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Coffee Research Foundation

An official organisation under the Coffee Board of Kenya



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ANNUAL REPORT AND ACCOUNTS OF THE COFFEE RESEARCH FOUNDATION (CRF) FOR THE YEAR ENDED 30TH SEPTEMBER 1993

STATEMENT BY THE CHAIRMAN OF THE BOARD

1.1 Introduction

The current Board of the Coffee Research Foundation (CRF) is new and was reconstituted on 3 March 1994 because the Coffee Board of Kenya (CBK) revised the list of the appointment of all Directors of the CRF Board on 4 February 1994. The CRF Board membership was reviewed following the election of new Board of Directors for the CBK during the Annual Coffee Delegates Conference held in Nairobi on Friday, 14 January 1994. The composition of the new CBK Board therefore affected the membership of some Directors in the previous CRF Board. This normally happens every three years.

However, information given in this year's report was obtained during the term of office of the previous Board. Four Board meetings were held during the year under review. In addition, Board members attended regular quarterly meetings as well as sub-committees and special meetings, when necessary, of the following standing committees:

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

The Annual General Meeting of Subscribers was held on 16 December 1993.

1.2 Capital Development

Construction of a Hostel Complex started at the Coffee Research Station on 11 August 1993 and is expected to end in December 1994. The complex comprises of a Lecture Hall, Dining Hall, Students' Hostel, Flats for four families and Domestic Staff quarters for the four flats. The Project is funded by the World Bank under the Second Coffee Improvement Project (SCIP II) and sponsored by the Government of Kenya. The Complex will be used for residential training of Coffee farmers and their agents from time to time. The purpose of training is to improve on skills required for producing good quality coffee.

1.3 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 crops against diseases, insect pests and reduction of costs. One new fungicide and one Tank Mixture of copper and an organic product already in use were recommended for the control of Coffee Berry Disease (CBD) during the year under review. Also recommended was another lot of four new copper fungicides for the control of Leaf Rust Disease.

The CRF continued to focus on research aspects geared towards lowering the cost of producing coffee. These included continued work on production and release of Ruiru 11 by seed as well as by Vegetative Propagation (VP) method and Tissue Culture. 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 1993 is estimated to be about 6560 hectares. This figure is based on the fact that a total of 16.4 million planting materials have been distributed to farmers either as seed or seedlings from 1986 and that Ruiru 11 is planted at 2 m x 2 m giving about 2500 plants per hectare.

Blind liquoring of cup quality of Ruiru 11 was continued during the year and the results continue to confirm that the cup quality of Ruiru 11 is as good as that of the traditional varieties such as SL 28.

Emphasis continued to be laid on the integrated method of pest control with particular emphasis on Biological control using locally available parasitoids and predators of the pests. The target pests for Biological Control include Scale insects, Antestia bugs, Giant Loopers and Berry moths.

The Economics Section continued to monitor the cost of production of coffee in Kenya. The average cost of production in the Smallholder Sector during 1991/92 was Ksh. 26,846 per ha (Ksh. 49,161 per metric tonne). During the year under review, there were major increases in coffee production especially in Estates Sector due to high interest rates and high farm input prices. Therefore, the average cost in the Estate Sector was Ksh. 69,886 per ha (Ksh. 62,398 per metric tonne). Smallscale coffee growers were very quick to respond to low coffee prices by neglecting their coffee trees and some almost abandoned or aprooted coffee from their 'shambas'.

A study has been conducted indicating that Farm Yard Manure (FYM) at the rate of two 'debes' (twenty-litre measure) per tree per year could be used alone on coffee without adding imported fertilizers. The yields are good but the economic implications of this study is in progress.

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.

1.4 Staff Matters

As indicated elsewhere in this report, two Senior Staff members were recruited during the year to replace those who left the CRF and one Senior staff member left the CRF during the year. Training of Staff continued. Two Research Officers completed their PhD training and one Accounts staff completed CPA Part III course. Five Research officers 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.

1.5 Finances

The Coffee Board of Kenya provided 100% of the total income and these were supplemented by internal revenues. The CRF made a gross surplus of about Ksh. 28 million of Recurrent Account during the year ended 30 September 1993 because of better and high coffee prices realised in that year. This surplus was used to improve on the level of RESEARCH RESERVE which had been very low during the 1989/90 and again in 1990/91 financial years as a result of deficit realised in those years. However, it should be noted that the surplus was made only on the Recurrent Account and was utilized in the year to finance deficit. There was also the Capital Account which had to be financed by the surplus during the year as indicated clearly under the 'SOURCES AND APPLICATION OF FUNDS' as follows:-

1. Purchase of fixed assets	-	9,909,309 00
2. Development expenditure	-	9,773,657 00
3. Additional cash balance in Bank	-	4,300,962.00
4. Stock increase	-	3,940,382 00
TOTAL		<u>27,924,310.00</u>
NET		257,965 00

This net surplus of Ksh. 257,965 would be the only amount of money to be considered as surplus for the year ended 30 September 1993.

1.6 Future Plans

The CRF is looking for ways and means of growing coffee cheaply. One aspect was done by introducing Vegetative Propagation of Ruiru 11 variety and other important varieties in addition to seed production of the varieties. The other aspect of reducing cost of coffee growing is by Tissue Culture method. The CRF is therefore planning to approach external donors through the Government for funding in order to build appropriately designed facilities for Tissue Culture work at the Coffee Research Station (CRS).

The CRF also continued with the project of Biological control which was started in 1990. Additional insect predators and parasitoids (Natural Enemies of insect pests) have been collected from coffee in the field, reared at the CRS Ruiru for distribution into the farmers' fields. The idea is to promote biological control on Kenya coffee instead of using insecticides. This will reduce the cost of coffee growing and also promote a clean environment.

All the above plans on Vegetative Propagation, Tissue Culture of desired varieties 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 activities mentioned in this report. There is also need to find money for buying the equipment needed for the laboratories built last year, and also for furniture, equipment and other furnishings for the new Hostel Complex.

A M MWANGI
CHAIRMAN
COFFEE RESEARCH FOUNDATION BOARD

COFFEE RESEARCH FOUNDATION

BOARD OF DIRECTORS



Mr. A.M. Mwangi
Chairman



Dr. Wilson R. Opile
Director of Research



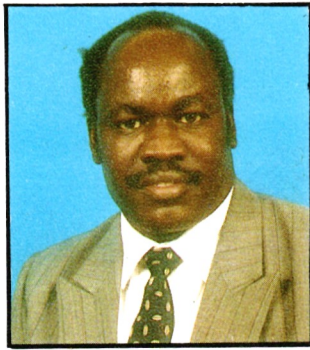
Mr. S.C. Muchiri



Mr. J.E. Muhia
Secretary



Mr. P. Mwangi



Mr. J.A. Odoyo



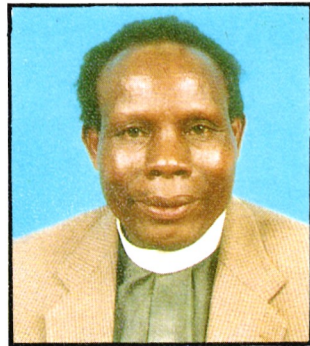
Mrs. N.N. Kaminchia



Miss B.W. Kingori



Mr. R.M. Makara



Rev. E. Kabii



Dr. A.M. Mailu



Dr. M. Isiakho



Prof. D.M. Mukunya



Mr. J.M. Nzioki



Mr. J.M. Mugho



Mr. S.K. Waruingi

COFFEE RESEARCH FOUNDATION HEADS OF SECTIONS



Mr. P.K. Michori
Deputy Director of Research



Mrs. D.M. Masaba
Plant Pathology



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



Mr. M.P.H. Gathaara
Crop Physiology



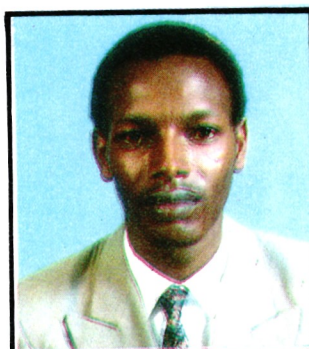
Mr. C.O. Agwanda
Plant Breeding



Mr. J.N. Mburu
Chemistry



Miss A.W. Wainaina
Entomology (Acting)



