and from the experience of having worked with our project collaborators for over five years, in the following Section we overview project management and supervision (both internationally and nationally), look at how adaptations were made to meet the various challenges faced during the course of project implementation, and suggest some recommendations regarding future project design and execution.

It is important to point out from the outset that a project involving seven core collaborating countries on three continents involving over fifteen institutions made for an extremely complex enterprise, and certainly presented a project management challenge.

It is, of course, inevitable that problems with the coordination and management of a project of this size and scope will have arisen at some stage. However, the important thing is not that there were problems *per se* but to examine what was done to solve them, and what measures were taken to ensure the same thing did not occur again. It is now clear that certain assumptions were made during initial project design concerning the ability of a particular management structure, and the participating national institutions themselves, to execute this project effectively. As we shall see, these assumptions were for the most part challenged, and addressed, early on during project implementation.

In reality, the project got off to what can best be described as a confused start. This was not helped by the fact that each national participating institution started its participation at a different time. This initial confusion, although perhaps overstated, can be attributed to a number of factors including:

- A lack of clear coordination at the international level, which was exacerbated by logistical difficulties and management problems at the national level;
- The fact that there were some parallel projects, either funded nationally or internationally by different donors, which were operating to different timetables and to slightly different goals and objectives;
- Administrative delays in a number of participating countries in signing the relevant paperwork and assigning resources to the project;
- National staff in many cases were unaware what was expected of them or what they could expect from the project;
- The normal problems that are inevitably experienced on all projects such as this, including staff movements, other time commitments, etc.

With hindsight it is easy to say that greater attention should have been paid to establishing realistic work plans, which dovetailed into existing national programmes and to ensuring that administrative and financial procedures were fully

developed and rolled-out during the initial project implementation phase. These are points we return to below.

Invariably, close monitoring sometimes proved difficult - be it technically, administratively or financially – but, overall, it should be noted that despite some set-backs and problems, the PEA is satisfied with how the project eventually progressed and concluded.

3.1 International project management

In macro-management terms, the project structure comprised the Project Executing Agency (the Food Quality and Standards Service of the Food and Agriculture Organization of the United Nations, based in Rome), the Supervisory Body (the International Coffee Organization, based in London), and an Advisory Board, composed of representatives from the PEA as well as the CFC, ICO, Dutch Government[15], and European coffee industry and trade[16].

The Advisory Board met at least annually, usually at the CFC headquarters in Amsterdam, to approve and review annual budgets and work plans, and to provide feedback to the PEA on project activities and direction. These annual meetings were both useful and informative, and worked well as a project oversight function, providing the PEA with valuable input and perspectives from both the project donors and the coffee industry. At this macro level, a similar structure for future project oversight can be recommended.

Close communication with members of the Advisory Board was maintained throughout the project. Specifically, the PEA submitted regular detailed 6-monthly and annual Project Progress Reports to the CFC and ICO, covering both administrative, financial, management and technical updates. In addition, presentations on project progress and activities were made by the PEA to the ICO Council at a number of biannual ICO meetings.

Overall responsibility for operational management of the project, including co-ordination and monitoring of implementation, planning, budgeting, accounts, and procurement was the direct responsibility of the PEA. A multi-disciplinary central project team was therefore put together to implement the project. Initially this comprised a Chief Technical Officer (CTO) based at FAO in Rome, and specialist international consultants, variously based at the University of Surrey in the UK, CIRAD in France and in Switzerland.

The approved project appraisal report included sufficient provision to contract a Coffee Specialist (who was also expected to act as day-to-day Project Manager), as well as a Mycologist and Coffee Production specialist. However, it did not include provision for any project administrative or co-ordination support, either at FAO or elsewhere. It became apparent during 2001 that a number of factors were mitigating against efficient daily project management and supervision:

[15] The UNDP was originally expected to be a key project co-financer, but an agreement was reached with the Dutch Government, through the Ministerie van Buitenlandse Zaken, to contribute US$1.5million to the project.
[16] Represented by the Institute for Scientific Information on Coffee (ISIC).

- The international consultant hired as Coffee Specialist/Project Manager, based in Switzerland and not a FAO staff member, was not in a position to manage the finer details of day-to-day project administration and supervision through FAO;

- The CTO based at FAO was not contracted either full-time (or even for a substantial amount of time) on the project. As a FAO staff member, the CTO was also the responsible technical officer for numerous other projects and activities, in addition to this complex, long-term multi-country project;

- Communication flows between the project team and national collaborators during 2000 and 2001 were patchy, and coordination of reporting was weak.

Despite the unimpeachable technical ability and expertise of the original central project team, the appointment of a full-time project administrator/coordinator to assist in maintaining regular contact with the field, in following up on the monitoring and reporting responsibilities of all collaborators, and to manage budgetary, contractual, financial and procurement obligations became a matter of some urgency to ensure efficient overall project management. Fortunately, this necessity was recognised early on in the life of the project. Indeed, it was a condition of the Dutch Government's agreement to provide US$1.5million co-financing to the project. A full-time project officer was duly appointed in mid-2002 for the duration of the project.

It is clear from the above that the importance of ensuring adequate project administration and support to facilitate project implementation was seriously underestimated during the initial project design and approval stages. This happens all too frequently in long-term, large-scale international projects such as this. There is an unfortunate belief that allocating funds to full-time project administration and support is somehow wasted, and unjustifiable, or that such support can be readily provided by technical staff. This is, however, a false economy, and invariably either has to be remedied once the project has started, or, if not, can contribute to poor overall project performance.

With hindsight, it would have been preferable if the differing skill-sets required by administrative and technical staff, and the time-consuming nature of administering and managing a seven country project, had been recognised at the project design stage. This is not to say that this project would not have been implemented without a dedicated PEA-based project officer, but to note that it probably wouldn't have been completed as successfully.

Budgets and work plans were developed on an annual basis by the central project team, in close discussion with each national centre, and were subject to approval from the CFC. The provision of standardised country budgets and work plans from 2003 onwards was a useful administrative step in ensuring that all project partners were as clear as possible about the work expected of them, and could focus resources available accordingly.

3.1.1 External project evaluation

A 20-day external project Mid-Term Evaluation was undertaken in Kenya and Uganda in March/April 2003 by two ICO selected consultants, Mr Mick Wheeler and Professor Ron Walker.

This coincided with a major project workshop held in Kampala, attended by all project national coordinators, which enabled the assessors to evaluate progress of the project generally, and to examine the achievements of individual participating countries. It also allowed the assessors to individually interview workshop participants to obtain detailed information on progress in their country, and to discuss any difficulties in achieving their envisaged outcomes, milestones and implementation schedules.

The final version of this report was presented to the CFC, ICO and PEA in July 2003, and specific recommendations were taken on board in planning future activities under the project. Key recommendations, all of which were subsequently addressed by the PEA, included:

- Additional investigations into transportation and the risk of OTA contamination, both nationally, and internationally;
- Finalisation of a project website as a matter of urgency;
- Completion of the establishment of laboratory facilities in Uganda and Côte d'Ivoire;
- Centralised purchasing by PEA of major items of non-expendable equipment for all project countries.

Finally, a brief word concerning post-project impact assessment and evaluation - the project Supervisory Body (SB), the ICO, in association with the CFC are due, under the relevant provisions of the original Project Appraisal Report to organise an assessment mission approximately six months following the conclusion of the project. On the basis of this, the CFC, in consultation with the ICO, will prepare an evaluation and impact assessment of the project. Naturally, the PEA looks forward to providing any assistance required.

3.2 National project management

Responsibility for the actual implementation of agreed national activities and work-plans was devolved to staff at the collaborating institutions in each of the seven project countries. Naturally, support was provided by the central project team, and technical back-up was provided the PEA and consultants through numerous field missions. It has to be said that this approach was not fully effective, but in reality it was the best option available.

The plan to leave project institutions to implement agreed annual work plans, with occasional technical back-stopping missions by the central project team was, to some extent, flawed. Arguably, this project simply involved too many actors to manage convincingly. In some cases a whole season was lost simply because work plans were

not implemented by the participating institution, sometimes for reasons unknown. With a perennial crop such as coffee, and in a project running comparative annual experimental trials, losing a season in one country can cause a serious setback to the overall work plan.

National collaborators were expected to provide full-time supervision of field trials to ensure that experimental protocols (provided by the central project team) were properly followed and that data were recorded correctly. As noted above, given the nature of coffee seasons, the project simply could not afford to loose a season through the misapplication or misunderstanding of project protocols at the national level. Unfortunately this did happen.

Clearly, in some cases an inability to implement project activities on the ground was due to unavoidable local events, beyond the control of local institutions or the PEA. In Côte d'Ivoire, the socio-political unrest that started in September 2002 and which has continued, to varying degrees, ever since, forced the cancellation of technical backstopping missions[17] and interrupted field trials. More recently, during 2004, the ongoing situation made it difficult to install HPLC equipment purchased under the project.[18] There is very little that the PEA can do to in the face of such events, except keep in contact with the national project coordinator as far as possible and provide as much support as practicable.

One of the key issues faced by the central project team was the delay in receipt of field trial results and reports. This aspect of reporting could certainly have been better, and probably should have improved more than it did over the course of the project. Delays in the delivery of this information often made it difficult for the central project team to plan follow-on activities, or guide the direction of research, as far in advance and as completely as would have been ideal.

3.2.1 Institutions – additional notes

As noted in the Introduction, market liberalization in the 1990s led to a significant weakening in formal institutional arrangements in many coffee-producing countries. In recent years, trade associations and other private bodies have only partially filled this gap.

Despite some support over the years from NGOs and donors (which is often short-term, patchy and project specific), coffee farmer support institutions dealing with research and extension basically suffer from a lack of funds and long-term investment in staff and their training. Revenues from coffee have declined alongside the international market price and this has had a dramatic impact on institutions, to varying degrees according to how their core funding is structured.

In Kenya, for example, a significant retrenchment of staff took place at the Kenyan Coffee Research Foundation (CRF) in October 2002 due to major funding cuts and income reduction – with the loss of over 70% of staff. This caused serious manpower

[17] Under FAO rules when a country is at Security Phase III or higher all non-essential missions and travel are generally suspended.
[18] The equipment supplier did not have a local installation engineer was not prepared to send one to Côte d'Ivoire owing to the security situation. – eventually a local HPLC expert was sent to Italy for training in installation at the supplier's expense.

deficiencies to the project, and forced a change in the national project coordinator. Whilst this invariably initially caused some disruption to project activities, credit must be paid to the efforts made by the CRF to offset this through the deployment of appropriate staff from other departments. In addition, financial support from the project itself helped mitigate staff shortages in implementing field trials.

The PEA recommends that collaborating institutes are subject to a rapid skills audit, as far as is practicable, before a project is finalised to determine the most appropriate activities (or training) to carry out there. This is not to suggest that they be cut out of a project, but to ensure that expectations are realistic and that support is appropriately defined and targeted at the earliest possible stage.

3.2.2 Project staff – additional notes

At all of the project collaborating centres a senior technical officer was assigned to follow project activities full-time with a direct line of communication to the central project team. It should be noted, however, that the timing of the appointment of national coordinators varied, and in a couple of cases, was not completed until 2003. Whilst this created some initial coordination problems at the start of the project, it is fair to report that there was a general improvement by national project coordinators in most areas of competence.

As noted in the Final Technical report, motivation of national project staff was often a problem encountered by the PEA. The occasionally complex and onerous workload required by the project was possibly at fault here, as was a lack of regular face-to-face contact with the central project team.

Furthermore, many national coordinators were handed the role in addition to their normal workload and responsibilities, and without sufficient consideration of the time required to implement such a project. The assignment of a senior staff member to supervise project activities on a full-time basis is essential if agreed national work plans are to be implemented in the manner and the timeframe required. A single, senior and dedicated focal point at the national centres also facilitates communication with the central project team.

It is equally imperative for large-scale research-based projects such as these, which demand a large commitment of effort in terms of practical research, that international project experts work on the ground as much as possible. Morale and the dedication - not only to do the work but to do it well - are fostered best by example, especially if it is provided by a respected outside expert.

In some collaborating institutions, the central project team also noted that there was a policy of regular staff turnover. This sometimes meant that data from consecutive seasons lacked continuity because of local in-house retraining of new students or trainees. It is critical that, as far as possible, national project staff, and especially senior staff, remain associated with the project from beginning to end in order to avoid this kind of disruption.

Additionally, pressure was sometimes brought to bear on national staff (sometimes with 'political' motivation) to divert attention from the agreed project programme and to pursue other avenues not necessarily sanctioned by the central project team.

Invariably, this caused problems, and resulted in loss of time, and expense of effort to refocus activities.

3.3 Communications

During the first couple of years of the project, communication and information flows between the national collaborators and the central project team were inadequate and patchy, and there were some serious communication gaps. We can posit a number of reasons for this, and we look at how these were resolved below. In the final years of the project communications improved greatly, due partly to investment in certain communications infrastructure by the project, but also as a result of the global project team understanding how best to interact with each other, the appointment of a project administrator/coordinator, and through the use of appropriate communications solutions.

Naturally, there is a 'bedding down' period at the start of any project as the people involved start to understand the project structure, and work out how best to communicate with each other. It is also important not to underestimate the difficulties in maintaining regular communication by telephone, fax or email with countries where infrastructure may be poor, or suffer frequent disruption.

