ANNUAL REPORT

OF THE

COCOA RESEARCH INSTITUTE OF NIGERIA, IBADAN

2002

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PRINCIPAL ADMINISTRATION AND RESEARCH STAFF LIST AS AT 31ST DECEMBER, 2002

ADMINISTRATION

1.	Ag. Director/Chief Executive	-	Dr. O.L. Idowu	-	B.Sc, Ph.D
2.	Ag. Admin. Secretary	-	J.O. Babafemi	-	B.Sc, M.B.A, MNIM

RESEARCH

Entomologists

1.	Dr. (Mrs.) F.A. Okelana	-	B.Sc, M. Phil, Ph.D
2.	T.C.N. Ndubuaku	-	B.Sc, M.Sc.
3.	K.T.M. Ojelade	-	B.Sc, M.Sc.
4.	E.U Asogwa	-	B.Sc, M.Sc.
5.	J.C. Anikwe	-	B.Sc, M.Sc.

Soils & Plant Nutrition Scientists

1.	O.S. Ibiremo	-	B.Sc, M.Sc.
2.	R.R. Ipinmoroti	-	B.Sc, M.Sc.
3.	Mrs. C.I. Iloyanomoh	-	B.Sc, M.Sc.
4.	M.A. Daniel	-	B.Sc.
5.	A. Alhaji Yabagi	-	B. Agric.

Crop Processing And Utilisation Scientists

1.	R.A. Hamzat	-	B.Sc, M.Sc.
2.	Mrs. C.O. Jayeola	-	B.Sc, M.Sc.
3.	L.E. Yahaya	-	B.Sc, M.Sc.
4.	S.O. Aroyeun	-	B.Sc, M.Sc.
5.	S.O. Ogunwolu	-	B.Sc, M.Sc.
6.	A.A. Ajao	-	B.Sc, M.Sc.
7.	M.A. Ogunjobi	-	B.Sc, M.Sc.
8.	R.O. Igbinadolor	-	B.Sc
9.	F.C. Mokwunye	-	B.Sc.

Economists And Statisticians

1.	O.O. Oduwole	-	B.Sc, M.Sc.
2.	T.R. Shittu	-	B.Sc, M.Sc.
3.	R.A. Sanusi	-	B. Agric., M.Sc.
4.	K.A. Oluyole	-	B. Agric
5.	B.O. Obatolu	-	B.Sc, M.Sc.
6.	J.O. Lawal (Mrs.)	-	B.Sc, M.Sc.
7.	Mrs. M. Adejumo	-	B.Sc.

Extensionists

1.	S.O. Adeogun	-	B.Sc, M.Sc.
2.	E.O. Uwagboe	-	B.Sc
3.	S. Adebiyi	-	B.Sc
4.	E.A. Agbongiarhuoyi	-	B.Sc
5.	N. Idris	-	B.Sc.

(Up to September, 2002)

Plant Pathologists

1.	Dr. (Mrs.) L.N., Dongo	-	B.Sc., M.Sc., Ph.D.
2.	S.O. Agbeniyi	-	B.Sc., M.Sc., M.Phil
3.	S. Orisajo	-	B.Sc., M.Sc.
4.	A.H. Otuonye	-	B.Sc
5.	M.O. Okeniyi	-	B.Sc

Plant Breeder

1.	K. Badaru	-	B.Sc., M.Phil
2.	S.S. Omolaja	-	B.Sc., M.Sc., M.Phil
3.	Dr. P.O. Adebola	-	B.Sc., M.Sc., M.Phil., Ph.D.
4.	O.M. Aliyu	-	B.Sc., M.Sc.
5.	A.R. Adedeji	-	B.Sc., M.Sc.
6.	P.O. Aikpokpodion	-	B.Sc., M.Sc.
7.	Mrs. A.A. Muyiwa	-	B.Sc.
8.	K.E. Dada	-	B.Sc.

Agronomists

1.	Dr. A.O. Famaye	-	B.Sc., M.Sc., Ph.D.
2.	Mrs. E.A. Adeyemi	-	B.Sc., M.Sc.
3.	A.O. Olaiya	-	B.Sc., M.Sc.
4.	L.A. Hammed	-	B.Sc., M.Sc
5.	A. Oloyede	-	B.Sc., M.Sc
6.	M.O. Ogunlade	-	B.Sc., M.Sc
7.	K.O. Ayegboyin	-	B.Sc.

Health Centre

1.	J.O. Coker	-	MBBS (Part-time Medical Officer)
2.	F.J. Oloyede	-	S.R.N., S.C.M.

Officers In-Charge of Substations

Adeyemo G.O.	-	Ikom
Akintoye T.B.	-	Owena
R.A. Madehin	-	Mambilla
Adebayo O.	-	Ibeku
Ajani A.	-	Ochaja
J.A.O. Akinboboye	-	Uhonmora

YEAR 2002 FRESH APPOINTMENT

S/N	NAME	POST	DEPLOYMENT	DATE OF ASSUMPTION OF DUTY
1	K.A. Oluyole	Res. Officer I HATISS 08	Econs & Statistics	02/01/2002
2	B.O. Obatolu	”	“	05/02/2002
3	S.O. Adeogun	“	Extension	25/02/2002
4	Mrs. C.I. Iloyanmoh		SPN	16/04/2002
5	M.A. Ogunjobi	”	CPU	29/07/2002
6	J.C. Anikwe	“	Entomology	18/12/2002
7	M.O. Ogunlade		Agronomy	20/08/2002
8	Orisajo S.	“	P/Pathology	24/12/2002
9	M.O. Okeniyi	Res. Officer II, HATISS 07	P/Pathology	02/01/2002
10	O.S. Ajani	“	Econs & Statistics	02/01/2002
11	K.O. Ayegboyin	“	Agronomy	02/01/2002
12	E.A. Agbongiarhuoyi	”	Econs & Statistics	02/01/2002
13	Mrs. J.O. Lawal	”	Econs & Statistics	08/02/2002
14	F.C. Mokwunye	”	CPU	26/02/2002
15	N. Idris	“	Econs & Statistics	02/04/2002
16	A. Alhaji - Yabagi		SPN	02/04/2002
17	Mrs. A.A. Muyiwa	“	Biotechnology	30/07/2002
18	Adebowale, L.A.	“	SPN	20/08/2002
19	Dada Keji E.		Plant Breeding	20/08/2002
20	A.O. Obatoye	Lab. Technologist HAT. 07	CPU	07/01/2002
21	Miss J.N. Ejiofor	“	CPU	28/02/2002
22	P.E. Aikpokpodion		SPN	27/12/2002
23	A.B. Adigun	Higher Agric. Supt. HAT. 07	P/EM	08/02/2002
24	O. Dada	“	“	21/02/2002
25	M. Idi	”	Outreach	02/04/2002
26	Miss F. Nwanosike	”	Ibeku S/S	30/05/2002
27	V. Enagi	”	Ajassor	31/05/2002
28	Chila N.F.	”	Mambilla S/S	10/05/2002
29	Miss P.O. Patrick	”	Ajassor S/S	01/08/2002
30	G.A. Ogunjobi	”	SPN	23/08/2002
31	Jesse Mbonyel	”	Mambilla S/S	23/09/2002
32	Olayiwola Adekunle		Entomology	31/12/2002
33	Miss Igwe, U.N.		Ibeku	25/09/2002
34	Mrs. M. Adejoro	Admin. Officer II HATISS 07	Admin.	06/02/2002
35	N.A. Arutu	Higher Exec. Offr. HATISS 07	Audit	06/03/2002
36	S.O. Olayinka	Higher Exec. Offr. HATISS 07	P/EM	16/08/2002
37	S.A. Adekojo	Asst. Exec. Offr. HATISS 05	Fin. & Accounts	07/01/2002
38	A.Y. Sardauna	Asst. Clerical Offr. HATISS 02	Mambilla S/S	02/10/2002
39	Mrs. Y.T. Adeagbo	Conf. Sec.II HATISS 06	Admin.	29/08/2002
40	P. Numfor	Typist Gd. II HATISS 06	Mambilla S/S	20/09/2002
41	Miss J. Asein		Uhonmora S/S	28/05/2002

42	S.A. Adeleke	Typist Gd.II HATISS 05	Engineering	02/01/2002
43	Ola Olutola S.	Higher Tech. HATISS 07	"	21/08/2002
44	Francis J. Wakaps	Higher Tech. HATISS 07 Asst. Craftsman HATISS 02	Mambilla S/S	20/09/2002

YEAR 2002 PROMOTION

S/N	NAME	PROMOTION FROM THE POST OF	PROMOTED TO THE POST OF	EFFECTIVE DATE
1	Akande M.A. (Mrs.)	Prin. Agric. Supt. II 09	Prin. Agric Supt. I 11	01/10/2002
2	Ajayi C.A.	Higher Agric. Supt. 07	Snr. Agric. Supt. 08	01/10/2002
3	A. Nda Abdullahi	"	Snr. Agric. Supt. 08	01/10/2002
4	R.F. Biiya Adeyemo (Mrs.)		Snr. Agric. Supt. 08	01/10/2002
5	J.O. Sote	Admin. Offr. II 07	Admin. Offr. I 08	01/10/2002
6	Miss P.A. Dimowo	Admin. Offr. I 08	Snr. Admin. Offr. 09	01/10/2002
7	K.W. Oguntona	Admin. Offr. II 07	Admin. Offr. I 08	01/10/2002
8	A. Akinrinola	Clerical Offr. 04	Snr. Clerical Offr. 05	01/10/2002
9	Mrs. M.A Somuji	Typist Gd. II 04	Typist Gd. I 05	01/10/2002
10	Mrs. V. Kehinde	Typist Gd. II 04	Typist Gd. I 05	01/03/2002
11	Mrs. G.M. Adesuyi	Prin. Nur. Offr. 11	Asst. Chief Nur. 12	01/10/2002
12	Mrs. M. Oguntona	Health Tech. 04	Snr. Health Tech. 05	01/10/2002
13	Mrs. O.M. Otigbo	Snr. Cook/Stew. 02	Catering Asst. 03	01/10/2002
14	Ajayi A.	Snr. Agric. Field 04	Security Supt. 05	01/10/2002
15	R.A. Lasisi	Security Guard 02	Head Security 03	01/10/2002
16	Adekanola, E.O.	Security Guard 02	Head Security 03	01/10/2002
17	Akubo S.	Security Guard 02	Head Security 03	01/10/2002
18	I. Lasisi	Security Guard 02	Head Security 03	01/10/2002
19	J. Wada	Security Guard 02	Head Security 03	01/10/2002
20	A. Emmanuel	Security Guard 02	Head Security 03	01/10/2002
21	Ajiboye O.	Asst. Tech. Offr. 05	Tech. Officer 06	01/10/2002
22	Agwimah E.O.	Asst. Tech. Offr. 05	Tech. Officer 06	01/10/2002
23	Ogundere E.	Foreman 05	Foreman 05	01/10/2002
24	A. Adisa	Asst. Craftsman 02	Craftsman 03	01/10/2002
25	T. Oyebanjo	Asst. Craftsman 02	Craftsman 03	01/10/2002
26	Asein O.	Store Keeper 03	Snr. Storekeeper 04	01/10/2002
27	Banke A.	Motor Driver Mech. 03	Senior Motor D. 04	01/10/2002
28	E. Mimba	Motor Driver Mech. 03	Senior Motor D. 04	01/10/2002
29	Olubamiwa O.	ACRO, HATISS 12	Chief Res. Officer 13	01/10/2002
30	Aliyu O.M.	Res. Off. I, HATISS 08	Snr. Res. Officer 09	01/10/2002
31	Adedeji A.R.	"	"	01/10/2002
32	Aikpokpodion P.O.	"	"	01/10/2002
33	Jaiyeola C.O. (Mrs.)	"	"	01/10/2002
34	Hamzat R.A.	"	"	01/10/2002
35	Ibiremo O.S.	"	"	01/10/2002
36	Adeyemi E.A. (Mrs.)	"	"	01/10/2002
37	Shittu T.R.	"	"	01/10/2002

38	Yahaya L.E.	”	”	01/10/2002
39	Ipinmoroti R.R.		”	01/10/2002
40	Olaiya A.O.		”	01/10/2002
41	Kolawole O.	Prin. Lab Tech, HATISS Lab Tech I, HATISS 08	Asst Chief Lab Tech 12	01/10/2001
42	Okoh G.O. (Mrs.)	Asst. Chief Agric. Supt.	Snr. Lab Tech. 09	01/10/2002
43	Emiola Y.	HATISS 12	Chief Agric Supt. 13	01/10/2002

S/N	NAME	PROMOTION FROM THE POST OF	PROMOTED TO THE POST OF	EFFECTIVE DATE
44	Sorinolu O.	Snr. Executive Offr. HATISS 08	Prin. Ex. Offr. HATISS 09	01/10/2002
45	Adamu P. (Mrs.)	Typist Gd I, HATISS 05	Snr. Typist Gd II, HATISS 06	01/10/2002
46	Adeniyi A.M. (Miss)	“	“	01/10/2002
47	Egbedeyi J.A.	Prin. Tech. Offr. II, HATISS 09	Prin Tech, Offr. I, HATISS 11	01/10/2002
48	Adewumi E.O. (Mrs.)	Lib. Tech-in-Trg. HATISS 04	Lib. Technician, HATISS 05	01/10/2002
49	Ayoade O.	Snr. Data Processing Asst, 04	Data Processing Offr. HAT 05	01/10/2002
50	Hammed I.A.A. (Mrs.)	Data Processing Asst-in-Trg. 02	Data Processing Asst. HAT 03	01/10/2002
51	Akinrinola A.	Clerical Offr. Gd. I, HATISS 04	Snr Clerical Offr. HATISS 05	01/10/2002
52	Olaoye M.A.	Clerical Offr. II, HATISS 03	Clerical Officer I, HATISS 04	01/10/2002
53	Taiwo A.B.	“	“	01/10/2002
54	Imodu L.I. (Miss)	”	”	01/10/2002
55	Umenregini U.	”	”	01/10/2002
56	Bolarinde F.A. (Mrs.)	”	”	01/10/2002
57	Oguntona B. (Mrs.)	Health Technician HATISS 04	Snr. Health Tech., HATISS 05	01/10/2002
58	Oyeniran K. (Mrs.)	Snr. Health Asst. HATISS 03	Health Technician, HAT 04	01/10/2002
59	Otigbo O.M.	Snr. Cook/Steward, HATISS 02	Catering Asst. HATISS 03	01/10/2002
60	Dare A.O.	Head Security Guard, HATISS 03	S.A.F.O. (Security) HAT. 04	01/10/2002
61	Imoke J.	“	“	01/10/2002
62	Ayambim J.	”	”	01/10/2002
63	Oladokun F.	”	”	01/10/2002
64	Williams F.	”	”	01/10/2002
65	Osasona S.A.	Security Guard, HATISS 02	Head Security Guard, HAT 03	01/10/2002
66	Lasisi R.	“	“	01/10/2002
67	Adekanola E.O.	”	”	01/10/2002
68	Akubo S.	”	”	01/10/2002
69	Wada J.	”	”	01/10/2002
70	Emmanuel A.	Craftsman. HATISS 03	Snr. Craftsman, HATISS 04	01/10/2002
71	Abah J.	“	“	01/10/2002
72	Adeyanju S.A.	Snr. MD/Mech II, HATISS 04	Snr. MD/Mech I, HATISS 05	01/10/2002
73	Bassey M.E.	“	“	01/10/2002
74	Omotoyinbo E.O.	“		01/10/2002

YEAR 2002 LEFT THE SERVICE

S/N	NAME	DESIGNATION/HATISS	DATE OF EXIT	MODE OF EXIT
1	Mrs. T.O. Akinwale	Prin. Res. Offr. HATISS 11	02/02/02	Withdrawal
2	Mr. E.A. Ayodele	Asst. Chief Res. Offr. HAT. 12	18/02/02	COM. Retirement
3	Mr. L. Ajao	Chief Agric. Field Overs. HAT. 05	02/03/02	Com. Retirement
4	Mr. J.A. Adio	Chief M/Driver Mech. HATISS 06	26/05/02	Com. Retirement
5	Mr. S. Awoyinka	Snr. Foreman, HATISS 06	03/03/02	Com. Retirement
6	Mr. Ajayi A.	Prin. Agric. Supt. I, HATISS 11	31/05/02	Com. Retirement
7	Dr. A.B. Fasina	Director/CE HATISS 15	06/06/02	Deceased
8	Dr. E.B. Esan	Asst. Director, HATISS 14	15/06/02	Com .Retirement
9	Mrs. C.J. Bright Agindotan	Res. Offr. I HATISS 08		Resignation
10	F.A. Sobowale	Chief Lab.Technologist HATISS 13	07/07/02	Com. Retirement
11	E.A. Onogbinde	Chief Lab.Technologist HATISS 13	13/06/02	Com. Retirement
12	S. Oladeji	Snr. Lab. Techn. HATISS 05	03/03/02	Com. Retirement
13	O.A. Ojo	Asst. Chief Agric F/O HATISS 05	22/06/02	Com. Retirement
14	B. Ojo	Asst. Chief Agric F/O HATISS 05	20/07/02	Com. Retirement
15	S. Faniyi	Snr. Agric. F/Overs HATISS 04	15/06/02	Com. Retirement
16	M. Ogundele	Snr. Agric. F/Overs HATISS 04	14/05/02	Com. Retirement
17	T. Adebimpe	Agric. Field Attd. I , HATISS 02	20/06/02	Deceased
18	A. Bolarinwa	Prin. Exec. Offr. II, HATISS 09	07/06/02	Com. Retirement
19	F. Ogbajie	Chief Typist, HATISS 08	22/06/02	Com. Retirement
20	R.A. Yusuf	Higher Works Supt. HATISS 07	05/05/02	Com. Retirement
21	Owoiya J.	Asst. Craftsman, HATISS 02	13/06/02	Deceased
22	Mr. P. Otobo	Agric Field Attd. I, HATISS 02	24/08/02	Deceased
23	O. Ajadi	Agric. Field/Overs. HATISS 03	30/08/02	Deceased
24	Y. Aribido	Snr. Foreman HATISS 06	27/08/02	Deceased
25	Dr. O.L. Idowu	Asst. Director, HATISS 14	25/09/02	Com. Retirement
26	Dr. A.A. Ige	Snr. Research Offr. HATISS 09		Resignation
27	L. Salami	Snr. Lab. Tech. HATISS 05	02/08/02	Com. Retirement
28	F. Akinugbe	ACAFO, HATISS 05	18/12/02	Com. Retirement
29	E. Akhuetie	ACAFO, HATISS 05	18/12/02	Com. Retirement
30	P. Akpata	ACAFO, HATISS 05	13/12/02	Com. Retirement
31	R. Rabiu	ACAFO, HATISS 05	04/08/02	Com. Retirement
32	M. Adeleke	ACAFO, HATISS 05	22/08/02	Com. Retirement
33	S.A. Ajewole	SAFO, HATISS 04	15/11/02	Com. Retirement
34	A. Mgbe	SAFO, HATISS 04	10/10/02	Com. Retirement
35	U. Acheneje	AFO, HATISS 03	24/12/02	Com. Retirement
36	J.O. Ogunbayo	Chief Exec, Officer, HATISS 13	01/11/02	Com. Retirement
37	J. Kuti	Prin. Exec. Officer, HATISS 09	01/12/02	Com. Retirement

38	M.A. Olugbesan (Mrs.)	Asst. Chief Nur. Offr., HATISS 12	01/11/02	Com. Retirement

YEAR 2002 SENIOR STAFF INTER-CADRE TRANSFER/ADVANCEMENT

S/N	NAME	PROMOTION FROM THE POST OF	PROMOTED TO THE POST OF	EFFECTIVE DATE
1	Ajao A.A.	Res. Officer II, HATISS 07	Res. Officer I, HATISS 08	08/07/02
2	Lawal J.O. (Mrs.)	Res. Officer II, HATISS 07	Res. Officer I, HATISS 08	17/07/02
3	Akanni A.S.B.	Prin. Ex. Officer I, HATISS 11	Prin. Accountant HATISS 11	01/10/02
4	Fabowale K.M.	Prin. Ex. Officer II, HATISS 09	Snr. Accountant, HATISS 09	01/10/02
5	Onifade O.	Asst.. Ex. Officer, HATISS 05	Higher Ex. Officer, HATISS 07	03/08/02

IN- SERVICE TRAINING FOR THE YEAR 2002

NAME OF TRAINEE	DESIGNATION	INSTITUTION	TYPE OF COURSE	DURATION
1. Mr. R.O. Obatolu	Research Officer I	University of Agric., Abeokuta	M. Agric./Ph.D	2002 till date
2. Mrs. Muyiwa Anna	Research Officer II	Ladoke Akintola University, Ogbomoso	M.Sc. (Plant Biochemistry)	2002 till date
3. Mr. E.O. Uwagboe	Research Officer II	University of Ibadan	M.Sc. (Agric Extension)	2002 till date
4. Mr.E.Anthony Agbongiarhuoji	Research Officer II	University of Ibadan	M.Sc. (Agric. Extension)	2002 till date
5. Mr. P. Aikpokpodion	Senior Res. Officer	University of Ibadan	Ph.D (Genetic Diversity in Nig. Cocoa Collections)	2002 till date
6. Mrs. J.A. Agwimah	Higher Exe. Officer	Ado-Ekiti University	MBA	2002 till date
7. Mr.Amos Adeyemi	Executive Officer	Olabisi Onabanjo University	B.Sc. Accounting	2002 till date
8. Mrs. A. Akande	Prin. Agric. Supt.	Federal Uni. Of Technology, Akure.	PGD in Crop Production	2002 till date
9. Asein Oyakhire	Snr. Store	Federal Poly.	ND Accounting	2002 till date

	Keeper	Auchi		
10. Olayinka Dada	Higher Agric. Supt	Fed. Uni. Of Technology Akure.	PGD in Agric Econs. Extension.	2002 till date
11. Mrs. O. Gbadamosi	Snr. Exec. Officer	Obafemi Awo-lowo University	MBA	2002 till date.