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



Mr. C.B. Nyakeri
Internal Auditor



Mr. J.M. Maina
Chief Estates Officer



Mr. E.K. Maina
Administrative Manager



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



Mr. J. Mburu Njoroge
Field Experimental Agronomy

**ANNUAL REPORT AND ACCOUNTS OF THE COFFEE RESEARCH FOUNDATION
FOR THE YEAR ENDED 30TH SEPTEMBER 1993**

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 1993

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 Kabili
Mr. S C Muchiri
Dr. M W Oggema - Ministry of Agriculture
Dr. Cyrus C Ndintu - Director, Kenya Agricultural Research Institute (KARI)
Mr. E Kandle - 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. Pithon Mwangi and Dr. C G Ndintu were due to retire by rotation and being eligible were re-elected

Four meetings were held during the year as follows:-

- One Hundred and eighty sixth meeting on 28 October, 1992.
- One Hundred and eighty seventh meeting on 21 January, 1993.
- One Hundred and eighty eighth meeting on 22 April, 1993.
- One Hundred and eighty ninth meeting on 22 July, 1993

2.1 COFFEE RESEARCH ADVISORY COMMITTEE AS AT 30 SEPTEMBER 1993

Mr. B W Ngundo - Chairman
Mr. A M Mwangi - Chairman, CRF Board
Dr. Wilson R Opile - Director of Research, CRF
Mr. M Njiru - Kirinyaga, (Small Scale)
Prof. Kimani Waithaka - Faculty of Agriculture
University of Nairobi
(Upto January 1993)
Prof. D M Mukunya - Faculty of Agriculture
University of Nairobi
(w.e.f April 1993)
Mr. W Kisaka - Trans Nzoia (Large Scale)
Mr. J K Kinoti - Coffee Board of Kenya
Mr. J Mathenge - Solai/Subukia
(Large Scale)
Mr. J O Mabeya - Kisii (Small Scale)
Mr. A G Mwereria - Meru (Small Scale)
Mrs. Mary Ntipilit - Kajiado (Small Scale)
Mr. J K Mbatha - Chairman, Pesticides
Chemicals Association(K)
Mr. M M S Kagwanja - Embu (Small Scale)
Mr. M Mugho - Taita/Taveta (Small Scale)
Mr. J A Odoyo - South Nyanza (Small
Scale)
Mr. B Latebo Psirmoi - Bungoma (Small Scale)
Mr. J M Nzioka - Machakos (Small Scale)
Mr. W Wambu - Murang'a (Small Scale)
Mr. J M Muasya - Technical Manager, SCIP
Mr. H M Mwangi - Ministry of Co-operative
Development
Mr. A M Michaelides - Ruiru (Large Scale)
Ms. B W Kingori - Ministry of Agriculture
Mrs. N N Kaminchia - Ministry of Agriculture
Mr. H Harries - Thika (Large Scale)
Mr. J M King'ang'i - Kenya Planters' Co-op-
erative Union
Mr. J E Muhia - Chief Accountant/
Company Secretary, CRF
Dr. (Mrs) D M Masaba - Ag. Deputy Director of
Research, CRF/Secretary

Four meetings were held during the year as follows:-

- One Hundred and eighty sixth meeting on 28 October, 1992.
- One Hundred and eighty seventh meeting on 21 January, 1993.
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**ANNUAL REPORT AND ACCOUNTS OF THE COFFEE RESEARCH FOUNDATION
1 OCTOBER 1992 TO 30 SEPTEMBER 1993**

3.0 STAFF

3.1 Promotions

The following Senior Staff promotions were approved by the Coffee Research Foundation (CRF) Board to take effect from 1 October 1992 according to respective Schemes of Service

Dr. (Mrs) D M Masaba, BSc MSc PhD, formerly Principal Research Officer (Pathology), promoted to Senior Principal Research Officer

Mr. M P H Gathaara, BSc MSc, formerly Senior Research Officer I (Physiology) promoted to Principal Research Officer

Dr. J M Njoroge, BSc MSc PhD, formerly Senior Research Officer Officer I (Agronomy) promoted to Principal Research Officer

Mr. C B Nyakeri, B Comm , CPA, Internal Auditor promoted to the next grade

Mr. A S K Maithia, Dip Agric, (Egerton), Dip Agric (CIMMYT) Senior Field Advisory Officer (Farm Manager - Azania Farm) Promoted to the next grade

Mr. B R Ochieng', Dip Agric. (Egerton), formerly Senior Field Officer II (Breeding) promoted to Senior Field Officer I

M C Mburugu, Dip Agric (Egerton), formerly Senior Field Officer II (Breeding) promoted to Senior Field Officer I

Mr. J N Mbugua, formerly Field Officer III (research Liasion) promoted to Field Officer II

Mr. I S Khaoya, formerly Field Officer III (Namwela Demonstration Plot) promoted to Field Officer II

Mr. S J Kanyanja, SLT II, formerly Senior Laboratory Technician (Chemistry) promoted to Chief Technician

Mr. D K Wainaina, formerly Accountant (Accounts) Promoted to Accountant I

Mr. S N Muriigi, Dip. Clinical Medicine, Dip Clinical Anaesthesia, formerly Clinical Officer II (Administration) promoted to Clinical Officer I

3.2 Appointments

Mrs. A W Ndungi (nee) Wainaina, BSc Msc (Zoology), Research Officer (Entomologist), was appointed substantive Head of Entomology Section w.e.f. 27 October 1992.

Mr. A M Karanja, BSc (Agric), MSc (Agric Econ), Research Officer (Economist) was appointed Head Of Economics Section for the period that substantive Head of Section is on unpaid leave

3.3 Recruitments

Mrs MT K Onsongo (nee) Onchere, BA (Econ) joined CRF service as Research Officer (Economics) with effect from 2 August 1993

Mr K T K Gitonga, BSc (Agric Econ) joined the CRF as a Research Officer (Economist) with effect from 1 September 1993

3.4 Departure

Mr S M Ndungu, Dip Clin Med , Dip Anaesthesia, formerly Clinical Officer, left CRF service on 17th June 1993

3.5 Conferences / Workshops / Symposia

Dr Wilson R Opile, Senior Principal Research Officer - Director of Research attended the Inter-African Coffee Organisation (IACO) Annual General Meeting in Abidjan, Cote D'Ivoire from 16 - 22 November 1992

Dr Wilson R Opile, was also nominated by the Kenya Government to attend the Constituent Assembly of the African Coffee Research Network held on 27 March 1993 at 22 Berners Street, London W1P 4DD He was also authorized to sign the Agreement of African Coffee Research Network on behalf of the Kenya Government

Dr Wilson R. Opile was elected Chairman of the African Coffee Research Network (ACRN) on 27 March 1993 The ACRN Membership is composed mainly of Research Institutes which deal with coffee in the Inter African Coffee Organisation (IACO) member countries The membership is also open to other Research Institutes who are interested in coffee in other countries The purpose is to obtain donor funding for Coffee Research in Africa

Dr Wilson Opile' attended the 15th International Scientific Colloquim on coffee which was held in Montpellier, France from 6 - 11 June 1993 He thereafter attended the African Coffee Research Network's (ACRN) Workshop on "The improvement of Productivity and Quality of Coffee through Genetics" held in Montpellier, France from 14 - 15 June 1993

Dr (Mrs) D M Masaba, Senior Principal Research Officer and Head of Plant Pathology Section, attended the Brighton Crop Protection Conference held in London from 23 - 26 November 1992. She thereafter visited the Schering AG Research Plant at Cambridge in Britain

Dr (Mrs) Masaba was invited by the Canadian Phytopathological Society to attend the 6th International Congress on Plant Pathology held between 26th July and 9th August 1993 in Montreal, Canada.