For example, in Kenya, it was often difficult to contact the CRF by telephone or fax. In 2003 Kenya Telecom issued a statement declining to continue to provide a fixed line telephone connection to CRF, citing the rampant vandalism of telephone cables in the Ruiru area - the copper in the telephone cables were being stripped for resale. To overcome this problem the project decided to cover the costs of installation of a satellite-based wireless internet/telecom system. This undoubtedly improved communication for the rest of the project, and will also have a beneficial post-project impact.[19]

The lack of a dedicated focal point for communication between all project stakeholders at the outset was in all likelihood a factor that contributed to poor initial intra-project communication. In large part, this was remedied by the hiring in 2002 of a project administrator/coordinator based at FAO, Rome.

However, it should be noted that simple actions such as, for example, remembering to copy or reply to all the project staff necessary in emails continued to be problematic even up to the end of the project, making the task of coordination that much more complex. This may seem like a trivial detail, but frequently, by getting the smaller things right, one can avoid later problems or misunderstandings.

Communication between the central project team was generally unproblematic. However, it is worth reiterating that in any project of this complexity, it is imperative that all senior consultants and experts stick to agreed experimental approaches and protocols, or seek approval from the central project team for any changes proposed. Only in this way can one ensure that the experimental work both across and between seven countries is meaningful and 'in sync'.

[19] Annex 1 of this report lists all IT and related communications equipment purchased under the project by country.

It would appear to be that those national institutions selected to participate in the project were perhaps not as fully involved in the initial design phase of the project as would have been desirable. Indeed, a stakeholder involvement and participation strategy does not appear to have been fully developed and discussed. Equally, participating national institutions may not have been fully aware of the expectation of their institutions' involvement in, and practical commitment to, the project. This gap between the expectation of national collaborators' involvement in a project, and the reality of their capacity on the ground, can obviously cause difficulties in subsequent project implementation.

Therefore, we suggest that it is best to involve *all* project participants as fully as possible, and at an early a stage as possible, in project design. This would also have the added advantage of early identification of a national project coordinator at each centre. Implementing ambitious national work plans is not only time consuming, but requires dedication and commitment. The correct selection of the national project coordinator is critical in ensuring project success, especially for a project that relied so heavily on field trials being correctly implemented from one coffee season to the next.

Similarly, the PEA occasionally found during the course of the project that national collaborators did not always appreciate how important activities being conducted in their country were, especially in terms of fitting into the wider context of the project's work.

The PEA does not have a ready solution for this, but it might be that early inclusion in project design and planning would have developed a more complete sense of ownership and team responsibility than was sometimes displayed.

Finally, on a practical note, one method communication that proved to be effective, as well as low-cost and practically instantaneous, was the use of SMS text messaging. This was especially useful for maintaining contact on urgent matters with project collaborators in Côte d'Ivoire, Kenya and Uganda. The project administrator/coordinator regularly texted follow-up queries, information, or requests for action in this way.

Texting was found to not only be effective in terms of response time, but also in terms of getting the message 'up front and personal'. People (ideally!) carry their mobile phones with them, and mobile phone networks are more widespread and reliable than fixed-line networks in many LDCs, so this is certainly an element to consider incorporating into any future project communication strategy.

3.4 Project closing date extensions

Initial receipt of project funds by the PEA took place in September 2000, almost a full year after the overall Project Agreement was signed. Due to this hold-up, delays in starting activities in some project countries, in obtaining signed Project Implementation Agreements with the seven collaborating institutions, and in hiring a dedicated project administrator/coordinator, the project's closing date was extended twice. These budget neutral extensions were made with the full agreement of all signatories to the Project Agreement.

In November 2003 the project was initially extended to December 31st 2004 for funding from the Ministerie van Buitenlandse Zaken, and to June 31st 2005 for CFC funding. A subsequent extension to October 31st 2005 was agreed for both funding components, the main rationale being that this would allow time to complete final activities, prepare final project *Guidelines* and findings, and organise the final project meeting so that it linked with the 2nd ICO World Coffee Conference being held in Brazil in September 2005.

3.5 Recommendations

Whilst no project (and especially one of this size) can reasonably expect to roll out completely smoothly and without glitches, there are some recommendations the PEA feels can be made to improve future proposal design and project communication, implementation and supervision:

- We believe that the experience gained from this project clearly shows that in any future projects of this size and complexity it would be wise to address the question of administration and coordination before the start of the project. Therefore, we recommend that the CFC and the ICO clearly define the role of project administration, and allow adequate budgetary provision, during the project design and approval phases;

- Given the investment of staff time and the complexity of preparing project proposals of this scope for funding consideration, it would be sensible for project development funds to be made available to offset these costs;

- At the project design stage there should be sufficient funds available to allow the participation and inclusion of *all* stakeholders and prospective partners, especially national collaborating institutions;

- Future projects should ensure that national project coordinators are identified as early as possible, and ideally before field activities commence. Implementing an international project with an ambitious work programme, and delivering goals both on time and within budget, is demanding and requires the full attention of a professional with a proven record of delivery and expertise, and with the authority to make decisions;

- Collaborating institutes should be subject to a rapid skills audit, as far as is practicable, before a project is finalised to determine the most appropriate activities to implement (or specific training required);

- Provision should be made for international experts to work on the ground as much as possible to maintain close personal contact with national project teams – this is especially important in a project predicated on scientific research involving complex specialisms (e.g. mycology) and experimental protocols;

- To improve communications, the PEA recommends the purchase of low-cost 'pay-as-you-go' mobile phones and SIM cards, dedicated for project use, for project coordinators at each collaborating centre to augment existing communication channels with the central project team.

4. Financial Management and Administration

Invariably, some of the issues and problems associated with general project management as described above are also relevant to the financial administration and management of the project. At the start of the project it is now clear that there was a degree of confusion and a lack of understanding (for both the PEA and Collaborating Institutions (CIs)) concerning the financial requirements of the project, especially regarding the processes that needed to be followed for funds replenishment and regular financial reporting.

In no small part some of the main problems were due to the lack of an easy 'fit' between the PEA's and CFC's formal financial and reporting procedures, which had not been fully discussed or ironed out before the project started.

The appointment of a dedicated project administrator/coordinator helped in this regard, and allowed for pragmatic solutions to be developed and implemented – for instance, the preparation of replenishment funds requests from the PEA to the Fund was quickly regularised and managed in such a way as to satisfy the reporting requirements of both organizations, an area that had been the cause of some confusion from the start of the project.

In light of this, it would certainly be advantageous if a standardised project agreement between FAO and the Fund could be concluded in the future, containing mutually agreed clauses on audit requirements, financial reporting, procurement, intellectual property rights and other related issues. This would help ensure that the operational framework within which projects like this are implemented is both unambiguous and formalised, and would surely ease the administrative burden of the project.

4.1 Resource utilisation

Total project value, including all co-financing and counterpart contributions, was US$6,242,000. The key funding components of this global total were grants from the Common Fund for Commodities (US$2,526,000) and the Dutch Ministerie van Buitenlandse Zaken (US$1,500,000). The initial project funding plan had incorporated US$250,000 per participating country to be funded through the UNDP country programmes concerned over four years, totalling US$1.5million. At the time of project approval this funding line had not been secured. Instead, these funds were made available by the Dutch Government, and these came on-stream from November 2001.

In addition, US$60,000 from a CFC-funded fast track project for related dissemination and training activities in Ecuador (CFC/ICO/25FT) was incorporated into the global budget in 2000. A further contribution of US$367,000[20] remained under the control of the European coffee industry, and was spent in support of the project, primarily on consultancy services and support for international

[20] Through the Institute for Scientific Information on Coffee (ISIC).

transportation trials. Finally, each Collaborating Institution (CI) agreed to provide the equivalent of US$227,000 in counterpart funding (e.g. staff time, use of facilities etc.) during the projects' lifetime.

The net result of the above is that the budget under the actual control of the PEA was US$4,026,815.[21] Initial funds in the form of a US$250,000 Authorised Allocation from the CFC were made available to the PEA in September 2000. The project was delivered within the original budgetary envelope agreed in 1999, though some budget line amendments were made during the course of implementation to reflect changes as they arose.

Funds disbursement (see also Section 4.2 below) and resource utilisation were initially slow, for reasons examined in Section 3 above, and behind schedule with regard to initial budget allocations and implementation timelines. This can be explained by the unforeseen staggered roll-out of the project, and delays encountered in 2000/2001. However, expenditure and funds disbursement increased after 2002 - total expenditure under the project during 2003 was over 2.5 times greater than in the previous year, a rate that was repeated during 2004 before reducing as project activities concluded during 2005/2006. In effect, actual expenditure was largely brought back into line with original budget distribution and expenditure expectations.

During the course of the project budget revisions and variances were communicated to the CFC in advance for approval, and reported to the project Advisory Board. Two key reallocations, and their justification, should be noted and are indicated below:

- The appointment of a full-time project administrator/coordinator necessitated some reallocation within individual budget categories, as this position was not envisaged in the original project documentation;

- As the project focus shifted from the provision of industrial drying equipment (as it did not impact on small-scale coffee producers) and concentrated on drying trials, funds initially provided for non-expendable equipment were reallocated to the purchase of laboratory consumables and supplies to assist in mycological and OTA analysis and investigations.

Financial tables detailing expenditure by budget line through to the project closing date of October 31st 2005 can be found in Annexes 3a and 3b. A total of US$292,403.55 remained 'unspent' on the official closing date of the project (see Table 1, below), which included US$41,892.01 under the Dutch Government financing component.

This amount was committed in the PEA's financial system to pay 84% of the costs associated with a study being finalised by LMC International Ltd., focussing on the potential impact of hygiene recommendations (under different scenarios) on the coffee industry, as well as the application of traceability to the coffee sector. This study was due to be completed within FY 2005. However, the final version of this report was not finalised until February 2006, hence the sum of US$41,892.01 from the Dutch Government was accrued into 2006. Final payment against FAO Purchase Orders 168880 (US$ 19,613) and 168879 (US$ 30,318) was made during March 2006.

[21] US$ 59,185 of the total US$ 4,086,000 budget remained under the control of the CFC/Dutch Government as it related to Supervision Costs (Category IX).

Table 1: Budget remaining as at 1st November 2005.

CFC Category	Summary totals by expenditure category to 31st October 2005	Budget balance remaining as at 1st November 2005
I	$659,956.41	$2,487.59
III	$275,283.87	$21,503.13
IV	$296,254.19	$35,914.81
V	$1,097,258.38	-$17,058.38
VI	$477,083.28	-$51,940.28
VII	$480,871.17	$200,408.83
VIII	$448,064.15	$101,087.85
Total	**$3,734,411.45**	**$292,403.55**

This 'unspent' balance included a number of hard commitments for activities and contracts under the project that had yet to be paid in full. Indeed, a further US$264,920.33 in actual expenditure between November 1st 2005 and April 2006 was submitted to the CFC for reimbursement, as detailed in financial reporting to the CFC. This included:

- Payment to LMC International Ltd., for completion of a study looking at the potential impact of the project's hygiene recommendations (under different scenarios) on the coffee industry, as well as the application of traceability to the coffee sector;
- Final contract payments to CIRAD concerning OTA analyses and completion of socio-economic studies in Indonesia and Uganda;
- Translation of the GHP CD-Rom into French and Spanish;
- Salary of project administrator/coordinator based at PEA through to the end of April 2006;
- Procurement of two RAS Romer Sample Mills (one each for Uganda and India) and critical laboratory supplies to ensure OTA analytical capability post-project;
- Settlement of costs associated with the final project meeting and attendance at the 2nd ICO World Coffee Conference in Salvador, Brazil in September/October 2005.

A balance of US$28,236.69 remains in the budget to cover final expenditure items during May/June 2006. These include the final audit cost; final report preparation costs; printing of the final version of 'Good Hygiene Practices along the coffee chain' CD-Rom; and final contract payment to the Instituto de Tecnologia de Alimentos (ITAL), Brazil for completion of a simulation study into the fill-levels of bulk transportation of coffee using 'mini-containers'.

During 2005, and as project activities in the CIs started to close, procedures were put in place to ensure that any unspent project funds held at the national level (due, for example to exchange rate savings) were returned to the FAO's project account via FAO Representations.

In Uganda no unspent funds needed to be processed, but in 5 countries (Brazil, Colombia, India, Indonesia and Kenya) refunds were arranged and credited to the project so as to zero national project accounts. Unfortunately, in the case of the Centre National de Recherche Agronomique (CNRA) in Côte d'Ivoire, a total of Franc CFA 10,525,170 (equivalent to approximately US$20,000, or 0.5% of the total project budget) remains unaccounted for.

Despite frequent requests by both the FAO Representative in Abidjan, and direct communication from the project administrator/coordinator, it remains unclear at the time of writing whether these funds will be returned to the project, or whether they have been utilised elsewhere. The PEA is actively chasing either a full refund, or at least a justification of how the funds have been spent.

Without prejudice to the final project audit review (see Section 4.5 below for further discussion), and excepting the situation in Côte d'Ivoire noted above, the PEA is satisfied that project funds have been correctly utilised to support project activities, and there is no other evidence of mismanagement of funds or inappropriate expenditure by CIs.

4.2 Funds disbursement

The disbursement of funds to CIs was somewhat sporadic at the start of the project, though this was regularised from 2002 onwards as financial reporting from the CIs to the PEA became more systematic, and monthly fund replenishment requests were submitted by the PEA.

In general, disbursement of funds to CI project accounts was unproblematic, and facilitated through the FAO Representations in each country. However, the PEA became aware in late 2002 that initial funds released to EMBRAPA in 2001 had not been made available for the operational project units to draw down and use[22]. This issue was resolved through an addendum to the original Project Implementation Agreement allowing for project funds to be channelled through the non-profit Fundação Arthur Bernardes (FUNARBE), with EMBRAPA continuing to act as the overall national technical collaborator. This revised system of funds disbursement worked well, and enabled each of the seven separate groups (at different institutions) working on the project in Brazil to receive funds in a timely manner. In addition, FUNARBE maintained close (and transparent) control over the funds, with the PEA being able to access all sub-project accounts in real-time online.