EXECUTIVE SUMMARY

Research activities in year 2002 were conducted under eight programmes. These included Cocoa, Kola, Coffee, Cashew and Tea programmes. Others were Statistics, Socio-Economics and Techno-economic (SST), Crop Processing and Utilization (CPU) and Farming Systems Research programmes.

Cocoa:

Highlights of the findings on the few tasks executed are:

(i) Preliminary study showed that low concentrations of three herbicides namely Paraquat, Glyphosate and Folar gave effective control of bryophytes infesting old cocoa.

(ii) Field application of ACTARA 25 WG insecticide at 0.0143%, 0.015% and 0.2% concentrations resulted in high mirid mortality.

Kola:

The Kola Programme recorded remarkable achievements in the area of crop protection during the year viz:

(i) Germination was faster in moderately weevilled nuts of *Cola nitida* than in the uninfested nuts.

(ii) Powdered formulation of the fruit of *Tetrapleura tetraptera* at 80g/kg. of kolanuts gave 100% mortality of the kola weevils in storage under laboratory conditions.

(iii) *In vitro* trials showed that 30% aqueous extract of *Ocimum gratissimum* was effective for the control of *Botryodipledia theobromae*, the main causal organism of the storage rot of kolanuts.

Coffee

In 2000, the coffee programme recorded the following achievements (i) half node stem cuttings propagation of coffee was perfected, (ii) Chlorpyrifos-based insecticides such as Dursban, Pyrinex, Termicide and Endofalm were found to be good replacement for the organochlorine- based insecticides (e.g Aldrex 40 EC) for the control of termites, (iii) diallel cross revealed that five alleles S_1, S_2, S_3, S_4 and S_5 were associated with the self-incompatibility locus in *C. canephora*, and clones that were suitable for synthetic and hybrid productions were identified, and (iv) the S-locus controlling cross compatibility in *C. canephora* was found to be associated with low and fast protein bands (low and high molecular weights). The major constraints were: (a) inadequate funding of research tasks (b) obsolete and non-functional equipment, (c) unavailability of essential facilities: no water supply, no vehicle to reach experimental locations outside the headquarters and electricity was absolutely not available. It was indeed a very bad year for research. Therefore, it was with a lot of sacrifice that the programme scientists were able to record the few achievements stated above.

The future focus are: (a) expand Nigerian *Coffea* germplasm and encourage the replanting of old varieties with new, improved, high yielding clones, (b) establishment of an effective marketing system for Nigerian coffee by encouraging direct linkage between coffee farmers' associations and overseas importers, as well as, promote local consumption, (c) encourage the use of biotechnology and reciprocal

recurrent selection programme in breeding for sustained high productivity and improved quality, (d) development of appropriate Integrated Pest Management techniques for pest control in coffee and (e) development of appropriate soil and agronomic practices for sustained high yield. Research and development, costly though they may be, guarantee sustained strength for a nation. The commitment of Nigerian leaders to the onerous task of the nation's technological advancement would be desirable; in terms of adequate and prompt funding for research or else the country's drive towards development would be a mirage.

Cashew:

Experiment on the effect of bud wood sterilization and fungicide application on cashew grafting showed that these treatments significantly improved the success rate. Additional cashew germplasm materials acquired from Kosoni-0la Farms Limited were raised and used to gap up the plantation established in 2000 and 2001. Another 1ha plot was also established in the Headquarters during the year. Studies on the ecology of cashew leaf miner also continued at the Headquarters. The result obtained was similar to those of 2000 and 2001.

The experiment on the growth and development of cashew as affected by nut sizes in the nursery was terminated due to logistic problems. It will be hopefully re-established in 2003. Observations also continued during the year on the experiment to determine the appropriate age for transplanting cashew seedlings. The experiment on floatation test was conducted and appropriate recommendation was made.

Tea

The Tea programme focussed on improving the establishment and productivity of highland tea in the Mambilla Plateau area of Nigeria, while the adaptation studies aimed at the production of tea in lowland areas of Nigeria including Akwete and Ikom were further strengthened. Successful rooting of tea cuttings raised in the nursery at CRIN Headquaters was recorded in the year; the best result was attained on clone 38(48%). More than 90% sprouting was achieved after 90 days of setting the cuttings. Application of organo-minerals fertilizer comprising the mixture of NPK and cowdung in 75:25kg/hectare mixture significantly influenced growth parameters such as plant height, girth, and leaf- areas when compared with other treatments and the control. Studies on the occurrence of insect pest and damage on tea showed that seedlings in the nursery were infested with Psyllids, while insect pests such as whiteflies (*Bemissia tabacci*), *Zonocerus variegatus*, and cotton stainer (*Dysdercus superstitiosus*) were predominant in the field. Execution of most of the activities proposed by the programme were constrained by paucity of funds and mobility.

Statistics, Socio-Economics and Techno-Economics (SST):

For the SST Programme, ten different tasks were reported on, with six being on socio-economics and four on extension research. Extension research was given more attention as effort was made to review past Annual reports in the last 2 decades for effective take-off. To address the issue of low production in Agriculture, gender factor was considered as the role of women who constitute larger percentage of the population was also given prominence. In enhancing the sustainability of Nigerian cocoa economy, processing by the small/medium scale enterprises along with crop production, marketing etc were studied. Preliminary work on the economics of cocoa rehabilitation was also commenced as attention has shifted to the method as a way of rejuvenating old and moribund plantations.

Crop Processing and Utilization (CPU)

The Cocoa Processing and Utilization Programme conducts research and development activities on the processing and utilization of Cocoa, Kola, Coffee, Cashew and Tea into foods, feeds and other products useful to man and animals. In year 2002, the following achievements were made:

(i) Liquid detergent was produced using kola pod husk to substitute the conventional potash.
(ii) Cashew apple yoghurt was produced using cashew juice

(iii) A simple formular of 75% dried kola testa and 25% palm kernel cake mixture supported good performance of snails.
(iv) Cocoa-fortified confectioneries were better in the sensory assessment than the common confectioneries.
(v) Coffee chocolate compared well with the conventional milk chocolate
(vi) The sensory qualities and consumer acceptability of the spice extract-treated juice compared favourably with the control (Benzoate-treated juice)

Farming System Research:

In the year under review, the Farming System Programme achieved the following:

Tea/Maize intercropping was recommended at 1-3 years of field establishment of tea and the intercropping of cocoyam, sweet potato and Cassava with mandate crops was found useful in suppressing weed biomass and in reducing cost of weeding to the bearest minimum in new plantations

COCOA PROGRAMME (Leader: K. Badaru)

Theme: Rehabilitation of unproductive, old and moribund cocoa plantations.
(Olaiya,A.O**)**
Task: Investigation of cultural and chemical control of degrading agents influencing the productivity of cacao trees.
Introduction: Bryophytes and Lichens have been identified as two main biodegrading agents affecting pod production in cacao. They form cushions on the stem thereby suppressing flowering and pod production. They are also implicated in the spread of black pod disease of cacao.
Objective: To control the degrading agents using both cultural and chemical methods.
Methodology: The third experiment carried out during the year was laid out in a Randomized Complete Block Design with ten treatments and three replicates each for both Bryophytes and Lichens. Three selected herbicides viz: Paraquat, Glyphosate and Folar were evaluated at three low concentrations of 0.91/ha, 1.21/ha and 1.5 litres/ha, split into two-applications, during the production season. Data were collected on number of flower cushions, total fruit set, cherelle-wilted pods, damaged pods and fermentable pods. Observations were recorded on the treatment effect on the trees as well as residual effect on the trees and production during flowering season. Analysis of data by ANOVA and DMRT were used to separate the means. Descriptive statistics was used for observational records.
Results/Finding: Results showed that Lichens at 60% and above stem coverage was responsible for depression in flowering and fruit setting while bryophyte infestation was linked to high incidence of cherelle wilt and damaged pods. Reduction in fruit setting and fruit size was recorded for Mistletoe affected trees. Folar was the most effective herbicide at 1.21/ha followed by Glyphosate at 1.51/ha. The herbicide application had significant effect on only Bryophytes.
Conclusion: There is need for trial of this experiment at other geopolitical zones before final recommendation could be made.
Constraints: Lack of fund to purchase materials as well as establishing the experiments at the sub-stations (Ikom, Owena and Uhonmora) where reports showed that the problem is more prevalent than at CRIN Headquarters.

Theme: Improvement of cocoa production, propagation and field management.
Task: Determination of IPM techniques for the control of black pod disease and mirid infestation. (Ojelade, K.T.M)

Activity: Further identification of cultural and chemical methods of controlling the brown cocoa mirids
Objectives: To source for alternative insecticides for the control of cocoa mirids, in view of the ban currently placed on lindane
Justification: Evaluation of Actara 25 WG (Nitromethylene) will enhance availability of new insecticides for the control of the cocoa mirids. This will no doubt tackle the problem of resistance often developed as a result of use of the same chemicals over a long period.
Methodology: The toxicity of ACTARA 25WG (Nitromethylene) was determined at the peak of mirid season from October-January 2001, at CRIN Headquarters. Four concentrations of the insecticide; 0.01%, 0.013%, 0.015% and 0.02% were evaluated using a knapsack sprayer. Using a randomized complete block design, four sub plots per block consisting of 100 trees were used for each concentration. Each insecticide was replicated four times.

The following records were taken one day before and one day after each treatment application.

(i) Number of infested trees.
(ii) Number of infested pods.
(iii) Number of infested cherelles.

(iv) Number of adult mirids.
(v) Number of nymphal mirids.

The second and third treatment applications were made at 28-days interval. Percentage adult and immature mirid mortality were calculated and the relative toxicity of Actara at various concentrations were determined and compared with that of unsprayed sub-plots.

Result: After the first spray applications of the four concentrations of ACTARA 25WG tested, 29.41%, 73.08%, 80.95% and 82.75% adult mortality were recorded, respectively. As for nymphal mortality 42.85%, 51.11%, 59.09% and 66.67% were recorded for 0.01%, 0.013%, 0.015% and 0.02% concentrations, respectively. Except for the 0.013% concentration which recorded a decrease in the percentage mortality from the residual population after the second treatment, all the other concentrations gave a slight increase in the percentage mortality (Table 1).

Conclusion; Records obtained after twenty-four hours of the third spray applications showed that the population of the mirids crashed to almost zero on sub-plots treated with 0.0143%, 0.015% and 0.2% concentrations.

TABLE I

EVALUATION OF THE TOXICITY OF ACTARA 25 WG (Nitromethylene) to Adult and Immature Cocoa, mirids – 2002

	FRUITS APPLICATION		SECOND APPLICATION		THIRD APPLICATION	
INSECTICIDE CONCENTRATION	%MORTALITY OF ADULT MIRIDS	% MORTALITY OF NYMPHAL MIRIDS	% MORTALITY OF ADULT MIRIDS	% MORTALITY OF NYMPHAL MIRIDS	% MORTALITY OF ADULT MIRIDS	% MORTALITY OF NYMPHAL MIRIDS
ACTARA 25 WG at 0.01%	29.41	42.85	45.45	65.56	75	73.33
ACTARA 25 WG at 0.013%	73.08	51.11	54.45	73.50	100	83.33
ACTARA 25 WG at 0.015%	80.95	59.09	88.89	83.33	100	90
ACTARA 25 WG at 0.02%	82.75	66.67	87.50	90.90	100	100
CONTROL	-113	-146	-105	-111	-102	-171

* Negative value indicates an increase in the mirid population

* Each value represents a mean of 4 replicates.

KOLA PROGRAMME (Leader T.C.N. Ndubuaku)

Experimental Title: Pre-germination of weevil-infested *Cola nitida* nuts for production of nursery seedlings (T.C.N. Ndubuaku)

Introduction: Kola is propagated mainly by seeds which are uniformly cured and stored for up to five months before propagation. The seeds are usually scarified before sowing to ensure faster germination. The weevils which are field to store pests are the most destructive insect pests of kola. The weeviled kola nuts are usually sorted out and discarded during curing and storage. The aim of this study is to find out if discarded weeviled nuts could be used for production of kola seedlings in the nursery.

Objective: To determine the effect of weevil damage on nut germination in *Cola nitida*

Materials and methods: Fresh and cured weevil-infested C. *nitida* nuts were used for this experiment. The fresh nuts were obtained from mature fresh pods which were harvested, broken and the nuts skinned and sown within twenty four hours. To ease skinning, the nuts were soaked in water for five days before the testa was removed. The cured nuts were eight weeks stored nuts. Curing was carried out by skinning and storing freshly harvested nuts in baskets lined with dry banana leaves. The kola nuts were continuously stirred and sorted during storage to remove the damaged nuts. The damaged nuts sorted out before and during storage were then used for this experiment. They were graded according to the severity of weevil damage on them. This was determined by the number of weevil's holes on the nuts. The different grades were as follows:

(1) Badly damaged nuts with 10-15 weevil holes
(2) Moderately damaged nuts with 5-10 weevil holes and embryo intact.
(3) Fairly damaged nuts with less than 5 weevil holes and embryo intact.
(4) Undamaged nuts (control).

Thirty-two open – mouthed baskets of 100cm surface diameter and 20cm depth were filled with 75% sawdust/25% topsoil mixture and arranged in batches of eight in a randomized complete block design (CRD) with four replicates.

Each batch of eight baskets represented a replicate. The experiment was set up at CRIN Headquarters, Ibadan in February 2001. In each replicate, cured nuts of the four grades were sown in four baskets while fresh nuts of the different grades were sown in the remaining four baskets. Each basket contained twenty nuts of each grade. The nuts were sown on their flat sides to the depth of 2cm below the surface of the sowing medium. Germination records were taken for sixty days to make sure that all the viable nuts were given a fair chance of germinating. Days to germination were calculated as the number of days taken for the first coleoptiles to emerge in each basket. The percentage germination was calculated as follows.

$$\% G = 100 CS$$

Where %G is the percentage germination, C is the number of coleoptiles emerged and S is the number of sown nuts in each basket.

Results and Discussion: The cured nuts germinated faster than the fresh nuts. The moderately damaged nuts recorded the least number of days to germination in both cured and fresh nuts. However a T-test analysis of the days to germination in the cured and fresh nuts revealed an insignificant difference between the two (Table 2). Scarification ensures faster and higher germination in kola nuts (Oladokun 1982). This could account for the faster germination recorded in the weevilled nuts as compared with the control. The cured nuts recorded higher mean percentage germination than the fresh nuts after sixty days of observation (Table 3). The highest record was obtained in the moderately damaged nuts.

Summary and Conclusion: The lower percentage germination recorded in the badly damaged nuts could be partly attributed to the damage to the embryo and food storage by the insect attack. The emerging coleoptiles depend on the food storage in the nuts for nourishment. Inadequate supply of food nutrients will result in abortive germination in the nut (Quarcoo1973, Oladokun, 1982). Consequently, the emerging coleoptiles die and the nuts decay inside the soil medium. There is therefore need to extend the study to the nursery to monitor the subsequent growth and performance of the pre-germinated seedlings in the nursery. The survival rate of the seedlings after one year of

nursery life will determine which grade and condition of the nuts that will be most suitable for nursery seedling production.

Table 1: Days to germination in weevil-infested cured and fresh *Cola nitida* nuts

Grade of nuts	Days to Germination	
	Fresh nuts	**Cured nuts**
Badly damaged nuts	33	34
Moderately damaged nut	28	31
Fairly damaged nuts	34	35
Control	35	36
Mean	32.50	34.0
LSD (P = 0.05)	NS	NS

Table2: T- test value to compare the mean days to germination in cured and fresh nuts of *Cola nitida*

Nut condition	Mean days to germination
Fresh nuts	32.5
Cured nuts	34.00
T- test value for one tailed, paired observation	0.65 NS

Table 3: Percentage germination in the weevil-infested cured and fresh *Cola nitida* nuts.

Grade of nuts	Percentage Germination (%)	
	Fresh nuts	**Cured nuts**
Badly damaged nuts	25	60
Moderately damaged nut	40	90
Fairly damaged nuts	75	85
Control	70	80
Mean	52.50	78.75
LSD (P=0.05)	6.45	3.80

Experimental Title: Laboratory evaluation of *Tetrapleura tetraptera* (Schum and Thum) fruits for the control of *Balanogastris kolae* (Desbr.) in stored kolanuts. (Ojelade K.T.M)

Introduction: The search for alternative materials for the control of the kola weevils in storage will no doubt enhance improved quality nut production in storage, as well as healthy nuts to consumers. The materials being tested may tolerate the natural enemies of the kola-weevils.

Objectives: In view of the enormous damage resulting from the development and feeding activities of the kola weevils in stored nut, and the toxicity of synthetic insecticides on the quality of stored kola nuts, efforts are being concentrated on the search for alternative and safe materials. Thus, the efficacy of plant materials being used as spices/condiment/herbs across the kola belt of Nigeria is being investigated.

Materials and methods: Powdered formulation of *Tetrapleura tetraptera* fruits were produced by air-drying matured fruits for consecutive days and oven drying at 72% for 3 hours with the aid of a manual milling machine. Kola nuts used for this study were extracted from harvested pods and processed.

Insect culture used for the experiment was raised from weevil-infested kola nuts collected from the plantation litters and kola depots.

Fifty healthy kolanuts were sorted into separate transparent polythene bags (0.038mm thick), and applied with three concentrations of the *T. tetraptera* powder at 20, 40 and 80g of powder/kg nuts. These were mixed vigorously to ensure proper coverage of nuts. Thereafter, five pairs of one week old male and female adult weevils sexed according to Ojo (1977), were collected from the raised culture and introduced into polyethylene bags containing the various treatment concentrations and the control. Weevil – damage was assessed over a period of 14 days. The experiment was replicated five times, while ANOVA was used for separation of means.

Results and Discussion: The highest concentration of the *T. tetraptera* fruit in nuts recorded a 100% mortality after 7 days of exposure, while 40g/kg of nut gave 73%, mortality. No mortality was recorded on the control (Table 1). The mean number of feeding holes observed on nuts treated with 20g/kg, 40g/kg and 80g/kg concentration were 50, 19 and 5.5 respectively. These were relatively lower than that of the control, which gave 60. The highest percentage damage nut was recorded in the control, .79.06%, while the 80g/kg concentration gave the least (8.41%). Similar trends were observed for the number of feeding marks and oviposition holes (Table 2)

Conclusion: The study revealed that the insecticidal properties of *T. tetraptera* fruit could be exploited by farmers for improved kola nut production.

Table 1: **Cumulative Percentage of adult mortality of *Balanogastris kolae* with different concentrations of *Tetrapteura tetraptera* Fruit Powder**.

Concentration (g/kg nuts)	Period of weevil exposure		
	2 days	7 days	14 days
80	11a	100a	100a
40	6b	73b	100a
20	1c	6c	15b
0	0c	0c	0c
S.E	+1.5	+24.76	+26.88

* Each value represents a mean of five replicates

* Means in columns with different superscripts are significantly different from each other at 5% level of probability by Duncan's Multiple Range Test.

Table 2: Effect of *Tetrapleura, tetraptera,* fruit powder on feeding marks, oviposition and damage of *Cola nitida* nuts.

Treatment (g/kg kola nut)	Number of Feeding marks	Number of oviposition holes	% Damage
80	5.5a	5.0a	8.41a
40	19b	17.5b	12.22a
20	50c	47.5c	77.92b
0	60c	50c	79.06b
S.E.	+12.8	+9.64	+17.06

* Each value represents a mean of five replicates.

* Means in columns with different superscripts are significantly different from each other at 5% level of probability by Duncan's multiple Range Test.

Experimental Title: Antifungal effect of *Ocimum gratissimum* extracts on *Botryodiplodia theobromae* the causal organism of kola storage rot *in vitro*. (Agbeniyi, S.O. and Adedeji, A. R.)
Objectives: The study was initiated to:

(i) determine the efficacy of the extract in the control of storage rot disease;
(ii) determine the most effective concentration required for the safe control of the disease.

Introduction :

Storage rot disease caused principally b*y Botryodiplodia theobromae* is generally the most serious post-harvest problem of Kolanut which farmers and Kola traders seek to solve. Kolanuts easily succumb to rot during storage due to high moisture content of 54-60% at which nuts are stored (Agbeniyi *et al*, 2000).

Use of fungicides is not recommended since up to 80% of Kolanut is consumed as fresh nuts (Agbeniyi and Fawola, 1999) hence the need to develop an alternative control method that is safe and economical.