Dr J M Njoroge, Principal Research Officer and Head of Experimental Agronomy Section, attended the 15th International Scientific Colloquium on coffee held in Montpellier, France from 6 - 11 June 1993. He thereafter visited the International Coffee Organization (ICO) headquarters in London

Mr. Andrew Karanja Mwiha, Research Officer, Economics, attended the 1992 All Africa Conference on Animal Agriculture held in Nairobi from 23 - 27 November 1992. He presented a paper

Mr. C O Omondi, Research Officer, Plant Breeding, attended the 23rd International Course on Applied Plant Breeding in Wageningen, the Netherlands from March to June 1993

Mr C O Agwanda, Head of Coffee Breeding Unit, attended the 15th International Scientific Colloquium on Coffee (ASIC) held in Montpellier, France from 6 - 11 June 1993

Mr. Agwanda thereafter attended the African Coffee Research Network's (ACRN) workshop on "the Improvements of Productivity and Quality of Coffee through Genetics" held in Montpellier from 14 - 15 June 1993.

Mrs A W Ndungi, Head of Entomology Section, attended a course on methods and techniques for biological control organised in Nairobi by the International Centre of Insect Physiology and Ecology (ICIPE) from 12 September to 1 October 1993

Mr. N K O Ojjo, Research Officer - Chemistry Section, attended a Seminar on Management and Statistical analysis of Data held in Nairobi between 20 - 24 September 1993. The seminar was organised by Data Perspectives

3.6 Training

Dr John Mburu Njoroge, Head Agronomy Section, successfully completed his training for the degree of Doctor of Philosophy at the University of Nairobi w e f 18 January 1993. His PhD thesis was entitled "Studies of Fertilization,

Plant Density, Pruning, Replacement Methods of Established coffee and Intercropping Food Crops with Ruiru 11 Coffea arabica L."

Dr Peter K. Michori, Deputy Director of Research, Successfully completed his training for the degree of Doctor of Philosophy at the University of Reading, United Kingdom w e f 3 July 1993. His PhD thesis was entitled "Nitrogen Budget under coffee".

Mr. S D Gatua, Senior Accountant, successfully completed the Certified Public Accountants (CPA III) Final Examination in August 1993

3.8 Attachments / Study Visits

Mr Richard C Marder, B. Eng MSc of the Natural Resources Institute (NRI) U K conducted a survey on pollution of Water courses from Wet Processing in Kenya in conjunction with the CRF Chemistry Section for six weeks w e f 11 November 1992

Mr. Jos Sinema from the Larenstein International Agricultural College, the Netherlands, came for a six months practical attachment at the CRF w.e.f. 13 January 1993

3.9 Part Time Lectureship

Dr. J M Njoroge was appointed part-time lecturer at the University of Nairobi's Crop Science Department from 26 April 1993

4.0 RESEARCH ACTIVITIES

4.1 Plant Pathology

The Pathology Section continued with work on evaluation of the pesticides for the control of three major coffee diseases. Disease control by cultural methods and by use of resistant varieties was also carried out. The Section also offered advisory services involving diagnosis and monitoring of minor and/or a new coffee disease situations as well as checking the quality of the recommended fungicides on the market.

Six new fungicides were screened in the laboratory during the year under review for their effect on Coffee Berry Disease (CBD) and Coffee Leaf Rust (CLR). Among these, two, (Prochloraz E.W ex-Schering Ag and Delan 500 Sc ex-Shell Ltd), have been selected for field evaluation against CBD alone, and one, (Demildex, ex-Safina Ltd), against both CBD and CLR

Field evaluation of four new fungicides and one tank mixture (Banko + Copper) for control of CBD was carried out at Kiamumbi Estate during 1991/92. Considering the results of three years' evaluation, one of these products, namely Banko (Chlorothalonil 75% WP), as well as a tank mixture of Banko and Cobox were recommended for CBD control in Kenya.

Four new coppers were evaluated for their performance against CLR at Bradgate and Azania Estates. The four coppers, namely Perecopper, Kopox, Cuprados and Coptox have been recommended for CLR control in Kenya after successfully completing the evaluation period.

A second lot of new coppers were evaluated against CLR at Murera and Azania Estates. The new coppers controlled CLR and the trial is continuing into the second year.

Field evaluation of a ground applied systemic fungicide (Armour-G) against CLR was conducted at Azania and Jacaranda Estates. The results so far obtained indicate that Armour-G applied at 38 g/tree once or twice per year, or applied at 19 g/tree twice per year gave control of CLR comparable to the standard Copper Nordox. The trial will continue into the third year.

Another experiment was conducted in order to determine the timing of application of the systemic fungicide Alto 100 SL (SAN 619F) and Anvail. The trial is in progress using various curative programmes in comparison with Bayleton 25% WP applied as a curative product and Copper Nordox (0.35%) applied on recommended protective schedule.

Two new coppers, Kocide DF and Funguran-OH, were evaluated for Bacterial Blight of Coffee (BBC) control at Ceres and Meruai Estates. The two coppers were comparable in performance to Kocide 101 and still continue to be evaluated.

A trial on integrated control of BBC using cultural and chemical methods is still in progress at Berea Estate.

Long term effects of copper sprays to control BBC and CBD on cropping and tree growth has been monitored for the last eight years. All treatments controlled both CBD and BBC. However, no symptoms of copper phytotoxicity on shoot emergence and growth extension were recorded during the year.

Screening for resistance to CBD was carried out on 1,267,000 coffee seedlings from the Coffee Breeding Programme and the results were used by the Coffee Breeding Section.

A total of 83 samples of fungicides from Estates and Co-operative Societies were analysed in order to determine if the percentage of the active ingredients in them conformed to the recommended products. The results indicated that all samples conformed to the standards of active ingredients.

4.2 Coffee Breeding

The Breeding Section continued with Breeding and Selection work aimed at improving commercial coffee varieties for disease resistance, yield and quality. The idea is to obtain better yield targets compared to

the existing varieties. The coffee germplasm preserved in the museum plots 5 and 13 at the Coffee Research Station's Jacaranda Farm and the Ethiopian Collections (EX-FAO, 1964 and EX-ORSTOM, 1970) planted in fields B1 and B14 at Oaklands Breeding Station continued to be maintained on routine basis.

Hybridization and selection work were continued by making relevant crosses, selfings and test-crosses as well as by evaluating progenies of similar crosses made in the past. The objective of these programmes is to improve the commercial cultivars (such as SL28, SL34 and K7) for Coffee Berry Disease (CBD) resistance, yield and quality. Up to 957 test-crosses and 264 selfings were made on individual trees selected from advanced breeding lines in order to identify genotypes homozygous for CBD resistance genes at a minimum of two resistance loci. Selfings of 367 genotypes made in the previous years were planted in field B24 (EX-B17, Oaklands) for the same purpose.

Evaluation of first Back crosses (BC1) planted in the field B20a continued in its second year of production. Yield in kg/tree for 1992 as well as the cumulative yield for 1990-1992 showed no significant variation amongst genotypes. Likewise, no variation was observed for field resistance to CBD. Variation for bean grades and leaf rust resistance were significant and therefore warranting further selection work to improve these characters. In similar trial involving selfings of the BC1 planted in field B22, significant variation was observed for yield and bean sizes. Selection in this field will be in favour of genotypes which combine higher yield, better bean grades, good cup quality with non segregation for CBD susceptibility.

The adaptation trials with cultivar Ruiru 11 were observed during their second year of production in Kisii, Koru and Jacaranda sites while Taita and Meru sites were in their first year of production (fly crop). Yield of cherry per tree varied from 1 kg to 7 kg depending on location and genotype. Similar observations were made for liquor quality where performance of genotypes varied from class 1 (excellent liquor) to class 6 (ordinary liquor) depending on genotype and location.

Hybrid seed output rose from 3 million in 1991/92 to 5.5 million seeds in 1992/93 reflecting an improvement on the hybrid seed production efficiency. About 7 million flowers were emasculated and pollinated for the purpose of hybrid seed production during the same year.