In terms of CFC funds replenishments, the only issue to note were delays at the start of the project of up to eight weeks from the request of funds by the PEA to receipt of payment by the CFC. This occasionally resulted in PEA project account deficits during 2003. However, through the latter part of 2003 and in early 2004, this

[22] The initial US$40,000 released to EMBRAPA was subsequently accounted for, and was utilised to purchase non-expendable laboratory equipment for the project.

occasional cash flow problem was ameliorated, and processing of replenishment claims for project expenditure continued in a timely manner through to the end of the project. In any event, interest earned on the PEA project account has offset any penalties incurred as a result of these initial delays.

4.3 Procurement

A significant proportion of the project budget (24%) was spent on non-expendable (Category I) and expendable (Category III) equipment and supplies – indeed, this level of Category I and III expenditure was envisaged in the original project documentation and budget. An important administrative function of the PEA was thus the timely and cost-effective procurement of material and equipment to support project field activities, and to build capacity in each of the project centres.[23]

One of the administrative recommendations of the Mid-Term Evaluation was that central procurement of specialised equipment should be investigated as a way of reducing costs, especially as hefty premiums are often applied by local suppliers.

For instance, VICAM OchraTest ImmunoAffinity Columns cost the equivalent of US$3,000 per pack of 100 if procured from a local Colombian supplier, compared to US$1,200 if procured in Italy and shipped to Colombia (example based on December 2005 prices and exchange rates). Similar differentials were also found to exist for other laboratory supplies, including basic equipment such as reagents and laboratory glassware. This obviously raises concerns regarding the sustainability of well-equipped and supplied laboratories being maintained post-project.

From 2003 onwards the PEA procured all key items of equipment centrally (when it was appropriate and cost-efficient to do so) and arranged for their delivery to CIs via national FAO Representations. In the vast majority of cases, this helped ensure that goods were delivered both duty- and tax-free, at an initial lower purchase costs.

It should be noted, however, that on a few occasions, notably in Brazil and East Africa, difficulties were experienced in clearing items through customs despite the fact that they should have been treated a either 'direct imports' or exempt from import restrictions under extant bi-lateral agreements with the United Nations. In these cases, primarily in order to avoid equipment being destroyed by shipping agents[24], some clearance and handling charges were paid – and in some cases this negated the cost saving that had been made through centralised procurement.

The other area of procurement under the project concerned contractual arrangements with individuals and institutions for the provision of expert services. All such contractual arrangements were concluded according to established FAO rules and procedures, and thus subject to audit scrutiny (see Section 4.5).

[23] See Part F of the Final Technical Report for a discussion of capacity building equipment provision and facility upgrading.

[24] In one case, ongoing delays by Brazilian customs authorities in clearing import of a Novasina A_w meter resulted in it's destruction by the freight carrier. Fortunately, this cost was fully recovered under FAO's shipping insurance and re-credited to the project.

4.4 Assets and inventory

The PEA maintains a central project inventory of all equipment regarded as an asset under FAO regulations (i.e. US$1,500 or above per unit purchase cost, or defined as an 'attractive' item of over US$500 per unit purchase cost). It should be noted that this central inventory *does not* include some items of non-expendable equipment of at least US$500 original purchase cost as they do not fall under the current FAO definition of an 'attractive' item. Some fifty-nine items fall under this category, and were not added to the central project inventory despite a request by the project administrator/coordinator that they be included.

Ownership of these items (including those 59 items regarded as 'expendable' under existing FAO inventory rules) is being transferred to the relevant project centres. A full listing of these items is provided in Annex 4 to this report. The PEA is in the process of obtaining from all CIs a statement, certified by appropriate officials at each CI, detailing assets received from the project, and confirming that such assets have been accounted for in their own inventory. These statements will be made available to the Fund once they are received.

4.4.1 Equipment loss – additional notes

Five (out of over 200 non-expendable items purchased under the project) were lost or stolen during the project's lifetime.

Three dataloggers were stolen from the UCDA at Makerere University Agricultural research institute where drying trials were being completed in April 2004. A successful insurance claim was made and replacement units were provided. In Kenya, a Novasina Sprint TH500 A_w meter was stolen from Kaitheri Youth Polytechnic in December 2003, where equipment was being held for use on trials at Kirinyaga. Again, a full insurance claim was successfully processed, and credited back to the project.

The only complete financial loss to the project was that of a Sinar AP 6060 moisture meter (valued at US$1,962) lost by FedEx in Brazil in April 2004, in transit somewhere between São Paulo and Brasília. Unfortunately, the non-delivery of this equipment was not noted at the time, and a year passed before it was noticed, at which point it was no longer possible to make an insurance claim.

4.5 Audit

Under Sections 7.08 and 7.10 of the Project Agreement, the PEA was required to present to the Fund annual audited financial statements and an auditors' report for the project for each reporting period.

At the national level, each Project Implementation Agreement concluded between FAO and Collaborating Institutions (CIs) also included provision for annual national project audits to be completed. These were undertaken in all seven project centres for financial years 2001-2005. These national audit reports informed the overall project audit reviews completed by FAO's Office of the Inspector-General, which are discussed below.

Following agreement with the Fund in 2002 the audit requirements of the Project Agreement would be satisfied by a report on significant findings of an examination of the project accounts by the Office of the Inspector-General of the Organization (FAO), as well as submission of certified accounts.

For each of the two periods January 1st 2001 to December 31st 2002 and January 1st to December 31st 2003 certified accounts were submitted to the Fund by the Director, Finance Division, FAO. Project accounts and underlying transactions were examined by the Office of the Inspector-General. These audit examinations reported no matters that would have prevented a clear audit opinion had the accounts be subject to examination by the External Auditor of FAO.

For the final reporting period of January 1st 2004 to October 31st 2005[25] an audit review and certification of statement of expenditures has, at the time of writing (mid-May 2006), been completed by the Office of the Inspector-General. A report on the significant findings of this review, and submission of the certified accounts, will be issued by the Director, Finance Division, FAO at the start of June 2006. Without prejudice to this final audit review, the PEA is satisfied that they will contain no matters that would prevent a clear audit opinion, and that project funds have been used in an acceptable and responsible manner.

4.6 FAO-funded Technical Cooperation Projects

In addition to the global project, the FAO approved a number of Technical Cooperation Progamme projects (TCP) at the request of member countries since 2002. Activities under these projects supported the globalisation of the effort to reduce mould formation and OTA contamination in coffee.

- Uganda (TCP/UGA/8923 and TCP/UGA/2801 – 'Enhancement of Coffee Quality through the Prevention of Mould Growth'), concluded March 2003, total value US$422,000.

- Vietnam (TCP/VIE/2903) – 'Improvement of coffee quality and prevention of mould formation and ochratoxin A (OTA) contamination', concluded January 2005, value US$353,000.

- Thailand (TCP/THA/3002) – 'Improvement of coffee quality and prevention of ochratoxin A on Robusta coffee', concluded April 2006, value US$360,000.

- Ecuador (TCP/ECU/3001) – 'Prevención de hongos productores de Ocratoxina A (OTA) en el café ecuatoriano', approved July 2004, value US$212,000.

[25] Audit reviews of FY 2004 and the period January 1st through to October 31st 2005 were conflated in agreement with the Fund. Following agreement with the Fund, the final audit review covers the period to 31st October 2005 as this is the official NTE date of the project. Project expenditure made after this date has been reported in detail separately to the Fund, and as noted in Section 4.1.

4.7 Recommendations

- The conclusion of a standard project agreement between the FAO and the CFC would significantly improve the efficiency of future project administration and reporting, and would avoid conflict between the rules and regulations of each organization. This should be addressed as a matter of priority;

- Some project implementing institutions simply do not have the experience or the capacity to ensure timely project administration and transparent financial management. A quick pre-project skills and processes audit of an institution's internal administrative and financial processes and set-up would be useful to help ensure that they are capable of dealing with the associated requirements such a project presents, and to identify areas for improvement early on;

- Due to the relatively onerous financial reporting requirements of the project (e.g. submission monthly expenditure submissions and documentation), similar future projects should ensure that each national project coordinator has sufficient administrative support within his/her institution to assist them with preparation of reimbursement claims and continuous budgetary control;

- The PEA recommends that an initial training course be run at all CIs at the very start of the project covering project processes and procedures (e.g. audit, procurement, reimbursement claims and financial reporting), attended by the national project leader and any support staff;

- Should annual audits for each national centre be a requirement under future projects, consideration should be given to the PEA directly managing contracts with the local audit firms engaged, and not devolving such management to CIs themselves;

- Care must be taken to check the local situation with regard to import of goods and equipment, and the application of any clearance/handling charges which might negate savings made through central procurement practices.

5. Summary of Main Project Achievements

Outlined below are some key project achievements, grouped thematically. Further details on, and a technical background to, these outputs can be found in the Final Technical Report.

5.1 Enhanced body of knowledge on the issue of OTA in coffee

Food safety regulation in international trade is evidence-based. Having data available on various aspects of food safety problems strengthens the position of countries in putting forward their points of view.

- Information on distribution and levels of OTA contamination in coffee - essential in evaluating proposals for maximum levels and in identifying points of the chain where hygiene control should be focussed;
- Relative performance of selected drying systems (in terms of OTA risk) - essential for determining acceptable practices;
- Relative performance of main processing systems (in terms of OTA risk) - essential for planning of sector development and deciding on recommended practice;
- Behaviour of microbial populations under real conditions of coffee processing and handling - essential for evaluating the risks of OTA contamination.

5.2 Guidelines for the hygienic production of coffee

The industry-wide *Guidelines*[26] produced and disseminated under the project provide the basis on which concerned institutions in producing countries can ensure that steps are taken right along the coffee production-marketing chain to minimise the risk of OTA contamination.

This is of particular significance given the proposal of the delegation of the European Community to the Codex Committee of Food Additives and Contaminants (CCFAC) held in April 2005 to initiate work on a '*Code of Practice for the Prevention and Reduction of Ochratoxin A (OTA) Contamination in Coffee and Cocoa*'.

The decision of the Committee was that the first step should be the preparation of a '*Discussion Paper on Ochratoxin A Contamination in Coffee and Cocoa*'. The *Guidelines*, and other data from the project, will be a critical input to this ongoing process.

Additionally, the European Commission is due to consider a limit on OTA in green coffee by June 2006, in addition to existing limits on ground and roasted coffee. The

[26] The '*Guidelines for the prevention of mould formation in coffee*' can be downloaded as a PDF file in English, French and Spanish from www.coffee-ota.org.

outputs from the project, including the *Guidelines*, should be a valuable input to this decision.

5.3 Capacity building at national coffee institutes on specific technical issues

Capacity building activities have been central to the project, be it in OTA and mycological analysis, or training of trainers' courses in the application of good hygiene practices. The following is a summary of main project achievements in this area:

- Capacity building in improving hygiene practices along the coffee chain, including:
  - Teams of trainers have been created in over 30 countries. Approximately 93% of all coffee export origins[27] participated in at least one of the 'Application of GHPs and HACCP principles to the coffee industry' training of trainers' (ToT) events organised under the project (and associated FAO-funded TCP projects) between 2001 and 2005;
  - A comprehensive electronic, CD-Rom based training and resource tool, 'Good Hygiene Practices along the coffee chain', available freely in English, French and Spanish, was created to support national institutes and other stakeholders in developing and implementing national programmes on training and dissemination;
  - Provision of training equipment, and training of selected target groups, in all participating countries.

- Provision of laboratory equipment and training in OTA analysis:
  - Laboratories upgraded in most project countries with equipment and materials required for OTA analysis;
  - Training in OTA analysis provided to analysts in project centres that lacked capacity;
  - Resource materials to guide laboratories have been developed (including a good laboratory management manual and training video);
  - An inter-laboratory testing programme completed to evaluate the level of competence in OTA analysis achieved by project countries.

- Laboratory facility development and training in mycological analysis:
  - Laboratories upgraded in most project countries with equipment and materials required for mycological analysis;
  - Training in mycological analysis provided to analysts in project centres that lacked that capacity;
  - Procedural manual on mycological analysis of coffee developed under the project and provided to laboratories to ensure good and standardised procedures in future work.

[27] Calculation based on total average exports and global production figures between 1995 and 2004. Source: ICO.

5.4 Strengthening of policy-making and regulation of the sector

- Seminars and training on Codex and the World Trade Organization (WTO) to make decision-makers in the coffee sector aware of how they need to proceed in influencing international decisions on safety in the coffee chain;

- Surveys of current practices, and socio-economic analyses of selected issues, have provided information to guide policy decisions that are under consideration in selected countries;

- Reviews of the system of coffee quality and safety regulation carried out in four project countries resulting in recommendations to the competent authorities on improving controls.

5.5 Regional and international collaboration

The 'global' nature of the project has encouraged the development of an informal network. The involvement of regional bodies in some activities, such as the InterAfrican Coffee Organization (IACO) and Promecafé, will hopefully facilitate continued collaboration among coffee professionals in producing countries to:

- Ensure capacity building, in the areas mentioned above, in other coffee-producing countries;

- To collaborate in generating information and data that could be required for future challenges.

