Coffee Research Foundation

An official organisation under the Coffee Board of Kenya

ANNUAL REPORT AND ACCOUNTS

1990-1991

ANNUAL REPORT AND ACCOUNTS OF THE COFFEE RESEARCH FOUNDATION (CRF) FOR THE YEAR ENDED 30TH SEPTEMBER 1991

STATEMENT BY THE CHAIRMAN OF THE BOARD

1.1 Introduction

The current Board of the Coffee Research Foundation (CRF) was reconstituted on 7 March 1991.

Four Board meetings were held during the year under review. In addition, Board members attended regular quarterly meetings as well as sub-committee and special meetings, when necessary, of the following standing committees:

1. Finance/Tender Committee
2. Coffee Research Advisory Committee (CRAC)
3. Staff Committee

The Annual General Meeting of subscribers was held on 14 November 1991.

1.2 Research Activities

The main research activities for the year under review have been outlined in this report. As has been the case in the previous year, major emphasis was laid on protecting the crops against diseases and insect pests. Five new fungicides were recommended for the control of Coffee Berry Disease during the year under review. Also recommended was another lot of six new fungicides for the control of Leaf Rust disease. However, screening and evaluation of new fungicides is in progress as indicated in this report.

The CRF continued to focus on research aspects geared towards lowering the cost of producing coffee. These include continued work on production and release of Ruiru 11 by seed as well as by Vegetative Propagation (VP) method. Plans are also underway to use Tissue Culture as a supplementary method of producing Ruiru 11. In the meantime, it should be noted that the cumulative acreage under Ruiru 11 from the time the Programme started in 1986/87 to September 1991 is about 4,000 hectares. The VP method of top working was used on coffee orchards on experimental basis in certain areas near the Coffee Research Station (CRS).

Emphasis continues to be laid on the integrated method of insect pest control with particular emphasis on Biological Control using locally available parasites and predators of the pests. The target pests for Biological control include: scale insects, Antestia bugs, Giant Loopers. Efforts are also being made to include other pests such as Leafminers, Berry borers and Berry moths in our future studies for Biological Control.

The Economics Section continued to monitor the cost of coffee production in Kenya. The average cost of production in the Smallholder Sector during 1990/91 was KShs.48,020/- (Forty eight thousand and twenty) per tonne of clean coffee compared to Ksh.43,280/- (Forty three thousand, two hundred and eighty) in the Estate Sector during the same year.

Work continued in providing routine services to coffee growers in the areas of soil and leaf analysis as well as Advisory and Training. Farmers' education through Agricultural Society of Kenya (ASK) Shows and Field Days continued.

1.3 Staff Matters

As indicated elsewhere in this report, twelve Senior Staff were recruited during the year to replace those who left the CRF. On the other hand, five Senior Staff members left the CRF during the year. Training of staff continued mainly for senior staff who included three Research Offices for Ph.D. and one for MSc. degrees. Four Research Officers and one Field Officer travelled outside the country to attend either conferences or courses during the year as part of their training and research awareness in modern techniques. Those who benefited from the local and overseas training are indicated in this report.

1.4 Finances

There was a decrease in Research Reserve Fund during the year under review, from KSh. 6,352,871 in 1990 to KSh. (6,598,318) in 1991. This arose as a result of an increase of the CRF Recurrent Expenditure by 27.4% from KSh. 68,144,132 in 1990 to KSh. 86,820,151 in 1991. The increase in the recurrent expenditure was as result of the increase in staff costs due to implementation of revised staff salaries and also inflationary cost increase of transport expenses and general maintenance of the CRF Station.

Total Income rose only by 21.7% from KSh. 66,869,612 in 1990 to KSh. 81,409,412 in 1991. The increase in Income could not match the increase in Recurrent Expenditure.

1.5 Future Plans

The CRF is looking for ways and means of growing coffee cheaply by introducing Vegetative Propagation of Ruiru 11 variety in addition to seed production.

Another aspect of reducing the cost of growing coffee is by Tissue Culture method. The CRF is therefore planning to build appropriately designed facilities for Tissue Culture Work at the CRS. One key personnel has been trained on Tissue Culture techniques outside the country in order to transfer the latest modern technology to the CRF. In the meantime, the seed production method has been refined by improving fruit set by 15%. Therefore about two metric tonnes of seed will be expected during 1991/92 as opposed to only about one tonne produced in 1989/90.

The CRF also refined the DUDU BANK project work which was started in 1990. Additional insect predators and parasites have been collected from coffee in the field, and reared at the Coffee Research Station (CRS) Ruiru for distribution into the farmers' fields. The idea is to promote Biological Control on Kenya coffee instead of using expensive insecticides. This will also promote a clean environment.

All the above plans on Vegetative Propagation, Tissue Culture and Biological Control of insect pests will need additional finances to implement. Therefore it is hoped that more funds will be made available for the planned research activities mentioned in this report. There is also need to find money for buying the equipment needed for the newly built laboratories.

There are plans to build a Hostel Complex comprising of (1) Lecture Theatre (2) Dining Hall, (3) Students' Hostel and (4) Staff Flats in future. The complex will be funded by the grant obtained from the World Bank funds under the Second Coffee Improvement Project (SCIP II) sponsored by the government.

Abraham M. Mwangi
Chairman

COFFEE RESEARCH FOUNDATION
MEMBERS OF THE BOARD

Mr. A.M. Mwangi
Chairman

Dr. Wilson R. Opilé
Director of Research

Mr. M. Njiru

Mr. J.E. Muhia
Secretary

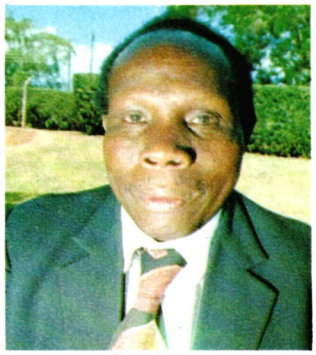
Mr. P. Mwangi

Mr. S.C. Muchiri

Mrs. N.N. Kaminchia

Miss B.W. Kingori

Mr. R.M. Wamakau



Rev. E. Kabii

Dr. B.W. Ngundo

Dr. M. Isiakho

Prof. K. Waithaka

Mr. S.M. Kibathi

Mr. J. O. Apuoyo

COFFEE RESEARCH FOUNDATION
HEADS OF SECTIONS

Mr. J.E. Muhia
Chief Accountant Co- Secretary

Mr. P.K. Michori
Deputy Director of Research

Mrs. D.M Masaba
Plant Pathology

Mr. M.P.H. Gathaara
Crop Physiology

Mr. J. Mburu Njoroge
Head, Field Experimental Agronomy (CRF)

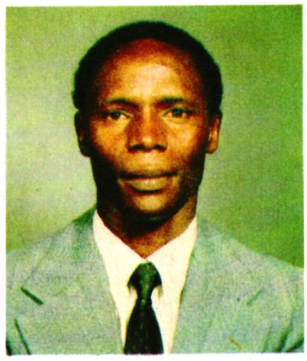
Mr. C.O. Agwanda
Plant Breeding

Mr. J. N. Mburu
Chemistry (Acting)

Miss A.W. Wainaina
Entomology (Acting)

Mr. A.M. Karanja
Agricultural Economics (Acting)

Mr. C.B Nyakeri
Internal Auditor



Mr. J.M. Maina
Senior Estates Officer

Mr. E. K. Maina
Administrative Manager

Mr. M.K. Nyagah
Research Liaison Training & Advisory

ANNUAL REPORT AND ACCOUNTS OF THE COFFEE RESEARCH FOUNDATION FOR THE YEAR ENDED 30TH SEPTEMBER 1991

Registered Office: Coffee Research Station
P.O. Box 4 Ruiru, Kenya
Telephone: Thika
21047/21092
22652/22653

2.0 BOARD OF DIRECTORS AS AT 30 SEPTEMBER 1991

Mr. A.M. Mwangi	—	Chairman
Mr. M. Njiru		
Mr. P. Mwangi	—	Chairman, Coffee Board of Kenya
Dr. M. Isiaho		
Mr. R.M. Wamakau		
Rev. E. Kabii		
Dr. E. Nyanjui		
Mr. S.C. Muchiri		
Dr. M.W. Oggema	—	Ministry of Agriculture
Dr. Cyrus C. Ndiritu	—	Director, Kenya Agricultural Research Institute (KARI)
Mr. E. Kandie	—	Director of Agriculture Ministry of Agriculture
Dr. Wilson R. Opile'	—	Director of Research Coffee Research Foundation
Mr. J.E. Muhia	—	Secretary

Co-opted Members

Prof. D.M. Mukunya	—	Dean, Faculty of Agriculture University of Nairobi
Mr. S.M. Kibathi		
Mr. J.A. Odoyo		

Mr. P. Mwangi and Dr. C.G. Ndiritu were due to retire by rotation and being eligible, were re-elected.