Vegetative Propagation of Ruiru 11 continued as a supplementary source of Ruiru 11 planting materials. This involved rooting stem cuttings and grafting on SL 28 rootstocks. A total of 74,000 rooted stem cuttings and 37,000 grafted seedlings were raised in readiness for sale to farmers. A new mother garden with 64 clones of Ruiru 11 pre-selected for CBD resistance was established.

It is now expected that a total of 16.4 million planting materials have been distributed to the farmers either as seed or seedlings since 1986 when the hybrid seed programme was initiated

4.3 Agronomy

During the year under review, research work was conducted on fertilizers, spacing, pruning, intercropping coffee with annual crops as well as perennial fruit trees, and replacement methods of established coffee with the hybrid coffee Ruiru 11, and weed control in coffee.

The trial 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 4000 trees/ha) continued. The fertilizer rates used were 80, 260 and 320 kg N/ha. Results obtained so far indicate that yields increased with increasing densities. No significant differences on yields was observed on various rates of fertilizer. The trial entered the second coffee cycle at Ruiru.

A trial was started in 1989 at Kiamworia to find out the coffee yield of Ruiru 11 response to planting hole size and rates of cattle manure applied. The hole size of 60 cm x 60 cm x 60 cm and application of farm yard manure at a rate of 25% gave the highest yield.

Various annual crops were planted amongst Ruiru 11 in 1987 at Mariene, Kisii and Koru. Except for the coffee trees intercropped with sweet potatoes at Mariene, all other trees intercropped with food crops had recovered from adverse effects recorded in the first year of coffee production.

Other studies of intercropping involved using perennial fruit trees such as macadamia planted amongst Ruiru 11 and SL 28 at Kitale and Ruiru in 1989. The objective was to screen various fruit trees as suitable intercrops with coffee for both fruits and shade effect. Coffee intercropped with guavas and bananas produced the lowest yields. The study is still in progress.

The processing Unit of Agronomy Section continued to process seed from the traditional varieties for sale. During the year under review 25 kg SL 28, 5 kg SL 34 and 5 kg K7 seeds were sold to coffee growers.

Meteorological records continued to be compiled routinely. These include records done at Ruiru, Mariene (Meru), Koru and Kisii for 1991 plus cumulative long term averages.

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

During the year under review, the Chemistry Section continued to analyze soil and leaf samples from coffee farmers at a nominal charge and also from Research Sections. A total of 3261 soil samples, 1430 leaf samples and 63 fertilizer and 7 manure samples were analyzed. The advisory soil samples

were received from 144 Estates and 861 Smallholders while leaf samples came from 242 Estates and 539 Smallholders. An overall decrease of 54% was recorded over last year's figure of leaf analysis. Similarly, there was a decrease of 24% in the number of soil samples analysed this year compared to last year. This may be due to the fact that coffee prices were very low and farmers were not enthusiastic in buying fertilizers.

A study was initiated at Azania to study the manurial effects of coffee pulp and cofuna on mature (French Mission) Arabica coffee conventionally spaced. Initial soil and leaf samples were taken for analysis. Other sites were planned from Mariene, Koru and Kisii. Correction of Magnesium deficiency with Kieserite (Mg) fertilizer was effected at Azania where Mg deficiency is common.

Fertilizer-Farm Yard Manure (FYM) substitution trial at CRF Azania Estate near Juja has been conducted since 1983 over two-five year change of cycles. The yield results from 1983-92 show that good yields of over 200 kg/ha clean coffee would be obtained if manure is applied alone at a rate of two 'debes' (20 litre measure) per tree per year. The results showed that use of FYM as nitrogen source gave coffee yield (2980 kg/ha) comparable to 3202 kg/ha from use of CAN at 35 kg N/ha. In addition, FYM increased leaf contents of nitrogen, phosphorus and calcium. However, leaf boron became deficient when FYM rate exceeded 2 "debes" per tree.

A trial was started in Mariene (Meru) in 1989 in order to determine the effects and interactions of Magmax, Nitrogen, Phosphate and Potash in coffee yields and quality on acid soils of Meru. Coffee is spaced at 2 x 1.25 m. The results showed that moderate application of lime (250 kg/ha per year) was found to interact positively with N (50-100 kg/ha) and P (40-80 kg/ha) to increase % grade 'A' beans. It was also noted that yield and % grade A beans were optimised where moderate lime, (500 kg/ha), N (50 kg/ha), P(40 kg/ha) and high potassium (50 kg/ha) were applied during the year. N application enhanced leaf Mg while suppressing leaf Potassium (K). This spelt out K/Mg antagonism during uptake. Thus the rates of nitrogen and potassium are important factors in this study.

The Pesticides' unit received 94 samples from farmers for checking their active ingredients compared to 169 samples received last year, indicating an overall decline of 44.6%. During the year under review, the Unit also developed a number of chromatographic methods for detecting active ingredients in various chemical formulations recommended for use on Kenya coffee. So far, it has been possible to include Sumithion (Fenitrothion), Delan (Dithianon), Lebaycid (Fenthion), Dursban and Folimat (Omethoate). Methodologies for Dyrene and Bayleton were under innovation to have a routine for their analysis. Training in the use of High Performance Liquid Chromatograph (HPLC) was recommended for the chemist.

A study on distribution, dissipation and accumulation of copper-based biocides applied on the coffee was started in 1985. The objective of the study was to find out if the levels of copper has increased in the coffee tissues and soils as a result of frequent use of the biocides to control Coffee Berry Disease, Bacterial Blight of Coffee and Leaf Rust diseases in Kenya. The results showed gradual build up in total and available copper in the top soil and corresponding increase in leaf copper. It was thus evident that the level of leaf copper was dependent on available copper in the soil.

The Quality Chemist was attached at the Coffee Board of Kenya's Liquoring Unit for familiarisation in Liquoring. Concurrently, the training of a liquoring panel continued.

Work on instrumental bean colour measurement was started using Lovibond Tintometer (model E). The usage of the instrument was constrained by lack of a rotary sample holder recommended for irregularly coloured beans. The holder will be budgeted for during the following year.

The Quality Unit received 1554 bean parchment from CRF and Coffee Traders samples for moisture, usual quality appraisal and 182 for sulphur analysis. A total of 1450 samples were analyzed.

Studies on the physico-chemical parameters of coffee quality were started to understand their use as indices of quality. This would be achieved by relating them with the known sensory liquor qualities. The parameters included midroast pH at 40°C, titratable acidity, apparent swelling, soluble solids, yield in roasting, viscosity at 40°C, bulk density, weight of 1000 beans and total ash. All agro-ecological zones were targeted.

The off-flavours for which the coffee trade complained during the 1992/93 pool year was explored by means of a broad survey. The survey covered the 'affected' farms as well as the coffee exporting firms. These off-flavours were commonly described as 'hard', 'hardish', 'salty', 'musty' or 'tainted'. These descriptions were alien to the Kenya coffee flavour description. A survey was taken up to establish the nature, extent and causes of Kenya Coffee quality decline in general in the coffee growing zones.

The results of the survey were published in Kenya Coffee bulletin of December 1993.

A project was initiated in 1991 in order to determine the factors which influenced the composting process of coffee pulp. Well composted coffee pulp is useful as manure and soil conditioner. However, the most suitable composting method to improve on its handling, transportation and distribution on the farm has not been identified. The results obtained so far indicate that well composted pulp is obtained by turning of the heap twice a week. Covering the piles

increased duration of composting. Thus short composting duration would be achieved by frequent turning of a fully exposed pile. On studying temperature, pH and pile volume as composting indicators, temperature was found to be the most rational parameter to determine complete compost.

A trial was laid down at various factory sites to determine the effect of prolonged soaking of parchment with daily washing and daily or weekly sampling. The samples were dried and hulled. The results showed that quality deteriorated from the 21st day. The study continued.

A survey on pollution by coffee effluents was started to determine the trend of water usage at the various stages of processing for different coffee processing regimes. The effect of recirculating processing water was given much attention as a water saving device. Water treatments components were also examined.