Materials And Method: A replicated trials were laid out in the laboratory to study the effect of aqueous extract of *O. gratissimum* on the radial growth of *B. theobromae*

The extract was obtained through a process involving freezing/thawing and squeezing of the leaves of the plant. The freezing/hawing processes were done alternatively every six hours for 3 days to allow the leaves to soften.

Three concentrations (30, 20 and 10%) levels were used. 1ml of each of 10, 20 and 30% extract concentration was introduced into 9ml of molten potato dextrose agar at 40°C. The medium was allowed to solidify and inoculated with 7 day old culture of the pathogen.

Radial growth was measured daily for a period of 6 days when the control finally filled the plate.

Result And Discussion: The result showed that the pathogen and radial growth was inhibited by the three concentrations used. However, 30% concentration permitted least radial growth of the organism Table 1.

Table 1: Comparison of mean growth diameter (cm) as affected by Extract Concentration.

Extract concentration (%)	Period of Observation (Hours)					
	24HA1*	48HA1	72HA1	96HA1	120HA1	144HA1
30	1.1967	1.9167	2,1000	3.1267	3.1767	3.3500
20	2.7300	3.9967	4.1833	5..3133	5.4000	6.0367
10	2.5633	4.9633	5.3833	5..3833	6.1133	6.2600
0	3.1233	5.1433	6.0433	7.1000	8.1967	8.4667
LSD(0.05)	0.5424	0.4957	0.3234	0.5573	0.5785	0.2071

*HA! = Hours after inoculation.

Summary And Conclusion: The *in-vitro* experiment shows promising result that the extract would serve as a good control agent against the storage rot of kola. The *in vivo* test shall be carried out to finally ascertain this hypothesis.

COFFEE PROGRAMME (Leader: S. S. Omolaja**)**

Theme : **Rapid clonal propagation, pest control and improved primary processing in coffee.**

Task**: Rapid clonal propagation of coffee using half node cuttings.**

Title**: Estimation of the number of self-incompatibility alleles in *C. canephora*.**

(Omolaja, S. S.)

Introduction: The number of the self-incompatibility alleles and S-allele genotypes within selected *C. canephora* population have been determined in countries where coffee-breeding research is more advanced. Such countries include Cote d'Ivoire (Berthaud, 1980) and India (Ram and Sreenivasan, 1984). Hitherto, the Nigerian *C. canephora* populations have not received attention in this respect. Considering the importance of identifying the S-allele genotype in the production of F_1 hybrid seed (Sanzol and Herrero, 2002), a study of S-allele within Nigerian *C. canephora* population would be worthwhile.

Objectives: To determine the number of self-incompatibility alleles (SIA) in *C. canephora*.

Methodology: Four plants from four different clones were used. The clones were A116 (C^1), C111 (C^2,), T1049 (C^3) and M53 (C^4). M53 is self-compatible while clones A116, C111, and T1049 are self-incompatibles. Six crosses were effected to estimate the number of self-incompatibility alleles. The compatibility response between cross partners was evaluated by stylar squash method.

Prior to microscopic examination the styles were treated with 1N NaOH for 24 hr and washed with distilled water. The styles were stained with 1% aniline blue prepared in 1M K_2PO_4. Finally the styles were placed on slides and after crushing were examined under an Olympus microscope. Usually five styles per cross were examined and the penetration level of the pollen tubes into each style was observed.

Interpreting compatibility response data

The compatibility response data among the clones were used to determine the number and nature of self-incompatibility alleles involved in each cross, and also the number of alleles in the gene pool of the *C. canephora* population. Among the plants exhibiting gametophytic self-incompatibility, total compatibility was possible only when the S-alleles carried by the cross partners were different i.e. $S_{1.2}$ x $S_{3.4}$ and so on. But partial compatibility could be observed when one of the S-alleles was common in the cross partners i.e. $S_{1.2}$ x $S_{1.4}$ and such others. Total incompatibility results when the partners carry identical S-alleles. The individual S-genotypes and the number of alleles in the population were determined by assigning an arbitrary genotype of $S_{1.2}$ to plant C^1. Then the genotypes of other plants were revealed by means of its compatibility response (Ram and Sreenivasan, 1984) to plant C^1. The pollinated ovaries were allowed to mature into fruits on the various branches involved in the cross to observe the seed set pattern.

Results And Discussion

Estimation of the number of self-incompatibility alleles

Microscopic examination of the squash preparations of pollinated styles revealed the existence of three types of compatibility responses: (i) all pollen tubes in the style normal (compatible), (ii) normal and deformed pollen tubes in approximately equal proportion in the style (partially compatible), and (iii) all pollen tubes in the style abnormal (incompatible). An arbitrary genotype of $S_{1.2}$ was assigned to one selected plant of *C. canephora* (C^1) and the genotypes of other plants were determined by means of compatibility responses as follows:

From the data (Tables 1 and 2) plant C^2 was compatible with C^1, which suggests that their two S-alleles were different. Hence C^2 should be $S_{3.4}$ in genotype. C^3 is partially compatible with C^1 and was given the genotype $S_{1/2}$ S_x*. Since plant C^4 was incompatible with C^1, it implies that the two plants have two common S-alleles, therefore C^4 should have $S_{1.2}$ genotype. Plant C^3 was compatible with C^2; since C^2 is $S_{3.4}$ genotype, C^3 would carry different alleles that is yet unknown ($S_{1/2}$ S_x). Plant C^4 that was incompatible with C^1 was found to be compatible with C^2; since C^2 is $S_{3.4}$ genotype, the given alleles of $S_{1.2}$ to C^4 properly agreed with this reaction.

To determine the identity of S_x the remaining crosses are useful. Plant C^3 could have been assigned the same alleles as C^4 because of their common reactions in crosses with C^2. If that is so, then C^4 x C^3

should have been incompatible. However C^4 x C^3 was actually partially compatible (Table 2), this no doubt pointed to the fact that C^4 and C^3 only share same allele in only one locus. Then, S_x of plant C^3 could be given the allele identity S_5. The hypothesis of plant C^3 carrying alleles $S_{1.5}$ fitted well into the model. Therefore, a total of five alleles S_1, S_2, S_3, S_4 and S_5 are available in the four plants studied. The seed set data corroborated the identity of the S-alleles involved as shown by the pollen tube count.

Table 1: Compatibility responses of four selected plants in *Coffea canephora*

Cross	NPG	NPT	%G	NNPT	APT	%APT	%SS	CC
C^2 X C^1	42	22	52.38	19	3	1..36	62.89	C
C^3 X C^1	35	9	25.71	4	5	55..55	12.83	PC
C^4 X C^1	32	6	18.75	1	5	83..33	5.00	IC
C^3 X C^2	46	34	73.91	32	2	5.88	62.82	C
C^4 X C^2	67	14	20.89	13	1	7.14	43.11	C
C^4 X C^3	21	8	38.09	4	4	50.00	30.23	PC

NPG: Number of pollen grains; NPT: number of pollen tubes; G: germination; NNPT: number of normal pollen tubes; APT: abnormal pollen tubes; SS: seed set; CC: categories of compatibility. C : compatible crosses; IC: incompatible crosses; and PC: partially compatible crosses;
C^1 : A116; C^2 :C111; C^3 : T1049; C^4: : M53.

Table 2 : Number and nature of S-alleles in selected clones of *Coffea canephora.*

Class of Crosses	Compatibility	Inferences		
		No. of alleles	Nature of the alleles	
C^2 X C^1	C	2 + 2	$S_{3.4}$	(1.2)**
C^3 X C^1	PC	2 + 1	$S_{.1.5}$	(1.2)
C^4 X C^1	1C	2 + 0	$S_{1.2}$	(1.2)
C^3 X C^2	C	2 + 2	$S_{1.5}$	(3.4)
C^4 X C^2	C	2 + 2	$S_{1.2}$	(3.4)
C^4 X C^3	PC	2 + 1	$S_{1.2}$	(1.5)

Plant C^1 was assigned an arbitrary genotype S_1 S_2; $S_1/_2$: presence of S_1 or S_2;
$S_3/_4$: presence of S_3 or S_4;
** Figures in parentheses represent the genotypes of the male parent.

Theme : Rapid clonal propagation, pest control and improved primary processing in coffee (Adeyemi, E.A and Omolaja, S. S.)
Task**: Rapid clonal propagation of coffee using half node cuttings.**
Title: Rapid clonal propagation of coffee using half node cuttings.
Introduction: Coffee is usually propagated by seed, although it has been successfully propagated by rooting, layering, marcotting and budding. Multiplication by vegetative means enables the creation of homogeneous clonal plantation from trees that have been selected for their attributes particularly high productivity. Propagation by stem cuttings is the most commonly used form of vegetative propagation. For rooting of coffee cuttings, the single leaf-node is commonly used. The need for

rapid multiplication of rooted stem cutting to meet the high demand of Nigerian farmers necessitated this work.

Objective To evaluate the effect of leafiness on the sprouting and rooting success of half-node stem cuttings of two clones of *Coffea canephora.*

Methodology: Non-lignified orthotropic branches of coffee clones Clll and C36 were obtained from the germplasm plot located at the Institute's headquarters, Ibadan in March, 2002. The cuttings were cut into smaller size of 2cm length with one node. The single node cuttings were further dissected into two symmetrical halves to obtain half-node stem cuttings. The experiment was factorial comprising of two factors (clone and leafiness) each at two levels to give 4 treatment combinations in a Randomised Complete Block Design replicated four times. The cuttings were set in black polythene pots under humidified condition. Hardening of the cuttings and data taking commenced 7 Weeks After Set (WAS). The data were subjected to ANOVA and means were separated by LSD.

Results and Discussion : The average sprouting success of half-node stem cutting of *Coffea canephora* is shown in Table 1. Leafiness was a critical factor in the sprouting and rooting success of *Coffea canephora* stem cuttings. In both clones non-leafy stem cuttings did not sprout. Differences in the clones, leafiness and interaction of clones and leafiness were highly significant (P=0.01) (Table 2)

Table 1: Average sprout success of *Coffea canephora* stem cuttings at fortnightly interval.

Clones & Leafiness	(Weeks After Set, WAS) 7	9	11	13	15
Clll leafy	70.31	67.19	64.06	62.50	60.94
Non-leafy	0	0	0	0	0
C36 leafy	25.00	25.31	20.31	20.31	20.31
Non-leafy	0	0	0	0	0

Table 2 Mean square Estimates of sprouting of *Coffea canephora* stem cuttings at fortnightly interval

Parameters	Periods (WAS) 7	9	11	13	15
Clone	2053.223	2197.266	1914.063	1779.785	1650.391
Leaf	9084.473	7656.250	7119.141	6857.910	6601.563
Interaction	2053.223	2197.266	1914.063	1779.785	63.477

Theme : Rapid clonal propagation, pest control and improved primary processing in coffee. (Ibiremo, O.S;)

Task: Rapid clonal propagation of coffee using half node cuttings**.**

Title: Response of robusta coffee seedlings to organic manures amended with phosphate fertilizers in two soil types in Nigeria

Objective : Greenhouse investigations were carried out to evaluate the response of robusta coffee (*Coffea canephora* Pierre Ex Froehner) seedlings to organic manures amended with different phosphate ferilizers in two coffee growing soils in Nigeria (Alfisol and Ultisol).

Methodology :

Two organic manures, cocoa pod husk (CPH) and cowdung (CD) were used, while the two phosphate fertilizers used were single super phosphate (SSP) and sokoto rock phosphate (SRP). The manures were applied at rates equivalent to 0, and 2.5 tonnes/ha, while the phosphate fertilizers were applied at 30 and 60kg $P_2 0_5$/ha. The fifteen treatment combinations were tested in a completely randomised

design and replicated three times.
Results and Discussion : The results indicated that the two organic manures gave better seedling performance (height, stem diameter and dry matter) in both ultisol and alfisols when compared with control. Coffee seedlings tended to perform better in height, leaf area, stem diameter and dry matter yield when cowdung was applied when compared with cocoa pod husk in an alfisol, while their performance was similar in an ultisol. However, SSP gave superior performance in height, stem diameter and leaf area of coffee seedlings than SRP in an alfisol, but in an ultisol, there was no significant difference in the various growth parameters. Although there was 16.7% increase in height when SRP was applied when compared to SSP with no significant difference in the growth of coffee seedlings when SRP was compared to SSP in an ultisol. It can be reasonably concluded that SRP can be used as a suitable substitute for SSP in coffee seedlings production especially in an ultisol.

Theme : Rapid clonal propagation, pest control and improved primary processing in coffee.
(Daniel, Andrew; Ibiremo, Olufemi S and Adeyemi Eunice A)
Task: Rapid clonal propagation of coffee using half node cuttings.
Title: Response Of Coffee Seedlings Grow n In An Alfisol To Organic Fertilizer In Nigeria.
Introduction : Coffee production in Nigeria over the years have been on the decline due to a number of factors ranging from low soil fertility, erratic rainfall and poor quality of product due largely to bad handling. Most of the soils on which coffee is grown are highly weathered and contain low level of nutrients and therefore, they will require augmentation for optimum productivity. Apart from the scarcity of inorganic fertilizers, its attendant effect on the soil and crop quality is negative, hence the need for organic fertilizer use to grow coffee.
Methodology : Three organic fertilizers namely *Chromolaena odorata* (Siam weed), *Pennisetum purpureum* (Elephant grass) and cowdung were variously applied at rates equivalent to 0, 5 and 10 tonnes/ha to a four-leaf stage coffee seedlings. The treatments were arranged in a completely randomizeed design replicated four times**.**
Results : The results indicated that *C. odorata* had the greatest positive effects on height, stem girth, leaf area and number of leaves over the control. Cowdung and *P. purpureum* showed similar trend on the growth parameters but not significant. *C.* o*dorata* had 50.7%increase in height, 12% in number of leaves and 15% in leaf area of coffee seedlings. From all indications coffee seedlings responded positively to organic ferilizers. *C. odorata* can be used in the production of coffee seedlings at the rate equivalent to 5 tonnes/ha .

Title: Impact Of Coffee Marketing Problems On Coffee Production In Nigeria
(Sanusi, Rahman. A. Oduwole, Olusoji; and Lawal, Justina. O.)
Introduction : Coffee marketing in Nigeria had been seriously hampered over the years mostly due to low prices offered to farmers. Consequently, while there is hardly any new plantings, coffee plots established years back were being abandoned.
Objective: To appraise the effect of coffee marketing problems on coffee production in Nigeria.
Methodology : One hundred and fifty (150) questionnaires were administered on randomly selected coffee farmers in Abia, Taraba and Kogi States of Nigeria.
Results And Discussion: Analysis from information gathered showed that the average age of farmers was 54 years while the average age of their coffee farms was 30 years. An average of 4.89 tones was realised as output from 8.13ha average coffee farm. With 53.5% of produce available for sale being eventually sold at an average price of N51, 690.00; farmers earned N25,384.69 (average) gross margin for the Coffee season. Using Markov (Chain) analysis, it was observed that with the trend exhibited in the Nigerian coffee industry, farmers with large unsold quantities of coffee beans would have increased from 21.6% in 1999 to 23.3% in year 2003. A major recommendation was that the coffee farmers should organise themselves into farmers' Cooperative in order to take advantage of bulking of their produce for sale.

Theme : Rapid clonal propagation, pest control and improved primary processing in coffee
(Adedeji, A.R. and M.O. Okeniyi)
Task: Rapid clonal propagation of coffee using half node cuttings.
Title: The Occurrence and prevention of cutting rot of ½ node coffee cuttings in the Nursery
Objectives: i To determine the fungi causing failure of ½ node vegetative propagated coffee

ii. To determine the effect of fungicide, hormone and presence of the leaf on rooting ability of half node stem cuttings.

Methodology: A replicated trial was laid out under cocoa shade. Fungicide, hormone and leaf were the treatments while control was free of all the three factors. Isolation of fungi, percentage infection and occurrence of fungi was recorded periodically.

Result: A list of fungi isolated and frequencies of their occurrence are presented in Table 1. All the fungi listed were freely isolated from pieces of infected cuttings. *Aspergillus flavus* and *A. fumigatus* could be isolated with any appreciable frequency from the nursery soil used. *Fusarium spp and Botryodiplodia theobromae* were frequently isolated from the two coffee varieties and soil sample. These pathogens have been reported as soil borne organisms. There was no apparent difference between the type and frequency of fungi isolated from C111 and C36. Table 2 shows the effect of treatment on the rate of infection in C36 coffee variety. The least infection (best performance) was obtained when fungicide and growth hormone were applied to cuttings with leaf.

However, there was no significant difference between this result and when only leaf was used as factor. There was no significant difference in the crop performance and disease incidence when C111 variety was tested.

The experiment is, however, planned to be repeated with foliar fungicide in place of the systemic fungicide used for the experiment.

Table 1:The percentage occurrence of fungi isolated from infected half node coffee cuttings and the nursery soil.

Fungi	Cuttings		Soil	
	C111	C36	C111	C36
Aspergillus flavus	16.5	20.5	0	0
Aspergillus fumigatus	16.5	15.5	0	0
Fusarium Sp	33.3	48.5	40.0	40.0
Botryodiplodia theobromae	50.0	62.8	60.0	62.5

Table 2: Effect of the treatment on the rate of infection in Coffee variety.

Treatment	Infection
A	56.25ab
B	43.75b
C	37.5bc
D	68.75a
E	6.25d
F	18.75cd
G	50.0ab
H	12.5d

Means followed by the same letter are not significantly different (P=0.05)

A* - No fungicide, no hormone, no leaf (control)
B - No fungicide, hormone presence, no leaf
C - Fungicide present, no hormone, no leaf
D - Fungicide present, hormone present, no leaf
E - No fungicide, no hormone, leaf present
F - No fungicide, hormone present, leaf present
G - Fungicide present, no hormone, leaf present
H - Fungicide present, hormone present, leaf present

Theme **: Rapid clonal propagation, pest control and improved primary processing in coffee**
(A.A Oloyede, A.O. Famaye and. S.S. Omolaja)
Task**: Rapid clonal propagation of coffee using half node cuttings.**
Title: Evaluation of half node cuttings of coffee treated with hormone and without hormone set on different rooting media viz: river sand, sawdust and sawdust/topsoil.
Methodology: The experiment was Completely Randomised Design which was laid out in factorial involving three rooting media, full node and half node cuttings and treated with hormone and not treated. There were twelve treatment combinations. The cuttings were set early in the morning, thoroughly watered and covered with a polythene sheet to ensure high humid condition of about 90.0%. The polythene sheets were sealed along the edges. The treatments were denoted thus.

i. Mo,M1,M2 for topsoil, sawdust/topsoil and sawdust media respectively.
ii. Co,C1 for full node and half node respectively.
iii. Ho, H1 without hormone and with hormone respectively.

The concentration of Indole butyric Acid used was according to the recommendation of Omolaja and Obatolu of 4000mg/1. There were ten pots per treatment each replicated three times.

Results: Results obtained on the number of sprouted cutting number callused, number rooted, percentage survival showed no significant difference at P(0.05). This indicates that any of the rooting media can be used and that half node coffee propagation is possible with or without hormone. It was only on root length that there was a significant difference at (P=0.05). As a result of hormonal application, maximum root length of 8.12cm was obtained when a quick dip of IBA was applied. This might be as a result of earlier root initiation in hormone treated cuttings. A least value of 1.6 cm was obtained in one node cutting without hormone set on topsoil. The mean values for number of cutting sprouted number callused, number rooted, percentage survival and root length are indicated in Table 1.

Table 1: Mean values for parameters measured.

Treatment	Percentage of Cutting sprouted	Percentage of Cutting callused	%age. Cutting Rooted	%age Survival Of cutting	Root Length (cm)
MoCoHo	40	40	40	40	1.62
MoCoH1	57	60	60	60	5.60
MoC1Ho	60	60	60	60	5.03
MoC1H1	70	70	70	70	7.05
M1CoHo	73	73	73	73	6.60
M1CoH1	73	76	76	73	8.12
M1C1Ho	60	60	60	60	5.02
M1C1H1	70	70	70	70	6.27
M2CoHo	70	73	73	73	5.03
M2CoH1	60	60	60	60	6.23
M2C1Ho	57	57	57	57	2.90
M2C1H1	67	67	67	67	6.67
SE(0.05)	NS	NS	NS	NS	7.84

Recommendation: The use of half node cutting of coffee in saw dust/Topsoil medium is recommended without the use of hormone as one will be able to get more planting materials and the cost of procuring hormone will not be necessary. The topsoil below will also be able to supply the necessary nutrients for rooted cuttings.
Theme : Rapid clonal propagation, pest control and improved primary processing in coffee. (E.U. Asogwa and F.A. Okelana.)

Task: Rapid clonal propagation of coffee using half node cuttings.

Title: Preliminary Investigation of The Effectiveness of Some Dusts And Granules For The Control of Termites In Western Nigeria.

Introduction: The effectiveness of using the Organochloride termiticides (Aldrin dust, Aldrex T., Dieldrex) as a seed treatment on seedlings, mature plants and for tree protection against termites is widely known. However, following the ban on the use of organochlorines due to their devastating effects on the environment and humans, there is the need to exploit other classes of insecticides for the control of termites. Four classes of granules/dusts, Carbonfuran (Furadan 3G); Metalaxy/carboxin/Furathiocarb (Apron plus 50 DS); Pirimiphos methly (Actellic D) and Permethrin (Pif-paf powder) were therefore selected for the control trials on termites.