Four meetings were held during the year as follows:-

- One Hundred seventh Board Meeting held on 15 November, 1990.
- One Hundred eighth Board Meeting held on 14 February 1991.
- A special Board Meeting held on 7 March, 1991.
- One Hundred ninth Board Meeting held on 23 May, 1991.
- One Hundred tenth Board Meeting held on 15 August, 1991.

The Annual General Meeting of the Subscribers was held on 14 November, 1991.

2.1 COFFEE RESEARCH ADVISORY COMMITTEE (CRAC)

Dr. B.W. Ngundo	—	Chairman
Prof. K. Waithaka	—	Representative of Dean of the Faculty of Agriculture, University of Nairobi.
Mr. A.M. Mwangi	—	Chairman of CRF Board
Dr. Wilson R. Opile'	—	Director of Research CRF
Mr. Ben L. Psirimoi	—	Bungoma (Small Scale)
Mr. Mike Harries	—	Large Scale (Thika)
Mr. A.M. Michaelides	—	Ruiru (Large Scale)
Mr. J.M. Mathenge	—	Solai/Subukia (Large Scale)
Mrs. M. Ntipilit	—	Kajiado (Small Scale)
Dr. E. Nyanjui	—	Thika (Large Scale)
Mrs. N.N. Kaminchia	—	Representative of the Director of Agriculture Ministry of Agriculture
J.K. Kinoti	—	Representing General Manager, CBK.
Mr. M. Njiru	—	Kirinyaga (Small Scale)
Mr. Walter Wambu	—	Murang'a (Small Scale)
Mr. M.S. Kagwanja	—	Embu (Small Scale)
Mr. J.M. Nzioki	—	Machakos (Small Scale)
Mr. W. Kisaka	—	Trans-Nzoia (Large Scale)
Mr. A.G. Mwireria	—	Meru (Small Scale)
Mr. J.A. Odoyo	—	South Nyanza (Small Scale)
Mr. P.K. Kagwanja	—	Representing Commissioner for Co-operative Development
Mr. C.N. Maina	—	Representing Project Manager, SCIP
Mr. J.M. Kingangi	—	Representing Managing Director, KPCU
Dr. M.W. Oggema	—	Ministry of Agriculture
Mr. J. Mabeya	—	Kisii (Small Scale)
Mr. M. Mugho	—	Taita (Small Scale)
Mr. H.M. Mwangi	—	Ministry of Co-operative Development
Mr. P.K. Michori	—	Deputy Director of Research/Secretary
Mr. J.E. Muhia	—	Chief Accountant/ Company Secretary

Four meetings were held during the year as follows:

- one hundred and seventy eighth meeting on 25 October 1990.
- One hundred and seventy ninth meeting on 24 January 1991.
- One hundred and eightieth meeting on 25 April 1991.
- One hundred and eighty first meeting on 25 July 1991.

3.0 Staff

3.1 Promotions

The following Senior Staff promotions were approved by the CRF Board to take effect from 1 October 1990 according to respective schemes of service:

Mr. P.K. Michori, B.Sc. (Nbi), M.Sc. (Reading), Principal Research Officer and Deputy Director of Research was promoted to Senior Principal Research Officer.

Mr. J.B. Maroko, B.Ed., Sci. (Nbi), M.Sc. (Nbi), Senior Research Officer II was promoted to Senior Research Officer I.

Mr. J.K. Mburu, B.Sc., Agric., Eng. (Nbi), Research Officer I, was promoted to Senior Research Officer II.

Mr. P.K. Mason, B.Sc., Agric., Eng. (Nbi), M.Sc. (Silsoe), Research Officer II, was promoted to Research Officer I.

Mr. E.I. Njeru, B.Sc. (Nbi), M.Sc. (BGSU-USA), Research Officer I, was promoted to Senior Research Officer II.

Mr. J.K. Kimemia, B.Sc., Agric. (Nbi), M.Sc. (Andra Pradesh), Research Officer I, was promoted to Senior Research Officer II.

Mrs. J.W. Kahia, B.Sc. (Jabalpur), M.Sc. (Lucknow), Research Officer I, was promoted to Senior Research Officer II.

Mr. C.O. Agwanda, B.Sc., Agric. (Nbi), M.Sc. (Nbi), Research Officer I, was promoted to Senior Research Officer II.

Mr. P.N. King'ori, B.Sc., Agric. (Nbi), M.Sc. (Tokyo), Research Officer I, was promoted to Senior Research Officer II.

Mr. J.K. Nyoro, B.Sc., Agric. (Nbi), M.Sc., Agric. Econ (Wye), Senior Research Officer II was promoted to Senior Research Officer I.

Mr. D.N. Njiru, B.Sc., Agric. (Nbi), Advisory Officer I, was promoted to Senior Advisory Officer.

Mr. J.M. Gitau, Cert. Agric. (Bukura), Cert. Earth Sci. (Kenya Poly), Field Officer II, was promoted to Senior Field Officer II.

Mr. G.K. Ng'ang'a, Cert. Agric. (Embu), Field Officer III, was promoted to Field Officer II.

Mr. S.K. Kamau, Cert. Statistics (RSA), Field Officer III, promoted to Field Officer II.

Mr. J.J. Andiki, Dip., Agric. (Egerton), Senior Field Officer II, promoted to Senior Field Officer I.

Mr. J.S.M. Gathuo, Field Officer III, promoted to Field Officer II.

Mr. C.M.S. Nyangena, Dip., Agric. (Egerton), Senior Field Officer I, was promoted to Senior Field Advisory Officer.

Mr. C.M. Maina, SLT II (Kenya Poly), Laboratory Technician I, promoted to Senior Laboratory Technician.

Mr. K.M. Gitau, HND App. Sci. (Kenya Poly), Senior Laboratory Assistant, promoted to Labora-tory Technician.

Mr. D.N. Miingi, Cert. Social Welfare & Admin. (KIA), Senior Administrative Assistant, promoted to administrative Officer.

Mr. F.O. Bolo, CPS I & II, Administrative Assistant, pro-moted to Senior Administrative Assistant.

Miss J.N. Ndario, Dip. Inst. Management (Kenya Poly), House-keeper I, promoted to Assistant Cateress.

Mrs. P.M.W. Kahura, Senior Personal Secretary, promoted to Executive Officer.

Atieno Odeyo, Technical Secretary II, promoted to Personal Secretary II.

Sarah Oduma, Technical Typist I, promoted to Technical Secretary II.

C.N.A. Ngwaye, Senior Storeman, promoted to Supplies Assistant.

3.2 Appointments

Mr. A.S.K. Maithia, Dip. Agric. (Egerton), Dip., Agric. (CIMMYT), Senior Field Advisory Officer (Pathology), was appointed Farm Manager, Azania Farm, w e f 5 November 1990.

Miss M.W. Kinuthia, B.Sc., M.Sc., Senior Research Officer (Entomology), was appointed Acting Head of Entomology Section w e f 1 December 1990.

Mr. J.N. Mburu, B.Sc., M.Sc. Senior Research Officer, was appointed Acting Head of Chemistry Section w e f 1 January 1991.

Mr. A.K. Ng'ethe, Field Officer, Agronomy Section, was appointed Officer-in-Charge, Mariene Coffee Research Sub-station w e f 11 February 1991.

3.3 Recruitments

Mrs. L.W. Njeru, B.Sc., Agric., M.Sc., joined CRF Service as Advisory Officer in Research Liaison, Training & Advisory Section w e f 1 October 1990.