6. Matrix of Project Activities and Targets Met

Component I: Knowledge - Diagnosis in chosen participating countries			
Planned Activity		**Target Set**	**Final Status**
Activity 1.1.1	Laboratory experiments at the CoE to determine A_w windows for different OTA producing fungi.	Identify OTA producing Aspergilli.	**Completed.** Identifications made.
		Identify exact window of action for OTA producing Aspergilli, and importance of competing yeasts.	**Completed.** OTA production window sufficiently defined. Report completed by project mycologist.
Activity 1.1.2	Validation of critical A_w windows through experiments in collaborating centres in project countries.	Establish operating (drying) conditions in each country and relate observed A_w with mould and OTA contamination.	**Completed.** Core validation concluded, and final related experimental trials finished.
Activity 2.1.1	Selection and acquisition of optimal moisture measuring equipment for use by collaborating centres.	Methods of moisture analysis established for all participating centres and all necessary equipment acquired.	**Completed.** Equipment procured for Brazil, Colombia, Côte d'Ivoire, India, Indonesia, Kenya, and Uganda. Low-cost Chinese made moisture meters procured and evaluated. Training provided by central project team. Additional equipment (thermo-hygrometers, A_w meters, solarimeters and anemometers) procured for drying trials (see Activity 2.1.2).
Activity 2.1.2	Conducting drying experiments in collaborating centres.	Improved and appropriate drying procedures established in participating countries.	**Completed.** Numerous drying trial protocols developed for all project countries and implemented, including investigations re: delayed drying, tree-drying, re-wetting, raking, drying layer thickness etc. See Final Technical Report for full discussion. Project *Guidelines* produced to inform future procedures.

Component I: Knowledge - Diagnosis in chosen participating countries			
Planned Activity		**Target Set**	**Final Status**
Activity 3.1.1	Develop sound ecological understanding of fungal communities - design trials to investigate and evaluate conditions during processing, storage and transportation, allowing for comparative analysis of production practices.	Determine the relationship between the fungal communities, mould growth and conditions of processing & storage.	**Completed.** First and second phase sampling concluded and contamination locales identified. Summary mycological studies report for each country completed. Final research trials on storage of dry and fresh beans/cherries and impact of processing regimes completed 2004/5. Final international transportation trial (Uganda to Europe) completed early 2005. Survey of coffee chains to help evaluate CCPs completed in 2004/5 in Côte d'Ivoire, India, Indonesia and Uganda.
Activity 3.2.1	Systematic and objective evaluation of field trials, verification of risk of re-contamination via by-products and optimization of their disposal.	Determine risk of contamination from pulp and husk.	**Completed.** Inconclusive evidence obtained re: mulching and composting. Results from dust contamination and composting trials from India analysed, and additional composting trials in Colombia and India completed in 2005. Risk incorporated into *Guidelines*.
Activity 3.3.1	Determination of valid critical control points for dissemination, based on field trial results.	Determine and disseminate code of good agricultural and manufacturing practice and HACCP-based tools for coffee chain.	**Completed.** CCPs determined and working operational limits established and incorporated into ToT courses and training materials as well as ECF Code of Practice. Draft GHP CD-Rom and *Guidelines* finalised in time for final project meeting, September 2005. Final versions now completed. See also Activity 5.1.1 for details.
Activity 3.4.1	Conduct feasibility studies on proposed recommendations of changes in practices and uptake of recommended technologies. Studies to cover socio-economic as well as non-economic feasibility aspects, and to look at investment project possibilities.	Feasibility studies completed with socio-economic analysis and recommendations/ justifications for proposed practices/technologies.	**Completed.** Initial socio-economic studies on solar dryer technology completed in Uganda. Socio-economic studies completed in Côte d'Ivoire and India in 2004/5. CIRAD socio-economic studies and surveys in Uganda and Indonesia completed during 2004/5, involving national consultants and local counterparts. Global economic-based study to determine the impact and costs of adopting recommended hygiene practices along the coffee chain commissioned from LMC International in April 2005 and finalised in March 2006.

Component II: Monitoring & feedback - Dissemination of Good Practice HACCP tools			
Planned Activity		**Target Set**	**Final Status**
Activity 4.1.1	Establish links between collaborating centres and the CoEs.	Creation of active OTA network in coffee-producing countries.	**Completed.** Regular communication maintained among officials of all collaborating institutions, PEA and project Consultants, including:. regional OTA workshop held in October 2002, Indonesia. Full project meeting held in March 2003, Uganda. Project collaborator participation in ASIC 2004. Numerous backstopping technical missions throughout project. Final project meeting and workshop held in September 2005, Brazil.
Activity 4.1.2	Develop a directory of expertise available in collaborating countries.	Directory of expertise in participating countries developed and disseminated.	**Completed.** Expertise incorporated into '*Good Hygiene Practices along the coffee chain*' CD-Rom training resource, available in 3 languages and from www.coffee-ota.org.
Activity 4.2.1	Training of counterpart personnel in latest techniques for determination of OTA, A_w and moisture content in coffee, and in coffee related field and laboratory based microbiological techniques.	National personnel in all participating countries trained in relevant mycological and chemical analyses and laboratory procedures.	**Completed.** Field mycology workshops completed in Brazil (Brazil + Colombia) and Kenya (Kenya + Uganda + Côte d'Ivoire). Additional training provided by project mycologist during technical backstopping missions and for Côte d'Ivoire in May and December 2003 and in Brazil and Colombia in 2004. TLC OTA analysis training completed in Uganda, December 2002 and HPLC training completed for Côte d'Ivoire, Kenya and Uganda in April 2004. Study tours of Nestlé NQAC, Singapore completed by Coffee Board of India and ICCRI. Coffee Board of India study tour to Brazil completed in September 2003 re: OTA analytical techniques and regulatory systems. Ugandan collaborators completed study tour of CIRAD laboratories in 2002. CENICAFE staff trained in HPLC analysis at Micotox in 2005. Good laboratory practices manual and training video on OTA analytical techniques produced by LACQSA, Brazil.

Component II: Monitoring & feedback - Dissemination of Good Practice/HACCP tools			
Planned Activity		**Target Set**	**Final Status**
Activity 4.2.2	Procurement, installation and operation of lab equipment for mycological analysis, determination of OTA, A_w and moisture content and microbiological investigations in collaborating institutions. Provision of effective OTA screening kits (presently being commercially developed) to as many producing countries as financially possible.	Laboratory capacity strengthened in all participating countries.	**Completed.** Laboratory equipment and materials procured for all project countries. Facilities upgraded in Kenya and HPLC equipment refurbished. HPLC equipment procured for Indonesia; HPLC and TLC equipment purchased for Uganda, and new laboratory constructed. TLC equipment procured in 2003 for Côte d'Ivoire and HPLC equipment procured in 2004. Analytical equipment procured for Colombia and India. Inter-laboratory proficiency ring test on OTA analysis, run by LACQSA, Brazil, concluded late 2005. **Not implemented.** Due to lack of confidence in rapid screening kits available, and evidence of high false positive results, kits were not supplied as envisaged. A new rapid flow-through kit will be evaluated by LACQSA, Brazil in mid-2006 as a final add-on activity under the project.
Activity 4.3.1	Prepare, test and finalise training materials covering application of GAP, GMP, GHP and HACCP at various stages of the coffee chain.	Training materials refined for GAP, GMP, GHP and HACCP. Training and education materials prepared for identified target groups throughout coffee chain.	**Completed.** Basic ToT package developed in 2001. Ten ToT courses completed (including FAO TCP projects), covering 30+ producer countries. GAP/GMP '*Do's and Don'ts*' developed & circulated. Posters and farmer information leaflets produced. Further training materials and Level II courses at national level developed and implemented (Indonesia, India, Kenya and Uganda). 'Wordless' booklet ('*COFFEA*') for training of farmers in good practices finalised and distributed globally by FAO in 2003. '*Good Hygiene Practices along the coffee chain*' CD-Rom finalised in 3 languages and available free of charge in mid-2006.
Activity 4.3.2	Establish a 'reference farm' network in each selected producing country and test innovations to address OTA problem.	Reference farm network functioning.	**Not implemented.** Decision on establishment of reference farms left to counterparts according to their preference and extension/ dissemination structure. Indonesia took steps in this direction.

Component II: Monitoring & feedback - Dissemination of Good Practice/HACCP tools			
Planned Activity		**Target Set**	**Final Status**
Activity 4.4.1	Establish and maintain printed, video & computer based resources for training materials and technical information. Including CD-Roms, video training aids, and Internet materials.	Training materials produced and available for circulation.	**Completed.** Smallholder farmer focussed posters and GMP/GAP '*Do's and Don'ts*' leaflets produced and distributed in 2002. Project mycological handbook completed. Training videos and good lab. manual re: OTA analysis developed by LACQSA and MAPA, Brazil. Development of CD-Rom training resource '*Good Hygiene Practices along the coffee chain*' completed, disseminated in September 2005, final version and translated into three languages in early 2006.
Activity 4.4.2	Disseminate training materials among coffee producing countries and develop specialist software that might be of wider interest.	As above.	**Completed.** Copies of *'COFFEA'* leaflet distributed to 45 coffee producing countries in 2003. '*Good Hygiene Practices along the coffee chain*' CD-Rom freely available, and available on Internet in 3 languages early 2006. Also refer to Activity 4.4.1.
Activity 4.4.3	Develop an Internet page, including bulletin board, and make available to all interested parties	Project website developed.	**Completed.** Website in English, French and Spanish: www.coffee-ota.org.
Activity 4.4.4	Equip participating institutions with appropriate hardware, software and training in basic computer use and the Internet.	Procure computer equipment as required.	**Completed.** Computer and ICT equipment and/or Internet connectivity purchased and installed for all project countries based upon identified needs. Software training also provided when required.
Component IIIa: Training & implementation of Good Practice/HACCP systems			
Activity 5.1.1	Organise 6 training workshops, one for each sub-region, involving approximately 12 trainees per workshop.	Training of Trainers' (ToT) workshops organised and completed.	**Completed.** Requirement exceeded – 10 ToT courses completed. ToT courses completed in Ecuador (sub-regional), Guatemala (sub-regional), India x2 (national), Indonesia (one national and one sub-regional), Kenya (sub-regional), Uganda (national) and Rwanda (sub-regional) involving 25+ trainees on each occasion. Under the Vietnamese FAO TCP project a national ToT course was completed in late 2003. Under the Thai FAO TCP project a national ToT course was completed in early 2005.

Component IIIa: Training & implementation of Good Practice/HACCP systems			
Planned Activity		**Target Set**	**Final Status**
Activity 5.2.1	One training course in each producing country involving collaborating centres and trained trainers, to benefit 12-15 extension workers per course.	National training events organised and completed.	**Completed.** Stage 2 ToT courses in India implemented. Information sessions undertaken in Uganda, and Sensitization of Stakeholders' workshop completed in Guatemala, Kenya, and Uganda. Development of follow-up training materials ongoing with local farmers' schools, and comprehensive Stage 2 training completed in 2003/2004 in Indonesia. Extensive training in Colombia reaching thousands of farmers. Farmer training materials produced in Uganda, and Factory Managers' course outline prepared for Kenya, due to be implemented by CRF in 2006.
Component IIIb: Monitoring & feedback - guidelines disseminated & compliance reviewed			
Activity 6.1.1	Prepare, test and finalise guidelines for GAP, GMP and GHP covering whole coffee industry based on the experiences gained and distribute to appropriate institutions and organizations.	Guidelines produced suitable for distribution to global coffee industry.	**Completed.** Preliminary *Guidelines* circulated via ICO as ED 1763/00 Rev 1 in May 2001 based on the conclusions of the ASIC workshops in 1997 and 1999, and the findings of the Pilot Project. Subsequently replaced by draft Code of Practice (ICO document PSCB No. 36/02), finalised in June 2002, updated with work from the global coffee mould project. Final project-based '*Guidelines for the prevention of mould formation in coffee*' prepared, and disseminated in September 2005.
Activity 6.2.1	Review application of GAP, GMP, GHP and HACCP control techniques at end of project in context of OTA contamination levels and compliance with suggested practices.	Reviews undertaken and reported on.	**Completed.** Three studies to define and recommend changes in the national regulatory systems of selected project countries (Uganda & Kenya, India and Indonesia) that would be required to ensure the best take-up of project recommendations completed in late 2005.
Activity 6.2.2	Provide assistance on monitoring and control programmes to collaborating countries if required.	Assistance provided as requested by project technical officers.	**Completed.** Further requirements and needs of countries discussed at the final project meeting and workshop in September 2005.

7. Dissemination of Project Results

7.1 Project outputs

The project has significantly increased the body of knowledge concerning mould formation and OTA contamination in the coffee chain, as detailed at some length in the separate Final Technical report and its Annexes. In addition to the current report and the Final Technical report, the project has two main outputs for wider dissemination to the global coffee sector:

- The '*Guidelines for the prevention of mould formation in coffee*', and
- The CD-Rom based training and resource tool '*Good Hygiene Practices along the coffee chain*'.

Both the *Guidelines* and the CD-Rom can be accessed electronically in English, French or Spanish from www.coffee-ota.org. Two thousand hard copies of the GHP CD-Rom (each copy includes all three language versions) are being printed and will be made available as follows:

- 300 copies will be sent to each of the International Coffee Organization and the European Coffee Federation for distribution to their members;
- FAO will circulate copies to FAO Representations in all coffee-producing FAO member countries;
- Further copies will be distributed to participants who attended Training of Trainers' courses held under the project;
- Copies to be distributed to people who request copies via the project website.[28]

The PEA will also investigate the possibility of a short feature article in the trade journal Coffee Cocoa International during 2006 to further promote the CD-Rom, and the project, to the wider coffee sector.

7.2 Final project meeting and workshop

The final project meeting and workshop were arranged to coincide with the 2nd ICO World Coffee Conference (WCC) and ICO meetings, held in Salvador, Brazil in late September and early October 2005. Not only did this ensure the widest possible exposure of project findings to the international coffee sector, but allowed for recognition of the role Brazilian institutions played in project implementation.