The results showed that water use was rampant and unjustified by amount of coffee pulped. Recirculation was used as a way to control pollution rather than a water saving tool. Isolated cases of pollution were observed.

Full recirculation of processing water was deemed capable of saving processing water usage substantially especially for the final washing and grading water.

Testing of hand pulpers was continued to establish an inventory of hand pulpers. The pulpers were supplied to CRF by manufacturers and farmers. The pulpers were tested when operated by a powered motor or manually. The number of runs were restricted at 4 - 8. The pulping rate for the Mughal Motorised Disc Pulper was 2 debes/minute or 1440 kg/hr while that of the manually run one was 0.45 - 1.0 debes/minute or 320 - 720 kg/hr. These rates were expected to change if the observations were prolonged with respect to time.

The hopper of Mughal Disc Pulper was found in need of re-designing although all pulpers did satisfactory work. The prices and ease of operation of the pulpers are quite attractive to the small scale farmers.

The chemistry section intends to initiate a study in Milling Loss. The loss should be documented for various grades and varieties of coffee in future.

4.5 Crop Physiology

The programme of the Crop Physiology Section was directed towards water use studies, tissue culture of Hybrid variety of Arabica coffee (Ruiru 11) and varieties and studies on the effect of established shade on growth, yield and quality of coffee.

Studies were conducted on physiological, growth and yield parameters of Ruiru 11 as influenced by

irrigation. The results so far obtained using overhead system of irrigation indicate that there were no significant differences between irrigation treatments used namely, 38, 51 and 76 mm of water applied at intervals of 21, 28 or 35 days in respect to physiological parameters e.g. stomatal conductivity leaf temperature. However, there were significant differences between irrigated and unirrigated trees. Yield results indicated that the best rate x interval treatment was 76 mm at 28 days intervals. Studies using under-tree system of irrigation showed that there was a significant decrease in growth extension when 100 mm of water was applied at 21 days interval. However under the drip system the best treatment in terms of yield was 25 mm at 28 day interval.

A trial was conducted to assess the effects of established shade trees on coffee tree growth, yield and quality. The results obtained were similar to the ones reported last year. That is, total chlorophyll content, leaf water potential, transpiration and stomatal conductivity decreased as the distance from the shade tree increased. Regression analysis of yield on distance from shade tree irrespective of compass direction was negative ($r = -0.74$).

A study on micropropagation of Ruiru 11 and other improved varieties continued. The aim of the project is to work out a viable alternative method for propagation of Ruiru 11 through nodal culture and somatic embryogenesis. Orthotropic nodes were cultured in a medium containing 10mg/l Benzyladenine (BA). These were maintained under one thousand lux illumination in a 16-hour photoperiod. Shoots started developing within four weeks. The shoots were then excised and rooted after developing two nodes. The highest rooting frequency of 80% was obtained when Naphtalene Acetic Acid (NAA) was used at 200mg/l. Over five hundred plants have been weaned from this procedure after the plants were transferred into a vermiculite soil mixture (1:1).

One cm² leaf explants gave callus when cultured in Murashige and Skoog (MS) medium containing 5 mg/l 2,4-Dichlorophenoxy acetic acid. Embryogenesis was achieved with each embryo passing through the sequential stages of embryo formation (i.e. globular, heart-shaped and torpedo-shaped). Each leaf explant gave 70-100 embryos. During the year over 600 embryos were obtained. The torpedo-shaped embryos were given an auxin dip and transferred into a MS medium without growth regulators for further development into plantlets. An attempt is being made to wean the rooted plantlets using different potting mixtures.

4.6 Entomology Section

During the year under review Entomology Section continued work on evaluation of insecticides on targeted insects/pests. It was also involved in biological control activities which are a priority project. The biological control programme is being used as a

component of Integrated Pest Management (IPM). The IPM strategy aims at developing low-cost and environmentally safe technologies for managing insect pests.

Field evaluation of three products, Hieldan 50% EC, Dursban 24 ULV and Fenitrothion 3% dust were evaluated against Berry Borer at Kirinyaga and Embu. The effect on Antestia bugs was also to be observed. Treated plots were observed to have low mean bored berries per tree than the control. The rates for each of the products did not differ significantly giving the possibility of using the low rates effectively. Results showed that treated plots kept the Antestia bugs at lower levels and below economical injury levels as compared to the control. The trial is in progress.

Four products namely Basudin, Sumicombi Alfa, Azochord and Tafethion were evaluated against leaf miner at DelMonte Estate. All the treatments showed significant control and reduced the infestation. The higher rates gave significantly higher mortalities as compared to the standard and control. The trial is in progress.

NTN 33893 products were evaluated at Rukera, Jokimu, Delmonte and Azania estates against leaf miner and Aspidotus scales. Drench and granular formulations were applied. Both applications reduced the pest incidence significantly better than the controls. The trial is in progress.

Biological Control work on targeted coffee insect pests is on-going. Mass rearing of indigenous predators and parasitoids (Natural Enemies - N.E) is being done under laboratory conditions. Emphasis is being laid on Giant looper (*Ascotis selenaria reciprocaria*), scales (*Aspidotus sp /Coccus sp*), Antestia bug (*Antestiopsis spp*) and Berry moth (*Prophantis smaragdina*).

A total number of 83,185 Natural enemies have been released during the year. Sites have already been established in Embu, Murang'a, Meru, Kiambu and Machakos to assess the impact of released N.E of Antestia bug. These studies will be extended to Nandi, Kitale and Kisii.

4.7 Agricultural Economics

Agricultural Economics Section devoted its resources to the following three main projects in both the Small holder and Estate Sectors: (1) The Evaluation of the effects of low coffee prices and liberal market policies on coffee production, profitability and farm incomes; (2) The economics of coffee production and; (3) The adoption and performance of Ruiru 11.

During the year under review, fundamental and major economic policies came into effect both domestically and internationally. On the international scene, the world coffee markets continued to be governed by supply and demand following earlier suspension of

economic clauses of the International Coffee Agreement (ICA) in July 1989. Any hopes of a new coffee pact were lowered by the collapse of the new ICA negotiations in London in early 1993

On the domestic scene, various policies aimed at liberalization of the economy were implemented. Some of these policies include the devaluation of the Kenya shilling by about 62%, re-introduction of foreign exchange retention account at 50% level for exporters, the quotation and trading of coffee in US dollars in the Nairobi auctions, increases in the interest rates by most commercial banks and the introduction of alternative coffee payment system i.e "the out of pool" payment system.

The "out of pool" payment system gave farmers and their co-operatives the opportunity to receive proceeds from their coffee sales immediately, instead of waiting for interim and final payments that come with the pool system. The system also offered direct link between sales and payments, quality and payments which can give farmers incentives to grow quality coffee at the same time ease their farm cash flow problems. However, the Co-operative sector still lagged behind in implementation of most of these favourable incentives. The perennial problem of deductions made by societies and factories continued to be a major worry and disincentive in most parts of the country. These deductions went as high as 50% in some districts like Nyeri and in most districts average about 30% of the total proceeds.

A study on price and production trends reveal nominal improvement in coffee prices in 1991/92 with the average price per kg of clean coffee in the year being Ksh.52. This is an improvement of 5% over the 1990/91 price. In 1991/92 pool year, a total of 90,000 metric tonnes of coffee were produced of which 55,926 (58%) came from the Smallholder sector and the rest 37,552 (42%) from the Estates. This production was 3.1% higher than the 1990/91 figure.

However, it is worth noting that the Co-operative Sector in 1991/92 was producing about 62% of its 1987/88 production despite the fact that the area under mature coffee has increased by about 6% over the same period. Most of the districts were producing less than 57% of their highest yield in 5 years period. The most affected districts are Taita, Meru North, South Nyanza, Machakos and Murang'a. On the contrary, the Estate Sector production has in the last few years stabilized to an average figure of 35,000 metric tonnes. In 1991/92 period, the Estate production was over 84.4% of the major crop of 1987/88.