Mr. M.W. Kingo'ro, Dip., Agric. (Egerton), joined CRF Service as Field Officer in Plant Breeding section w e f 15 November 1990.

Miss P.N. Mbataru, joined CRF Service as Bilingual/ Technical Secretary in Administration Section w e f 1 March 1991.

Mr. J.T. Thuo, B.Sc., joined CRF service as Research Officer (Analytical Chemist) w e f 5 August 1991.

Mrs. S.A. Orwa, Dip. Applied Chem. joined CRF service as Laboratory Technician in Chemistry Section w e f 6 August 1991.

Miss L.K. Muturi, B.Sc., Agric., took up appointment as Research Officer in Economics Section w e f 8 August 1991.

Mrs. P.N. Muriithi, joined CRF Service as Technical Secretary in Administration Section w e f 19 August 1991.

Miss A.W. Wainaina, B.Sc., M.Sc., joined CRF Service Research Officer in Entomology Section with effect from 19 August 1991.

Mr. N.O. Olang'o, B.Sc., joined CRF Service as Research Officer (Quality Chemist) in Chemistry Section w e f 2 September 1991.

Mr. H.M. Mugo, B.Sc., joined CRF Service as Research Officer in Entomology Section w e f 2 September 1991.

Mr. A.M. Karanja, B.Sc., joined CRF Service as Research Officer in Economics Section w e f 2 September 1991.

Mr. M.M. Kariri, Dip. Applied Sci.; Higher Dip. in Applied Chem., joined CRF Service as Laboratory Technician in Chemistry Section w e f 9 September 1991.

3.4 Departures

Dr. F.M.E. Wanjala, B.Sc., M.Sc., Ph.D., formerly Head of Entomology Section resigned from CRF Service w e f 30 November 1990.

Mr. S.M. Njoroge, B.Sc., M.Sc., Senior Research Officer (Quality Chemist) left CRF Service w e f 5 October 1990.

Mr. J.B. Maroko, B.Sc., M.Sc., formerly Head of Chemistry Section, left CRF Service w e f 31 December 1990.

Mr. D.M. Mwangi, Typesetter in Administration Section, left CRF Service w e f 13 June 1991.

Mr. E.I. Njeru, B.Sc., M.Sc., Senior Research Officer in Entomology Section, left CRF Service on 14 August 1991.

3.5 Training

Mr. J.M. Gitau, Senior Field Officer, Chemistry Section attended the International Course in Soil and Plant Analysis for six months w e f 15 October 1990 at the Royal Tropical Institute in Amsterdam, the Netherlands. He was awarded a fellowship to attend the course by the Netherlands Fellowship Programme.

Mr. S.D. Gatua, Senior Accountant was sponsored for the CPA Part III course at the Kenya Institute of Administration w e f 7 January 1991 by the CRF.

Mr. J.O. Wasambla, Field Assistant, Crop Physiology Section was sponsored by the CRF to pursue a three year diploma course in Agricultural Engineering at the Jomo Kenyatta University College of Agriculture & Technology w e f 22 October 1990.

Mr. P.M. Mbucho, Senior Laboratory Assistant, Chemistry Section was sponsored by the CRF to undertake a five-year diploma course in Food Technology at the Kenya Polytechnic w e f January 1991.

Dr. (Mrs.) D.M. Masaba, B.Sc., M.Sc., Ph.D., Head of Pathology Section, successfully completed her training for Ph.D. degree at the University of Reading, England, on 24 August 1991. Her Ph.D. thesis was entitled: "The Role of Saprophytic Surface Microflora in the Development of Coffee Berry Disease *(Colletotrichum coffeanum)* in Kenya."

Miss M.W. Kinuthia, B.Sc., M.Sc., Senior Research Officer, attended a one month course on "Biological Control of Food Crop Pests (Biocontrol Training)" in Cotonou, Republic of Benin from 13 September 1991. The Food and Agricultural Organisation of the United Nations (FAO) sponsored her to attend the course.

3.6 Conferences/Seminars

Dr. Wilson R. Opile', Director of Research, attended the International Service for National Agricultural Research (ISNAR) Workshop on Monitoring and Evaluation (M+E) in National Agricultural Research Systems from 12 — 14 November 1990 in the Hague, the Netherlands.

Dr. Opile' also attended the Brighton Crop Protection Conference on Pests and Diseases in London from 19 — 22 November 1990.

Dr. Opile' also participated in the Directors' Forum for ICIPE's Strategic framework for the 1990's and its linkages with the National Programmes held at the International Centre for Insect Physiology and Ecology (ICIPE) headquarters at Duduville, Nairobi from 3 — 6 September 1991. The forum was organised by ICIPE.

Mr. G.M. Kairu, Senior Research Officer, Pathology Section, attended the "4th International Conference on *Pseudomonas syringae"* held in Florence, Italy, from 10 — 13 June 1991. He was sponsored by M/s ISK Biotech Corpora-tion and Griffin International to attend the conference.

Mr. M.P.H. Gathaara, Head, Crop Physiology Section attended a five days "Training Needs Assessment Workshop" from 26 — 30 August at Hotel Kunste, Nakuru. The Workshop was organised by the Ministry of Manpower Development and Employment.

3.7 Student Attachments:

Two Yemeni Students, Messrs Abdullah and Ahmed underwent a Coffee Management Course at the CRS from 5 —30 November 1990. Their training expenses were met by the GTZ-project.

Mr. P. Munyankera, a Rwandese Agricultural Engineer in charge of Studies and programmes at the Coffee Board of Rwanda (OCIR-CAFE) undertook a one-week study tour at the CRS to study how Coffee Berry Disease (CBD) is controlled in Kenya from 3 — 7 June 1991. His expenses were met by the Coffee Board of Rwanda.

Mrs. Jiang Quingnian, A Chinese national, underwent a six months' training attachment on Modern and Advanced Technologies in coffee pro-duction at the CRS from April to August 1991. All her training expenses were met by FAO.

3.8 Consultancy

Mr. J.K. Nyoro, B.Sc., M.Sc., Senior Research Officer (Economist) was appointed a consultant to a technical team on implementation of improved payment system to coffee farmers whose objective was to make coffee payment transparent to the producers. The consultancy was for a period of one month w e f 1 April 1991.

3.9 Staff Development Courses

There were no staff development courses attended by the CRF staff during the year under review due to financial constraints.

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4.0 Research Activities

4.1 Plant Pathology

The Pathology Section continued to screen and evaluate new fungicides for the control of Coffee Berry Disease (CBD), Leaf Rust (LR) and Bacterial Blight of Coffee (BBC).

Nine new fungicides were screened in the laboratory during the year under review for their effect on CBD and LR. Two of the new chemicals passed laboratory test for field evaluation against CBD and LR were: (1) Caprado-S from Helm Ag. (2) Coptox from India, and two against LR alone (1) Funguran-OH from BASF and (2) Armour G from ICI.

Field evaluation of 17 new fungicides for the control of CBD was done at four different sites in the medium (about 1600 m) and high (about 1800 m) altitude areas. The sites were Jacaranda, Kiamumbi, Kasarani and Closeburn Estates. The level of disease pressure at most sites was low, but an indication of the performance of the treatments could be discerned. Considering the results from the three years of evaluation, two of these fungicides namely Shirlan and Octave Super have been recommended for CBD control in Kenya, while the other treatments are still undergoing evaluation.

Evaluation in the field of five new 50% copper formulations was conducted at low rates (0.7%) in comparison with high rates (1.0%) at Closeburn Estate. There was no significant difference between the high rates and low rates in the control of CBD. Three of the coppers have been recommended for the control of CBD in Kenya. These are Oxycop, Cuprox and Cuprasol.

Seven new fungicides were evaluated in a trial at Azania Estate, Juja for control of LR. One of the fungicides, SAN 619F, has been recommended for LR control in Kenya after successfully completing three years of evaluation.

The performance of six new copper formulations against LR continued to be tested at Bradgate and Azania Estates for the second year. Five of the coppers have been recommended for leaf rust control in Kenya, and these are: Blitox, Oxycop, Cuprox, Copsap and Cuprasol.