The PEA organized a publicity stand for the project in the WCC exhibitors' area. This generated interest from both ICO and WCC delegates, with posters detailing project

[28] At the time of writing, some 100 copies have been pre-ordered.

results, a workstation running the '*Good Hygiene Practices along the coffee chain*' CD-Rom and copies of the draft *Guidelines* made available.

Almost 500 copies of the preliminary version of the CD-Rom were distributed, as well as free bookmarks to publicise and promote both the CD-Rom and project website (in English, French and Spanish at www.coffee-ota.org).

Delegates were also invited to attend an open information session on project results and outputs - the programme was designed to introduce the background and content of the project's draft '*Guidelines for the reduction of mould formation in coffee*', the training CD-Rom resource '*Good Hygiene Practices along the coffee chain*', the project website, as well as significant findings and conclusions from the project. Twelve posters detailing trials completed under the project by national collaborators were also on display.

Image 1: Project stand at 2nd ICO World Coffee Conference, Salvador, Brazil, September 2005.

8. Management Recommendations: lessons learned

There is no doubt that this was a complex project to implement from both a management and a technical perspective. It presented both interesting and real challenges to all involved on a frequent basis, and has been a major part of many people's working lives for a number of years. During the course of this report recommendations concerning future project management supervision have been made – below we synthesise what we feel are the main lessons that should be borne in mind in the design and implementation of any similar enterprise:

- We believe that any future projects of this size and complexity should address the question of administration and coordination before the start of the project. We recommend the CFC and the ICO clearly define the role of administration in any initial project documentation with the role being assigned to a full-time individual within the PEA, and adequate budgetary provision made, well before a project commences;

- The conclusion of a standard project agreement between the FAO and the CFC would significantly improve the efficiency of future project administration and reporting, and would avoid conflict between the rules and regulations of each organization. This should be addressed as a matter of priority;

- Given the investment of staff time and the complexity of preparing project proposals of this scope for funding consideration, the PEA recommends that project development funds to be made available to offset these costs;

- The PEA urges that the importance of the full participation and inclusion of representatives of *all* project stakeholders and prospective project partners is appreciated, and incorporated at the project design stage;

- Future projects should ensure that national project coordinators and support staff are identified as early as possible, and ideally before field activities commence. CIs should be subject to a rapid pre-project technical skills audit, as far as is practicable, to determine the most appropriate technical activities to implement (or specific training that would be required);

- Some project implementing institutions simply do not have the experience or the capacity to ensure timely project administration and transparent financial management. A quick pre-project skills and processes audit of an institution's internal administrative and financial processes and set-up would be useful to help ensure that they are capable of dealing with the associated requirements such a project presents, and to identify areas for improvement early on;

- The PEA recommends that an comprehensive initial training course be run at all CIs at the very start of the project covering project processes and procedures (e.g. audit, procurement, reimbursement claims and financial reporting), as well technical work plans, attended by the national project leader and any support staff.

9. Annexes

- Annex 1 ICT Equipment and Training
- Annex 2 Project Activities, Outputs and Objectives
- Annex 3a Resource Utilisation to 31st October 2005 – CFC Funds
- Annex 3b Resource Utilisation to 31st October 2005 – Dutch Govt. Funds
- Annex 4 Project Equipment Purchased (US$500 and over)

Annex 1 – ICT Equipment and Training

Brazil

IT equipment/software purchased:

Item	No.	Purchase cost	Year purchased
Pentium IV laptop	3	US$ 5278	2002
Digital camera	1	US$ 2405	2002
Digital camera	2	US$ 2643	2002
Canon G5 digital camera	1	US$ 1294	2003
Pentium IV laptop	1	US$ 2450	2003
Total		US$ 14070	

Colombia

IT equipment/software purchased:

Item	No.	Purchase cost	Year purchased
Sony DSC F717 Cybershot digital camera	1	US$ 795	2003
DELL Latitude D800 P2M power laptop	1	US$ 2435	2003
Total		US$ 3230	

Côte d'Ivoire

IT equipment/software purchased:

Item	No.	Purchase cost	Year purchased
HP LaserJet 2200D printer	2	US$ 1700	2003
Iomega 250MB USB zip drive	2	US$ 250	2003
DELL Pentium IV C840 laptop	2	US$ 4769	2003
Sony DSC F 717 Cybershot digital camera	1	US$ 1025	2003
InFocus LP530 LCD video projector	1	US$ 3350	2003
DELL Optiplex GX270 PC	1	US$ 975	2004
Total		US$ 12069	

Installation of a new phone line and improved Internet connectivity for the project co-ordinator were funded by the project in 2003/4. Additional ADSL broadband Internet connectivity was approved for purchase during 2005, but this was never installed owing to unresolved internal issues within CNRA.

India

IT equipment/software purchased:

Item	No.	Purchase cost	Year purchased
HP Pavilion PC	3	US$ 2899	2001
Flatbed scanner	2	US$ 700	2001
InkJet printer	3		
Compaq Presario 6171 PC	1	US$ 1224	2002
Compaq Presario 1535 laptop	1	US$ 1933	2002
Flatbed scanner	1	US$ 294	2002
InkJet printer	1		
Olympus Camedia C-4000 digital camera	1	US$ 772	2003
InFocus LP530 LCD video projector	1	US$ 2203	2004
MS Windows XP Professional OS	1	US$ 163	2005
InkJet Printer	1	US$ 342	2005
Total		US$ 10530	

Indonesia

IT equipment /software purchased:

Item	No.	Purchase cost	Year purchased
Zyrex Pentium IV PC	1	US$ 1611	2001
Panasonic PT-L730 multimedia LCD video projector	1	US$ 5193	2002
Toshiba Satellite 5105 laptop	1	US$ 2520	2002
Nikon Coolpix 5700 digital camera	1	US$ 1285	2002
Wireless radio cassette, microphones and receiver	1	US$ 213	2003
Projector screen	1	US$ 356	2003
Total		US$ 11178	

Kenya

- Training in MS Office software packages (Excel, Word, PowerPoint), SPSS and Internet (16 days total) for 8 people, October 2003. Training completed at local further education college.
- Wireless Internet connection installed at CRF, April/May 2004 - Initial installation of a fixed-line Internet connection at CRF was quoted for and approved in July 2003. However, Telecom (Kenya) did not provide the necessary telephone connection required for installation, and on 24th February 2004 issued a statement declining to provide a fixed line telephone connection citing rampant vandalism of telephone cables in the Ruiru area. Hence the decision was taken to install a (more costly) wireless system.
- IT equipment/software purchased:

Item	No.	Purchase cost	Year purchased
IBM Netvista PC	1	US$ 2129	2002
Sony DSC F707 digital camera	1	US$ 810	2002
Sony SLV-SX720N multisystem VCR	2	US$ 424	2003
Kodak Ektalite 1500 35mm slide projector	1	US$ 1475	2003
InFocus LP530 LCD video projector	1	US$ 3350	2003
DELL Optiplex GX260 PC	2	US$ 2657	2003
DELL Pentium IV C840 laptop	2	US$ 4419	2003
MS Office software suite	1	US$ 431	2003
HP LaserJet 2300D printer	2	US$ 1520	2003
HP ScanJet 4600 flatbed scanner	1	US$ 200	2003
Sony CCD-TRV 218 Hi-8 video camera	1	US$ 465	2003
Philips bClever SV1 LCD video projector (cheaper to buy new model than to purchase replacement lamps for model purchased in 2003)	1	US$ 725	2005
Total		US$ 18605	

Uganda

- Wireless Internet connection and Local Area Network (LAN) installed at UCDA, September 2003 - UCDA staff were had no office-based Internet connection and were using Internet cafés in the local town to correspond with the project team. In light of this, purchase of a VSAT based wireless Internet 128 kbps connection at UCDA was approved in August 2003, and installed by AFSAT Communications (U) Ltd. In order to facilitate staff access to the Internet connection a LAN was also set-up by Infonet Consultants. The total installation cost of US$ 5344 was covered by the project, on the understanding that the ongoing monthly charge and annual maintenance fee were covered by UCDA as part of their contribution to the project.
- IT equipment/software purchased:

Item	No.	Purchase cost	Year purchased
Sony MVC CD300 camera	1	US$ n/k	2002
Benq mini CD writer	1	US$ 218	2003
HP LaserJet 4200dtn printer	2	US$ 4141	2003
DELL Optiplex GX270 PC (MS Office pre-loaded)	1	US$ 1518	2003
DELL Latitude D800 P2M power laptop (MS Office pre-loaded)	1	US$ 2429	2003
Total		US$ 8306	

Annex 2 – Project Activities, Outputs and Objectives

Component I - Knowledge - Diagnosis in chosen participating countries			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 1 Refine critical water activity (A_w)windows for OTA producing *Aspergillus* species and their competitors on coffee and side-products.	**1.1** A_w windows defined.	**1.1.1** Laboratory experiments at the CoE to determine A_w windows for different OTA producing fungi.	▪ Further refining of A_w windows had no practical importance at the producer and field level, so was discontinued.
		1.1.2 Validation of critical A_w windows through experiments in collaborating centres in project countries.	
Objective 2 Determine optimal drying conditions to prevent mould growth.	**2.1** Drying procedures developed for sun-drying and mixed-drying of cherries, parchments (Robusta and Arabica), producing minimum moisture variation in beans.	**2.1.1** Selection and acquisition of optimal moisture measuring equipment for use by collaborating centres.	▪ The focus on industrial drying as original envisaged was not believed to be appropriate as it did not impact on small-scale coffee producers. Project refocused to concentrate on investigation of sun- and mixed-drying of cherries and parchment.
		2.1.2 Conducting drying experiments in collaborating centres.	

Component I - Knowledge - Diagnosis in chosen participating countries			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 3 Field test HACCP-based models appropriate to participating countries. Based on mycological studies of pilot study finalize HACCP models based on individual country production conditions, transport and storage.	**3.1** Suitable areas for carrying out trials identified and subsequent relationships between processing parameters and development of OTA contamination defined, including possible links to organoleptic qualities.	**3.1.1** Develop sound ecological understanding of fungal communities - design trials to investigate and evaluate conditions during processing, storage and transportation, allowing for comparative analysis of production practices. Assess organoleptic measures with fungal occurrence due to different drying practices.	▪ Organoleptic assessment activity reformulated so as not to relate it solely to OTA contaminated coffee. ▪ Output 3.1 and Activity 3.1.1 reworded to more accurately reflect investigations that will be followed to reach the Objective. ▪ Output 3.2 reworded as no longer relevant to creation of HACCP based model for Objective.
	3.2 Field trials evaluated and by-product contamination risk determined.	**3.2.1** Systematic and objective evaluation of field trials, verification of risk of re-contamination via by-products and optimization of their disposal.	

Component I - Knowledge - Diagnosis in chosen participating countries			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 3 Field test HACCP-based models appropriate to participating countries. Based on mycological studies of pilot study finalize HACCP models based on individual country production conditions, transport and storage.	**3.3** Identification of valid critical control points - devised from field and process control strategies.	**3.3.1** Determination of valid critical control points for dissemination, based on field trial results.	▪ Original Output 3.4 removed and associated Activity 3.4.1 incorporated into Activity 3.1.1. ▪ Output 3.5 renumbered as Output 3.4. This was reworded to reflect the necessity of feasibility studies underpinning any project recommendations, in light of the continuing coffee crisis.
	3.4 Feasibility studies completed for investment projects on proposed recommendations of changes in practices and uptake of recommended technologies in preventing mould formation.	**3.4.1** Conduct feasibility studies on proposed recommendations of changes in practices and uptake of recommended technologies. Studies to cover socio-economic as well as non-economic feasibility aspects, and to look at investment project possibilities.	

Component II - Monitoring and feedback - Dissemination of HACCP, GAP, GHP, GMP tools			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 4 Develop training tools to support the application of GAP, GHP, GMP and HACCP, including establishment of monitoring systems. Training programmes to strengthen laboratory facilities to support national OTA prevention programmes.	**4.1** Regional pools of expertise and foci of motivation for HACCP, GAP, GHP and GMP implementation.	**4.1.1** Establish links between collaborating centres and CoEs.	▪ Objective 4 reworded to account for focus on HACCP, GAP, GHP and GMP rather than IPSM - this is also reflected in subsequent Activity wording. Preliminary survey data did not indicate significant links between pest/phytosanitary management practices and OTA contamination. The only factor still considered was the effect of CBB damaged beans on OTA contamination further down the chain.
		4.1.2 Develop a directory of expertise available in all participating countries and disseminate among all concerned institutions.	

Component II - Monitoring and feedback - Dissemination of HACCP, GAP, GHP, GMP tools			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 4 Develop training tools to support the application of GAP, GHP, GMP and HACCP, including establishment of monitoring systems. Training programmes to strengthen laboratory facilities to support national OTA prevention programmes.	**4.2** Capacity building for mycotoxin analysis and monitoring in all collaborating centres, including trained laboratory personnel and suitable equipment and supplies.	**4.2.1** Training of counterpart personnel in latest techniques for determination of OTA, A_w and moisture content in coffee, and in coffee related field and laboratory based microbiological techniques. **4.2.2** Procurement, installation and operation of laboratory equipment for determination of OTA, A_w, moisture content and microbiological investigations in collaborating institutions, and provision of effective OTA screening kits (presently being commercially developed) to as many producing countries as financially possible.	▪ Objective 4 reworded to account for focus on HACCP, GAP, GHP and GMP rather than IPSM - this is also reflected in subsequent Activity wording. Preliminary survey data did not indicate significant links between pest/phytosanitary management practices and OTA contamination. The only factor still considered was the effect of CBB damaged beans on OTA contamination further down the chain. ▪ Rewording of Activity 4.2.2 accounts for strengthening of laboratory facilities.