The production figures led to the conclusion that future coffee trends production increases especially in the co-operative sector may not be expected to be dramatic. The declining coffee yields, coupled with diminishing farm sizes and food security problems in the major coffee growing districts will make coffee production recovery a slow process. The study recommends increased extension service especially

to those districts with high levels of neglect

Data from a smallholder survey carried out in 1991 covering 240 farmers was used to analyse the effects of low prices on the coffee enterprise. The results showed coffee productivity in the subsector in 1991/92 to average about 546 kg of clean coffee per hectare. However, coffee yields varied widely across agro-ecological zones, districts and among management levels. Yields for the low, medium and high management farmers were estimated at 220 kg, 1140 kg of clean coffee per hectare respectively.

On coffee profitability and gross margins, the profitability results from the data revealed that the overall coffee gross margin reported in 1990/91 period of negative Ksh 700 deteriorated to stand at negative Ksh.2636 per hectare. The deterioration of the gross margin can be attributed to low yields, changes in costs of farm inputs during the year and almost constant coffee prices in the same period. Results from the study showed that only the high management farmers, who constitute 24% of all the smallholders made a profit out of coffee production. The medium level farmers who constitute about 30% of the small holders could not break-even, but when labour cost is taken as income to the farmer, then this category of farmers had a net gross margin of Ksh.3,298 per hectare. The low management farmers who constitute the bulk of the smallholders (46%) could not break even, even after ignoring labour costs. This last category of farmers have been observed to be intercropping their coffee with food crops mostly maize, beans and potatoes.

The total cost of coffee production in the smallholder sector is comprised of the farm gate cost of production and the processing cost. In 1991/92 crop year, the farm gate cost of production per hectare averaged Ksh 18,054, Ksh 22,093 and Ksh 29,043 for low, medium and high management farmers. The overall average was Ksh 21,902 per hectare (Ksh 40,114 per tonne). When the cost of processing coffee is considered, this average cost adds up to Ksh 26,846 per hectare (Ksh 49,161 per tonne).

During the year under review, there were major increases in coffee production costs in the estate sector mainly due to high interest rates on working capital and high farm input prices. The variable cost per hectare averaged Ksh.26,483. The variable cost for irrigated estates was 48% higher than that the non-irrigated ones. The total cost of production per hectare was Ksh 75,325 and Ksh 60,622 for irrigated and non-irrigated estates respectively. This difference in cost was mainly due to differences in variable costs between the two subsectors. The overall cost of production was Ksh.69,886 per hectare (which is equivalent to Ksh.62,398.20 per tonne of clean coffee produced).

A study on profitability in the estate sector confirms

that intensified coffee production can go a long way in reducing the unit cost of production. This is shown by comparing variable cost structures among different yield and quality groups of estate. The variable cost per tonne generally decreased as both yield and quality increased. When comparison is made between various yield groups, the low yield group spend six times higher than the high yield group of estates to produce a tonne of clean coffee.

A farm level survey conducted between March and May 1992 covering 140 coffee estates on various aspects of hybrid Arabica Ruiru 11 revealed that

- Ruiru 11 has been adopted by about 36% of the estates in Kiambu districts and its environs having the highest adoption level. Adoption level tended to increase with estate size and production technology with 58% and 24% of the irrigated and non-irrigated estates having adopted Ruiru 11 respectively.
- Ruiru 11 spacings were varied with a total of 8 different spacing being used. The spacing ranged from 1.35 m x 1.35 m (2.4 m path after every 8 rows) to the conventional spacing of 2.74 m x 2.74m. The 2.74m x 1.35m spacing (2984 tree/ha) was the most widely adopted, being used by 36% of Ruiru 11 adopters.
- Ruiru 11 yields varied with plant density per hectare and level of production technology. The yields ranged from 1.91 tonnes of clean coffee per hectare to 3.27 tonnes/ha with a mean of 2.8 tonnes/ha.
- Ruiru 11 was rated as resistant to CBD and leaf rust. However, certain Ruiru disadvantages were identified. Major among them being that the variety is prone to topping over (lodging) the cause of which needs further investigation. Lack of investment capital for Ruiru 11 establishment was identified as a major constraint hindering its adoption. The establishment cost per hectare by May 1992 was given as Ksh 47,000 and Ksh 55,000 for internally generated capital and borrowed capital respectively. The magnitude of these costs rises with the spacing adopted and mode of establishment.
- The payback period required to recoup to the establishment and annual maintenance cost for new land planting and uprooting was calculated to be five years regardless of the spacing. Interplanted Ruiru 11 had a payback period of six years.
- The results indicated that new land planting was the dominant mode of establishing Ruiru 11, being used by 72% of the estates. Uprooting of old traditional varieties as a mode of establishing Ruiru 11 was used by 27% of the estate sector while only 1% used interplanting.

- It was estimated that from 1988 to 1991, a total of 968 ha of Ruiru 11 were planted in the estate sector, of which 707 ha were planted on new land. It was estimated that all factors given, if the current trend continues, there will be 4155 ha of Ruiru 11 in the estates by the year 2000. This will represent 11% of total estate coffee area.

4.8 Research Liaison Training & Advisory Section (RLTAS)

The role of the RLTAS is to provide, encourage and maintain a continuous contact between coffee farmers, researchers, coffee agencies and other people interested either individually or as a group in the research, production and processing aspects within the coffee industry.

To effectively reach the farmers, the section liaises with coffee extension staff in the Ministries of Agriculture, Livestock Development & Marketing, Cooperative Development, the Cooperative Movement Managing Agencies and Coffee Board of Kenya (CBK) field services personnel in disseminating research information and receiving feedback from the field. Farmers, particularly estate owners do have a direct contact with the section.

Information flow is effected through training, provision of publications, participation in Agricultural Shows, and coffee farmers field days, making advisory visits to farms, visits by farmers to the station and demonstration sites located in all major coffee growing areas and through audio visual media.

Within the year, the section was internally able to conduct two courses for Coffee Extension Workers, four for factory managers and one for nursery managers. Externally, there were twelve training workshops conducted in eleven coffee districts where 495 coffee extension workers participated.

A symposium on coffee pruning was held at Coffee Research Station (CRS) and a total of one hundred and fifteen (115) coffee experts from all coffee districts, coffee managing agencies and CRF attended.

There were six foreign and three local students on attachment at CRS.

There was a drastic decrease in the number of the various publications sold from 704 last year to 336. However, there was an increase in the number of leaflets distributed to growers particularly those on Ruiru eleven (11) Technical Circulars handouts and Coffee Research Activities.

The number of advisory visit increased from 191 in 1991/92 to 229 this year. These were either requested or planned visits by the farmers, coffee managing agencies and the extension staff. Unlike in the previous year, there is a noticeable demand for farm

visits. This could be attributed to recent changes in liberalization of the economy where farmers are getting better payment for their produce

Eighteen coffee farmers field days were conducted in eighteen coffee districts across the country where about 5,400 farmers participated. The CRF held a major field day in August 1992 and over 7,000 farmers, extension staff and other guests attended. In the CRF demonstration plots located at Bukura, Namwela, Kitale, CRF, Kirinyaga and Mariene, a total of 3500 farmers were attended to during their visits. Common observations and notes during the field days and the visits are improved coffee husbandry practices as compared to previous years.

The RLTAS staff of CRF attended eleven (11) Agricultural Society of Kenya shows and seven (7) District Harambee Shows. The CRF staff and CBK were able to interact with farmers and other interested participants in all aspects of coffee husbandry, processing, marketing and the future of coffee farming as a business

CRF was able to receive a total of 8216 visitors at CRS, its substations and demonstration sites who paid visits individually and as groups apart from those who attended the organized open/field days in these sites as reported above. These visitors were either farmers, students/pupils and foreigners with various interests on coffee

The sale of traditional coffee seeds namely K7, SL28 and SL34 was 36 kg compared to 123 kg in 1991/92 year. There was however, a high demand for Ruiru 11 planting material as noted under the Coffee Breeding Unit Section on the main report.