A trial was conducted for the third year in order to test the performance of Bayfidan 1% WP and Bayfidan 250 EC applied on the ground for control of LR. The results confirmed that two applications, one during the short rains and another during the long rains were necessary for good control of rust using the granules and the drench. However, the rust control did not result in improved yield.

A total of 120 samples were received from growers who bought the fungicides for use on their coffee. All samples were of good standards. The results imply that fungicides supplied to growers during the year conformed to the standard of the recommended products.

Screening for resistance to CBD continued and 49,214 coffee seedlings were tested. The results have been used by the Breeding Section.

Studies on Bacterial Blight of Coffee (BBC) covered (1) Evaluation of agricultural antibiotics for the control of BBC, (2) Field evaluation of chemicals against BBC and CBD control (3) Integrated control of BBC using cultural and chemical methods and (4) Long term effect of copper sprays on tree growth and cropping.

Trials using an Agricultural Antibiotic known as Kasumin Bordeaux (proprietary mixture of Kasugamycin antibiotic and copper oxychloride) at the rates of 0.2% and 0.4% for the control of BBC were done for the third year at Kentmere (Ceres) and Meruai Estate in Solai, Nakuru area. The results so far indicate that the standard products Procida Bordeaux Mixture (1.0%) or Kocide 101 (0.7%) gave better yields than plots treated with the antibiotic. The antibiotic is still under evaluation.

Field evaluation of bactericides continued for the fourth year at Teremuka and Kentmere (Ceres). The bactericides/fungicides being tested for comparison with Kocide 101 (.07%) and Procida Bordeaux Mixture (1.0%) are: Champion (Cupric hydroxide 0.7%), SDS 644220 HC (0.5%), Kocide 357M (0.6%), Cobox (0.7%) and Parasol (Cupric hydroxide 0.7%).

The results indicate that all the chemicals used including the standards, failed to control BBC at Kentmere and Teremuka but were effective against CBD. All the chemicals tested gave good yields. The bactericides and fungicides will be considered for recommendation against BBC.

A trial on the integration of cutting back infected shoots and application of copper sprays on the Control of BBC under optimal management was sited at Berea Estate and was in its second year. There was no control of BBC with all the treatments and the level of CBD was very low. The yields were also very low. The site had been affected by hail damage.

The project whose objective is to determine the long term effect of copper sprays on the tree growth and cropping was in its sixth year during 1990 at Kinoru and Little Farm. The coppers used

were Kocide 101 (0.4% and 0.7%), Copper Nordox (0.4% and 0.7%), Cobox (0.4% and 0.7%) and Procida Bordeaux Mixture (0.5% and 1.0%). All the treatments resulted in good control of BBC and CBD but the yields were low due to change of cycle. No indication of phytotoxicity has been noted.

4.2 Coffee Breeding

The Coffee Breeding Programme worked towards meeting the following five objectives:-

(1) To improve further the genetic base of the selected breeding lines for disease resistance, bean grade and cup quality.

(2) To search for alternative sources of resistance of Coffee Berry Disease (CBD) and Leaf Rust especially in the Ethiopian collection.

(3) To cluster the Ruiru 11 hybrid variety for yield and bean/cup quality through a test-cross programme.

(4) To establish adaptation parameters for the hybrid Ruiru Eleven variety.

(5) To develop cheap, reliable and efficient procedures for multiplication and distribution of hybrid Arabica coffee.

No project was concluded

A project to introgress the recessive k-gene into hybrid Ruiru 11 was initiated whereas the seed production programme was restructured in order to improve on the seed production efficiency as indicated by elevated fruit set. Projects which were continued included: (1) Maintenance, evaluation and utilization (2) test-cross programme (3) evaluation of interspecific hybrids between *Coffea arabica* and *C. canephora* for yield quality, and leaf rust resistance (4) Catimor improvement programme (5) Adaptation trials with hybrid varieties (6) realization of the hybrid seed production (7) realization of vegetative propagation of cultivar Ruiru 11.

The variety collection of materials planted in the Museum Plots 5, 13 and the Ethiopian collections (ex-FAO 1964 and ex-ORSTOM 1970) planted at Oaklands Breeding Station continued to be maintained on routine basis. A total of 49 crosses involving the Ethiopian collections, Hibrido-de Timor, K7 and SL28 were made and screened for CBD resistance. These crosses are part of a diallel crosses aimed at investigating the nature of CBD resistance in these materials.

The test-cross project continued to be evaluated for yield, bean and liquor qualities, and disease resistance. About 1233 selfings were made in order to improve on the homozygosity of CBD resistance in the elite breeding populations planted in fields B22a and b; and b21, Oaklands. In order to comprehensively establish the adaptation parameters for the disease resistant cultivar Ruiru 11, the adaptation trial was expanded by two sites, viz. Mariene Substation in Meru and Taita FTC. First year data were collected for yield and growth components on materials planted at Jacaranda, Koru and Kisii.

In respect to seed and vegetative production, a total of 13,223,434 flowers were emasculated, isolated and pollinated. An improvement of about 15% was observed on the previous year's fruit set; consequently about two tonnes of seed will be expected from the 1991/92 campaign. Multiplication of Ruiru 11 by Vegetative propagation (VP) was carried out at a modest rate. About 36,400 seedlings were sold to farmers. Topworking on old coffee orchards was undertaken on experimental basis in areas within 200 km radius from Coffee Research Station.

4.3 Agronomy

During the year under review, work was done on trials concerning Fertilizer x Density, establishment of hybrid Ruiru Eleven, effect of cover crops on coffee, screening of herbicides on coffee weeds, weed-crop competition assessment, intercropping coffee with other economic plants, shade studies and demonstration of recommended practices. The following herbicides were recommended for use on coffee during the year under review: Novaquat as a contact herbicide at 2 1/ha and Faycomex as a soil acting herbicide at 3 1/ha. Low rate and volume applications of Gramoxone, Sting, Kamata and Basta were recommended.

A trial started in 1981 at Ruiru, Koru and Namwela on nitrogen requirements of three recommended densities (1329, 2658 and 5320 trees/ha) was continued. As reported last year, cumulative yield results over eight years from 1983-1990 indicate that yield response to N-fertilizer tended to be optimal at 100 kg. N/ha. The medium density of 2658 trees/ha (2.74 x 1.37 m) appeared adequate. The trial is progress in the second cycle period.

A trial was initiated at Ruiru, Kisii, Koru and Meru in 1986 to determine the effects of NPK fertilizer rates on yields of Ruiru 11 at various densities (2400, 3200 and 400 trees/ha). The fertilizer rates used were 80, 160, 320 kg/ha of N with or without P or K. Results so far indicate that 160 kg

N/ha tended to be optimal at Ruiru while 100 kg N/ha was adequate for Meru and Kisii. Phosphate requirement at high N rates of application. The trial is still in progress.

A trial was laid in 1983 to study the response of high density spacing of disease resistant hybrid cultivar to various sizes of planting holes (15 x 15; 30 x 30; 45 x 45, or 60 x 60 cm) and rates of Farm Yard Manure (FYM) applied therein. The trees were spaced at 2 x 1 and 2 x 1.5 m at Koru, Kirinyaga and Kiamuoria. The yield records indicate that hole size of 60 x 60 cm is the best as last year. At Koru, yield records from 1985-89 indicate that use of 25 — 75% FYM is optimal while the treatments had no notable difference at Kirinyaga and Kiamuoria from the 1990 yield records. The trial is in progress.

A project was initiated in 1986 with the objective of finding out the best method of replacing the existing coffee cultivars with Ruiru 11. The results indicate that good yields were obtained where old coffee was replaced with Ruiru 11 planted in hedgerows with one head, and at 50% partial replacement. The trial is in progress.

An investigation has been going on since 1978 at Ruiru in order to assess the effect of interplanting *Desmodium intortum,* a leguminous cover crop, among coffee trees on yield as compared to grass mulch. The results of this year confirm the previous year's records which indicated that Napier grass mulch coupled with application of 60 kg N/ha or 120 kg N/ha gives good coffee yields. The trial is in progress.

Screening and evaluation of herbicides which started in December 1986 and which was reported last year was concluded. The recommended herbicides for use on coffee have been indicated in this report and have also appeared in the Weed Control Technical Circular No. 65 prepared by the Coffee Research Foundation (CRF) in 1990.