Component II - Monitoring and feedback - Dissemination of HACCP, GAP, GHP, GMP tools			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 4 Develop training tools to support the application of GAP, GHP, GMP and HACCP, including establishment of monitoring systems. Training programmes to strengthen laboratory facilities to support national OTA prevention programmes.	**4.3** Training and educational materials/programmes; verification and extension of scientific findings; verification of GAP, GMP, GHP and HACCP methodology.	**4.3.1** Prepare, test and finalise training materials covering application of GAP, GMP, GHP and HACCP at various stages of the coffee chain. **4.3.2** Establish a 'reference farm' network in each selected producing country and test innovations to address OTA problem.	▪ Objective 4 reworded to account for focus on HACCP, GAP, GHP and GMP rather than IPSM - this is also reflected in subsequent Activity wording. Preliminary survey data did not indicate significant links between pest/phytosanitary management practices and OTA contamination. The only factor still considered was the effect of CBB damaged beans on OTA contamination further down the chain.

Component II - Monitoring and feedback - Dissemination of HACCP, GAP, GHP, GMP tools			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 4 Develop training tools to support the application of GAP, GHP, GMP and HACCP, including establishment of monitoring systems. Training programmes to strengthen laboratory facilities to support national OTA prevention programmes.	**4.4** Set of education materials available to all coffee producing countries and an Internet forum in place to maintain ongoing GMP, GAP, GHP and HACCP procedures.	**4.4.1** Establish and maintain printed, video & computer based resources for training materials and technical information. Including innovative expert software, CD-Roms, video training aids, and Internet materials.	▪ Objective 4 reworded to account for focus on HACCP, GAP, GHP and GMP rather than IPSM - this is also reflected in subsequent Activity wording. Preliminary survey data did not indicate significant links between pest / phytosanitary management practices and OTA contamination. The only factor still considered was the effect of CBB damaged beans on OTA contamination further down the chain.
		4.4.2 Disseminate training materials among coffee producing countries and develop specialist software that might be of wider interest.	
		4.4.3 Develop an Internet page, including bulletin board, and make available to all interested parties.	
		4.4.4 Equip participating institutions with appropriate hardware, software and training in basic computer use and the Internet.	

Component IIIa - Monitoring and feedback - Training & implementation of HACCP, GAP, GHP, GMP systems in selected countries			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 5 To disseminate GAP, GMP, GHP and HACCP methodology through training.	**5.1** At least one trainer per coffee producing country trained in GAP, GMP, GHP and HACCP methodology in green coffee production.	**5.1.1** Organise 6 training workshops, one for each sub-region, involving approximately 12 trainees per workshop.	▪ Objective 5 reworded to reflect GAP, GMP and GHP in preference to IPSM, as stated in original project documentation.
	5.2 Minimum of 800 extension workers trained in GAP, GMP, GHP and HACCP principles and their applications to improve coffee quality.	**5.2.1** One training course in each producing country involving collaborating centres and trained trainers, to benefit 12-15 extension workers per course.	

Component IIIb - Monitoring and feedback - Training & implementation of HACCP, GAP, GHP, GMP systems in selected countries			
Objective	**Output**	**Activity**	**Variance from original Project Appraisal Report**
Objective 6 To emphasise monitoring and mechanisms to ensure sustainability including codification of guidelines on good practice throughout the chain.	**6.1** Codes of practice covering agronomy, processing, storage and transportation developed.	**6.1.1** Prepare, test and finalise guidelines for GAP, GMP and GHP covering whole coffee industry based on the experiences gained and distribute to appropriate institutions and organizations.	▪ Changes made to the description of Activities, Outputs and the overall Objective to better reflect regulatory framework set-up and ensure sustainability of monitoring systems. ▪ Activities 6.1.1 and 6.1.2 conflated into reworded 6.1.1.
	6.2 National monitoring and control programmes initiated.	**6.2.1** Review application of GAP, GMP, GHP and HACCP control techniques at end of project in context of OTA contamination levels and compliance with suggested practices.	
		6.2.2 Provide assistance on monitoring and control programmes to collaborating countries if required.	

Annex 3a - Resource Utilisation to 31st October 2005 – CFC Funds

Budget Item	Budget Categories	CFC CFC/ICO/06 USD	CFC Fast Track ICO/25FT USD	2000 Expenditure	2001 Expenditure	2002 Expenditure	2003 Expenditure	2004 Expenditure	2005 Expenditure
Personnel & Consultancy									
International Experts									
Coffee Specialist /Project Mgr	**V (5650)**								
Food Microbiologist/ Coffee Specialist	**V (5650)**	$4,000.00			$650.00				
Senior Mycologist	**V (5650)**	$106,444.25			$68,826.30	$12,617.95		$18,240.36	$18,521.32
Project Administrator	**V (5300)**	$135,000.00					$57,126.92	$63,593.81	$80.986.65
Sub-total		$245,444.25	$0.00	$0.00	$69,476.30	$20,617.95	$57,126.92	$81,834.17	$99,507.97
National Experts									
Coffee Scientists, Field workers, Lab Analysts	**IV (5660)**	$208,000.00	$16,169.00			$16,000.00	$50,440.58	$53,163.62	$60,148.99
Sub-total		$208,000.00	$16,169.00	$0.00	$0.00	$8,000.00	$50,440.58	$53,163.62	$60,148.99
International Consultants									
Trainers	**V (5650)**	$50,000.00						$2,080.00	$39,534.88
Socioeconomists	**V (5650)**	$17,284.39						$10,691.59	$10,231.54
Training Material Specialist	**V (5650)**	$50,000.00							$40,910.17
Data Handling Specialist	**V (5650)**	$3,000.00							$1,366.70
Investment Project Specialist	**V (5650)**								
Sub-total		$120,284.39	$0.00	$0.00	$0.00	$0.00	$0.00	$12,771.59	$92,043.29

Budget Item	Budget Categories	CFC CFC/ICO/06 USD	CFC Fast Track ICO/25FT USD	2000 Expenditure	2001 Expenditure	2002 Expenditure	2003 Expenditure	2004 Expenditure	2005 Expenditure
National Consultants									
Agronomists	**V (5570)**	$10,000.00			$10,000.00				
Field workers	**V (5570)**								
Sub-total		$10,000.00	$0.00	$0.00	$10,000.00	$0.00	$0.00	$0.00	$0.00
Official Travel									
Project Meetings	**VI (5900)**	$65,000.00		$121.89	$3,072.63		$7,881.60		
Field visits, ToT courses, Meetings, Other travel (local)	**VI (5900)**	$212,000.00			$3,345.08	$42,179.30	$64,913.16 $49,120.53	$96,028.57	$113,526.54
Other travel (local etc)	**VI (5900)** **VI (5900)**	$140,143.00	$8,000.00		$13,000.02	$29,752.00	$54,141,96		
Sub-total		$417,143.00	$8,000.00	$121.89	$19,417.73	$71,931.30	$176,057.25	$96,028.57	$113,526.54
Contracts									
Centre of Microbiological Expertise	**V (5650)**	$200.36		$200.36			-$9,216.34		
Other Institutions	**V (5650)**	$271.00			$271.00			$2,826.26	$14,191.92
Sub-total		$471.36	$0.00	$200.36	$271.00	$0.00	-$9,216.34	$2,826.26	$14,191.92

Budget Item	Budget Categories	CFC CFC/ICO/06 USD	CFC Fast Track ICO/25FT USD	2000 Expenditure	2001 Expenditure	2002 Expenditure	2003 Expenditure	2004 Expenditure	2005 Expenditure
Equipment									
Laboratory Equipment	**I (6100)**	$201,084.00	$6,500.00		$19,750.08		$126,545.85	$61,296.78	
Non-expendable Equipment	**I (6100)**	$85,500.00					$53,547.33	$22,701.82	$7,132.80
Supplies and Material	**III (6000)**	$165,000.00	$10,787.00		$98,000.04	$2,500.00	$32,511.21	-$195.67	$23,867.97
Infrastructure	**I (6100)**	$70,000.00					$2,306.32	$59,058.30	$8,257.13
Sub-total		$521,584.00	$17,287.00	$0.00	$117,750.12	$2,500.00	$214,910.71	$142,861.23	$39,257.90
Training and Dissemination									
Training of trainers	**VII (5920)**	$268,720.00	$11,280.00		$5,000.00	$6,965.97	$73,895.71	$140,005.86	
Training of extension workers	**VII (5920)**	$241,280.00				$29,640.00	$60,805.25		$64,001.77
Study Tours and Farmer Training	**VII (5920)**	$160,000.00				$8,314.00	$92,242.61		
Sub-total		$670,000.00	$11,280.00	$0.00	$5,000.00	$44,919.97	$226,943.57	$140,005.86	$64,001.77
General Operating Expenses & Supervision									
CFC supervision	*IX*	*$35,000.00*							
Evaluations	*IX*	*$16,185.00*			*Category IX funds not available to PEA but controlled by CFC (total = US$ 51,185)*				
General Operating Expenses	**VIII (6130 / 6300)**	$281,888.00	$7,264.00		$28,920.80		$89,448.05		$70,950.62
Subtotal		$333,073.00	$7,264.00	$0.00	$28,920.80	$0.00	$89,448.05	$0.00	$70,950.62
GRAND TOTAL		**$2,526,000.00**	**$60,000.00**	**$322.25**	**$250,835.95**	**$147,969.22**	**$805,710.74**	**$529,491.30**	**$553,629.00**

Annex 3b - Resource Utilisation to 31st October 2005 – Dutch Govt. Funds

Budget Item	Budget Categories	Dutch Govt. WW053803 US$	2001 Expenditure	2002 Expenditure	2003 Expenditure	2004 Expenditure	2005 Expenditure
Personnel & Consultancy							
International Experts							
Coffee Industry Specialist (Gerrit van der Stegen) & mid term evaluation costs	**V (5570)**	$60,000.00			$11,308.20	$37,040.48	$11,651.32
Food Microbiologist / Coffee Specialist	**V (5570)**	$91,221.46	$41,221.46	$50,000.00			
Senior Mycologist	**V (5570)**	$74,000.00	$2,338.54	$24,666.00	$34,712.89	$12,282.57	
Project Administrator	**V (5300)**	$117,000.00		$53,227.78	$29,200.00	$34,572.22	
Sub-total		$342,221.46	$43,560.00	$127,893.78	$75,221.09	$83,895.27	$11,651.32
National experts							
National experts and staff locally recruited	**IV (5660)**	$108,000.00			$54,291.50	$53,708.50	
Consultants (National and International)							
Coffee Socioeconomists, Trainers	**V (5570)**	$52,000.00		$9,500.00	$16,421.84	$26,078.16	
Investment/Feasibility Project Specialist	**V (5570)**	$50,000.00				$8,107.99	
Sub-total		$210,000.00	$0.00	$9,500.00	$70,446.34	$87,894.65	$0.00

Budget Item	Budget Categories	Dutch Govt. WW053803 US$	2001 Expenditure	2002 Expenditure	2003 Expenditure	2004 Expenditure	2005 Expenditure
Contracts							
Centre of Microbiological Expertise	**V (5650)**	$188,778.54	$29,729.00	$46,666.00	$70,439.66	$41,943.88	
Other Institutions	**V (5650)**	$71,000.00	$29,729.00	$20,334.00		$20,937.00	
Sub-total		$259,778.54	$59,458.00	$67,000.00	$70,439.66	$62,880.88	$0.00
Equipment							
Laboratory Equipment	**I (6100)**	$229,000.00	$24,500.00	$88,502.49	$18,269.74	$97,727.77	
Pilot Plant/Coffee Dryers	**I (6100)**						
Supplies and Material	**III (6000)**	$121,000.00		$9,942.40	$38,181,60	$66,017.46	$4,458.86
Infrastructure	**I (6100)**	$70,000.00	$14,750.00	$4,000.00		$51,250.00	
Sub-total		$420,000.00	$39,250.00	$102,444.89	$56,451.34	$214,995.23	$4,458.86
General Operating Expenses & Supervision							
Evaluations	*IX*	*$8,000.00*	*Category IX funds not available to PEA but controlled by CFC (total = US$ 8,000)*				
General Operating Expenses	**VIII (6130 / 6300)**	$260,000.00	$17,295.00	$44,961.88	$77,255.47	$115,108.67	$4,123.67
Sub-total		$268,000.00	$17,295.00	$44,961.88	$77,255.47	$115,108.67	$4,123.67
GRAND TOTAL		**$1,500,000.00**	**$159,563.00**	**$351,800.55**	**$350,080.90**	**$564,774.70**	**$20,233.85**[29]

[29] A further US$3,654.99 of expenditure was made between 1st November 2005 and 31st December 2005, as reported to the CFC; US$41,892.01, as described in Section 4.1 above, was accrued into 2006.