Objective: To investigate the termicidal activities of four classes of granules/dusts and to recommend effective application rates and methods.

Materials And Methods : Termites (workers) for the laboratory bioassay tests were collected from the Cocoa Research Institute of Nigeria experimental plantations. The termite culture jars were maintained and kept in the Entomology Laboratory at 28 - 32^0C and relative humidity of at least 80% (Pearce, 1997). The four classes of granules/dusts, Carbonfuran (Furadan 3G); Metalaxy/Carboxin/Furathiocarb (Apron plus 50DS); Pirimiphos - methyl (Actellic D) and Permethrin (Pif - paf powder) were procured from a reputable Agrochemical shop at Ibadan, Nigeria.

The insect bioassay tests (topical/residual/contact tests) were carried out on ten termites (workers) in each of the petri dishes using various ratio mixtures of both the granules/dusts with sawdust and sand (1:0; 1:1; 1:5; 1:10; 1:15 and 1:20). 0.025g of the various ratio mixtures was used for the topical application and 0.050g for the residual contact test. Each treatment was replicated four times. Mortality count was taken and recorded every 15 minutes for 1 hour. A termite was declared dead if it does not show any sign of movement when touched lightly with a soft camel hair brush or when it is lying flat on its back.

The resulting data in all the bioassay tests were subjected to analysis of variance and the means were separated using Duncan Multiple Range Tests (Little and Hills, 1977; Steel and Torrie, 1980; Obi, 1986).

Results And Discussion : Data presented in Tables 1, 2, 3 and 4 reveal that, all the insecticide treatments were significantly better than the control treatments.

Table 1 compared the effect of topical application and residual contact action of furadan/sawdust and furadan/sand mixtures on mean mortality of termites (workers). The mortality rate for both the topical and residual contact tests decreased with increased ratio of saw dust or sand to furadan. However, all the treatments were significantly different from the control, even though some of the treatments were significantly different from the other. There was also not much difference between the mortality trend for both sawdust and sand mixtures. The same above was repeated as shown in Table 2,3, and 4 using Apron plus, Actellic dust and pif-paf powders respectively.

The effectiveness of the four classes of dusts/granules, investigated in this study was quite commendable as they all competed favorably with high mortality rates. Apron-plus, sawdust and sand mixtures achieved between 78-100% mortality against the termites (workers) within 1 hour after application, while 75-100% mortality was recorded for furadan, actellic and pif- paf powder respectively. From the above an inference could be drawn that Apron plus, furadan, actellic and pif-paf powder are all good termiticides, but a more detailed field trial is needed to confirm this proposition. However, this result is in line with the reports of some earlier workers on the activities of some of these granules and dusts. Opareke *et al* (1998) reported that actellic dust at all three levels applied gave 100% mortality of adult *Callosobruchus maculatus* (F). A complete protection of the grains in storage for almost 24 months have also been recorded with pirimiphos-methyl formulations at various concentrations in Argentina, Australia, U.K., USA, Nigeria etc (I.C.I. Handbook, 1982; Pricket,1987; Asogwa and Osisanya, 2000). According to Cowie *et al (1989*), the major treatment in forestry as they have been for other crops in the past few years is carbofuran. For high-value crops, more emphasis has been put on the use of granular applications, which has a slow-release formulation, especially in the nursery seedling application. Release over a two-year period can help seedling establishment, allowing them to become more resistant to termites. Carbofuran or carbosulfan (furadan) granules are nearly as effective as chlordane at 0.6g of a.i. per tree (Pearce,1997).

There was no significant differences between the mortality ratios of sawdust and sand mixtures, so the active constituent of these dusts could comfortably be replaced with any of these inert materials (sawdust or sand) depending on the availability. This was clearly shown in Tables 1, 2, 3 and 4 where a ratio of one part of the dust to twenty parts of inert materials still exhibited a high mortality rate even though slightly different from the other ratios.

In conclusion therefore, the achievement of comfortably replacing the active constituent of these granules/dusts with 95.2%w/w(1:20) of inert materials(sawdust or sand) will make for effective utilization of these termiticides and save the farmers some reasonable costs.

Table 1; Effect of topical application and residual contact action of furadan/sawdust and furadan/sand mixture on mean mortality of Termites (workers caste) (n=10/replicate

	Mean motalities			
	(Actellic/sawdust)		(Actellic/sand)	
Treatments	**Topical**	**Residual**	**Topical**	**Residual**
Control (X)	0a	0a	0a	0a
1:0 (0% w/w)	10b	10b	10b	10b
1:1 (50% w/w)	10b	9.75b	10b	9.5b
1:5 (83.3% w/w)	9c	8.75c	9.5b	9bc
1:10 (90.9% w/w)	9c	8.25c	9.25b	8.25c
1:15 (93.8% w/w)	8.5c	8c	8.75bc	8cd
1:20 (95.2% w/w)	8cd	7.5cd	8.5c	7.75d

Means within a column followed by different letters are significantly different at 5% Duncan's Multiple Range Test ($P<0.05$)

Table 2: Effect of topical and residual contact action of apron plus/sawdust and apron plus/sand mixtures on mean mortality of termites (workers caste) (no= 10/replicate)

	Mean mortalities			
	(Actellic/sawdust)		(Actellic/sand)	
Treatments	**Topical**	**Residual**	**Topical**	**Residual**
Control (X)	0a	0a	0a	0a
1:0 (0% w/w)	10b	10b	10b	10b
1:1 (50% w/w)	10b	10b	10b	9.5bc
1:5 (83.3% w/w)	10b	9.75b	9.75b	8.75c
1:10 (90.9% w/w)	9.75b	9.5b	9.5b	8c
1:15 (93.8% w/w)	9.25b	9bc	9.5b	8c
1:20 (95.2% w/w)	8.75bc	8.25c	9bc	7.75cd

Means within a column followed by different letters are significantly different at 5% Duncan's Multiple Range Test ($P<0.05$)

Table 3; Effect of topical and residual contact action of actellic dust/sawdust and Actellic dust/sand mixtures on mean mortalities of termites (workers caste) (n=10/replicate).

	Mean motalities			
	(Actellic/sawdust)		(Actellic/sand)	
Treatments	**Topical**	**Residual**	**Topical**	**Residual**
Control (X)	0a	0a	0a	0a
1:0 (0% w/w)	10b	10 b	10b	10 b
1:1 (50% w/w)	10b	10b	9.75b	10 b
1:5 (83.3% w/w)	10b	10b	9.5b	9.75 b
1:10 (90.9% w/w)	9c	9.5 b	9 bc	9.25 b
1:15 (93.8% w/w)	8.75c	8.5c	8.5 c	8.75bc
1:20 (95.2% w/w)	8.25c	8.25c	7.5d	8c

Means within a column followed by different letters are significantly different at 5% Duncan's Multiple Range Test (P<0.05)

Table 4: Effect of topical and residual contact action of Pif-paf powder/sawdust and Pif-paf powder/sand mixture on mean mortalities of termites (workers caste) (n=10/replicate).

	Mean motalities			
	(Actellic/sawdust)		(Actellic/sand)	
Treatments	**Topical**	**Resudual**	**Topical**	**Resudial**
Control (X)	0a	0 a	0 a	0 a
1:0 (0% w/w)	10b	9.75 b	10 b	10 b
1:1 (50% w/w)	10b	9.5 b	10 b	9.75 b
1:5 (83.3% w/w)	10b	9b	10 b	8.75 c
1:10 (90.9% w/w)	9.5b	8.75 bc	9.25 b	8.75 c
1:15 (93.8% w/w)	9 bc	8.25c	8.5 bc	8c
1:20 (95.2% w/w)	8d	7.75cd	7.5 c	7.5cd

Means within a column followed by different letters are significantly different at 5% Duncan's Multiple Range Test (P<0.05)

Theme : Rapid clonal propagation, pest control and improved primary processing in coffee. (E.U. Asogwa and F.A. Okelana.)

Task: Rapid clonal propagation of coffee using half node cuttings.

Title: Preliminary Investigation of the Termicidal Activity of Chlorpyrifos and Hexachloro-Cyclohexane in South Western Nigeria.

Introduction : The effectiveness of using the organochloride insecticide (Aldrin, DDT, Aldrex T) as a seed treatment, on seedlings, mature plants and for tree protection, is widely known. However much of this work comes from field trials carried out before the ban on organochlorines (Pearce, 1997). Since the ban on the use of organochlorines there have been the control of termites. The following chemicals (termiticides) are currently in use in commercial agriculture, Oftanol, Chloropyrifos, Carbofuran and Permethrin. (Pearce, 1997).

Most of these achievements recorded so far with these termicides have been outside the shores of this continent, hence the main objective of this inquiry is to investigate the activities three brands of chloropyrifos and Hexachloro-cyclohexane and find out how best they can be adapted to our own local environment.

Materials And Methods :

Collection of the termiticides: The three brands of Chloropyrifos (Pyrinex 48 EC, Termicid and Dursban) and Hexachloro-cyclohexane (Endosulfan) were purchased from a reputable Agrochemical shop at Ibadan.

Collection and identification of termites: Termites (workers and soldiers caste) for the laboratory tests were collected from Cocoa Research Institute of Nigeria experimental plantations. The termite culture was maintained and kept in the laboratory at 28-32^{0}C (29^{0}C optimum) with a humidity of at least 80% Relative Humidity (Pearce 1997).

Bioassay of the termiticides: The following tests were carried out on the termite caste (workers and soldiers) collected using different concentration of the various termiticides.

(1) Topical application test
(2) Residual contact test
(3) Fumigant action test

Topical application test: Ten termites were picked from the culture jars or plate nests into a petridish for each treatment of these tests. There were six treatments and a no treatment control for each of the various termiticides. The various termiticide concentrations used are 0ppm, 125ppm, 250ppm, 500ppm, 1000ppm and 2000ppm. Ten microlitres of each termiticide concentration was applied directly on the termites in respective petridishes with the aid of a microsyringe (ie one microlitre/insect).

Each treatment was replicated four times. Mortality counts were taken and recorded after every 15 minutes for 1 hour, but for the soldier caste, the time was extended to 2 hours. A termite was regarded as dead if it showed no signs of movement when touched lightly with a soft carmel hair brush or when it is lying flat on its back

Residual contact action: This test was carried out with petri dishes` fitted with filter papers. The filter paper was drenched with 60 microlitres of the termiticide and drained off. Ten termites were placed in each of the petridishes to be in contact with the residue of the termiticides. Each of the six treatments with their control was replicated four times with a control treatment. Mortality counts were taken and recorded after every 15 minutes for 1 hour for the workers caste and 2 hours for the soldiers, using the same attribute of identifying a dead insect as above.

Fumigant action test: The test was carried out using 500mls plastic cups with cover and small muslin cloth bags measuring 7cm x 15cm. Ten termites were placed in each bag and the mouth tied with an extended rope with which it was lowered half way into the plastic container containing 2mls of the termiticide. The cups were covered immediately to allow the termites get in contact with the fumes of the various termiticide concentrations. Each of the six treatments and a control was replicated four times. Mortality count and recording were taken after 1 hour (workers caste), and 2 hours for the soldiers..

Statistical analysis of the tests: The data obtained in all bioassay tests were square- root transformed to promote normality before subjecting them to analysis of variance by Duncan multiple Range Tests (Senedecor and Cochran, 1972; Little and Hills, 1977; Steal and Torrie, 1980; Obi, 1986).

Results And Discussions :

The results showed that in topical/residual contact action tests, an adult (workers) mortality rate of between 90% -100%, 82.5% - 100%, 82.5% - 100% and 90% - 100% was recorded for Pyrinex, Termicid , Dusban and Endosulfan, respectively within 1 hour following topical and residual contact tests. For the soldier caste the mortality rate was between 17.5% – 72.5%, 22.5% - 77.5%, 22.5% - 77.5% and 35% - 95%, respectively for Pyrinex, Termicid, Dursban, and Endosulfan 2hours after application. However, none of the termiticide concentration s had fumigant action against the termites (workers and soldiers) when exposed to different concentrations of their fumes.

CASHEW PROGRAMME (Leader: Dr. P. O. Adebola)

Title: Ecology of the Cashew leaf miner *Acrocercops Synagramma (Meyricki) (Lepidoptera: Lithocolletidae*) Okelana, F.A. (Mrs)

Objective: To monitor the occurrence of the Cashew leaf miner *A. synagramma* on cashew at CRIN Headquarters.

Methodology: Twenty stands of cashew at each of two locations viz: Around the officer complex and nearby North Plot at CRIN Headquarters were selected randomly, every week, making a total of 40 stands. Four branches at hand height were chosen per tree and the number of leaves with active (fresh) mines of the pest were counted and recorded. Total and mean weekly values of mines per month were computed.

Results: The miner, *A. synagramma* occurred in ten out of the twelve months of the year at both locations. It was absent in April and May at both sites with incidental occurrence in March at both locations (Table 1). Peak population of the pest was recorded on cashew at both locations in September followed by August with higher incidence on the Office Complex stands than those at the North Plot (Table 1). As was observed in 2000 and 2001, tender cashew leaves were more susceptible to the miner's attack than the old leaves.

Constraint: Lack of funds to conduct biological studies on the pest.

Table 1: 2002 Incidence of the cashew leaf miner *A. synagramma* **on Cashew at two locations at CRIN Headquarters, Ibadan**

	Mean weekly number of leaves with fresh/active mines	
Months	**Office Complex**	**North Plot**
January	11.0	9.5
February	2.8	1.0
March	0.8	0.3
April	0.0	0.0
May	0.0	0.0
June	8.3	5.0
July	29.2	23.4
August	50.3	38.8
September	88.3	59.3
October	24.0	13.2
November	26.5	15.0
December	6.4	4.2

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Title: Effects of floatation test on germinability of cashew nuts (L.A. Hammed and E.A. Adeyemi)

Objective: To study the germinability of cashew nuts as affected by floatation test in water.

Methodology: The experiments were conducted twice in 2001 and 2002 under a cashew tree at the headquarters of Cocoa Research Institute of Nigeria, Ibadan. The nuts (7.6g mean weight) were all from high yielding Iwo selections collected from Zone 1 cashew plantation.

In the first trial, 286 nuts, three months after harvesting (MAH) were soaked in tap-water, at ambient temperature, for 24 hours. 108 and 178 nuts were found to float and sink, respectively. They were collected and sown separately in polythene bags containing top-soil. The second trial took off with 30 nuts for each of sinkers and floaters. The nuts, 4 MAH were treated as above. However, the sowing depth was 5cm. Germination percentages were computed two, three and four weeks after sowing (WAS).

2002 Trials:

In the first and second trials, 50 nuts were sown for each of floaters and sinkers. The nuts, 1 MAH and 2 MAH for the first and second trials respectively, were again treated as in experiment-1 of 2001 before sowing.

Results: The results of the experiments are as follows:

Table 1a: Germination Percentage of Cashew nuts as affected by floatation test: (2001 Experiment:

Weeks after Planting(WAP)	First Experiment F	S	Second Experiment F	S
2 WAS	3.33	0 .00	4.00	0.00
3 WAS	90.00	93.33	84.00	92,00
4 WAS	90.00	96.67	86.00	99.00

Note: F = floaters (Nuts), S = Sinkers (nuts)

Table 1b: Germination Percentage of Cashew nuts as affected by floatation test: 2002 Experiment:

Weeks after Planting(WAP)	First Experiment F	S	Second Experiment F	S
2 WAS	14.00	22.00	0	4.00
3 WAS	52.00	64.00	62.00	92.00
4 WAS	84.00	92.00	86.00	96.00

Note: F = floaters (nuts); S= sinkers (nuts)

Germination rate of cashew nuts is expected to reach maximum 4 WAS. At this period, while floaters recorded between 86.00% and 90.0% germination percentages, the sinkers had between 96.67% and 99.00% germination (Table 1a). These observations were confirmed by the records of 2002 repeated trials. While the floaters attained a maximum of between 84.00% and 86,00% germination percentages, the sinkers, on the other hand, recorded between 92.00% and 96.00% germination percentages (Table 1b). Therefore the germination percentage of floaters 4WAS (between 84.00%) and 90.00%) is very appreciable, though, that of sinkers at the same period is between 92.00% and 99.00%. This is indicative of the fact that viability/germinability of cashew nut is not as linked with floatation test in water, as earlier thought of.

Conclusion:

Among pre-planting operations for cashew nuts is floatation test in water. The floaters were always discarded because their light weight was believed to be a hindering factor to viability/germinability. The results of these experiments have shown the opposite.

The next stage of the work will be to investigate on the character(s) responsible for floating and sinking of cashew nuts.

Experiment I: Growth and development of cashew (*Anacardium occidentale, Linn*) as affected by nut sizes in the nursery. (L.A. Hammed**)**

Objective,: To study the effect of nut-size on morphological and physiological growth and development of cashew in the nursery.

Materials and Methods: The experiment was laid out in RCBD with four replications. The three distinct cashew nuts sizes used included: Jumbo (16g) and Madrass (2g) (that respectively, constitute the largest and smallest nuts of cashew) while the third one was the medium (8-12)g. Two plant (seedling) samples taken monthly from each of the treatments were brought to the laboratory for physiological operations.

Duration: 12 months

Location: CRIN Headquarters, Ibadan.

Results: The experiment was terminated in September 2002 due to logistic problems. It is to be re-established in 2003

***The experiment was reestablished in May 2002 at the Institute's main nursery.

Experiment 2: Field establishment of cashew (A. occidentale, L.) as affected by seedling age (L.A. Hammed**)**

Objective: To determine the appropriate age of transplanting seedlings to the field.
Materials and Methods: The experiment, laid out in RCBD with three replications and seven treatments, was established in June 2002 at zone 1. The treatments included 3-8 weeks after planting (WAP) and 3 months after planting (MAP). The variations in the seedling age (as enumerated by treatment definition) had earlier been made to occur in the nursery, during nut-sowing, between March and June 2002.
Location: Zone 1 of the CRIN Headquarters, Ibadan
Duration: 2 years
Results: The project is in progress
Constraints: (1) Lack of labour constituted most serious constraint
(2) Lack of field assistants, i.e. Agricultural superintendent
(3) Lack of funds
Recommendations (1) The plantation manager needs be officially directed to allocate 4 casual workers to the project for routine cultural maintenance.
(2) Provision of at least one Agricultural superintendent for field assistance
(3) Provision of funds.

.Experiment 3: Early field establishment of cashew (*A. occidentale L.*) as affected by Nut size and planting method. (L.A. Hammed)
Objective: (1) To study the effect of nut-size on early field establishment of cashew (*A.occidentale*. L.)
(2) To study the effect of method of planting on early field establishment of cashew (*A. Occidentale L.*)
Materials and Method: It is a factorial experiment laid out in RCBD with three replications. Nut-size (Jumbo, medium and Madras) and planting method (potted seedlings, bare-root seedlings and direct seeding) constituted factors A and B respectively.
Locations: (1) Zone 1 of the CRIN headquarters, Ibadan (rainforest zone)
(2) CRIN, Ochaja substation (guinea savanna zone)
Duration: Initiation of reproductive organs
Constraints: As in experiment 2 above.

Experiment 4: Effect of intercropping maize on early field establishment of cashew (*A. occidentale, L.*) grown at different planting densities. (L.A. Hammed)
Objective: To study the performance of cashew, at different planting densities, when intercropped with maize, using early growth attributes.
Materials and Methods: It is a factorial experiment laid out in RCBD with three replications. Planting density of cashew (277, 493 and 1,111 plants/hectare) and maize intercrop (at 80,000, 53,333 and zero plants/hectare) constituted factors A and B respectively.
Locations: (1) Zone 1 of CRIN headquarters, Ibadan (rainforest zone)
(2) CRIN, Ochaja substation (guinea savanna zone)
Duration: Initiation of floral organs.
Results: Data collection in progress
Constraints: As in experiment 3
Recommendations: As in experiment 3

Experiment 5: Effect of planting density on establishment, yield and yield components of cashew (*A occidentale. Linn*). (L.A. Hammed, E.A. Adeyemi (Mrs) and A.O. Famaye).
Objectives: (1) To study the field establishment of cashew as affected by planting densities, using early growth attributes.
(2) To monitor the effect of planting density on yields and yield components and fruit quality of cashew.
Materials and Methods: The experiment was laid out in RCBD with three replications. Cashew Nut of jumbo size (16g) was used for planting. The treatments included 123 plants/ha (9m x 9m) 204 plants/ha (7m x 7m), 400 plants/ha(5m x 5m), 816 plants/ha (3.5mx3.5m) and 1,600

plants/ha(2.5m x 2.5m). The needs to afford even light interception necessitate planting at square spacing.

Locations: (1) Zone 5, CRIN headquarters, Ibadan (rainforest zones)
(2) Ochaja CRIN Substation (guinea savanna zone)
(2) Uhonmora CRIN substation (rainforest zone)
(3) Owena CRIN Substation (rainforest zone)

Results: Establishment in progress

Constraints: (1) Insufficient supply of planting materials
(2) Transportation problems
(3) Lack of field assistants

Recommendations: (1) Provision of 6,000 cashew nuts of jumbo size
(2) Provision of programme vehicles
(3) Provision of enough Agricultural Superintendents

Title: Effect of soil sterilization, phosphorus types and mycorrhizal inoculation on early vegetative growth of Cashew (Ibiremo, O.S.)