A trial was started in 1985 at Ruiru on French Mission Coffee (mixed cultivars) and replicated at Kisii on Ruiru 11 coffee. The objective of the trial was to determine the competitive effects of *Oxalis* sp. and *Cyperus* sp. weeds on yield and quality. The cumulative yield results from 1985 — 1990 indicate that there were no yield differences between treatments as compared to clean weeding. The trial is in progress.

Pruning x Density trials on Ruiru 11 were initiated in November 1985 at Kisii, in April 1985 at Ruiru and in November 1986 at Koru. The objective of the trial was to investigate the optimal density and pruning management of Ruiru 11. The densities used were 4800 trees/ha (2x1.04 m) 4000 trees/ha (2x1.25 m), 3200 trees/ha (2x1.56 m), 2400 trees/ha (2x2.09), and 1600 trees/ha (2x2.4 m). Pruning systems were as follows: (1) one head throughout, (2) one head during first cycle followed by two heads on subsequent cycles (3) two heads throughout and (4) two heads during first cycle followed by three heads in subsequent cycles. Results indicated as in previous year that yield increased with tree density at all sites. Capping delayed the onset of the first crop but the trees caught up in the subsequent crop. The trial is in progress.

The processing Unit of Agronomy Section continued to process seeds of the traditiona' varieties. During the year under review, 96 kg of SL28, 19 kg of SL34 and 25 kg of K7 seeds were distributed to farmers during the year. In addition, the Section continued to process experimental samples (Quality and one-tenth) samples in order to determine percentage of grades of beans in the samples.

Meteorological records are normally done as a routine by the Agronomy Section. The records include rainfall, temperature and other weather parameters for Ruiru, Mariene (Meru), Koru and Kisii for 1990 and long term averages.

4.4 Chemistry (Soil Fertility, Plant Nutrition, Coffee Quality, Coffee Processing and Residue Analysis)

The Chemistry Section continued to provide farmers with soil and leaf analyses services free of charge. The studies covered testing growth of young seedlings on composited coffee husks (Cofuna) as compared to cattle manure. The Fertilizer-Farm Yard Manure substitution that continued to determine the optimal substitution level of manures for N-fertilizer. Coffee quality studies were conducted to determine the influence of mineral elements on colour of raw Arabica coffee beans and to assess the level of caffeine, acidity, body ash and carbohydrates in Kenya coffee in relation to quality. The assessment was also made on the quality samples received from various other Research Sections in the CRF for advisory purposes. Pesticide formulation analysis was also done for farmers. Some studies were conducted on the distribution and accumulation of copper containing biocides when applied to coffee. Also tested was a four unit processing machinery from Pinhalense S/A Macquinas Agricolas, Brazil.

During the year under review, a total of 5567 soil samples and 1993 leaf samples were analysed. The advisory leaf samples were received from 115 Estates (1037) and 76 Smallholdings (106). The other samples were for research purposes. There was a decrease of 32.3% in leaf samples analysed compared to last year's figure of 2940. The advisory soil samples were received from 134 Estates (2306) and 472 Smallholdings (984).

The number of advisory soil samples decreased by 40.3% compared to last year's figure of 6840. The rest of the soil samples submitted for analysis were for research purposes.

A trial was started at Mariene (Meru), in 1989 in order to determine the effects and interactions of Magmax, nitrogen, phosphate and potash on coffee yields and quality on acid soils there. Coffee was spaced at 2 x 1.25 m. The results showed lime to depress % grade A in clean coffee while low liming and moderate N rate (50 — 100 kg/ha) increased grade A coffee as potassium was increased. Phosphorus and Potassium both enhanced % grade A coffee.

A trial was laid using potted coffee seedlings in order to check the effect of Cofuna (coffee husks) on growth of the seedlings as compared to cattle manure. Each test material was used at 0, 1000, 2000 and 4000 g/pot. A blanket P dose of 100g of Triple Superphosphate (TSP) was applied to each pot including the control pot. Results indicated that Cofuna is inferior to cattle manure during early growth of SL28 Arabica coffee seedlings because Cofuna reduced the rate of growth in terms of height and number of branches. Cofuna may not therefore be used as a substitute for cattle manure or inorganic fertilizer since it has constantly performed very poorly.

The fertilizer-Farm Yard Manure substitution trial at Azania Estate showed that manure applied beyond 2 debes per tree depressed yield. Manure enhanced leaf zinc and potassium but induced boron deficiency if rate exceeded 2 debes/tree. Unlike N fertilizer, manure raised levels of exchange of K, Mg and Ca in the top soil.

The distribution, dissipation and accumulation of copper containing biocides when applied on coffee was started as from 1985. The formulations of coppers used were Kocide (Cupric hydroxide — 0.7% and 0.4%), Copper Nordox (Cuprous Oxide — 0.7% abd 0.4%) Cobox (Cupric chloride — 1.0% and 0.5%) and Procide Bordeaux Mixture applied at 1.0% and 0.5%. The objective of the experiment was to determine the long term effects of copper sprays applied to control BBC and CBD on copper levels in soils and plant materials. The studies conducted so far indicate that the use of copper containing biocides lead to increase in the concentration of copper in leaves and soil as total copper in both top and sub soil. However no build-up in available copper was observed. Cumulative results over the years showed that there was a decrease in levels of copper in leaves. It can therefore be concluded that despite the apparent high copper usage on coffee, the effects do not seem to be adverse on coffee growth or on accumulation of available copper in soil. Besides build up in total copper does not affect available copper.

The Quality Unit continued to offer advisory services by analysing 2851 samples from various research Sections during the year as compared to 265 samples analysed last year. The analyses cover physical and chemical quality parameters such as bean size, weight, colour, moisture content, proportion of defects and mineral content.

The Pesticide Unit analysed 166 fungicides and 76 sulphur (leaf) samples submitted to the CRF by farmers for determination of active ingredients as compared to the recommended products.

A four unit coffee processing unit imported from Brazil was installed in 1989 and the tests started in July 1989. The units were (1) Batch Tubular Rotary drier plus driving gear and electric motor (2) Mechanical coffee washer with vibrating conveyor, driving gear, and electric motor and (3) coffee drum pulper with green bean separator, rotary grading sieve, driving gear and electric motor and (4) repasser pulper with driving gear and electric motor. The objective of the tests was to determine the technical specifications and performance of these units. A rapid economic assessment was also conducted (Economics Section) to determine the cost of processing coffee using Brazilian Units as compared to the traditional method used in Kenya.

In conclusion test results showed that the drier and the vibrating convey or needs to be modified before their consideration for recommendation. Otherwise the performance of the mechanical washer was acceptable. As for the main drum and repasser pulpers, they performed satisfactorily as long as use of recirculation water was avoided. This was so because recirculation water is loaded with solids which tend to block some important water lines of these units. When the Brazilian coffee processing units are operated together in series to form a pulping system, a higher slope than the current factories would be required unless such a system is equipped with mechanical elevators. However, separate units can be adopted into the existing factories with minimal changes as the needs of a particular farm may dictate.

Although durability tests are still in progress, current observations identify corrosion as the major threat to the life of these units. Failure of some parts for the vibrating conveyor and mechanical has already been observed.

4.5 Crop Physiology

The main activities of Crop Physiology Section during the year were water studies, micropropagation of Ruiru Eleven (11) and studies on effects of established shades on Arabica coffee. Two trials on water use studies on Ruiru 11

hybrid were started during the year. The work is in progress.

The objective of the shade trial was to assess the effects of established shade trees on coffee growth, yield parameters, disease and pest incidence and the clean coffee yield. Data on chlorophyll content, leaf water potential and transpiration rates indicated a decrease of these parameters with increasing distance from the shade trees. It was noted that clean coffee yield increased linearly (R = + 0.61) with the distance from the shade tree. This work is continuing.

The work which was initiated in 1988 with the aim of using Tissue Culture techniques to propagate Ruiru 11 continued. Plantlet regeneration was possible from mature leaf explants and apical buds. Studies done with leaf cultures indicated that out of 54 rooted plantlets, 50 produced single roots while the rest produced 2 — 3 roots. The plantlets were then trransplanted in pots containing sterilized vermiculite to harden. Apical bud culture studies on the other hand showed that after two months of culturing in the dark at 28°C, 20 — 30 embryos were formed and subsequently plantlets emerged. On culturing the shoots, root regeneration occurred. The plantlets were then transferred in pots containing vermiculite to harden.