Annex 4 - Project Equipment Purchased (US$500 and over)

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
Air Conditioning & Refrigerating Equipment						
	Air Conditioner	1		$931.00	KENYA S/N: 210KA04662-043995	ADM 41 - CRF Purchased 2003
	Air Conditioner	1		$931.00	KENYA S/N: 303KA00094-2AT015	ADM 41 - CRF Purchased 2003
	Air Conditioner	1		$1,365.00	UGANDA S/N: N/K	ADM 41 - UCDA Purchased 2002
	Lab Refrigerator "Klab" R1500c	1		$3,169.00	COTE D'IVOIRE S/N: 11767	137161
	Refrigerator "Sharp" SJ-68L-B2G	1		$681.00	INDONESIA S/N: D 02116	ADM 41 - ICCRI Purchased 2001
	Freezer, Lab Type Upright	1		$1,980.00	KENYA S/N: 10362	148586
	Refrigerator, "Ariston"	1		$799.00	KENYA S/N: 108160205-8117870101	ADM 41 - CRF Purchased 2002
	Refrigerator, "Daewoo"	1		$1,255.00	UGANDA S/N: 990904826	ADM 41 - UCDA Purchased 2002

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
Analysing & Measuring Equipment						
	"Dwyer Vane" Thermo-Anemometer VT-200	2		$636.00	UGANDA S/N: 02460774 & 02460763	134549
	Digital Thermo-Hygrometer "Rotronic" Hygropalm AW1-Set/40 Complete	1		$1,841.00	KENYA S/N: 142170-010 & 14459	137359
	Moisture meter, "Sinar" AP 6060	2		$4,162.00	INDIA S/N: 14671; 14668	ADM 41 - CBI Purchased 2001
	Portable Aw Measuring Set, "Novasina" MS1	1		$1,890.00	COLOMBIA S/N: 0211007/2	126961 (FPO 5-22790)
	"Novasina" portable Set AMS	1		$1,495.00	COLOMBIA S/N: 0305004	137341
	Moisture Analyzer, "Sinar" AP 6060	1		$1,627.00	KENYA S/N: 15587	126955 (FPO 5-22798)
	Digital Thermo-Hygrometer "Rotronic" Hygropalm Aw1-Set/40 Complete	1		$1,841.00	UGANDA S/N: 28101015	137376

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	"Rotronic" HygroLog-D Datalogger and HygroClip HP-28, S probes, cables	3	Dataloggers stolen in April 2004. Insurance claim paid and replacements purchased under PO 154099.	$3,150.00	UGANDA S/N: N/K	134489
	"Rotronic" HygroLog-D Datalogger and HygroClip HP-28, S probes, cables	5		$5,250.00	KENYA S/N: 27736-018; -013; -026; -005; -019 / 27476-014; -015; -016; -017; -018	134576
	"Rotronic" HygroLog-D Datalogger and HygroClip HP-28, S probes, cables	3		$3,150.00	COTE D'IVOIRE S/N: 27891010; 28477045; 28154040 & 26615002; 28167005; 26615001	137352
	"Rotronic" HygroLog-D Datalogger	3		$1,170.00	UGANDA S/N: 33065 048; 33065 045; 33065 046	154099
	"Solrad" 3 with CN3 pyranometer	1		$1,296.00	UGANDA S/N: 00494 - 3303008	134516
	"Solrad" 3 with CN3 pyranometer	1		$1,218.00	COLOMBIA S/N: 36597	137368
	"Solrad" 3 with CN3 pyranometer	1		$1,218.00	KENYA S/N: 00545	137364

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	"Solrad" 3 with CN3 pyranometer	1		$1,218.00	COTE D'IVOIRE S/N: 00526	137362
	"Novasina" portable set AMS Aw meter	1		$1,495.00	INDONESIA S/N: 0305003/2	137344
	Water activity analyser	1		$1,723.00	BRAZIL S/N: 0128232-000	ADM 41 – EMBRAPA Purchased 2002
	Digital pH meter	1		$1,128.00	BRAZIL S/N: 0128249-000	ADM 41 – EMBRAPA Purchased 2002
	"Novasina" enSARK-3 sensor	1		$901.00	COLOMBIA S/N: N/A	155526
	"Novasina" enMBRK-3 sensor	1		$1,050.00	COLOMBIA S/N: N/A	155526
	"Rotronic" Hygropalm Aw1	2		$3,682.00	COTE D'IVOIRE S/N: 26522017 / 26522018	132849
	Water Activity Analyser, "Hygrolab" Model 3 complete with activity station	1		$4,396.00	UGANDA S/N: 35065045	142870
	Portable Measuring Set "Novasina" MS1-Set Aw 230v	2		$3,780.00	KENYA S/N: 0211002/2; 0211003/2	126944 (FPO 5-22789)

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	"Novasina" Aw Sprint TH500 Aw meter 230v	1	Write off as item stolen from CRF in December 2003. Insurance claim made by CRF.	$8,000.00	KENYA S/N: T7630B	126944 (FPO 5-22789)
	Moisture Analyzer, "Sinar" AP 6060	2		$3,414.00	COTE D'IVOIRE S/N: 15677 / 15678	134968 (FPO 5-22791)
	Portable Meters, "Rotronic"	1		$3,281.00	INDIA S/N: 26569005	ADM 41 - CBI Purchased 2003
	Portable Meters, "Rotronic"	1		$3,281.00	INDIA S/N: 24977011	ADM 41 - CBI Purchased 2003
	Water Activity Measuring Equipment, "Novasina"	1		$2,328.00	COLOMBIA S/N: 0309009	143551
	Moisture Analyzer, "Sinar" AP 6060	1	Written off. Items never received as lost by courier. Insurance claim unable to be instituted as loss reported too late.	$1,962.00	BRAZIL S/N: N/A	147208
	Portable Measuring Set, "Novasina" MS1	1		$2,298.00	KENYA S/N: 0401007/2	147581

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Portable Measuring Set, "Novasina" MS1	1		$2,298.00	KENYA S/N: 0401008/2	147581
	"Novasina" Set Aw	1	Written off. Insurance claim made and full refund made to project.	$2,711.00	BRAZIL S/N: N/A	147164
	Moisture, "Sinar" AP 6060	1		$2,319.00	INDIA S/N: 15605	ADM 41 - CBI Purchased 2002
	Thermohygrometer "Hanna" HI-9161	1		$813.00	INDONESIA S/N: 111301	ADM 41 - ICCRI Purchased 2001
	"Garmin" GPS eTrex Vista	1		$721.00	COLOMBIA S/N:89859089	ADM 41 - CENICAFE Purchased 2004
Blending, Mixing & Shaking Equipment						
	Homogenizer, "OmniMixer" 600 Watt, Model 17106	1		$1,877.00	COTE D'IVOIRE S/N: 001450	155355
	Homogenizer, "OmniMixer" 600 Watts, Model 17106	1		$1,877.00	UGANDA S/N: 001413	155355
	Electric sample homogenizer, "Gehaka"	1		$771.00	BRAZIL S/N: 0128527-000	ADM 41 - EMBRAPA Purchased 2002

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Homogenizer/blender	1		$1,263.00	KENYA S/N: 05-005418	148586
	Stomacher	1		$6,169.00	KENYA S/N: 60380245	ADM 41 - CRF Purchased 2002
	Stomacher, Lab Blender 80-400 ml, "Mayo"	1		$1,690.00	COLOMBIA S/N: HG400	155507
	Homogenizer Stomacher Capacity 80-400 Ml 220v 50hz	1		$1,610.00	COTE D'IVOIRE S/N: 03/081	137162
	Environmental Shaker, "Orbitex" LE-IL(S)	1		$3,561.00	INDIA S/N: 200 3400 21	ADM 41 - CBI Purchased 2003
	Magnetic Stirrer	1		$681.00	KENYA S/N: 513704	ADM 41 - CRF Purchased 2004
	Shaking Water Bath, 270x225x140	1		$1,729.00	COTE D'IVOIRE S/N: 1402.0147	153025
	Shaking Water Bath, Volume 15 1	1		$1,729.00	KENYA S/N: 33626-Q34	148586
Boring, Grinding & Cutting Equipment						
	Mill, "Cyclotec" 230v 50hz	1		$4,185.00	UGANDA S/N: 403580302	134558

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	"Romer" RAS Sample Mill	1		$7,817.00	INDONESIA S/N: N/K	163328 (FPO 5-22794)
	"Romer" RAS Sample Mill	1		$7,817.00	KENYA S/N: 4689/G001-0008-3804	163328 (FPO 5-22794)
	"Romer" RAS Sample Mill	1		$7,817.00	COTE D'IVOIRE S/N: 04070210	163328 (FPO 5-22794)
	"Romer" RAS Sample Mill	1		$7,000.00	INDIA S/N: 04070202	178629
	"Romer" RAS Sample Mill	1		$7,000.00	UGANDA S/N: 05010211 / 565789001-00004-0705	178629
	"IKA" A11 Sample Mill	1		$1,241.00	INDONESIA S/N: 07.020695	150955
	"IKA" A11 Sample Mill	1		$1,241.00	KENYA S/N: 07020610	148563
	"McKinnon" coffee sample huller	1		$1,750.00	KENYA S/N: F206 J	ADM 41 - CRF Purchased 2004
	Sample grinder	1		$979.00	COTE D'IVOIRE S/N: 07.103227	137413
	Sample Mill, "Cyclotec"	1		$5,015.00	INDIA S/N: 391710210	ADM 41 - CBI Purchased 2002

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
Computer Printers, General						
	Printer "HP", LaserJet, 4200 Dtn, Q2428a	1		$2,105.00	FAO HQ S/N: CNFX411105	137799
	Printer "HP", LaserJet, 4200 Dtn	1		$2,296.00	UGANDA S/N: J6057a	141156 / 145474 / 140030
	Printer "HP", LaserJet 2200d	1		$850.00	COTE D'IVOIRE S/N: CNCCC00643	131942
	Printer "HP", LaserJet 2200d	1		$850.00	COTE D'IVOIRE S/N: CNCCC00634	131942
	Printer "HP", LaserJet 2200d	2		$1,520.00	KENYA S/N: CNCDD62309; CNCDD55221	134572
Generating Sets						
	Generator	1		$535.00	KENYA S/N: 2222186	ADM 41 - CRF Purchased 2003
Laboratory Equipment & Supplies						
	Island Table, "Modern Lab"	1		$1,943.00	INDIA S/N: N/A	ADM 41 - CBI Purchased 2001

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Island Table, "Modern Lab", without reagent rack and sink	1		$1,404.00	INDIA S/N: N/A	ADM 41 - CBI Purchased 2001
	Instrument table, granite top, "Modern Lab"	1		$713.00	INDIA S/N: N/A	ADM 41 - CBI Purchased 2001
	Laminar airflow, "Alpha"			$1,195.00	INDIA S/N: ASC/0025	ADM 41 - CBI Purchased 2002
	Autoclave	1		$3,228.00	COTE D'IVOIRE S/N: 002904	137161
	"Sonorex" Ultrasonic Bath T-710	1		$1,146.00	KENYA S/N: 000061024	149208
	Deioniser, 50-100 Lt. WP3000	1		$1,674.00	KENYA S/N: 0700259	148586
	Ultrasonic bath LDS 1,8	1		$1,094.00	KENYA S/N:33641-Q3A	148586
	Vacuum pressure pump	1		$599.00	KENYA S/N: 1351129	145586
	Vertical Laminar Flow	1		$4,992.00	KENYA S/N: 01-0054	ADM 41 - CRF Purchased 2003
	Rotary Evaporator, "Heidolph"	1		$4,875.00	INDIA S/N: 40307071	ADM 41 - CBI Purchased 2003
	Lab. Oven "Sanyo-Gallenkemp"	1		$2,034.00	INDIA S/N: 20506006	ADM 41 - CBI Purchased 2003

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Humidity Chamber, "Sanyo" MLR-350H	1		$8,993.00	INDIA S/N: 21113312	ADM 41 – CBI Purchased 2002
	Water Bath	1		$3,160.00	COTE D'IVOIRES/N: 33627	ADM 41 – CNRA Purchased 2002
	Incubator, BD 115 Lts.	1		$2,765.00	COTE D'IVOIRE S/N: F504-0024-Q3A	ADM 41 – CNRA Purchased 2002
	Ultrasonic Bath	1		$2,074.00	UGANDA S/N: 03-2391-1200203317007	ADM 41 – UCDA Purchased 2002
	Laboratory Oven "Memmert Gmbh"	1		$2,026.00	INDIA S/N: g502-0192	ADM 41 – CBI Purchased 2002
	Laboratory Oven "Memmert Gmbh"	1		$2,026.00	INDIA S/N: g502-0193	ADM 41 – CBI Purchased 2002
	Lab. Oven JIRC 7	1		$947.00	UGANDA S/N: 1833	ADM 41 – UCDA Purchased 2002
	Vacuum cleaner, "Euroclean" 1000W wet and dry	1		$1,337.00	UGANDA S/N: N/K	ADM 41 – UCDA Purchased 2002
	De-ioniser "So-Safe"	1		$546.00	UGANDA S/N: N/K	ADM 41 – UCDA Purchased 2002
	Autoclave "All American" 1941 X	1		$510.00	INDONESIA S/N: N/K	ADM 41 – ICCRI Purchased 2001

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Ultrasonic bench top cleaner "ELMA" LC-30 H	1		$978.00	INDONESIA S/N: 12471071	ADM 41 - ICCRI Purchased 2001
	Eye-wash station (fixed unit)	1		$600.00	UGANDA S/N: N/A	ADM 41 - UCDA Purchased 2002
	"Supelco" Visiprep Vacuum Manifold	1		$757.00	INDONESIA S/N: 00939	153961
	Vertical autoclave, 75l	1		$880.00	BRAZIL S/N: 0128534-000	ADM 41 - EMBRAPA Purchased 2002
	Vertical autoclave, 30l	1		$511.00	BRAZIL S/N: 0128535-000	ADM 41 - EMBRAPA Purchased 2002
	BOD incubator	1		$3,463.00	BRAZIL S/N: 0128536-000	ADM 41 - EMBRAPA Purchased 2002
	Bacterial incubator, "Memmert" BE 500	1		$1,490.00	BRAZIL S/N: e504.0035	148529
	Forced air oven, ULM 500	1		$1,339.00	BRAZIL S/N:504.0025	149966
	Forced air oven, ULM 500	1		$1,339.00	KENYA: S/N: DIN40050:IP20	149966
	Forced air oven, ULM 500	1		$1,339.00	COLOMBIA S/N: 0701697	149966
	Forced air oven, ULM 500	1		$1,339.00	COTE D'IVOIRE S/N: F504.0024	149966