Objective: To evaluate the influence of phosphorus fertilizer from different sources, soil sterilization and mycorrhizal inoculation on early growth of cashew.

Methodology: Twelve treatments from three sources of phosphorus, two soil treatments and two levels of VA-mycorrhizal inoculations were applied to young cashew seedlings planted in 5kg soil in 5-litre plastic buckets (The details are reflected in year 2001 annual report).

Results: There was no significant effect of P-application, soil sterilization and mycorrhizal inoculation on the heights, and stem diameter of cashew. However the effect of mycorrhizal inoculation was significant on the height at 2MAP while P-sources significantly affected the height and stem diameter at 4 and 6 MAP respectively. SSP in most cases gave consistently more vigorous seedlings. The influence of SSP on cashew seedlings was more pronounced than SRP in an Alfisol indicating similar trend of the year 2001.

Constraints: The nutrient analysis of the soil and plant samples obtained from the trial are yet to be analysed due largely to power outage and lack of distilled water.

Table 1: Response of cashew seedlings to soil sterilization, phosphorus fertilizer and mycorrhizal inoculation in an Alfisol.

		Plant Height (cm)		
Treatment		2MAP	4MAP	6MAP
1.	$P_oS_oM^-$	21.27	30.33	34.60
2.	$P_oS_oM^-$	17.83	26.67	35.00
3.	$P_oS_oM^-$	20.33	29.00	37.20
4.	$P_oS_oM^-$	17.17	27.50	36.30
5.	$P_oS_oM^-$	20.77	27.67	32.70
6.	$P_oS_oM^-$	20.17	29.17	32.20
7.	$P_oS_oM^-$	27.30	36.57	36.20
8.	$P_oS_oM^-$	13.17	26.00	36.50
9.	$P_oS_oM^-$	18.07	21.67	33.70
10.	$P_oS_oM^-$	14.63	25.17	33.80
11.	$P_oS_oM^-$	16.07	25.83	34.80
12.	$P_oS_oM^-$	18.53	21.83	32.00
	Mean	18.77	27.28	34.00
	LSD	8.98	9.095	12.42
		S	S	N.S

P_o = Nil P P_2 = 30kg P_20_5/ha (SRP) M^- = without mycorrhizal inoculation, So =without sterilization

P_1 = 30kg P_20_5/ha MAP = months after planting M^+ = with Mycorrhizal inoculation S_1=with sterilization

Table 2: Stem diameter of coffee as affected by soil sterilization, phosphorus fertilizers and Mycorrhizal inoculation in an Alfisol.

		Stem Diameter (cm)		
	Treatment	2MAP	4MAP	6MAP
1.	$P_oS_oM^-$	0.74	1.12	1.32
2.	$P_oS_oM^-$	0.74	1.06	1.17
3.	$P_oS_oM^-$	0.81	1.17	1.30
4.	$P_oS_oM^-$	0.86	1.19	1.43
5.	$P_oS_oM^-$	0.77	1.21	1.49
6.	$P_oS_oM^-$	0.74	1.15	1.41
7.	$P_oS_oM^-$	0.87	1.25	1.66
8.	$P_oS_oM^-$	0.75	1.19	1.47
9.	$P_oS_oM^-$	0.75	1.15	1.35
10.	$P_oS_oM^-$	0.78	1.00	1.17
11.	$P_oS_oM^-$	0.80	1.22	1.21
12.	$P_oS_oM^-$	0.73	0.95	1.37
	Mean	0.78	1.14	1.36
	LSD	0.17	0.34	0.33
		NS	NS	S

Task: Effect of budwood sterilization and fungicide application on cashew grafting. (Aliyu, O. M.)

Objective: The objective of this study is to improve on the vegetative propagation technique of grafting in cashew through budwood sterilization and fungicide application.

Methodology: Six hundred rootstocks were raised and terminal cleft method was employed in this exercise. The trial consisted of treatments and control. Each treatment comprised of 25 rootstocks replicated thrice. 5% ethanol and 1.0g/L of benlate were used for sterilization and spraying respectively.

Treatments
1: UNO – Unsterilized, unsprayed and opened grafts
2: UNC - Unsterilized, unsprayed and covered grafts
3: USO – Unsterilized, sprayed and opened grafts
4: USC - Unsterilized, sprayed and covered grafts
5: SNO - Sterilized, unsprayed and opened grafts
6: SNC - Sterilized, unsprayed and covered grafts
7: SSO - Sterilized, sprayed and opened grafts
8: SSC – Sterilized, sprayed and covered grafts.

Covered grafts were those covered with transparent polythene sheet immediately after grafting operation until 30 days after operation. This to create a humid environment for the grafts and also reduce water loss through transpiration.

Results: The result of the grafting trial is presented in Table 1 below

Table 1: Cashew grafting trial showing the effect of sterilization and fungicide application

Treatments	No. Grafted	No. of Take 14 DAG	No. Sprouted	No. of surviving Grafts 3MAG
UNO	75	12	4	0
UNC	75	15	5	3
USO	75	19	18	6
USC	75	30	24	18
SNO	75	49	21	15
SNC	75	60	30	24
SSO	75	54	30	24
SSC	75	70	58	50

DAG: Days after grafting MAG: Months after grafting.

The results showed that budwood sterilization and fungicide application significantly improved the success rate of grafting in cashew. Combinations of sterilization, spraying and covering of the grafted materials with transparent polythene sheet (SSC) was found to give the highest about 66%. The results also indicated that budwood sterilization was more critical than fungicide spraying. This implies that budwood sterilization drastically reduced infection lof grafted portion and die back of grafts.

Constraints: No fund and materials were provided for this work.

Recommendation: The result of this work is fascinating, more effort should be made to improve on it.

Task: Further selection of cashew (*Anacardium occidentale* L.) germplasm with desirable qualities (high yielding, jumbo nuts with consistent yield) in existing/identified local plantations. (Aliyu, O.M and Adebola, P.O.)

Objective : To acquire cashew germplasm with good qualities (yield, disease and pest tolerance) into the institute's cashew gene pool.

Methodology: Open pollinated nuts of the selected trees identified with good qualities and desirable characteristics were collected from Kosoni-Ola Farm Limited, Oro, Kwara State. Nuts were collected on tree basis. The materials were planted at Headquarters, Ochaja and Owena Substations.

Results: At the Headquarters some of the nuts were used to gap up missing stands in the plots established in the 2000 and 2001 planting seasons and 1ha was also established. About 2.5ha were planted each at the Ochaja and Owena Substations. However, the Ochaja plot was ravaged by fire during last dry season, while those at Headquarters and Owena are being maintained regularly. The acquisition of clonal materials cannot be carried out as funds and logistics were not provided.

Constraints: Non-provision of more labour for adequate maintenance of these plots. In adequate provision of funds and logistics for research programmes

Task : Improvement of acquired cashew germplasm through hybridization. (Aliyu, O.M and Adebola, P.O.)

Objective : To combine the available desirable traits of pre-selected local and exotic genotypes through the conventional method of hand pollination.

Methodology : Top quality trees with jumbo-sized nut that produced 200-500 nut/tree/year and extra small-sized nut (Madras) that produced about 4000 nuts/ tree/year were selected and tagged during Year 2001 fruiting period. Hand pollination was to be carried out among these selected trees to produce F1 nuts that combine nut characteristics of two parents

Location : Ochaja

Results : This experiment cannot be executed for lack of funds and logistics. The trees for this work are only available in Ochaja Substation. The work will be carried out in Year 2003

if materials, funds and logistics are provided.
Recommendation : Development of hybrid cashew in the institute is long over due. However, to achieve meaningful results in this work adequate provision for materials and logistics is essential.

TEA PROGRAMME (Leader: K.T.M. Ojelade)

Theme: Production of Tea In Lowland Areas of Nigeria. (Ojelade. K.T.M.)
Task: Continuation of evaluation of farms and farmers productivity. Continuation of adaptation studies on establishment, yield and quality in Iyanomo, Akwete, Ikom, Ikorodu, Araromi-Obu, Ijebu-Ife, Mayo Selbe and Ibeku.
Activity: Monitoring incidences and abundance of insect pest attack on Lowland tea.
Objective: To identify, collect and determine the pest status of insects associated with Tea cultivation in the lowland.
Methodology: Established Tea experimental plots at Akweate (Abia) and Iyanomo (Edo) were visited during the year. Insects' identification was done, while unidentified insects were bought to the Insect Museum for proper identification. The level of insect pest damage was assessed by visual examination, and scored as low, medium, and high on plants with 10-20%, 21-45% and 46-100% level of leaf damage (defoliation), respectively
Result: Tea seedlings in the Green house were infested with psyllids. Although no other insect pests were observed, symptoms such as leaf-curl, and defoliation that could be associated with insect pests infestation were observed. Tea clones 236, 143,35 and 238 were observed to be highly defoliated, recording about 40-55% defoliation. The level of insect pest infestation was low in about 20% of the planted tea seedlings, while 33% of the stands were within the medium level of defoliation. The remaining stands, about 47% fell within high-level infestation bracket. Notable insect pests observed include, white flies (*Bemissia tabacci*), nymphal stages of *Zonocerus variegates,* red ants (not identified) *and Riptortus dentipes* (cotton stainer)
Recommendation : Observation from the filed showed that the tea seedlings introduced from the highland, Mambilla Plateau, established impressively on the lowland, at Akwete. However, the plots were not adequately maintained (weeding and irrigation) after establishment of the shade by the rubber trees inter cropped with the tea seedlings which resulted in scorching of an appreciable number of seedlings. The weedy condition of the plot encouraged insect population build- up, consequently, high level of leaf defoliation and in some instances mortality of seedlings were observed.

The non-removal of the polythene bags (used in raising the seedlings) before transplanting on the filed enhanced drying up of the primary and secondary roots of the seedlings, consequently, termite infestation and damage resulted in seedling mortality.
Location: Akwete (Abia State).

Theme: Production of Tea In Lowland Areas of Nigeria. (Oloyede, A.A. and Omolaja S.S.)
Task: Continuation of adaptation studies on tea establishment, yield and quality in Iyanomo, Akwete, Ajassor, Ikorodu, Araromi-obu, Ijebu-Ife, Malyo-selbe and Ibeku.
Activity: Setting of tea cuttings at the Headquarters from clonal materials brought from Mambilla D.
Methodology: Dr. E.B. Esan brought some commercial tea clones to the Headquarters. The materials were stored in moist transparent polythene bags to prevent dessication. The cuttings were set on 18th September 2001. The clones evaluated were 143, 35, 318 and one-node cuttings were made from the clones. Cuttings obtained from clone 318 in the Headquarters served as control. There were five-treatment replicates and five pots of cuttings. The cuttings were arranged on a raised platform and covered with polythene sheet to ensure humidified environment for the cuttings.
Results: The highest rooting of 46% was obtained in cuttings of 318 obtained at the Headquarters. The poor rooting obtained in this experiment was as a result of massive termite infestation.
We therefore suggest the following for future cuttings set:
(i) preventive measure against termite infestation.
(ii) Preventive measure against pathogens.
(iii) Use of rooting hormone may be desirable to hasten rooting of cuttings.

Table 1:

Treatment	R1	R2	R3	Mean	Percentage
143	0	0	0	0.00	0
35	2	0	0	0.67	13.4
318	0	0	0	0.00	0
unknown	0	0	1	0.33	6.6
318(HQ)	4	1	2	2.30	46

Theme: Production of Tea In Lowland Areas of Nigeria. (Oloyede, A.A. and Omolaja, S.S.)

Task: Continuation of adaptation studies on establishment, yield and quality in Iyanomo Akwete, Ajassor, Ikorodu, Araromi-obu, Ijebu-Ife, Mayo-selbe and Ibeku.

Activity: Evaluation of some tea clonal cuttings raised on different rooting media (red sub-soil) obtained from some lowland areas mentioned above).

Methodology: A total of 270 tea cuttings consisting of clones 318 and 143 were set at CRIN Headquarters on the 17th March 2001. The cuttings were set on red sub- soil obtained from the lowland areas of Araromi-obu and Ijebu-Imosan. The Mambilla red sub-soil served as the control

Result: Results obtained from the study revealed more than 90% sprouting after 90 days of setting the cuttings. More than 80% of the cuttings also callused but without a corresponding root formation. Rooting of the cuttings was below 5%. The poor result obtained in terms of rooting may be due to the following.

(i) extensive die- back of the sprouted cuttings which was ascribed to pathogenic attack
(ii) infestation by termites. They used the red sub-soil in constructing their nest tertarium.
(iii) no hormonal (treatment to enhance rooting.

Theme: Improvement in the establishment and Productivity of Highland Tea in the Mambilla Plateau area of Nigeria. (Obatolu C. R**.,** Ipinmoroti R. R.)

Task: Determination of optimum organic fertilizer regime for highland tea production.

Title: Effects of organo-mineral fertilizers and NPK on tea (*camellia sinesis L*.) growth and nutrient uptake in Kusuku and Ibadan areas of Nigeria).

Introduction: There is need for adequate fertilizer application on tea fields for optimum harvest of tea leaves on fortnightly basis, and this input forms over 50% of annual variable inputs for tea production over the years, Nigerian Ttea farmers have been achieving this through the application of NPK fertilizers for the past few decades. The farmers have been funding it too difficult to get enough to meet their farm needs due to scarcity and high cost of procurement for the few available bags of fertilizer. To alleviate this problem, organo-mineral fertilizers were formulated using organic and inorganic fertilizer combinations. Rapidly available basal organo and poultry droppings were used, while Urea, muriate of potash and Rock phosphate were the inorganic sources for NPK.

Methodology: The fertilizers were applied to supply N at the rate 0, 75, 150 and 300Kg/ha and to supply P and K at 0, 15 15, 30 and 60kg/ha. The organo-mineral fertilizers were formulated at two levels of 75% and 50% fortifications, while the organic and inorganic fertilizers were also applied as sole for good result comparisons. The treatments were applied to tea seedlings planted in 10kg soil filled pots in 4 replicates each in the open filed near the nursery unit. Agronomic data on plant height, girth, number of leaves leaf area and number of branches were collected on monthly basis for 18 months. Soil samples were collected on six monthly basis to monitor some chemical changes in the soil over the period of experimentation.

Results: Results so far indicate that the tea growth parameter values taken increases with age and length of the experiment. While the plant height, girth and leaf area values gave significant superior values compared to the control, the number of branches and number of leaves values were not statistically significant despite their superiority over the control. Application rate at 75kg N/ha gave

values which were better and significantly superior to other rate values The organo-mineral treatments were better utilized at the 75:25 mixture than at 50:50 mixture level except for CPH which was better at 50:50 level of mixture. Results on the chemical influences of the treatments both on the soils and plant uptake of nutrients would be given in subsequent reports.

Theme: Production of tea in lowland areas of Nigeria. (A.A. Oloyede, and S.S. Omolaja.)
Task: Development of an appropriate method for raising tea cuttings in the lowland areas of Nigeria (Ajassor, and CRIN Headquaters).
Activity: Evaluations of some clonal tea cuttings brought from Mambilla and set at the CRIN Headquarters.
Objective: To see the possibility of vegetatively propagating tea in the lowland areas of Nigeria where tea cultivation is adaptable e.g. Ajassor
Justification: The natural environment for tea of Nigeria is the high altitude location of the Mambilla Plateau of Taraba state, Nigeria. At present 100% of annual national tea output comes from Mambilla (Omolaja, etal. 2001). In an attempt to increase and extend tea production to the lowland areas of Nigeria, experiments were carried out to find the best location(s) and clones that are best suited to the lowland areas. Of all the locations, Ikom was found to be the most suitable while clone 143 performed best. It was based on the possibility of growing tea in some of the lowland locations that an experiment on appropriate cutting production method in the lowland areas was initiated
Methodology: Some tea cutting materials of clones 33,357,143,318 were harvested in the early morning of 19th September 2002 and preserved in moistened transparent polythene bags and tied at both ends to ensure a humidified environment. Red subsoil was also brought to the Headquarters on which the cuttings were set. The cuttings were set on the third day (21-09-02) in polybags of dimension 6.25cm x 30cm. The cuttings were treated with IBA solution at 4000g/cm^3.
The pH of some rooting media viz: Mambilla red sub-soil, termitarium, Ijebu-Imosan, Araromi Obu subsoil's were determined using electronic pH meter. However, the cuttings were only set on Mambilla sub-soil and Headquarters sub-soil.
Results: The result of the pH values of some rooting media are given in Table 1, while the performance of the cuttings viz: percentage sprouting, callusing, rooting, height of sprout, volume of root and average root length (primary and secondary roots) is given in Table 2.
The pH values (Table1) fall within the recommendation of 4.5 and 5.5 by CTA (1991) except for termitarium that slightly falls below the lower extreme of 4.5 by 0.1 and Headquarters subsoil 16.2 used for setting the cuttings. The means of all parameters measured are given in Table 2.

Considering the performance of the cuttings of different clones in Mambilla soil, more leaves and rooting were found in clone 33 (9 leaves and 66.7% rooting), however clone 143 had highest root volume (50.7) and root length (17.2cm).

The performance of the clones was similar in terms of percentage callusing and percentage sprouted. In the Headquarters subsoil, the result obtained in terms of volume of rooting and rootslength still-showed that clones 143 and 318 are still the most adaptable clones to the lowland.
Conclusion: From the results obtained from this study, it is still possible to obtain some reasonable level of cutting success in tea in the lowland, particularly the clones 143 and 318. There is however the need to try tea cuttings on sub-soils from other lowland locations viz: Ajassor, Araromi-Obu, Ijebu-Imusan, and on termite mound which has a pH close to that of recommended pH of between 4.5 and 5.5
Constraints: More rooting media from Ijebu axis, Araromi-Obu, Ikorodu, Ajassor etc would have been obtained but for dearth of vehicle and fund to go to the areas.

Table 1

Sub-soil type	**pH**
Mambilla red subsoil	5.3
Ijebu Imosan	5.4
Termitarium	4.4
Araromi Obu	5.2
Headquarters	6.2

Table 2: Mean values for the parameters measured.

Clone Number	No. of Leaves		% Rooted		% of cutting Sprout		% Callused		Root Volume		Root length (cm)		Height of Sprout(cm)	
	Mb	HQ	Mb	HQ	Mb	HQ	Mb	HQ	Mb	HQ	Mb	HQ	Mb	HQ
33	9.60	4.00	66.7	25.0	100	83.3	100	100	16.7	0.0	6.7	0.0	15.8	3.7
357	6.0	5.00	33.3	0.0	66.7	83.3	100	100	26.7	0.0	10.0	0.0	6.0	2.0
318	6.67	4.70	50.0	30.0	75.0	75.0	100	100	15.7	2.0	9.7	2.5	4.3	3.8
143	4.67	6.70	58.3	25.0	100	83.3	100	100	50.7	9.3	17.2	6.7	7.7	12.7

Legend
Mb: Mambilla red subsoil
HQ: Headquarters

STATISTICS, SOCIO-ECONOMIC AND TECHN0-ECONOMIC STUDIES (O. O. Oduwole)
Theme: Adoption, Economic Impact Assessment of CRIN Developed Technologies and Economic Threshold of Crop Production.

Title: Economic Analysis of the productivity of Kolanut farmers in South-Western Nigeria.
(Lawal, J.O and Sanusi ,R.A.)
Background: The fact that farmers have access to all materials and equipment needed for a successful farming does not imply that the productivity of the farmer(s) will be as expected. Quite a number of factors could be responsible for variations in the productivity of farmers. It could be that the farmer refused to adopt modern innovations on the crop he is cultivating, or he is unable to finance such innovation, or it may be socio-economic problems.
Objective: This study was designed to determine the factors that affect the productivity of kola farmers in selected states of Nigeria.
Methodology: The data for the study involved primary data with the use of structured questionnaires. The data collection involved 300 kolanut farmers in the selected states of Nigeria.
Results and Discussion: The questionnaires were constructed but were not distributed due to lack of fund.
Budget Estimate: ₦200,400.00
Fund Released: Nil
Fund Utilised: Nil
Constraint: None release of fund for research.

Theme: Adoption, Economic Impact Assessment of CRIN Developed Technologies and Economic Threshold of Crop Production. (Sanusi, R. A. and Oduwole, O. O.)

Task*:* Socio-economic Impact of Cocoa Powder Cottage Industries in Nigeria.
Background: The need to add value to cocoa especially in the origin countries has now become a matter of priority due to the world cocoa market crisis, in terms of an all-time low cocoa bean pricing, for most part of year 2000. This led to the agreement reached at the 62nd regular meeting of the ICCO held in Geneva, Switzerland in year 2000. The agreement stipulated that the major West African producers (i.e. Cote d' Ivoire, Ghana, Nigeria and Cameroon) should withdraw (and probably destroy) a total of 252,000 tons from the international market as part of an original withholding scheme. Nigeria's portion is 22,000 metric tons.