4.6 Entomology

The Entomology Section continued conducting trials on Integrated Pest Method of control. Preference was devoted on Biological Control while evaluation of various insecticides against coffee insect pests continued.

Mass rearing of predators and parasitoids (Natural Enemies N.E.) aimed at controlling coffee insect pests started in 1990. Bulking of Antestia egg parasitoid, giant looper predators, parasitoids of green and fried-egg scales, and different species of predatory ladybird beetles against Green scales was achieved and released in farmers' fields. More work on Biocontrol is in progress.

Two insecticides, Dursban 450 ULV and Fenitrothion 3% dust were evaluated against Coffee Berry Borer and Antestia bugs at Kisii. Fenitrothion 50% E C and Dursban 48% E C were used as standards. Results obtained indicated that Dursban 450 ULV and Fenitrothion 3% dust at low rates were effective in controlling both insect pests as the standard products.

Evaluation of three chemical products; Dursban 4, Dursban 48H and Selectron 72 EC against Leafminer were conducted at Del Monte. Fenitrothion 50% EC was used as the standard. The results obtained showed that no significant difference occurred on all rates of Dursban 48H, Dursban 4 EC and Selectron 72% EC. The trial is in progress.

The effect of *Bacillus thuringiensis* var. *Kurstaki* (Dipel) against Giant Looper larval stages was evaluated at Kiaora Coffee Estate. *B. thuringiensis* (Thuricide) was used as a standard. Each of the products applied at three rates were replicated three times. Results obtained indicated that Thuricide and Dipel applied at 200 g and 100 g per hectare respectively, effectively controlled Giant Looper larvae.

The systemic insecticide NTN 33893 5GR at 10 g, 12 g, and 20 g per tree and NTN 33893 200SL at 1.5 ml and 5.0 ml per tree are being evaluated against *Aspidiotus ruandensis* at Rukera and Jokimu Coffee Estates. Temik 15 GR at 15 g per tree and Furadan 10 GR at 20 g per tree are being used as standard products. The trial is in progress.

4.7 Agricultural Economics

During the year under review, resources were devoted on a number of studies aimed at evaluating the effects of low coffee prices to farm incomes, the relative profitability of dry processed and wet processed Arabica coffee, the economics of coffee production in both Estate and Smallholder Sectors and the economics of intercropping dry food beans with coffee.

The withdrawal of the Coffee Price Support Mechanism of the International Coffee Agreement (ICA) in July 1989 set in place a free market situation which sent coffee prices tumbling. The average coffee prices dropped by 27% between 1988 and 1989 pool years which prompted a study to evaluate the impact of this decline on coffee profitability and farm incomes. Data was collected from 340 randomly selected Smallholder farmers within the coffee growing areas of Kiambu, Nyeri, Murang'a, Kirinyaga, Embu, Meru, Kisii and Machakos. The analysis of the data revealed that coffee productivity dropped from an average of 0.65 tonnes of clean coffee per hectare in 1988 to 0.57 tonnes per hectare in 1989. The ability of the Smallholder coffee farmer to produce food crops was also adversely affected by the low coffee prices, thereby compelling coffee Smallholder family to have its subsistence requirements supplemented from other non-farming activities.

The low coffee prices also caused a decline in use of Agrochemical inputs from 31% in 1988/89 to only 27% in 1989/90. Labour cost increased from 52% in 1988/89 to 59% in 1989/90. The average cost of production in the Smallholder Sector increased from KSh. 37,000/- = (K£1850) in

1988/89 to KSh. 48,020/- (K£2401) per tonne of clean coffee. The net coffee payment rate was KSh. 30,440/- per tonne for the same period. Smallholder coffee farmers therefore only remained in coffee farming business by ignoring the valuation of family labour even though it has its own opportunity cost.

A study with an objective of evaluating the profitability of producing and processing 'mbuni' as compared to cherry (wet processed coffee) both in the Smallholder and Estate Sectors was also undertaken during the year. Time series data on total production costs and net coffee payments from 1982/83 to 1989/90 pool year was collected and analysed. In the Estate Sector, the total production cost of wet processed coffee was found to be higher across all the years under consideration than that of dry processed coffee (mbuni). However, the profit margin across the years was higher for wet processed coffee than for 'mbuni'. For instance, in 1989/90 pool year, the profit margin per tonne of wet processed coffee was minus KSh. 4,200/- (K£210) while the profit margin per tonne of mbuni was KSh. 22,860/- (K£1143). A similar exercise for Smallholder Sector revealed the same trend. It should be considered that although the general indication is that one kilogram of 'mbuni' fetches a better price than a kilogram of cherry, this trend is reversed when a unit of 'mbuni' is converted into its cherry equivalent. The study therefore concluded that the production of 'mbuni' is not economical and that is one of the reasons why the current Coffee Board of Kenya payment system is objectively aimed at discouraging the production of dry processed coffee.

The production, price and quality data for a sample of 139 Estate farms randomly selected stratified according to size and mode of production was collected and analysed during the year under review. The principal objective of this study was to determine the cost structure and production costs in each Estate size group. Like all the previous years, the irrigated Estates had a higher intensity of input use than the non-irrigated Estates resulting in higher average yields of 1.34 tonnes of clean coffee per hectare as compared to 0.70 tonnes per hectare for the non-irrigated Estates in 1989/90 pool year. Generally in 1989/90 pool year, the average Estate Sector productivity dropped to 1.10 tonnes per hectare. The average cost of producing a tonne of clean coffee in the Estate Sector was KSh. 43,280/- (K£2164) while the average price paid per tonne was KSh.40,840/- (K£2042). It is therefore evidently clear that coffee farming was unprofitable during the year under review, this being particularly so in non-irrigated farms. There was a decline in capital investment during the year as farmers tended not to depreciate their equipment, machinery and buildings in order to break-even. However, this trend has serious repercussions in the long-term viability of commercial coffee farming.

A trial was started during the short rains (October/November) period of 1988 with an objective of evaluating the impact of interplanting food beans (GLP variety — MWEZI MOJA) in conventionally spaced (2.74 x 2.74 m) coffee.

The initial results of the trial were reported last year. The gross benefit from the plot intercropped with beans was higher than that without beans. The mean benefit was KSh. 3,810/- higher for the intercropped plot as compared to the plot without beans during the year under review. The result indicates that during periods of low cherry prices, the farm income can be favourably complemented by food beans. This trial is still continuing and the final results will include the effect of coffee quality on the coffee intercropped with beans.

4.8 Research Liaison, Training and Advisory Section (R.L.T.A.S.)

The RLTA Section's broad objectives are to provide, encourage and maintain continuous contact between the farmers, researchers and other persons interested in coffee research and production aspects within the coffee industry. The Section liaises with coffee extension workers in the Ministries of Agriculture and Co-operative Development; the Coffee Board of Kenya (CBK) and coffee managing agencies to disseminate research results, provide and encourage feedback to the researchers from the field. This is effected through training, production of publications for the field staff and farmers, participation in Agricultural Shows; conducting Field Days in farmers' plots, making advisory visits to both the Smallholder and Estate Sectors; encouraging visits to the Coffee Research Station and its Sub-stations by the extension workers and farmers; and participation in radio and other audio-visual media programmes.

The Section was able to conduct seven residential courses at CRS where 142 course participants were taught various coffee production techniques and 10 Training and Visits Workshops were held in the provinces. The revision of CRF publications continued in the year as well as the sales of new publications. A total of 2,600 publications were sold and many technical circulars and leaflets distributed to growers.

External advisory services were given to growers during agricultural shows, advisory visits and field days where the Section participated in 17 shows; 249 farm visits and 11 field days across the coffee growing areas of Kenya. To create awareness to growers as to what is expected of

them in coffee farming throughout the year, 24 'Kahawa Wiki Hii' radio programmes were conducted at least twice a month.

Unlike the previous years, demand for traditional coffee seeds was low. Only 166 kg of seeds were sold. Howerver, the demand for Ruiru 11 seeds was higher than the supply.