CRF continued its cooperation with other local institutions in inter-library loaning of books particularly with the Kenya Agricultural Research Institute (KARI), the Universities, Kenya National Library Services (KNLS) and Kilimo Library. Five books were donated to CRF by the Technical Centre for Agricultural and Rural Co-operation (CTA) which is highly appreciated.

The current CRF Library requires expansion to accommodate the many publications we have and modern equipment for collecting, organizing, storage and dissemination of information

5.0 Income and Expenditure Summary

The income/Expenditure and the Balance Sheets as at 30 September 1993 are attached hereto. The Foundation's income for the year to 30 September 1993 was K£8,294,426 compared to K£5,783,381 for the incurred during 1992/93 compared to £5,133,020 incurred in the previous year.

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

Foundation's Coffee Berry Disease Unit	
	K£
Staff Remuneration, Labour Wages	260,803
Travelling and General Upkeep	
New Equipment	13,400
	274,203

Foundations Bacterial Blight of Coffee Project

Staff Remuneration, Labour wages	
Travelling & General Upkeep	151,105
New Equipment	79,793
	230,898

The above Expenditure for the two units was reimbursable by the Coffee Board of Kenya over and above the Main Subvention. The Budget for the year 1993/94 in respect of these projects stand at K£393,860 and K£222,560 respectively.

The bank balance was K£463,740 at 30 September, 1993

6.0 Acknowledgement

This opportunity is taken to thank the Coffee Board of Kenya, the Ministry of Agriculture, Livestock Development & Marketing, the Ministry of Research, Technical Training 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 30 SEPTEMBER 1993**

I have examined the accounts of the Coffee Research Foundation for the year ended 30 September 1993 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 the 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 financial affairs of the Foundation as at 30 September 1993 and of its surplus and source and application of funds for the year ended on that date.

W. K. KEMEI
AUDITOR-GENERAL (CORPORATIONS)

6 October 1994

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Balance sheet as at 30th September 1993

	Note	1993	1992
ASSETS EMPLOYED			
Fixed Assets			
INVESTMENTS	2	29,195,688	24,052,137
Quoted Investments at Cost Schedule II		1,489,725	1,601,445
CURRENT ASSETS			
Coffee Board of Kenya Stocks		20,261,385	12,642,922
Debtors & Deposits	6	6,486,225	2,545,843
Cash & Bank Balance	4	5,144,779	5,008,162
		10,138,584	5,837,621
		42,030,972	26,034,548
CURRENT LIABILITIES			
Creditors, Accruals and Provisions	7	24,202,358	26,481,293
Withholding and Corporation tax		60,978	43,532
		24,263,336	26,524,825
NET CURRENT ASSETS		17,767,636	(49,277)
Total Net Assets		48,453,049	25,163,305
FINANCED By:			
Coffee Research Reserve Fund		2,000,000	2,000,000
Capital Reserve	5	25,468,747	20,502,314
Research Reserve		20,984,302	2,660,991
		48,453,049	25,163,305

Accounts were approved by Board of Directors on

29 September 1994

Mr. A. M. MwangiChairman

Dr. Wilson R. Opile Director

**COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)**

**Income and Expenditure Account/Research Reserve
for the year ended 30th September 1993**

	1993	1992
	Kshs	Kshs
Surplus for the year	28,182,275	13,330,529
Provision for withholding and Corporation Tax	(85,307)	(69,077)
Capital expenditure incurred on land owned by Coffee Board of Kenya or Government of Kenya	(9,773,657)	4,026,712
	18,323,311	9,234,740
Research Reserve brought forward	2,660,991	6,573,749
	20,984,302	2,660,991

**COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)**

**Detailed Income and Expenditure Account for the year
ended 30th September 1993**

INCOME	1993	1992
Coffee Board of Kenya	Kshs	Kshs
Main subvention payments	70,412,047	69,402,419
Reimbursements of plant Breeding Expenses	17,441,947	12,222,340
Reimbursement of SCIP Expenses	9,859,705	5,650,980
	<hr/>	<hr/>
	97,713,699	87,275,739
	<hr/>	<hr/>
Reimbursement of FCBDURU Expenses	6,810,440	5,635,360
Reimbursement of FBBCRU Expenses	4,514,560	3,782,860
	<hr/>	<hr/>
	11,325,000	9,418,220
	<hr/>	<hr/>
Government of Kenya Contribution Towards Coffee Rehabilitation/Programme	-	-
Coffee Proceeds	49,239,766	15,931,840
Dividends and Interests on Investments	202,185	183,281
Sundry Income	7,407,856	2,858,526
	<hr/>	<hr/>
	56,849,807	18,973,647
	<hr/>	<hr/>
Total Income	165,888,506	115,667,606
	<hr/>	<hr/>
EXPENDITURE		
Recurrent Expenditure	126,821,442	94,457,523
Special Services	5,939,031	3,988,064
Depreciation	4,765,758	3,995,722
Audit Fees	180,000	150,000
	<hr/>	<hr/>
Total Expenditure	137,706,231	102,591,309
	<hr/>	<hr/>
Surplus from the operations	28,182,275	13,076,297
Profit on sale of Assets	-	254,232
	<hr/>	<hr/>
SURPLUS FOR THE YEAR	28,182,275	13,330,529
	<hr/>	<hr/>

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Statement of Changes in Financial Position
for the year ended 30th September 1993

SOURCES OF FUNDS	1993	1992
Surplus for the year before	Kshs	Kshs
taxation	28,182,275	13,330,529
Adjustment for items not involving the movement of funds:-		
Depreciation	4,765,758	3,995,722
Shares Adjustments	111,720	(254,232)
Profit on Sale of Fixed Assets	(125,200)	-
Taxation	85,307	(164,430)
	<hr/>	<hr/>
Funds Generated from Operations	32,849,246	16,907,589
	<hr/>	<hr/>
OTHER SOURCES		
Proceeds on Disposal of Fixed Assets	125,200	391,500
	<hr/>	<hr/>
Total Funds Available for Application	32,974,446	17,299,089
	<hr/>	<hr/>
APPLICATION OF FUNDS		
Purchase of Fixed Assets	9,909,309	3,831,826
Development Expenditure	9,773,657	4,026,712
	<hr/>	<hr/>
Total Applications	19,682,966	7,927,615
	<hr/>	<hr/>
	13,291,480	9,371,474
	<hr/>	<hr/>
MOVEMENT IN WORKING CAPITAL		
Increase in Creditors and Accruals	(2,278,935)	(5,767,515)
(Increase) in Debtors and deposits	(7,755,080)	(7,914,457)
(Increase)/Decrease in Taxation	17,446	
(Increase)/Decrease in stocks	(3,940,382)	(380,247)
Increase on Capital Reserve	4,966,433	2,076,829
	<hr/>	<hr/>
	8,990,518	(11,985,390)
	<hr/>	<hr/>
	4,300,962	2,613,916
	<hr/>	<hr/>
MOVEMENT IN LIQUID FUNDS		
Increase/(Decrease) in Cash and Bank Balances	4,300,962	(2,613,916)
Decrease in Bank Overdraft	-	-
	<hr/>	<hr/>
	4,300,962	(2,613,916)
	<hr/>	<hr/>

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)

Notes to the Accounts for the year ended 30th September, 1993

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 or net realisable value.