This need not have happened if the principal cocoa market outlet for Nigerian cocoa is not exportation. There has been little cocoa processing in Nigeria, even though the output of some of the indigenous firms are still semi – processed products such as cocoa butter, cocoa paste, cocoa liquor, etc. Recently the *Cocoa Producers' Alliance* and the *International Cocoa Organisation* have called for cocoa beans processing in countries of origin in addition to finding new market for cocoa. Small/medium scale manufacturing industries developed in the wake of the fever of trade liberalisation that swept through some of the origin countries including Nigeria. Hence, (cocoa) processing will not only assist in rejuvenating the Nigerian cocoa industry but enhance the sustainability of the Nigerian cocoa economy in terms of production, marketing, etc as viable agribusiness ventures need to be investigated, explored and exploited.
Objective: This study is purposely to determine the economics of small/medium scale firms' satcheted instant cocoa beverage.
Methodology: The data for the study involved primary data with the use of structured questionnaires. The data collection involved 150 small/medium scale cocoa processors in the selected states of Nigeria (i.e. Oyo, Lagos, Edo and Ondo).
Results and Discussion: The questionnaires were constructed but a limited number was distributed due to lack of fund. The processors in Ondo State were eventually used as a case study. It was found out that the location of the firms in relation to cocoa cake producing factory is one of the determinants of instant, satcheted cocoa beverage production by small/medium scale firms. Most of the equipment and machines used by the firms are locally fabricated. The study is still in progress.
Budget Estimate: ₦350,000.00
Fund Released: Nil
Fund Utilised: ₦6,600

Constraints: Non- release of fund for research.

Theme: Adoption, Economic Impact Assessment of CRIN Developed Technologies and Economic Threshold of Crop Production.

Tasks: Analysis of Coffee output and Hectarages In selected States of Nigeria
(Mrs. J. O. Lawal)

Introduction: Coffee is one of the leading commodities in international trade. Saudieu, (1996) stated that among the primary commodities produced in and exported from Africa; coffee, apart from petroleum, is the second most important commodity traded between the developed and developing countries.

In Nigeria, the internal marketing of coffee has been largely unorganised and uncoordinated thereby making coffee industry less profitable and unattractive. However, following the crisis that engulfed the world (coffee) market in the 1980's which resulted in supply shortfall (Indian Coffee, 1996), owing to price fluctuation coupled with the trade liberalization of 1986 and the abolition of commodity Marketing Board, there has been decline in output from Nigeria coffee farms. This study therefore examines the trend in coffee output and hectarages.

Objective: To assess the effect of price as a coffee-marketing problem on coffee production in Nigeria

Methodology: The data used in this study were obtained from primary sources. The study covered both major and minor coffee producing states i.e. Kogi, Abia, Taraba, Ondo, Ogun and Oyo States of Nigeria. In Oyo, Ogun and Ekiti States coffee cultivation has been abandoned to such an extent that only a few stands of coffee planted more than 40 years ago can be found on the plots. However, from the survey, there is still a few (part-time) coffee farmers in Abia States and many full -time coffee farmers in Kogi and Taraba States. Data obtained include total farmland available, area put to coffee, volume of output, and prices. Purposive and simple random sampling technique was used and the data were analysed using descriptive statistics.

Result: The survey taken in the years 2000 and 2001 involved about 50 farmers (in sampled states). Statistics from the survey conducted in Kogi, Abia and Taraba States indicated that an average of 14.35, 10.53 and 5.50ha of farmland, respectively was available to the farmers. While and average of 10.31, 4.73 and 2.71 ha, respectively were planted to coffee in the states giving a percentage of 71.85, 44.95 & 49.27% area of the total farmland planted to coffee in the respective states (Table 1). The average output of coffee in the three selected states were 8.62, 3.11, and 2.94 tons respectively (Table 2). The average price per ton was N58, 410; N26, 000; N70, 080, respectively (Table 3).

Kogi State which had the highest amount of land put to coffee had the highest output also. The farmers in Kogi had an encouraging price on the output hence this may have made them to sustain their production over the years and still get a better output. Taraba being the least in terms of area put to coffee had a better price for the produce and this had made them put almost 50% of their land to coffee (Table 1). We can also deduce that the glut in Kogi market caused the drop in price compared with that of Taraba.

Also the difference in output/price in Taraba and Kogi must be due to varietal difference. The Arabica coffee (planted in Taraba) is better priced than the Robusta (of Kogi) in the world market.

In Abia State most farmers abandoned their farms because of the low prices offered for the coffee. This low pricing did not encourage production in the state. Absence of sustainable market and market information is a major problem.

Looking at the percentage change in farmland available and the land put to coffee in Abia state it increased through the years. This is responsible for the continual increase in output from the years 1998 – 2000. (2.22 – 3-83 tons). Also, the price/ton did drop slightly from N27, 000.00 in the previous year, 1998) to N25, 000 in 1999, rising slightly to N26,000 in year 2000.

The rate of change in cultivated farmland also increased with the price and output but the slight drop in price in 1999 caused the drop in the rate of increase in coffee cultivation in Abia, to 60,87% from 109,09% in 1998 (Table 4).

In Taraba, the gradual drop in prices resulted in the drop in output but looking at the rate of change in farmland available it increased from 2.44% to 5.14% which resulted in the increase in coffee land cultivated by 16.46% due to the prevailing price of N75, 790 but as the price continued to drop, the rate of increase on the land use dropped also to 1.41% when the current price dropped down

to N64.380/ton (Tables 3 and 4). From a 1999 census of 271 coffee farmers in Abia State, it was revealed that only 21.75% of farmland is available.

Table 1: Average volume of coffee output, available farmland and area put to Coffee (1998 – 2000)

States	*Vol. Of out-put (ton)*	*Farmland Available (ha*	*Area put to Coffee (ha)*	*% Area put to Coffee*
Kogi	8.62	14.35	10.31	71.85
Abia	3.11	10.53	4.73	44.92
Taraba	2.94	5.50	2.71	49.27

Source: Field Survey, 2000 – 2001

Table 2: Average (yearly) volume of coffee output (tons)

States	*1998*	*1999*	*2000*	*1998 - 2000*
Kogi	10.13	8.78	6.99	8.62
Abia	2.22	3.29	3.83	3.11
Taraba	2.32	3.11	3.38	2.94

Table 3: Average (yearly) Prices of coffee (per ton)

States	1998	1999	2000	1998 – 2000
Kogi	62.06	55.70	57.46	58.41
Abia	27.00	`25.00	26.00	25.00
Taraba	75.79	71.88	64.38	70.68

Source: Field Survey, 2000 – 2002

Table 4: Average Rate of increase / Percentage change in Available farm land and land put to coffee

States		1998 – 1999	1999 – 2000
Kogi	**FL*	2.78	8.81
	**CF*	6.28	5.72
Abia	**FI*	30.77	33.33
	**CF*	109.09	60.87
Taraba	**FL*	2.44	5.14
	**CF*	16.46	1.41

Source: Field survey 2001
*CF - Coffee farm
*FL - Farmland

Task: Effect of Ideal and Un -ideal Weather Conditions on Cocoa Production in Nigeria

(Mrs. M. O. Adejumo)

Introduction: The role of agriculture in the economic and social life of human beings has made the Economic sector a great concern for Government and people no matter the level of development of any society.

Nigeria agricultural scientists are continuously carrying out research on problems of Nigerian agriculture while the government too focuses on agriculture in fiscal and monetary policy pronouncements. Nigerian government and research scientists efforts in sustaining agricultural production can be said to be effective through what can be termed controllable facts such as technology, material inputs, management e.t.c.

However, a single (uncontrollable) factor that can considerable degrade the effect of this is weather. This is because weather characteristics are the major factor influencing variations in crop yield/production, soil Utilisation and conservation and can relegate all other factors especially the social and economic factors into relatively minor positions (Akintola, 1986)

Objectives:

(i) To estimate the influence of climatic variables (rainfall , temperature and relative humidity) on the production of cocoa in the study area.

(ii) To identify the problems that affect cocoa production when there are changes in the climatic elements (rainfall, temperature and relative humidity)

(iii) To determine the effect of ideal and un-ideal weather conditions on the yield of the crops

(iv) To find a way of improving the growth and production of cocoa in Nigeria

Methodology: The data was used for this study were obtained from secondary sources. In decomposing total yield variation into technology and weather effects, so as to quantitatively isolate the magnitude of yield variations arising from weather factors from those arising from trend factors, statistical techniques used to test the hypotheses and analyse the data include multiple correlation analysis, student t- test and Spearmans rank correlation coefficient. Spearman rank correlation coefficient is used here to examine the partial correlation or relationship between each of these climatic variable namely temperature, rainfall and relative humidity and cocoa yield.

Weather variables and cocoa Yield from 1980 to 1990

Year	Total Annual Rainfall (mm)	Yield (No. of Cocoa Pods harvested) (kg)	Mean Annual Temperature (^{o}C)	Mean Annual Relative Humidity(%)
1980	1575	16271	26.08	82.7
1981	957	17559	26.75	72.6
1982	735	15634	26.29	78.0
1983	683	25530	25.04	78.1
1984	1393	40716	24.29	79.1
1985	1447	21874	24.37	78.9
1986	1062	27734	24.79	75.0

1987	1345	27730	2425	72.0
1988	1373	16724	23.58	74.2
1989	1220	20588	24.25	70.0
1990	1569	16026	24.33	74.6

In the light of the objectives of this study, focus would be on the verification of the following assumptions.

(i) No significant relationship between temperature and cocoa yield

(ii) No significant difference between rainfall and cocoa yield

(iii) No significant difference between relative humidity and cocoa yield.

(iv) No significant difference between the climatic variables (i.e. temperature rainfall and relative humidity) on cocoa yield.

Result: From the analysis, it was gathered that the value of correlation between temperature and cocoa yield was 0.483, and since the direction was positive, we say that as the temperature increases, cocoa output increases within the period.

It was gathered that there was a negative correlation between rainfall and cocoa yield as the result shows – 0.207. This implies that heavy rainfall does not favour yield of cocoa.

There is also a positive relationship between relative humidity and cocoa yield as the result, which was 0.492. So we can infer that as the relative humidity increases the cocoa yield increase too. Then from multiple correlation, it showed that there was a strong correlation between climatic variables and cocoa yield.

Task: The Nigerian Cocoa Industry (1958 – 2000): A case for Value - adding for sustainable production. (R. A. Sanusi and K. A Oluyole)

Introduction: Cocoa exports dropped from 22.3% in 1960 to an all time low of 0.7% in the late 1990. (FDA, 1983, FBN, 1999; Anyanwu, 1995). This (drop in export carryings) is not unconnected with the dwindling fortunes of the Nigerian Cocoa in terms of output figures. During the early 1970s, Nigeria was the world's second largest producer of cocoa (Gill and Duffus, 1983). But since then there has been a decline in cocoa production in Nigeria so much that Nigeria now occupies the seventh position in cocoa production (ICCO, 1999). Several reasons were, however advanced for this such as Nigerian crude oil boom of the mid-1970s and other problems that range from biological to environmental, socio-economic and institutional.

Quite a number of measures have been taken over the years by government to improve cash crop sub-sector. One of these measures is stimulation of production through improved marketing of the crops. However, according to Upong (1993), "inspite of these measures, the performance of the sector in terms of production has generally been considered unsatisfactory. In view of the above, the (CPA (1999) and ICCO (2000) recommended increased indigenous consumption/utilisation of cocoa in the origin countries.

Objectives :

1. To determine the extent to which factors such as rainfall, world grindings as well as stock, and price affect Nigerian cocoa production.

2. To give recommendations based on the findings.

Results: Secondary data were collected in respect of cocoa output, export, grindings, rainfall, opening/closing stock and price. The data were collected from the various source for the period (1958 – 2000) under review. These sources included Akintola (1986), CBN Annual Reports (Various issues) FAO (Various issues) Statistical Bulletin of the (defunct) NCB (various issues), Cocoa statistics and Cocoa Market Report of Gill and Duffus (Various issues) FOS (Various issues) and cocoa Growers Bulletin of the ICCO (Various issues).

Data analysis is however in progress. Data interpretation as well as final report writing will be done later.

Title: Cocoa and Its Diversification in a Liberalised Context: A Case Study Of Cross Rivers State, Nigeria. (Obatolu, B .O)

Introduction and Problem Statement:

Farm income of cocoa producers had been nose-diving as a result of falling produce prices, in the international market over the years. This has necessitated some of the farmers to devise some means of coping with the situation.

Incidentally, the production output which increased by as much as 200% globally, even in the face of increased production cost in producer countries like Nigeria presents a dilemma considering the dwindling international price for the primary produce. Costs of domestic cocoa production continues to rise in areas of major inputs such as insecticides and fungicides, costs of processing and also in transportation and storage.

Hence at the domestic level, farmers will desire an opportunity to make higher profits from cocoa production which may undoubtedly lead to an ultimate extinction of some cocoa plots, (D' Almeida,[1] (2002)

Cocoa farms create employment for over 300,000 households in Nigeria (ICCO[2], 2000), hence a dwindling international primary produce price for cocoa will evidently be matched with certain coping strategies by farmers. It is of interest to investigate the nature, scope and length of such coping strategies. Governments and non-govenmental organisations are looking for ways to enhance farmers' income under these several constraints facing the cocoa industry. It is not without doubt that the changing global trend may make some farmers grow other perennial crops like oil - palm, plantain and banana either in furrows or on small plots within cocoa fields. Other farmers might be focusing on exploiting domestic markets or processing cocoa to better bargained secondary products. These methods of diversification of the cocoa industry is the subject of investigation in this research. In order words the research attempts to find out how far these coping strategies have affected cocoa production and or established an equilibrium or dis-equilibrium in the Nigerian cocoa industry.

Objective : The general objective of the study is to determine the level of diversification of cocoa farmers in Nigeria.

The specific objectives are:

i To identify the various Cocoa farmers in terms of diversification and non diversification..
ii. To determine factors influencing the diversification and non-diversification of farms.
iii. To examine the socio-economic characteristics of cocoa Farmers..
iv. To analyse resource cost, returns and levels of profitability for the farmers.
v. Using time series data to analyse revenue changes of the farmers.
vi. To have an overview of marketing trends in the cocoa industry from the producers' perspectives.

Methodology:

The study area: The study was conducted in 1kom in Cross-River state, which is in the south – eastern part of Nigeria. Production of cocoa is centred in 6 local government areas. The vegetation is forest savannah mosaic with a temperature range of 26-33.5 degrees Centigrade and rainfall of about 2,600mm - 3,300mm per annum. The climate is considered to be ideal for cocoa production. The main cocoa harvesting period is between October and March. Land area for cocoa cultivation in Nigeria is estimated at 700,000ha. Cross-Rivers State is the second largest producer of cocoa with a range of 38,000 - 48,000 metric tonnes per annum. Cocoa is however known to be smuggled to neighbouring Cameroun (CRIN[3], 1997, Cocoa Express[4], 2002).

Sources of data and data collection: This study will rely on primary data which will be collected from cocoa farmers, and a rapid rural assessment of the producing communities will be conducted by the research scientist.

Sampling procedure and size: A multi-stage sapling procedure is considered for this study. Purposive sampling is used in picking Ikom LGA in Cross River State which is the principal region of cultivation of cocoa in the State. Four local governments areas(LGA) were selected for the purpose of this study to include (i) 2 high producing(LGA), (ii) 2 medium producing (LGA) communities, (iii) 1 low producing(LGA). A random sampling technique was used to select 110 respondents from the study area, from the list of cocoa farmers registered with the State Agricultural Development Programme office in Ikom.

Data collection: Data were collected with the aid of well structured questionnaires and interview schedules. Information on the following were obtained.

1. Socio-economic data:
2. Production data:
3. Marketing data:

Methods of data analysis: Descriptive statistics such as bar charts, and frequency distribution tables were used to describe the distribution of the respondents based on the socio-economic data obtained.

Correlation analysis were used to investigate the relationship between the product output (cocoa) and the explanatory variables (labour, hectarage cultivated, fertilizer application, chemicals applied and Naira value of miscellaneous expenses).

Results, Findings and Conclusion : Majority of the respondents fell within the age bracket of 51-60 years of age (27%). A majority of the farmers 42%, had secondary school education. Seventy four percent (74%) depended solely on agriculture as their main source of income. Other activities engaged in by some other farmers are business and public servants in the Civil Service.

The predominant type of cocoa cultivation in this area is inter-cropping of cocoa with other perennial and annual crops like citrus trees, kola trees, Palm trees and Plantain/ Banana. Other food crops are maize, cocoa-yam, melon etc. A majority (80%) of the farmers intercropped cocoa.

Over 70% of the farmers got less than N20, 000 a year from other income generating activities. Eighty seven percent (87%) of the farmers have between 1-3 plots of cocoa less than 10HA. Labour on farm was is achieved through assistance of family members and relatives.

Radio ranked highest (in terms of possession compared to television). Knapsack and hand sprayers were available and could be borrowed if in need. Vehicles were scarcely owned (6%), while motor bikes, bicycles and wheelbarrows were common, 50% of farmers spent less than N500 a year in borrowing equipment.

Licensed buying agents were of tremendous benefit to the farmers. They served as sources of credit and provide transport, which carry cocoa beans from farmer's farm to warehouses. Sources of credit available to farmers were Banks, Cooperative and licensed buying agents. 70 % of farmers patronized between 1-2 licensed buying agents, while 76% of the farmers had been patronizing same agent for over 4 years.

Recent trend showed that farmer's income from cocoa had been gradually increasing in recent years with a few farmers revenue entering the N100, 000 – N200, 000/year bracket. Constraints of farming mentioned were high cost of labour, chemicals, fertilizer and lack of high yield seedlings.

Correlation analysis tested significant for the following;

i. Access to credit and farm size

ii. Access to credit and Local Government Area

iii. Household size and workforce

iv. Household size and Sons working on farm

v. Household size and Daughters working on farm

vi. Household size and Mothers working on farm

Other correlation results such as the following showed no significant relationship

i. Revenue and amount spent on borrowing equipment.

ii. Amount paid on hiring equipment and farm size

iii. Education and Revenue

iv. Access to credit and Revenue.

The recent development in the cocoa industry is experiencing an unprecedented hike in revenue as never experienced in 14 years, which has rekindled the hope of cocoa farmers who intend to cash in on the opportunity. Family labour has constituted a readily available source of labour.

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EXTENSION PROGRAMME

Task: Assessment of Awareness and Adoption Level of Cocoa Farmers on CRIN By-Product Technologies In Oluyole Local Government Area of Oyo State (Adeogun, S. O., Oluyole, K.A., Idris, N.)

Introduction: The adoption of developed technologies by end-users (farmers or industrialists) would be determined by the farmers' level of awareness of such technologies. Cocoa Research Institute of Nigeria (CRIN) one of the research Institutes in Nigeria mandated to develop innovations capable of promoting agricultural development in the country has developed different types of technologies meant to enhance the income status of the end- users of such technologies. These technologies include.

(a) The use of kola testa as the feeding stuff for snail.
(b) The use of cocoa pod husk in soap production.
(c) The use of cocoa and cashew in wine and juice production.
(d) Use of cocoa pod husk in livestock feed production.

This study aims at determining the level of awareness and adoption of these technologies by farmers and industrialists in the Local Government where the Headquarters of the Institute is located. The study showed that all the respondents were aware of CRINs existence but not all were aware of the technologies developed by the Institute.

Objective:

1. To determine the personal characteristics of the respondents
2. To ascertain the level of awareness of the respondents towards CRIN- developed technologies.
3. To determine the respondent's sources of information.
4. To identify the respondent's level of adoption of CRIN - developed technologies.

Methodology:

The respondents of this study were cocoa farmers who are members of Cocoa Farmers Association of Nigeria (CFAN) in Oluyole Local Government area. The association spread across 10 wards having registered 298 members . From this number, 60 farmers (about 20%) were randomly selected from the total number of 298 members. From each ward 6 farmers were randomly selected and administered with well-structured questionnaire to obtain the information for the study.

Result and Findings:

Personal Characteristics of the Respondents:

The result revealed that most of the respondents (about 59%) were in their middle age i.e. 41 – 60 years while 25% were above 60 years. All the respondents of the study were males. Majority of the respondents about 67% had more than 10 children, the remaining 21% had between 1 – 5 children, 53.3% of the respondents had more than one wife while the remaining 46.7% had only one wife. On the issue of religion, 60% were Christians, 33.3% were Muslims while the remaining 6.7% have been in the business for over 60 years. Majority of the farmers (63.3%) claimed to have between 1 –5 hectares of land, 10% had more than 5 hectares while the remaining 26.7% had less than 1 hectare.

Level Of Awareness: From the study, 96.7% claimed to be aware of CRIN's developed technologies, while 3.3% claimed ignorance of CRIN's developed technologies. On the specific technologies developed by CRIN known to the farmers, farmers' awareness score of use for kola testa as snail feeding stuff were very low i.e. 2.6% the highest was cocoa pod husk for livestock feed (38.3%) followed by cocoa pod husk for soap production 33.3% while cashew and cocoa for wine and juice production scored 26.1%. The total number of score was more than 60 because most farmers were aware of more than one technology.

Level of Adoption:
30.7% claimed not to have adopted any of the technologies, 36% had adopted only one technology, 20% had adopted more than one technology while the remaining 13.3% had adopted more than two technologies.

Sources of Information: Majority of farmers, 41% and 28.3%, claimed to have obtained information through other farmers and the cocoa Farmers' Association, respectively. The remaining 25% and 3% claimed the sources of their information to be CRIN's staff and mass media, respectively. No farmer claimed to have obtained information from ADP Extension agents.