The Coffee Research Foundation continued to receive increasing numbers of visitors who ranged from one to 90 during each visit. These visitors came from the farming sectors, high scholos, colleges, universities, representatives of local and a few foreign agrochemical companies, foreign visitors on "Coffee Safari", the Inter African Coffee Organisation (IACO) delegates, besides the CRF Board Members and Government Officials in the coffee industry.

4.9 General

On the finances of the CRF, there was a decrease on the level of Research Reserve from KSh. 6,352,872 in 1990 to KSh. (6,598,318) which is a decrease of KSh. 12,951,189. Therefore the deficit for the year under review rose from KSh. 9,557,355 in 1990 to KSh. 11, 162,574 in 1991.

The funds allocated by the coffee industry through Coffee Board of Kenya had been supplemented with the internal revenue as shown under Income and Expenditure Account of this report. During the year under review, our Azania Commercial farm in Juja produced 137 tonnes of clean coffee valued at KSh. 7,561,100 while Rukera Demonstration farm near Coffee Research Station, Ruiru produced 63 tonnes valued at KSh. 3,280,924. Sale of coffee seedlings was the main source of sundry income.

5.0 Income and Expenditure Summary

The Income/Expenditure and the Balance Sheet as at 30 September 1991 are attached hereto. The Foundation's income for the year to 30 September 1991 was K£4,070,470 compared to K£3,343,480 for the previous year. Expenditure of K£4,628,599 was incurred during the year 1990/91 compared to K£3,852,039 incurred in the previous year.

Special Expenditure in respect of the Coffee Berry Disease Unit and Bacterial Blight of Coffee Project was as follows:

Foundation's Coffee Berry Disease Unit

	K£
Staff Remuneration, Labour Wages Travelling and General Upkeep	154,801
New Equipment	300
	155,101

Foundation's Bacterial Blight of Coffee Project

	K£
Staff Remuneration, Labour Wages Travelling and General Upkeep	128,078
New Equipment	71
	128,149

The above Expenditure for the two units was reimbursible by the Coffee Board of Kenya over and above the Main Subvention. The Budget for the year 1991/92 in respect of these projects stand at K£225,725 and K£340,470 respectively.

The Bank Balance was K£390,315 as at 30 September 1991.

6.0 Acknowledgement

This opportunity is taken to thank the Coffee Board of Kenya, the Ministry of Agriculture, the Ministry of Research, Science and Technology, the Ministry of Co-operative Development, the Kenya Planters' Co-operative Union, the Agrochemical companies dealing with coffee pesticides in Kenya and the entire coffee farming community and their agents for supporting research during the year. The co-operation received from them and the Government of Kenya is very much appreciated by the CRF Board.

REPORT OF THE AUDITOR-GENERAL (CORPORATIONS) ON THE ACCOUNTS OF THE COFFEE RESEARCH FOUNDATION FOR THE YEAR ENDED 30TH SEPTEMBER 1991

I have examined the accounts of the Coffee Research Foundation for the year ended 30th September 1991 in accordance with Section 29 (2) of the Exchequer and Audit Act, (Cap 412). I have obtained all the information and explanations that I have required for the purpose of my audit. Proper books of account have been kept by the Foundation and the accounts are in agreement therewith.

In my opinion, the Balance Sheet and the Income and Expenditure Account, when read together with the notes thereon, present a true and fair view of the state of the financial affairs of the Foundation as at 30th September 1991 and of its deficit and source and application of funds for the year ended on that date.

A.J. OKOTH
AUDITOR-GENERAL (CORPORATIONS)

14th October, 1992

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Income and Expenditure Account/Research Reserve for the year ended 30th September, 1991

	1991	1990
Surplus for the year	(11,138,006)	(9,557,355)
Provision for taxation	(66,015)	(76,470)
Capital expenditure incurred on land owned by Coffee Board of Kenya or Government of Kenya	(1,722,600)	(2,562,202)
	(12,926,621)	(12,190,027)
Research Reserve brought forward	6,352,871	18,542,898
	(6,573,750)	6,352,871

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Balance Sheet as at 30th September, 1991

	Note	1991 Kshs	1990 Kshs
ASSETS EMPLOYED			
Fixed Assets	2	24,353,300	24,249,434
INVESTMENTS			
Quoted Investments at Cost — Schedule II		1,437,015	1,437,015
CURRENT ASSETS			
Coffee Board of Kenya		4,649,709	5,469,890
Stocks		2,165,596	1,621,691
Debtors and Deposits	4	5,086,918	5,791,128
Cash and Bank Balances		8,451,537	4,787,550
		20,353,760	17,670,254
CURRENT LIABILITIES			
Creditors, Accruals and provisions	3	32,247,125	16,640,867
Taxation		45,215	48,704
		32,292,340	16,689,571
NET CURRENT ASSETS		(11,938,580)	980,688
Total Net Assets		13,851,735	26,667,137
FINANCED BY:-			
Coffee Research Reserve Fund		2,000,000	2,000,000
Capital Reserve	5	18,425,485	18,314,266
Research Reserve		(6,573,750)	6,352,871
		13,851,735	26,667,137

These Accounts were approved by the Board of Directors on

Mr A. M. Mwangi ..... Chairman

Dr Wilson R. Opilé ..... Director

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Statement of changes in Financial Position for the year ended 30th September, 1991

	1991	1990
SOURCES OF FUNDS	**Kshs**	**Kshs**
Surplus for the year before Taxation	(11,138,006)	(9,557,355)
Adjustment for items not involving the movement of funds:-		
Depreciation	4,188,751	4,258,964
Profit on Sale of Fixed Assets	—	(613,818)
Shares Adjustments	—	9,365
Funds Generated from Operations	(6,949,255)	(5,902,844)
OTHER SOURCES		
Proceeds on Disposal of Fixed Assets	—	1,231,586
Increase in Capital Reserve	111,218	2,763,740
Total Funds Available for Application	(6,838,037)	(1,907,518)
APPLICATION OF FUNDS		
Tax paid	69,503	70,568
Purchase of fixed Assets	4,292,617	9,926,908
Development Expenditure	1,722,600	2,562,202
	6,084,720	12,559,679
Total Applications	(12,922,757)	(14,467,197)
MOVEMENT IN WORKING CAPITAL		
Increase in Creditors and Accruals	15,606,258	(1,164,064)
(Increase) in Debtors and deposits	1,524,391	16,179,113
(Increase)/Decrease in Stocks	(543,905)	158,791
	16,586,744	15,173,840
	3,663,987	706,643
MOVEMENT IN NET LIQUID FUNDS		
Increase/(Decrease) in Cash and Bank Balances	3,663,987	706,643
Decrease in Bank Overdraft	—	—
	3,663,987	706,643

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Notes to the Accounts for the year ended 30th September, 1991

1. ACCOUNTING POLICIES

(a) Accounting Convention

The Accounts are prepared under historical cost convention.

(b) Stocks

Stocks of Consumable Stores are valued on a "first-in, first-out" basis at the lower of cost and net realised valued.

(c) Depreciation

Depreciation is calculated to write off the cost of Fixed Assets on a diminishing balance basis over their estimated useful lives at the following annual rates:-

Farm Machinery	20%
Farm Equipment	15%
Furniture Office and Laboratory Equipment	12.5%
Office Equipment	12.5%

(d) Investments

Investments are stated at cost

(e) Research Reserve

Where the Foundation finances and development assets of a permanent nature on land owned by the Government or the Coffee Board of Kenya, the gross cost of these assets is debited to this reserve fund.

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Note to the Accounts for the year ended 30th September,1991

4.	CASH AND BANK BALANCES	Kshs
	Continental Bank of Kenya Limited	3,104,252
	Cash in hand and at Bank	8,256,104
	Bungoma District co-operative Bank	195,433
3		11,595,789
	Provision for doubtful debts:-	
	Continental Bank Balance under receivership	3,104,252
		8,451,537

The Foundation felt that this amount with Continental Bank of Kenya Limited might not be recovered, hence a provision of 100% was made in 1985/86 Accounts.