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	"Ampulmatic" Ampoule Sealer	1		$5,186.00	BRAZIL S/N: AMP-0074	156152
	Water Still "Fissons" WH/A/250	1		$1,288.00	KENYA S/N: 8022	ADM 41 – CRF Purchased 2002
	Temperature regulated water bath	1		$844.00	KENYA S/N: 1301-0685 / 400056-IP20	ADM 41 – CRF Purchased 2002
	Vacuum Manifold, 24 places	1		$1,853.00	KENYA S/N: 57250-U	148563
	Air compressor / vacuum pump	1		$919.00	KENYA S/N: 328534	148563
	Vacuum pressure pump, 2 stages	1		$599.00	KENYA S/N: 1351129	148586
	Deioniser	1		$584.00	KENYA S/N: 13114	ADM 41 – CRF Purchased 2002
	Fume hood	1		$1,359.00	COTE D'IVOIRE S/N: 2-447-709559	137417
	Air pump	1		$546.00	COTE D'IVOIRE S/N: 1570271	137413
	Vacuum manifold – "Vac Elut" SPS 24	1		$1,483.00	COTE D'IVOIRE S/N: No serial #	137413
	"Memmert" Incubator BE 500	2		$2,444.00	COTE D'IVOIRE S/N: E503-0490; E503-0491	137160

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Nalgene Dessicator Cabinet	1		$600.00	COTE D'IVOIRE S/N: 5317-0180	145532
	Scrubber Unit, "Apan Scientific"	1		$1,065.00	INDIA S/N: BRGS 6205 ZZ	ADM 41 – CBI Purchased 2003
	Incubator, 110 Lt	1		$1,558.00	KENYA S/N: 23802	ADM 41 – CRF Purchased 2002
	Air Oven, FC 2cfd	1		$1,558.00	KENYA S/N: 0230431	ADM 41 – CRF Purchased 2002
	Vacuum Manifold SPS 24	1		$4,077.00	UGANDA S/N: 1223-4003 / 1050	ADM 41 – UCDA Purchased 2002
	Vacuum Pump	1		$4,913.00	UGANDA S/N: 102.2044922002	ADM 41 – UCDA Purchased 2002
Optical Equipment, Stereoscopes						
	Microscope Trinocular, "Steddy T"	1		$1,257.00	COLOMBIA S/N: 66344	154529
	Microscope Trinocular, "Steddy T"	1		$1,257.00	INDIA S/N: 56703	148957
	Microscope, "Trino Triton"	1		$2,119.00	COTE D'IVOIRE S/N: 062847	134561
	Microscope Trinocular, "Steddy T"	1		$898.00	COTE D'IVOIRE S/N: 056666	134561

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Binocular Microscope, X10	1		$584.00	KENYA S/N: 0039169	ADM 41 – CRF Purchased 2002
	Microscope, "Olympus" Contrast	1		$4,470.00	INDIA S/N: 2A-00788	ADM 41 – CBI Purchased 2002
	Microscope, "Olympus" Contrast	1		$4,470.00	INDIA S/N: 2A-00781	ADM 41 – CBI Purchased 2002
Personal Computers						
	Computer Desktop, "Dell" Optiplex Model GX270, 17" Monitor	1		$1,518.00	UGANDA S/N: DSIN-MY-08J85 14-46632-IAC-8351	141244
	Computer Desktop, "Dell" Optiplex Model GX270, 17" Monitor	1		$1,195.00	COTE D'IVOIRE S/N: 7SQV513 / CN-04N741-71616-43CO-OH11	153663
	Computer, "Dell" Optiplex GX 260 Complete with accessories	2		$2,657.00	KENYA S/N: DSKPQOJ / FSKPOOJ	133317
	Computer, "Dell" Pentium IV C840 Complete with accessories	2		$4,419.00	KENYA S/N: 65044A02 / 6J044A02	133317
	Computer, "IBM" Netvista	1		$2,129.00	KENYA S/N: KBKACB4	ADM 41 – CRF Purchased 2002

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Computer, "Toshiba" Notebook 5105-S501	1		$2,520.00	INDONESIA S/N: 82131617P	ADM 41 – ICCRI Purchased 2002
	Computer, "Zyrex" P IV/30	1		$1,611.00	INDONESIA S/N: No serial #	ADM 41 – ICCRI Purchased 2001
	Computer, "Presario" Laptop	1		$1,933.00	INDIA S/N: P 250LDLZ0090	ADM 41 – CBI Purchased 2002
	Computer,"Presario" 6171	1		$1,224.00	INDIA S/N: P246 LFM 70 262	ADM 41 – CBI Purchased 2002
	Computer, "HP" Pavillion Model 8854	1		$1,342.00	INDIA S/N: SG 10761160	ADM 41 – CBI Purchased 2001
	Computer, "HP" Pavillion Model 8853	1		$1,557.00	INDIA S/N: SG 107 63635	ADM 41 – CBI Purchased 2001
	Computer, "HP" Pavillion Model 8854	1		$1,557.00	INDIA S/N: SG 10763669	ADM 41 – CBI Purchased 2001
	Intel Pentium IV Notebook	3		$5,278.00	BRAZIL S/N: 0128231-000; 0128229-000; 0128230-000	ADM 41 – EMBRAPA Purchased 2002
	Intel Pentium IV Notebook	1		$2,450.00	BRAZIL S/N: 0128633-000	ADM 41 – EMBRAPA Purchased 2003

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
Photographic and Cinematographic Equipment						
	Digital Camera, "Olympus" Camedia C4000	1		$772.00	INDIA S/N: 239109299	ADM 41 – CBI Purchased 2003
	Digital Camera, "Nikon" Coolpix 5700	1		$1,286.00	INDONESIA S/N: 7005139	ADM 41 – ICCRI Purchased 2002
	Digital Camera	1		$2,405.00	BRAZIL S/N: 0128233-000	ADM 41 – EMBRAPA Purchased 2002
	Digital Camera	2		$2,643.00	BRAZIL S/N: 0128222-000; 0128223-000	ADM 41 – EMBRAPA Purchased 2002
	"Canon" G5 digital camera	1		$1,294.00	BRAZIL S/N: 0128634-000	ADM 41 – EMBRAPA Purchased 2003
	Digital Camera, "Sony" DSC-F717	1		$795.00	COLOMBIA S/N: 3-072-575-01	144251
Portable Computers, Laptops, Notebooks						
	Laptop Computer, "Dell" P2l Latitude C840	2		$4,769.00	COTE D'IVOIRE S/N: CN-03JO10-12961-31F-8284 S/N: CN-03JO10-12961-32B-2249	130935

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Computer "Dell", P2m, Latitude D800, 1.40ghz, 512MB RAM, 20GB HDD	1		$2,435.00	COLOMBIA S/N: 932RY	141987
	Computer "Dell", P2m, Latitude D800, 1.40ghz, 512MB RAM, 20GB HDD	1		$2,429.00	UGANDA S/N: D52RW0J	140904
Projectors						
	Slide Projector "Kodak" Ektallite 1500 Auto-Focus 24x36mm	1		$1,475.00	KENYA S/N: 10547	134572
Spectral Measuring Equipment						
	High Performance Liquid Chromatography system, "Shimadzu"	1		$28,065.00	INDONESIA Serial Numbers: C 20954070892 US (RF 10A XL) C 21044002673 KL (CTO-10 Asvp) C 21014010447 CD (SCL-10A vp) C 20964011284 LP (LC-10 AD vp) C 210844003390 KL (LC-10 AD vp) C 20924006700 CR (DGU 14 A)	123980

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	"Chromato-Vue" With Ultraviolet Light	1		$2,464.00	UGANDA S/N: M03-3075	142581
	Multi-Channel Fluorescence Detector, "Waters" 2475	1		$14,582.00	COLOMBIA S/N: M03475	144348
	"Chromato-Vue" With Ultraviolet Light	1		$2,464.00	KENYA S/N: 0414785	153868
	Modular "Shimadzu" HPLC System	1		$65,970.00	UGANDASerial Numbers:C20954103850 YS (RF 10A XL) C21044133134 CS (CTO-10Asvp) C21014104126 LP (SCAL-10Avp) C20964130252 CS (LC-10 ADvp) C21084104395 (FCV-10Alvpl+DGU-14A) 4703 (7725i Reodyne Loop Injector) 700BJ ALUEL 312 DIK8561 (Intel Pentium IV PC MODEL NO. C17JC-7 STUDIO 700S)	147093
	Spectrophotometer, "Shimadzu" RF-10AXL	1		$16,800.00	COTE D'IVOIRE S/N: C20954104200YS	156773

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Spectrophotometer	1		$9,667.00	UGANDA S/N: 3SGE330006	ADM 41 - UCDA Purchased 2002
	Chromatography, "Shimadzu" Data System	1		$25,480.00	COTE D'IVOIRE S/N: C21014114895CD	156773
	Fluorometer, V1-S4 "Vicam"	1		$8,458.00	UGANDA S/N: A1493	144392
	UV cabinet for chromatography	1		$613.00	BRAZIL S/N: 0128495-000	ADM 41 - EMBRAPA Purchased 2002
	"Chromato Vue" C-70g with Ultraviolet Light	1		$2,464.00	COTE D'IVOIRE S/N: C21003770182US	137413
	Gas Chromatography, "Thermo Finnigan"	1		$2,543.00	INDIA S/N: 20023274	ADM 41 - CBI Purchased 2002
Video Camera						
	Digital Video Camera, "Sony" DSC F707	1		$810.00	KENYAS/N: 140458V	126778
	Video Camera "Sony" Digital DSC F717 Cybershot	1	Unserviceable no longer in use - written off.	$1,025.00	COTE D'IVOIRE S/N: S01-1409778-M	131942
Video Projectors, Colour						
	Video Projector "Infocus" LP 530	1		$2,203.00	INDIA S/N: 7 KN 35 190910	148220

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	Video Projector "Infocus" LP 530	1	Unserviceable no longer in use - written off.	$3,350.00	COTE D'IVOIRE S/N: 7KN34490353	144776
	Video Projector LCD "Infocus" LP 530	1	Unserviceable no longer in use - written off.	$3,350.00	KENYA S/N: 7KN31790065	134572
	"Philips" bClever SV1 video projector	1		$725.00	KENYA S/N: MVC60348010420	176025
	Projector, "Panasonic" Multimedia	1		$5,193.00	INDONESIA S/N: SE 2440066	ADM 41 - ICCRI Purchased 2002
Weighing Equipment, Micrometers, Gauges						
	Electronic Balance, Media 2-Place	1	Unserviceable no longer in use - written off.	$1,558.00	KENYA S/N: Ae06462662	ADM 41 - CRF Purchased 2002
	Balance, Two Place Torsion	1		$1,818.00	KENYA S/N: 53140180	ADM 41 - CRF Purchased 2002
	Top loading balance, "Adams" AFP 2100L	1		$897.00	COLOMBIA S/N: 239119398	155518
	"Adams" AFP-720L top loading analytical balance	1		$1,239.00	KENYA: S/N: BB 4144	168008

Category description	Equipment description	Number	Write-off details	Purchase cost	Country & Serial number	PO Number/ ADM 41
	"Setra" top loading analytical balance, BL 4100S	1		$632.00	KENYA S/N: CAP 4100	167540
	AAA 250 LE Analytical Balance	1		$1,482.00	KENYA S/N: N9503	149112
	Analytical balance ABS 120-4	1		$755.00	COTE D'IVOIRE S/N: WB 0300015	137417
	"Setra" top loading analytical balance, BL 4100S	1		$632.00	UGANDA S/N: BB1068	154415
	Digital top loading balance "AMD" GF 2000	1		$903.00	INDONESIA S/N: 14602859	ADM 41 - ICCRI Purchased 2001
	Analytical balance "AND" GR 200	1		$1,534.00	INDONESIA S/N: 14205023	ADM 41 - ICCRI Purchased 2001
	Analytical Balance, "Mettler Toldeo"	1		$1,513.00	INDIA S/N: B2 04-S	ADM 41 - CBI Purchased 2002
	Analytical balance ABS 220-S	1		$2,059.00	COTE D'IVOIRE S/N: WB 0310147	144771

ADM 41 = Annual FAO Report of Equipment Purchased Locally

Total purchase value = $549,017.00

This document relates the principal management findings of a 5-year global project: 'Enhancement of Coffee Quality through the Prevention of Mould Formation'.

In the late 1990s the occurrence of a fungal mycotoxin, ochratoxin A (OTA), in coffee from various origins was reported. This project was designed to address the concerns of coffee-producing countries in building their capacity to reduce mould and OTA contamination in coffee, and the consumer heath concerns of regulatory bodies worldwide. The project focused on assisting coffee-producing countries to develop and implement national prevention programmes through field investigations and training in relevant disciplines.

Seven major coffee-producing countries were directly involved in the project: Brazil, Colombia, Côte d'Ivoire, India, Indonesia, Kenya and Uganda, covering all major coffee-producing regions, and commercially traded varieties.

This report details key management conclusions, and suggests various recommendations for future project design, implementation, supervision and management, based on the Project executing Agency's experiences and operational lessons learned.

The project was funded with grants from the Common Fund for Commodities and the Government of the Netherlands, and support from the European coffee industry. It was implemented under the supervision of the International Coffee Organization, and executed on behalf of the above by the Food Quality and Standards Service of the Food and Agriculture Organization of the United Nations.

An enclosed CD-Rom contains electronic versions of this report, the Final Technical report, and various third-party reports and studies commissioned by the project are included in over 30 separate Annexes.

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