Problems in Cocoa Production: Majority of the farmers identified ageing of cocoa farms as their major problem; this was closely followed by inadequate input provision and inadequate labour on the farms. Other problems identified included inadequate credit facilities, poor linkage with CRIN's researchers and non-availability of incentives to farmers.

Constraints : The study was limited to Oluyole Local Government because fund was not provided for the study by the Institute.

Conclusion And Recommendations:

Research development becomes irrelevant if it is not transferred and adopted by the end users of such technologies. Although majority of the respondents were aware of CRIN's developed technologies, the adoption level was somehow low most especially the use of kola testa as snail feeding stuff.

Recommendations:

1. The extension arm of the Institute should be provided with adequate facilities for effective transfer of the Institute's developed technologies in collaboration with ADP extension agents.
2. Farmers' association or co-operative societies should be encouraged to have good working relationship with CRIN's researchers for easy dissemination of developed innovations.
3. CRIN should continue the use of mass media such as radio to intimate farmers of the institute's activities

Theme: The assessment of CRIN Mandate crops on the crops' stakeholders (S. O. Ajani, S. O. Adeogun)

Task: Analysis of women's activities, in Tea growing regions of Nigeria.

Introduction: Gender differences were viewed in the past as one of the contributors to the low production in Agriculture. Women are not seen as individual contributors to development of Agriculture, but as a subsidiary of their husband and this has had a long term effect on per capita income of the people and consequently affect Gross Domestic Products of our nation (Nigeria.).

This research work was aimed at knowing the activities of women in tea growing regions of Nigeria where tea cultivation was knows as the major activity.

Objectives :

1. To identify the roles played by Women in Tea growing regions
2. To identify the effect of growing tea in their life.

Methodology : The population of the study is women of Mambilla Plateau where tea is mainly cultivated. Structured interview schedule was the main instrument that was used for collection of data from respondents which were randomly selected in the growing region Descriptive statistics such as percentage, frequency distribution and mean were used to analyze the data.

Result/ Finding

Table I: Ownership Of Land & Property

Type of Ownership	**Freq.**	**Percentage**
Inherited	36	90
Purchased	2	5
Borrowed	1	2.5
Rented	1	2.5
TOTAL	40	100

The findings in Table I one revealed that, women in Tea growing region inherited the land on which they farm and such is controlled by their husband. Few of the respondents (5%) purchased the land, while very few respondents rented their farmland. Majority of the respondents used the land for multi-purpose activities such as growing other food crops and animal husbandry which fetch them additional income. Due to low income of the respondents, very few of them possessed few properties which showed their level of poverty.

Table II: Farming Activities :

Farm activities	Frequency	Percentage
Planting	40	100
Weeding	36	90
Harvesting	40	100
Processing	40	100
Soil conservation	5	12.5

Multiple Responses : Table II revealed that, as peasant farmers, most of the farm activities such as planting, weeding, harvesting and processing of Tea leaves as well as other crops were performed by the respondent and other members of the family, only that their husband helped in supervising these activities.

Domestic Activities :

Table III			**Table IV**		
Cooking	Freq.	Percentage	Firewood	Freq.	Percentage
1. Yourself	35	87.5	Your self	2	5.0
2. Your husband	-	-	Your husband	31	77..5
3. Your house maid	2	5	Your house maid	1	2.5
4. Your daughters	2	5	Yours daughters	1	2.5
5. Yours Sons	-	5	Your Sons	-	-
6. Your self and House maid	1		Your self & house maid	5	12..5
Total	40	100		40	100

Table III revealed that Domestic activities such as cooking are performed by the respondents themselves. Only in some cases their housemaid and daughters assisted them. Water is provided in the same manner.

Table IV showed that the husband and housemaid provided fuel woods. Payments of household bills such as Rent, Taxes, School fees, Wages of House helps, hired farm labourers were taken care of by their husbands.

Type of Animals Kept

Table (V)

Type of Animals	**Freq.**	**Percentage**
Cattle	24	60
Sheep & Goats	38	95
Poultry	40	100

Multiple Responses : Table V of the findings revealed that keeping of poultry, cattle, sheep and goats is a common practice by the respondents. The system of rearing is both semi range and free range systems which lessen the cost of production as Animals are fed on food remna nts (left over) and grasses.

Conclusion Women were not deprived of the right to have their own farm as their husband readily made land available to them as requested.

Women have contributed immensely to the development of Agriculture in Mambilla plateau as majority of them grow tea, other arable crops and keep animals. Poor financial condition of the respondents did not afford them the opportunity of going into commercial production. The ability to get loans from financial institution did not yield results.

Extension agents do not pay constant visit to the respondent and do not afford them the opportunity to adopt innovation technology.

Recommendations : Extension services need to be intensified for proper dissemination of improved technology thereby creating ways for adoption .

Theme: Review of Annual Reports (Uwagboe, E. O. , Adeogun, S. O.)

Task: Review for Two Decades (1981 – 2000).

Introduction: Agricultural Research Institutes in Nigeria were developed with mandate to develop innovations meant to move agricultural production forward in the Country.

One of such Institutes is the Cocoa Research Institute of Nigeria whose mandate covers cocoa, Kola, Cashew, Coffee and Tea. This study was carried out to review the annual reports submitted by the Institute's researchers between 1981 and year 2000.

The result of the study showed that more works were done between 1981 and 1990 compared to the period between 1991 and year 2000, this could be attributed to shortage of fund for research work. It was also discovered that extensionist were not involved in research work within this period. According to O. O. Oduwole and R. A. Sanusi (Annual Report, 1999) above 90% of the respondents were not aware of the CRIN developed products and quality assessment could not be verified since most of the products are not yet in the market and no samples were given for evaluation. This problem could be attributed to the non-involvement of extension specialists in the development and transfer of research findings in the Institute.

Objectives: (i) To determine the number of research works carried out within the period and annually.

(ii) To examine the discipline of researchers involved in the research works carried out within the period.

(iii) To ascertain the involvement of extension personnel in research work carried out in the institute between 1981 – 2000

Methodology: Nine (9) and Five (5) Annual Reports out of 20 were available for (1981 – 1990) and (1991 – 2000), respectively at the time of this review.

Procedure: (1) The review was based on, the year, research programmes, research projects, number of projects, research discipline, and names

(2) Tables, bar charts and percentage % were used for analysis

Results/ Findings: The results revealed that in the first decade (1981 – 1990) a total of 188 research projects were executed with the highest projects of 25 executed in 1989 while in the second decade (1991 – 2000) the highest projects of 40 were executed in 1999. The lowest of 17 and 18 were done in 1988 and, 1995 & 1996 respectively.

For the research projects, Plant Breeders had the highest involvement with 21.37% and 24.18% and the lowest of 0.00% for extensionists who were not involved in the first and second decades respectively. (Table II and V attached).

For the research projects executed in the 7 and 9 programmes of first and second decades respectively, Cocoa programme had highest research projects of 52 and 30 out of 188 and 124 research projects executed in the first and second decades, respectively while the lowest projects of 0 and 3 were executed in first and second decades in Extension which only existed as a programme in 1999.

Conclusion: Based on the findings of the review, fund inadequacy reduced research work in the period of study. Government should make effort to provide enough fund for research Institutes to be effective. Secondly, the report shows that majority of the technologies developed were not effectively transferred since Extension Division of the Institute was not involved in research work during the period of the study. It is therefore advisable that the Institute should make effort to involve Extension specialists in the transfer of technologies developed in the Institute for effective transfer.

(Bar chart and Tables I – IV on another file)

Table V: Researchers involvement in the various project for the period 1991 – 2000

RESEACHERS	Agr.	Sch.	Ent.	Pbr.	Ppa.	Eco.	Bch.	Ext.	Total
Number of Involvement	19	22	23	37	21	11	20	-	276
Percentage Involvement	12.42	14.38	15.03	24.18	13.72	7.20	13.07	0.00	100

Agr = Agronomy, Sch = Soil Chemistry, Ent = Entomology, Pbr = Plant Breeding
Ppa = Plant Pathology, Eco = Economics, Bch = Biochemistry, Ext = Extension.

From the above illustration (Table V) the highest Researchers involvement of 24.37% was Plant Breeders while the lowest of 7.20% was by Economists. The 0.00% by Extensionist signifies their non -involvement.

Table VI: Researcher projects in the various programmes for the period 1991 – 2000

PROGRAMMES	Co	Ko	Cf	Ca	Te	Cp	Fs	Ex	Sst	Total
Projects	30	15	18	14	13	22	5	3	4	124
Percentage	24.19	12.10	14.52	11.29	10.48	17.74	4.03	2.42	3.23	100

Co = Cocoa, Ko = Kola, Cf = Coffee, Ca = Cashew, Te = Tea, Cp = Crop Processing, Fs = Farming System, Ex = Extension Sst = Statistics and Socio Techno economics.

From the above illustration (Table VI) the highest projects of 30 with 24.19% were executed in projects by Cocoa programme while the lowest of 3 projects were done in Extension.

Task: **Preliminary Investigation Into Coffee Coppicing Technology Transfer In Kabba, Kogi State (**Agbongiarhuoyi E. A. And Oduwole O.O**)**

Introduction : The acceleration of the growth rate in the agricultural sector and its diversification is dependent on research focused on the development, dissemination, adoption and use of modern agricultural technologies (Ekpere, 1994).

After a careful literature search on coffee rehabilitation through coppicing technology, which was developed by CRIN over 20 years ago, it was observed that efforts have been made in transferring this innovation to the end-users. Hence, the need to investigate the extent of transfer and adoption. The components of coffee coppicing technology as recorded in CRIN Annual reports and coffee production Technology Transfer workshop are:

(i) Stem height of 30cm above ground level.
(ii) Retaining of four vigorous shoots per tree.
(iii) Painting with red paint after cutting.
(iv) Use of sharp cutlass or chain saw.
(v) Fast growth of new flushes, fruiting among others.

References

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Objective : The objectives of the study are to estimate the number of adopters and non-adopters of coppicing technology; describe coffee farmers socio-economic characteristics; determine the components of coffee coppicing technology and ascertain the constraints affecting the practices of coppicing technique by farmers.

Methodology : Visit and interaction with the main coffee growers in Kabba, Kogi State was undertaken in November 2002 for a preliminary field test. Forty questionnaires were administered in Kabba Bunu Local Government Area, only 20 have been returned as at the time of writing this report. Further work will continue when the remaining questionnaires are received. The results are discussed using frequency count, tables, percentages and average.

Findings And Observations : The findings of the few respondents so far, on coffee coppicing technology, show that:

i. Information sources and transfer of coppicing technique from CRIN Officers and ADP was low. Most farmers learnt coppicing practice from past parents and friends while 85% of them were not involved in the Kabba training workshop organized by Cocoa Research Institute of Nigeria (Table (2).

ii. Seventy percent of adopters and non-adopters are of average age of 40 – 59 years. Seventy – five percent had 16 – 43 years of coffee farming experience. (Table 1). All the respondents are married with 90% being males. The farmers seems to be enlightened since up to 50% claimed to have tertiary education (Table 1).

iii. Eighty-five percent of farmers were not visited by extension agents (Table 2). 56.3% of adopters coppiced because of old age and low productivity of coffee trees. (Table 2).

iv. Sixty-two percent of coppicing adopters adopted without proper understanding of the underlying principles and components of the technique.

v. Poor Marketing, inadequate inputs, weak link between researchers and farmers, poor farm access roads, high labour cost and lack of finance ranked among the very serious constraints facing coffee coppicing adopters.

vi. All the respondents claimed to be aware of coppicing technology but only 4 out of the 20 did not adopt due to risk, no follow up visit and fear of cutting down their old coffee trees. Also, none of the adopters used Red paint after coppicing, which could be attributed to high, cost of purchase and application.

Recommendations: Based on the aforementioned findings and observations, the following recommendations are made:

(a) All perfected technologies developed by CRIN especially coppicing should be disseminated by the Extension unit of the Institute in collaboration with the Scientists, ADP supported with Radio announcement for efficient linkage and practice by farmers.

(b) Involvement of most farmers via National coffee and Tea Association of Nigeria (NACOFTAN) and cooperatives in the organization of training workshop by CRIN Researchers. It should also involve Extension agents who will in turn train other larger farmers' population so as to ensure adequate coverage.

(c) Nationwide rehabilitation of coffee plots through coppicing in coffee producing States, should be encouraged by the three tiers of Government to revive old unproductive trees.

(d) Industrialists and CRIN should be supported by Philanthropists, NGOs and Government to establish Coffee industries for local processing and utilization which could strengthen marketing.

(e) Subsidization of farm inputs by the Federal Government and granting of soft loans by the Nigerian Agricultural Cooperative and Rural Development Bank (NACRDB) could ameliorate farmers' constraints. Also, to reduce high labour cost, Local Government should rehabilitate farm roads for easy accessibility.

Table 1: Socio-Economic Characteristics of Coffee Farmers

Characteristics	Frequencies	Percentage
Total No of Respondents	20	100.00
Age (Years)		
40 –49	7	35.00
50 – 59	7	35.00
60 – 69	5	25.00
70 – 79	1	5.00
Sex		
Male	18	90.00
Female	2	10.00
Marital Status		
Married	20	100.00
Single	-	-
Divorced	-	-
Widowed	-	-
Educational Level		
No Formal Education	6	30.00
Secondary	-	-
Primary	4	20.00
Tertiary	10	50.00
Adult Education	-	-
Years of Farming		
2 –15	3	15.00
16 – 29	7	35.00
30 – 43	8	40.00
44 - 57	2	10.00

Source: Field Survey Data (2002)

Table 2: Information Sources, Linkage and Coppicing Components

SOURCES			**COMPONENT PRACTICE**		
Adopters and Non-Adopters				**Adopters Only**	
Sources & Linkage	**Frequencies**	**Percentage**	**Stem Ht**	**Frequencies**	**Percentage**
CRIN Officers	5	25.00	30cm	1	6.25
Ext. Agent (ADP)	2	10.00	40cm	7	43.75
Radio	-	-	Did not measure	8	50.00
Friends/Relatives	5	25.00	Total	16	100
Others	8	40.00	Shoots No. Retained		
Total	20	100			
Ext. Visit					
Visited	3	15.00	2	1	6.25
Not Visited	17	85.00	4	8	50.00
Total	20	100.00	5	3	18.75
			Did not Count	4	25.00
Coppicing Learning			Total	16	100
Kabba Training Workshop	3	15.00	**Reasons for coppicing**		
Coop. Society	3	15.00	Long stem, Ht. & Age	3	18.75
Contact Farmer	4	20.00	Diseases, Pests & Age	4	25.00
Parents/Friends	9	45.00	Low Productivity & Age	9	56.25
Total	20	100.00	Total	16	100.00

Source: Field Survey Data (2002)

Conclusion : The successful transfer of coffee coppicing technology requires good information sources and linkage with farmers, active participation, adoption, proper use of package components and sustainability. Further work continues when the remaining questionnaires are received .

Constraints :

I. Lack of fund hampered the administration of questionnaires in Kabba, Kogi State and the work could not be completed.
II. Transportation and accommodation difficulty to and within study area.
III. Lack of stationeries and typing problem

The progress made so far in this work was from personal purse.

Title: Cocoa Rehabilitation for Improved Employment and Revenue Generation in Nigeria
(B.O Obatolu)

Introduction: Cocoa production in Nigeria dates back to the early 1900's and began to attain the status of a national crop in the early 1930's and 1940's as it was found to be ecologically suitable to

the south-western Nigeria; mainly Ondo, Osun, Ekiti, Ogun and Oyo States. Nigeria at this period was the second largest producer of cocoa beans in Africa (Ojo 2001) in the late 1960's and early 1970's. However, the trend in recent years has not been the same. In the early 1970's, Nigeria could boast of over 300,000 metric tonnes production per year, but most recently Nigerians production lies between 160,000-200,000 metric tonnes per year (Adeyemi 2000). The fall in general output of production ranges from neglect of the cocoa industry by farmers, ageing trees, loss of fertility of soils, pests and diseases, low domestic utilisation, inadequate infrastructure and insufficient and inappropriate government policy for the cocoa industry.

Domestic level:

Rehabilitation techniques of old cocoa farm boarders around;

I Complete farm replanting
ii. Phased farm Replanting
iii. Selective replanting
iv. Growing young cocoa under old cocoa trees
v. Chupon Regeneration
vi. Improved Chupon regeneration
vii. Use of cover and shade crops for young cocoa plots
viii. Effective use of fertilizers
ix. Pests and disease control

The Federal Government and Cocoa Rehabilitation:

Past and Present: The federal government in the past had made deliberate attempts to rehabilitate cocoa production. In the first national development plan (1962-68) only 16% of targeted rehabilitation was achieved. In 1972 the Cocoa Developments Units (CDU) became operational but later it had some peculiar problems. Ajobo (1979) however identified that though the government efforts were to be praised, some of the problems of the CDU included the following;

i. The Programme covered limited number of farmers, and those included in the programme were associated with the co-operatives involvement, which is 5% of estimated 700,000 farmers.
ii. Lack of physical structures and infrastructural facilities.
iii. Wide geographical spread of old cocoa farms.
iv. Inadequate technical staff and equipment shortage
v. Cocoa seedlings do not readily establish in soils carrying old and unproductive cocoa trees.
vi. Many of the elderly cocoa farmers are retiring from the farm without replacement by younger people which could be attributed to urban drift of rural youths and also poor international price for the primary produce.

The federal government in 2000 established the National Cocoa Development Commission which was charged with the responsibility of revamping the cocoa economy (CAN, 2002). It was to operate under a counterpart funding of the Federal Government, Cocoa producing States, Local Governments, and the Cocoa Association of Nigeria. The estimated budget for this programme was N1.3 billion .In 2002, the federal Government succeeded in earmarking N13.3m for rehabilitation of cocoa seed gardens across cocoa producing states (13 of 14 producing states). In addition to this, the federal government earmarked 221 million Naira for the purchase of chemicals and fertilizers to be supplied to farmers at subsidised rates. The federal government has supplied chemicals at a subsidised rate of 50% and fertilizers at 25%. Cutlasses have also been purchased and are to be supplied to farmers. The effects of this recent attempt may not be evident until year 2003.

The Way Forward :

An increase in the production of cocoa output should not be seen as the ultimate goal of a rehabilitation programme, but rather it should be for the improvement of the income generation both to farmers and also to the National economy. Cocoa development does not exist in isolation of other sub-sectors of the national agricultural economy. Government's effort should go beyond input provision to looking for avenues to add value to the produce, which lies mainly on processing of cocoa to other secondary products. It is unlikely that developing countries will assist our domestic

production and processing initiatives by providing grants and technology assistance to a point where we will compete with their local industries. Policies should be put in place that will encourage a ratio of export of produce of secondary products, which is not often affected by price fluctuation in the international market. Hence, cocoa producers need to understand that an increase in production of the primary produce may not necessarily imply a general increase in revenue if world price of the primary produce continues to fall.

The need for an increased rate of use of cocoa produce domestically cannot be over emphasised. There is a need to create an awareness on the benefits of the by-products of cocoa domestically ranging from its use in creams, wines and confectionery and thereby promote increased domestic demand which can be a succour to the risk of falling international price, "Aloe Vera" is enjoying an unprecedented media coverage at the moment, and also patronage as never before in Nigeria. Cocoa products too should be given such media coverage especially regarding its health benefits.

Cocoa is still a crop, which has no close substitute. Crude oil as a source of energy has many substitutes and is a limiting and non-renewable resource. The earlier we began to harness the potentials in the cocoa trade the better for Nigeria. The alliance of cocoa producing countries should come together to work out a feasible plan on how to achieve better prices for its cocoa at the international market, either by cutting down production, increasing national reserves or finding new markets.

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CROP PROCESSING AND UTILIZATION PROGRAMME

(Leader: O.Olubamiwa)

Task Production and evaluation of cashew apple yogurt (Aroyeun, S.O.)

Introduction: Cashew apple has been rated foremost among the native fruits and large heaps are seen in the local market during the season (Akinwale, 2000). As a result of the glut during the season, cashew apples eventually become wasted due to lack of good preservation technique.

However, utilization of the apple in the production of other foods can be considered appropriate in increasing the technique of preservation.

Objectives (i) To find a way of increasing the utilization of cashew apples apart from consumption in the raw form

(ii) To enhance the vitamin C. status of yogurt

(iii) To evaluate the organoleptic quality of the yogurt produced

Methodology: Yogurt was produced according to Karleskind et al. 1991. Cashew apples obtained from experimental plots of Cocoa Research Institute of Nigeria Ibadan were extracted using a juice extractor and juice samples were sieved using a clean muslin cloth and reserved for the experiment. The cashew apple juice was added at 50% v/v. Analyses carried out included pH, TTA (Titratable Acidity), SSC (soluble solid content) Specific Gravity and Vitamin C. Sensory Evaluation was also carried out using 12 regular Tasters drawn from CRIN.