5.	CAPITAL RESERVE			Kshs	Kshs
	Capital Reserve as at 1.10.88				18,314,266
	Capital Additions in Special Funded Programmes:-				
(a)	Equipment	—	BBCRU	1,410	
		—	FCBDRU	6,000	
		—	Coffee Rehabilitation Programme	4,285	
		—	Plant Breeding	79,960	91,655
(b)	Developments	—	Plant Breeding	19,563	18,425,484

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Notes to the Accounts for the year ended 30th September, 1991

(ALL AMOUNTS IN KENYA SHILLINGS)

2. FIXED ASSETS

	Furniture and office equipment	Laboratory equipment	Farm equipment	Vehicles and tractors	Farm machinery	Miscellaneous equipment	Total
Written Down Value as at 1st October 1989	3,227,879	12,117,977	1,305,033	6,328,043	896,509	373,993	24,249,434
Additions during the year	2,438,534	654,305	148,489	705,058	207,595	138,636	4,292,617
As at 30th September, 1990	5,666,413	12,772,282	1,453,522	7,033,101	1,104,104	512,629	28,542,051
Disposals	—	—	—	—	—	—	—
	5,666,413	12,772,282	1,453,522	7,033,101	1,104,104	512,629	28,542,051
Depreciation for the year	708,301	1,596,535	218,028	1,406,620	220,820	38,447	4,188,751
As at 30.9.90	4,958,112	11,175,747	1,235,494	5,626,481	883,284	474,182	24,353,300
As at 30.9.89	3,277,879	12,117,977	1,305,033	6,328,043	896,509	373,993	24,249,434

3. TAXATION

Taxation has been provided on Income from Investments at the Corporation rate.

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Detailed Income and Expenditure account for the year ended 30th September, 1991

	1991	1990
INCOME	**Kshs**	**Kshs**
Coffee Board of Kenya:-		
Main subvention payments	47,299,936	40,371,904
Reimbursement of Plant Breeding Expenses	8,919,480	7,657,483
Reimbursement of SCIP expenses	4,183,600	4,309,853
	60,403,016	52,339,240
Reimbursement of FCBDRU Expenses	3,425,981	2,917,000
Reimbursement of FBBCRU Expenses	4,303,063	1,986,000
	7,729,044	4,903,000
Government of Kenya Contribution:-		
Towards Crop Rehabilitation/Programme	—	1,000,000
Coffee Proceeds	11,333,633	7,627,601
Dividends and Interest on/Investments	142,372	152,610
Sundry Income	1,935,138	847,161
	13,411,143	9,627,372
Total Income	81,543,203	66,869,612
EXPENDITURE		
Recurrent Expenditure	86,960,905	68,144,132
Miscellaneous Expenses	1,381,553	4,487,689
Depreciation	4,188,751	4,258,964
Audit Fees	150,000	150,000
Total Expenditure	92,681,209	77,040,785
Surplus from the Operations	(11,138,006)	(10,171,173)
Profit on Sale of Assets	—	613,818
SURPLUS FOR THE YEAR	(11,138,006)	(9,557,355)

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

SCHEDULE II
Schedule of Investments

No. of Shares	Nominal Value of Shares KShs.		At Cost KShs.	Middle Market Value KShs.
14,260	5.00	Consolidated Holdings Lts.	71,300	51,336
21,450	10.00	E.A. Breweries Ltd.	214,500	622,050
5,742	20.00	E.A. Power & Lighting Co. Ltd.	114,840	178,002
3,775	5.00	A Bauman & Company Ltd.	18,875	13,212
16,432	5.00	Car & General (K) Ltd.	82,160	80,106
7,834	10.00	B.A.T. (K) Ltd.	78,340	313,360
84,060	20.00	Kenstock Ltd. 12.5% Deferred Loan Stock	84,060	66,197
5,000	—	Kenya Government 6% Stock 1992 at 90.75%	91,180	—
5,800	—	Kenya Government 6% Stock 1997 at 86%	99,920	—
—	—	KPCU Deferred Stock	509,920	—
3,209	10.00	KPCU 10% Unsecured Redeemable Loan Stock 1991/	32,090	—
3,983	10.00	KPCU 10% Unsecured Loan Stock 1996/2000	39,830	—
			1,437,015	—

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

SCHEDULE III

B ATTRIBUTABLE TO THE GOVERNMENT OF KENYA

1. LAND

	Coffee KShs.	Land Develop-ment KShs.	Total KShs.
Jacaranda Estate 312 Acres LR/116/1 & 116/3	80,680	314,300	394,980
Rukera Estate 251 acres LR/116/2	77,100	258,500	335,600
Meru Sub-Station 57 acres LR 780 AND 80 — 6	14,420	61,540	75,960
Kisii Sub-Station 45.6 acres	13,780	53,200	66,980
	185,980	687,540	873,520

2. BUILDINGS

	WDV 30.9.90	Depreciation 121/2 %	30.9.91
Main office, Lecture Hall and Garage	13,788	1,723	12,065
Laboratories	49,199	6,149	43,050
Farm office, Stores and Workshop	23,256	2,907	20,349
Coffee Factories	13,582	1,697	11,885
Water Installation and Pump houses	8,988	1,123	7,865
Dairy Cattle Sheds and Dips	4,731	591	4,140
Domestic Houses and Staff Amenities	213,553	26,694	186,859
Museum and Library	2,905	363	2,542
	330,002	41,247	288,755

3. FURNITURE, EQUIPMENTS AND STORES

Furniture, and Office Equipment	862	107	755
Laboratory Equipment	1,847	230	1,617
Farm Equipment	1,724	215	1,509
Vehicles and Tractors	329	41	288
Miscellaneous Equipment	821	102	719
Farm machinery	1,467	183	1,284
Expendable Stores	995	124	871
Consumable Stores	113	14	99
	8,158	1,016	7,142

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Schedule of Recurrent Expenditure Schedule I

	FINANCED BY SPECIAL FUNDS								FINANCED BY CRF		TOTAL	
	FCBDRU		PLANT BREEDING PROGRAMME		BBCRU		COFFEE REHABILITATION PROGRAMME					
	YEAR ENDED		YEAR ENDED		YEAR ENDED		YEAR ENDED		YEAR ENDED		YEAR ENDED	
	30.9.90	30.9.91	30.9.90	30.9.91	30.9.90	30.9.91	30.9.90	30.9.91	30.9.90	30.9.91	30.9.90	30.9.91
Maintenance and General Upkeep	145,146	741,382	3,450,035	5,986,844	463,632	583,917	571,627	796,227	13,525,747	15,043,738	18,156,187	23,152,108
Travelling and Touring Expenses	29,936	781,792	503,194	712,386	588,630	642,426	932,422	1,234,538	7,204,196	11,631,628	9,258,378	15,002,770
Staff Remuneration and Labour Wages	445,966	1,572,851	3,593,496	4,932,236	583,888	1,335,223	2,798,624	4,303,952	30,543,853	36,414,080	37,965,827	48,558,342
Equipment Purchased	2,295,952	6,000	58,375	79,960	349,850	1,410	7,180	—	—	—	2,711,357	87,370
Capital Development	—	—	52,383	19,563	—	—	—	—	—	—	52,383	19,563
	2,917,000	3,102,025	7,657,483	11,730,989	1,986,000	2,562,976	4,309,853	6,334,717	51,273,796	63,089,446	68,144,132	86,820,153

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

SCHEDULE III — NOTES

I Meru Sub-Station LR 780 and 806 — That piece of land situated seven miles south of township on the main Meru/Chogoria Road containing the buildings commonly known as Meru Coffee Research Sub-station together with the necessary curtilage.

II Kisii Sub-Station Block 2/136 — That piece of land situated within Kisii township containing buildings commonly known as Kisii Research Sub-Station together with the necessary curtilage.

III The buildings included in Schedule IIIA have been valued by the Ministry of works and additions have been shown at cost.

IV Appropriated amendments to the Coffee rules have been prepared and submitted to the Attorney General's department pending enactment of the necessary legislation. the following (v) applies.

In accordance with Sessional Paper No. 3 of 1863, land and buildings in Schedule IIIB were to be leased to the Coffee Board of Kenya for a period of 21 years from 1st October 1963 at a peppercorn rental, subject to the condition that the use be restricted to research and related activities only, ownership reverting to the Government in the event that the assets are not required for such purposes.