(c) Depreciation

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

Farm Machinery	
Vehicles & Tractors	20%
Farm Equipment	15%
Furniture Office and Laboratory Equipment	12.5%
Misc. Equipment	7½%

(d) Investments

Investments are stated at cost

(e) Research Reserve

Where the foundation Finances and develops 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)**

Notes to the Accounts for the year ended 30th September 1993

ALL AMOUNTS IN KSHS

2. FIXED ASSETS

	12½%	12½%	15%	20%	20%	7½%	
	Furniture and Office Equipment	Laboratory Equipment	Farm Equipment	Vehicle and Tractors	Farm Machinery	Miscellaneous Equipment	TOTAL
Written Down Value as at 1 October 1992	4,421,354	11,479,239	1,155,606	4,934,250	706,627	1,355,061	24,052,136
additions during the year	1,751,914	2,761,415	943,950	2,683,000	-	1,769,030	9,909,309
As at 30 September 1993	6,173,268	14,240,653	2,099,556	7,617,250	706,627	3,124,091	33,961,445
Disposals	-	-	-	-	-	-	-
Depreciation for the year	6,173,268	14,240,653	2,099,556	7,617,250	706,627	3,124,091	33,961,445
	771,659	1,780,082	314,934	1,523,450	141,326	234,307	4,765,753
As at 30th September 1993	5,401,609	12,460,571	1,764,622	6,093,800	565,301	2,889,784	29,195,688
As at 30 September 1992	4,421,354	11,479,238	1,155,606	4,934,250	706,627	1,355,061	24,052,136

One vehicle KTX 598 which had been fully depreciated was sold during the year

3. TAXATION

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

**COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)**

**Notes to the Accounts for the year ended
30th September 1993**

4.	CASH AND BANK BALANCES		KSHS
	Cash in hand and at Bank		9,920,193
	Bungoma District Co-operative Bank		218,390
			<u>10,138,583</u>
5.	CAPITAL RESERVE	KSHS	KSHS
	Capital Reserve as at 1st October 1992		20,502,317
	Capital Addition in special Funded Programmes:-		
a)	Equipment		
	- BBCRU	1,595,850	
	- FCBDRU	268,000	
	- Coffee Rehabilitation Programme	1,500,255	
	- Plant Breeding	1,280,500	
			<u>4,644,605</u>
b)	Developments	-SCIP	321,825
			<u>25,468,747</u>

**COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)**

Notes to the Accounts for the year ended
30th September 1993

6. SUNDRY DEBTORS	Kshs
Ministry of labour	142,060.00
Deposits	28,180.00
ICIPE	43,901.00
Continental Bank	2,904,252 00
Coffee Seedlings	168,845.00
Equipment Reserve	3,340 00
Unpaid cheques	53,412.30
Staff Debtors - Petrol	25,064.55
Staff loans & Advances	897,258 20
Safari Imprests	845,739 65
Dividends Receivables (KPCU)	7,391 90
Soil Analysis Services	12,320.00
Welfare Bus	9,990.00
School Transport	2,950.00
Kiosk Rent	750.00
	25,335.00
	5,144,779.60

7. The Foundation felt that the amount of Kshs 3,014,252 with Continental Bank of Kenya might not be recovered, hence a provision of 100% was made in 1985/86 Accounts. However, in 1992/93 the liquidators paid CRF Kshs 200,000 leaving a balance of Kshs 2,904,252.

COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)
Schedule of Recurrent Expenditure Schedule I

FINANCED BY SPECIAL FUNDS						FINANCED BY CRF		TOTAL
CBD	SOIL ANALYSIS	PLANT BREEDING	BB CRU	SCIP	CRF			
YEAR ENDED	YEAR ENDED	YEAR ENDED	YEAR ENDED	YEAR ENDED	YEAR ENDED	YEAR ENDED	YEAR ENDED	YEAR ENDED
30.9.92	30.9.92	30.9.92	30.9.92	30.9.92	30.9.92	30.9.93	30.9.92	30.9.93
Maintenance and general Upkeep	26,550	5,913,782	309,957	499,043	17,008,560	26,734,488	24,326,644	35,513,086
Travelling and Touring Expenses	-	1,249,949	759,879	1,023,325	11,102,302	19,008,040	27,491,468	23,920,652
Staff Remuneration and Labour Wages	13,623	6,360,168	2,189,861	4,625,329	36,601,710	43,534,082	40,562,582	62,421,270
Equipment purchased	-	321,110	1,690,950	11,564	-	-	202,557	4,644,605
Capital Development	-	-	-	51,225	-	-	5,125	321,825
4,580,606	158,173	13,845,007	4,950,647	6,210,516	64,712,572	89,276,610	94,457,532	126,021,439

**COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)**

**Schedule II
Schedule of investments**

No. of shares	Nominal value of shares		At Cost Kshs	Middle Market Kshs
14260	5.00	Consolidated Holdings Ltd	71,300	51,336
25740	10.00	E. A. Breweries Ltd	257,400	622,050
5742	20.00	E. A. Power & Lighting Co. Ltd	114,840	178,002
3775	5.00	A. Bauman & Company Limited	18,875	13,212
16432	5.00	Car & General (K) Ltd	82,160	80,106
7834	10.00	B. A. T. (Kenya) Ltd	78,340	313,360
84060	20.00	Kenstock Ltd 12 $\frac{1}{2}$ % Deffered Loan Stock	84,060	66,197
5800	-	Kenya Government 6% Stock 1997 at 86%	99,920	-
-	-	K. P. C. U. Deffered Stock	509,920	-
-	10.00	Redeemable Loan Stock 1991		-
3983	10.00	K. P. C. U. 10% unsecured Loan Stock 1996/2000	133,080 39,830	-
			1,489,725	-

**COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)**

F

Fixed Assets Financed and Developed by the Foundation

A. ATTRIBUTABLE TO THE COFFEE BOARD OF KENYA						KSHS	KSHS
1. LAND AND DEVELOPMENTS						35,480	-
	Koru Land LR 11253					94,380	129,860
	Koru Developments					<u>77,380</u>	
	Azania Estate LR 10084					<u>2,88,890</u>	<u>2,966,364</u>
	Azania Developments						
2. BUILDINGS		WDV	Additions	Total	Depreciation	WDV	
	Farmhouse and Workshop	30,09,92	-	641,419	2.5%	30,9,83	
	Coffee Factory and Developments	641,419	-	641,419	16,035	625,384	
	Water Installations and Pump House	368,202	-	368,202	9,205	358,997	
	Dairy Cattle Sheds & Dips	2,051,263	4,375,119	6,426,382	160,659	6,265,723	
	Domestic Houses and Staff Amenities	34,426	-	34,426	860	33,566	
	Main Office, Library and Lecture Hall	23,325,288	3,606,326	26,931,614	673,291	26,258,323	
	Laboratories	3,960,249	122,174	4,082,426	102,060	3,980,363	
	Coffee Developments	13,999,054	1,320,690	15,319,684	382,993	14,936,691	
	Road Repairs	872,895	849,408	1,722,303	30,557	1,491,746	
		891,539	-	891,539	22,288	869,251	
	Total	46,144,335	9,773,657	55,917,992	1,397,948	54,520,044	54,520,045

57,616,268

**COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)**

SCHEDULE III

B. ATTRIBUTE TO THE GOVERNMENT OF KENYA

1. LAND	COFFEE Kshs	LAND DEVELOPMENT 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 LR780 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	W D V	DEPRECIATION	
	30.9.92	12.5%	30.9.93
Main Office Lecture Hall and Garage	10,557	1,320	9,237
Laboratories	37,669	4,709	32,960
Farm Office Stores and Workshop	17,806	2,226	15,580
Coffee Factories	10,400	1,300	100
Water Installation and Pump Houses	6,882	860	6022
Dairy Cattle Sheds and Dips	3,623	453	3,170
Domestic Houses and Staff Amenities	163,502	20,438	143,064
Museum and Library	2,225	278	1,947
	252,664	31,584	221,080
 3. FURNITURE EQUIPMENT AND STORES			
Furniture and Office Equipment	661	83	578
Laboratory Equipment	1,415	177	1,238
Farm Equipment	1,321	165	1,156
Vehicles and Tractors	252	32	220
Miscellaneous Equipment	630	79	551
Farm Machinery	1,124	140	984
Expendable Stores	763	95	668
Consumable Stores	87	11	76
	6,253	782	5,471

**COFFEE RESEARCH FOUNDATION
(A COMPANY LIMITED BY GUARANTEE)
SCHEDULE III - NOTES**

- (i) Meru Sub-Station LR 780 and 806 - That pieces 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 building included in Schedule IIIA have been valued by the Ministry of works and additions have been shown at cost.
- (iv) Appropriate amendements 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.
- (v) In accordance with Sessional Paper No 3 of 1963. 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 in that assets are not required for such purposes.