Result:

Table 1 Sensory Score for Ordinary Yogurt (OY) and Cashew apple based yogurt (CABY)

Sample	Taste	Texture	Flavour	Overall Acceptability
CABY	5.21a	5.33a	4.60a	6.81a
OY	4.27b	5.36a	4.00b	6.00b

Table 2: Physicochemical Characteristics of yogurt samples produced

Sample	SG	SSC	FAT	PROT.	MOIST	ASH	VIT.C
CABY	1.023a	20a	3.20b	3.22b	77.0a	0.84a	53.70c
OY	1.0145a	18b	5.80a	5.27a	70.1b	0.78a	14.10b

a,b… means along the same vertical column with different subscript are significantly different at $P<0.05$

Constraints: (1) Erratic electricity supply (2) Inadequate funds

Theme: Utilization of cocoa by-products in main briquettes (Ajao, A.A.)

Task: Studies on the use of cocoa leaves in making briquettes

Introduction: Cocoa leaves are always abundantly available in cocoa plantations. These leaves can be used to make briquettes, which are used as fuel or as holding stands for glass wares. Cocoa leaves are suitable for making briquettes because they contain lignin.

Objective: Study was aimed at looking into the possibility of making briquettes from cocoa leaves

Methodology: The hydraulic press machine to be used in making the briquettes is still under going design. The designing of the machine is being done in conjunction with the Engineering group of the Institute.

Results: The experiment is still in progress

Constraints: Non availability of fund.

Theme: Development and Quality Improvement of cashew juice to meet NAFDAC Standard. (Igninadolor, R.O, Jayeola, C.O.).

Task: Microbiological study of cashew juice

Introduction: Cashew apple is grossly under utilized in Nigeria. It is consumed fresh to a limited extent because it is a climacteric fruit which shows prominent increase in respiration coincident with

ripening. It reaches the respiratory peak very fast due to large amount of ethylene being produced in concomitant with evolution of aromatic colatices resulting to its spoilage. This eventually causes wastage of the apples resulting in a glut during the peak-season.

Cashew juice from the apple is highly rich in vitamin C but it is faced with the problem of high microbial load, which ultimately results to spoilage that is dangerous to health when consumed.

In order to device an appropriate method of cashew juice development and quality improvement, a knowledge of the microbial load of the cashew juice will be a guide to arrive at a sound judgement.

Objectives;(1) To produce a high quality cashew juice with longer shelf-life that would be commercially and nutritionally acceptable to consumers

(2) To eliminate the seasonal glut associated with cashew apple

(3) To reduce deficiency diseases associated with lack of vitamin C

Methodology: Cashew juice was produced according to the method of Akinwale, 2000 Matured (ripened) cashew apples obtained from experimental plots of Cocoa Research Institute of Nigeria Ibadan were sorted, washed and the juice extracted using the juice extractor. However, some portions were steamed before the extraction in order to reduce the astringent taste and then sieved with a muslin cloth to obtain a clean liquid, the under listed treatments were applied to the juice as shown in Table I after which some microbiological analyses were carried out.

Table 1: Various treatments applied to cashew juice prior to analyses

Samples	Treatments
A	Cashew apples blanched before extraction, pasteurized and bottled. No preservative added
B	Cashew apples blanched before extraction, pasteurized and bottled. A preservative (Sodium Benzoate added)
C	Juice pasteurized, No blanched and preservatives were added
D	No blanching, No pasteurization and No preservatives
E	Juice pasteurized, No blanching and No preservative

Results: The microbiological results obtained so far showed that fungi are the sole organisms that cause spoilage in the juice as no bacterial growth was recorded. The fungi are *Penicillium, Curvularia, Aspergillus* and *Fusarium*. There was also a change in pH. However, the experiment is still on-going.

Constraints: Lack of fund has been the major constraint.

THEME: Utilization of kola by-products in livestock feeding **(Hamzat R. A)**

Task: Use of kola testa in snail diets

Introduction: Kola testa, a by-product of kola plantation is one of such by-products that have been reported to have a fairly good chemical composition and is abundantly available for livestock feeding. Preliminary studies have shown that edible snails relish (like) feeding on kola testa.

Objectives: This study was aimed at assessing the nutritional quality of snails fed on dried kola nut testa (DKT) and palm kernel cake (PKC) mixture in feeding African giant land snails *(Archachatina marginata).*

Methodology: Seventy-two (72) growing African land snails with weight ranging between 175g and 208g were used for this experiment. Four experimental diets were formulated such that diet A (the control) contained 100% fresh pawpaw leaves; diet B, contained 75% DKT; 25%PKC; diet C contained 50% DKT; 50%PKC while diet D contained 25%DKT; 75%PKC. Each experimental diet contained 18 snails, which was replicated thrice with 6 snails per replicate in a completely randomized design.

Results: The result of performance were ranked in this order: B>C>D>A.

Constraints: - Fund was not released and
No Labourers

Theme: Development of cocoa-based confectioneries as a method of increasing the local utilization and consumption of cocoa in Nigeria. (Jayeola, C.O. ,Mokwunye F.C.)

Introduction: Nigeria is one of the largest producers of cocoa in the world. Most of the cocoa is exported in the raw form, while chocolate and cocoa beverages are imported back into the country.

These imported products are only consumed by the high socio-economic class of the society that has acquired the foreign food habits and who can also afford the products.

Recently, local utilization of cocoa powder has been limited to cocoa beverage production only.

Objectives: To increase the consumption of cocoa products in Nigeria by incorporating cocoa powder into local and every home confectioneries. To reduce the effects of glut in the supply and unstable price of cocoa in the world market.

Methodology: Cocoa powder was incorporated into wheat flour at 5% level for the production of cocoa biscuits, cocoa pie and cocoa cake. The normal recipes for the production of these confectioneries were critically followed. Analyses were only carried out on cocoa biscuits.

Results: The sensory evaluation results of the products revealed that the products are acceptable. The protein analysis revealed that there is an increase in the protein level of the cocoa-fortified product. Other analyses are still on going. Attempts are also being made to incorporate kola and coffee powder into Biscuits.

Constraints: Funds and power supply were not available.

Theme: Cocoa Powder Supplement In Yogurt Production(Jayeola, C. O., Yahaya, L.E. And Igbinadolor, R.O.)

Introduction: Yogurt is fermented milk product produced by the application of mixed cultures of *Lactobacillus bulgarius* and *Streptococcus thermophilus* at a temperature range of 43^{o}C until the required acidity and pH are reached.

Yogurt has been shown to have a lot of antibiotic effect and reduces incidence of lactose intolerance and gaseous intestinal illness. Inclusion of cocoa powder into yogurt production contributed to the pleasant flavour and chocolate colour of the product.

Objectives:To impart chocolate flavour and colour into yogurt production.

- To increase utilization of cocoa in the producing countries.

Methodology: Experimental yogurt was prepared by the methods of Karleskind *et al* (1991) with little modification. Chemical Analysis was determined according to AOAC (1990).

Result: The results revealed that the formulated chocolate yogurt has pH of 4.23, specific gravity of 1.0426, fat 3.64, protein 6.82 and ash 1.22. The organoleptic appreciation revealed that preference was given to the chocolate yogurt for its unique colour and flavour.

Task: Production of antibacterial liquid detergent from kola pod husk and cashew nut shell liquid. (Yahaya, L.E)

Introduction: Cashew nut shell liquid (CNSL) is a polyphenol obtained from the pericarp of the nut of cashew apple. This liquid has been found to be of high industrial value such as in brake lining ,anticorrosion and antibacterial. Not much work has been carried out on its antibacterial property. Effort was therefore geared towards formulating a liquid detergent that has dual functions namely: antibacterial property and cleansing property using cashew nut shell liquid and a base obtained from the husk of *Cola nitida*.

Objectives: To replace the conventional potash with that obtained from kola pod husk (KPH).

- To encourage the use of both KPH and cashew nut shell liquid
- To produce products that compete favorably with similar products in the market, hence serving as source of income to the nation.

Methodology: The antibacterial liquid detergent was produced using standard method as described by AOAC 1990 with slight modification. Analyses carried out were microbiological. The concentrations of the test organisms were measured through the minimum Inhibition Concentration (MICs).

Result: The minimum inhibition concentrations (MICs) were measured for some selected test organisms viz; *K. pneumoniae, P.aeuroginosa, E. coli* and *S.aureus*. While *K. pneumonine* and *E. coli* were most susceptible to the formulation at 10%(v/v), *P. aeroginosa* and *S.aureus* were susceptible at 8%(v/v).

The contact time studied revealed that even at concentration 12%(v/v), there was no visible increase in the inhibition zone for the test organisms, hence alluding to the fact that different disinfecting agents work best at different concentrations. The study also revealed that at 1%(v/v), there was noticeable effect of the modified liquid soap on the different test organisms hence its ability to serve a disinfecting function.

Constrant: Electricity failure most of the time and inadequate fund.

Theme: Nutritional composition of non-conventional chocolate products in the tropics (Ogunwolu, S.O.)
Task: To evaluate the nutritional composition of non-conventional chocolate products in the tropics and compared them with the standard milk chocolate
Introduction: In order to increase the general eating habit of chocolate products in the tropics, and also increase the local utilization and consumption of cocoa beans in the producing countries, other tropical crops had been incorporated into chocolate recipe to develop some chocolate products; Oguntuga and Williams (1977). Ojeh and Williams (1978), Ojeh (1979), Ojeh and Falomo (1983) and Akinwale and Aina (2000). The nutritional composition of these non-conventional chocolate products in the tropics; kola chocolate, cashew chocolate and coffee chocolate were carried out and compared with that of standard milk chocolate.
Objective: To ascertain that, the non-conventional chocolate products are not inferior to the standard milk chocolate in terms of the nutritional composition.
Methodology: Nutritional Composition of the non-conventional chocolate products and standard milk chocolate were carried out. Moisture content and fat contents were determined as described by Peakson (1980). The AOAC (1980) method was used for the determination of total ash, minerals, crude protein content and digestible carbohydrates and caffeine content. Calorific value was estimated by multiplying the proportions of protein, fat and digestible carbohydrate by their physiological fuel values of 4,9 and 4kcal/g respectively and taking the sum of the products. The nutritional compositions of the non-conventional chocolate products were then compared with that of standard milk chocolate.
Results/Findings and Conclusion: The protein content of these non-conventional chocolate products was found to compare favorably with that of standard milk chocolate. In terms of individual mineral content, coffee chocolate had highest potassium, calcium and magnesium which implies that coffee chocolate could be a better source of these minerals compared to the standard milk chocolate. Kola chocolate had higher calorific value than the standard milk chocolate. Also, coffee and kola chocolates were found to contain caffeine, which is the stimulant.

It can be concluded that, the non-conventional chocolates are as nourishing as the conventional milk chocolate.

Theme: Preservative effects of *Aframomum melegueta* and *Aframomum danielli* on the storage stability of cashew juice. (Ogunwolu, S.O.)
Task: To preserve the cashew juice by the use of spices as an alternative to chemical preservative.
Introduction: Due to the myriad of problems associated with the use of chemical preservatives, alternative preservatives are needed which possess antimicrobial properties as chemical preservative. Spices like *Aframomum melegueta* and *Aframomum danielli* are examples of those alternative preservatives according to Dzlezak,(1989) and Zalka (1988). The uses of these spices for the preservation of the cashew juice hitherto preserved by the use chemical preservatives was carried out.
Objectives: To establish the use of *Aframomum melegueta* and *Aframomum danielli*, separately for the preservation of cashew juice and to establish the consumer acceptability of the juice.
Methodology: Fresh matured ripe local cashew apples were steamed and the juice extracted.

The spices, *A. melegueta* and *A. danielli* were ground and aqueously extracted at 70^{o}C for 1hour at concentrations of 5%, 10%, 15%,20%,25% and 30%, centrifuged and decanted. The extracted juice was treated with these six different concentrations of the two spices, and bottled. As a control, the extracted juice was pasteurized at 80^{o}C for 10mins, sodium benzoate (0.35% v/v) was added and bottled.

Chemical and microbiological analyses were carried out on fresh apple juice, steamed apple spices treated juice and Benzoate treated juice. Sensory evaluation was carried out on the spices treated and Benzoate-treated cashew juices.

Results/Findings/Conclusion: Microbiological analysis results indicated that, at the end of third month of storage, some microbiological growths like *Mucor spinocus* and *Aspergillus niger* were identified only in cashew juice treated with *A.danielli* extract at 5%, 10%, 15% concentrations and *A. melegueta* extract at 5%, 10%, 15%, 20% and 25%, thus *A. danielli* extract at 20%, 25% and 30% concentrations and *A. melegueta* extract at 30% were effective in preserving the cashew juice as sodium benzoate. Also it was observed that vitamin C was more stable in the presence of the spice extract than in the presence of the chemical preservative (Benzoate), thus *A. danielli* and *A. melegueta* extract at the effective concentration may be an important substitute for conventional chemical preservative in processing of cashew juice. The sensory qualities and consumer acceptability of the sice-extracts treated juice compared favourably with the control (Benzoate-treated juice.)

FARMING SYSTEM PROGRAMME (Leader**:** A. O. Famaye)
Theme: Determination of rehabilitation in Coffee/Kola intercrop(Famaye, A.O. Oloyede, A.A. and Adeyemi, E.A.)
Activity/Title: Effect of hormonal treatment and nodal number on the performance of kola Cuttings variety Larborchi.
Objectives: To determine the impact of number of nodes and hormonal treatment on the sprouting, callusing and rooting of kola stem cuttings.
Methodology: This experiment was carried out at CRIN headquarters, Ibadan. The experimental design was Completely Randomised Design (CRD) in a factorial layout of two levels of IBA (Indole Butyric Acid) hormone (Ho, H1) and four levels of nodes on the stem cuttings (No, N1, N2, N3) replicated three times. Cuttings were harvested early in the morning and prepared according to the methods of Ashiru & Quarcoo (1971) and Quarcoo (1974). Transparent Polythene sheet weighed down with soil at the edges was used to achieve high humidity. Polythene was first opened after 30 days for watering and weeding. It was finally opened after 3 months of setting and data were collected on the number that sprouted, callused and rooted.

Results obtained were analysed statistically and LSD was used to separate the means that were significant.

Results: Differences in the number of nodes on the stem cuttings had no effect on their sprouting (Table 1). Hormonal treatment affected sprouting. Cuttings not treated with IBA hormone gave a higher sprouting success than those that were treated. Table 2 shows that the extent of callusing of the cuttings was not different among the nodal numbers either treated or untreated with hormone.

The success of cutting production depends on the extent of rooting. In this experiment as shown in Table 3, neither the number of nodes used nor hormonal treatment had effect on the success of rooting.

Conclusively, this study has revealed that the use of single node cutting without hormonal treatment offers good possibility in the propagation of kola in Nigeria.

Table 1: Mean number of Kola Cuttings Sprouted

	No	N1	N2	N3	LSD(0.05)
H_o	1.67	3.67	4.00	2.67	1.3102
H_1	0.33	1.33	2.33	2.33	
LSD(0.05)	NS	NS	NS	NS	

Table 2: Means Number of Kola Cuttings callused

	No	N1	N2	N3	LSD(0.05)
H_o	3.00	4.00	4.00	3.33	NS
H_1	1.67	3.00	3.67	3.00	NS
LSD(0.05)	NS	NS	NS	NS	

Table 3: Mean number of Kola cuttings rooted

	No	N1	N2	N3	LSD(0.05)
H_o	0	0.67	1.33	1.0	NS
H_1	0	0.33	0	0.33	NS
LSD(0.05)	NS	NS	NS	NS	

Legend:
Ho = no hormone, H_1 = with hormone
No = one node, N_1 = two nodes, N_2 = three nodes
N3 = 5 nodes.

Reference:

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Title: Effect of intercropping tea seedlings with maize in humid highland ecological areas of Kusuku Mambilla plateau. (Ipinmoroti, R.R. Famaye, A.O. Oloyede, A.A. & Daniel , M.P.)

Activity: To determine the effect of intercropping tea with maize.

Objective: To know the interactive effects of planting tea with maize under intercropping system.

Justification: The initial field spaces between tea stands are left bare without cover and the spaces are prone to erosion. It takes between 3-4 years for the spaces to be closed up by tea branches, when planting tables are formed. Most farmers on the Mambilla do plant arable crops such as maize, okra, potatoes, cowpea and pepper within the inter-crops. The interactive effects of this practice has not been well documented and there is therefore the need to experiment on this in order to know the interactive effects of the crops on tea when they are intercropped.

Methodology: A total of 318m^2 land was used for the experiment. The land was divided into 3 equal plots. Tea seedlings were planted as sole at 0.6 & 1m^2 in plot 1. Similar number of tea seedlings were planted in plot 2 while the inter-rows were planted to maize at 30cm apart. Plot 3 was planted to sole maize at 30cm x 90cm within and between rows, respectively. The tea seedlings were introduced 12 months earlier (April 2001). Growth parameters of the tea were monitored for months covering the duration of the maize plants on the field. The yield of tea was taken every 14 days (2 times in a month) while the maize yield was carried out after 5 months of establishment. The data collected on the tea seedlings under sole were compared within those from the tea/maize intercrop plot.

Results: The values of all the growth parameters increase with age in all the plots. The numbers of branches were not statistically different for any of the treatment plots. This indicates that intercropping tea with maize has no detrimental effect on the number of branches that tea plants would produce. Number of branches is very important in tea management because it indicates the number of plucking points on a tea bush and how quick the plucking table would be formed. Tea sole was superior to tea from tea/maize plot in the first two months for plant height but thereafter, the tea from tea/maize plot gained upper hand but the plant girth for these tea stands under tea/maize treatment were smaller in value compared to the tea sole stands although the values were not significantly superior (P=0.05) to one another.

The number of leaves in the tea sole plot were fewer in number compared to the tea/maize plot values in the first 3 months but they gained upper hand in the subsequent months.

Tea harvest at the early stage of the maize introduction in tea/maize plot compared favourably with values from the tea sole plot. These values continued to differ from the 3rd month up to the fifth month. It is believed that the competition between the maize stands and the tea resulted to the decrease in tea yield. The reduction in tea yields (though marginal) was compensated for by the maize yield from sole maize plot (Table 1). The result helped to suggest that there is a complementary relationship in the planting of tea and maize together especially at the early years of field establishment and that the tea roots had some biochemical exudates which are released, that are advantageous to the growth of maize.

Recommendation: It is recommended that tea/maize intercropping should be encouraged at early year of field establishment of tea.

Table 1: Tea Growth parameters, yield and maize performance under tea/maize intercrop.

Parameter	Period of data collection				
	April	May	June	July	August
Tea/Maize					
Height(cm)	54.6	56.3	73	82	80
Girth(cm)	0,73	0.95	1.11	1,.47	1.67
Number of leaves	130	134	140	148	160
Number of branches	8	9	14	15	16
Tea harvest (kg)	0.62	0.65	0.60	0.72	0.85
Maize (kg)	-	-	-	-	1.60
Tea sole					
Height(cm)	63.1	64.5	63.1	74.2	71
Girth (cm)	0.66	0.96	1.09	1.54	1.71
Number of leaves	61	86	125	158	169
Number of Branches	7	7	10	14	15
Tea yield (kg)	0.61	0.68	0.75	0,84	1.0
Maize sole (kg)	-	-	-	-	1.2

-

Theme: Determination of suitable intercropping system in Cocoa, Kola and Coffee (Oloyede**,** A.A. and Famaye, A.O.)
Task: Determination of suitable intercropping system in Coffee
Activity/Title: Weed suppression under coffee/arable intercropping system.
Methodology: Five treatments were investigated viz:
(i) Coffee/sweet potato/maize
(ii) Coffee/cassava/maize
(iii) Coffee/cassava
(iv) Coffee/Cocoyam/Okra/pepper
(v) Coffee sole

Quadrant of dimension 30cm x 30cm was thrown thrice per treatment equivalent of 555 throws/ha . The weed biomass was taken per treatment. The fresh weight was measured using Sartorius balance while the dry weights were obtained after oven drying for 72 hours to a constant weight. The area of a treatment unit was 9m x 6m ($54m^2$)

Result: Analysis of variance revealed no significant difference in the ability of the intercropping at suppressing weeds. The order of weed suppression over the control was Coffee/cocoyam/Okra/Pepper (49.08%) > Coffee/Cassava(46.03%) Coffee/cassava/maize (43.17%) > Coffee/sweet potato./maize (37.90%).

The change in the order of performance may be due to better establishment of the other crop combinations over that of Coffee/sweet potato/maize – cassava had fully established and likewise the Cocoyam with good canopy.

Table 1: Mean fresh and dry weight values for year 2001 and year 2002.

	Weed Biomass			
	Year 2001		Year 2002	
Treatment	Fresh wgt(g)	Dry wgt(g)	Fresh wgt(g)	Dry wgt(g)
(i) Coffee/sweet potato/maize	53.09	8.45	92.97	19.17
(ii) Coffee/cassava/maize	83.03	13.18	85.07	16.17
(iii) Coffee/cassava	68.32	13.09	80.80	18.13
(iv) Coffee/Cocoyam/okra/pepper	71.87	10.88	76.23	12.13
(iv) Coffee(sole)	99.53	20.79	149.7	37.90
LSD(P=0.05)	NS	NS	NS	NS

Recommendation: The use of intercropping in coffee should be encouraged, as it was able to suppress weed biomass than when coffee was planted sole.
Location: CRIN Headquarters
Suggestion for Improvement: Adequate and prompt release of fund and research materials.

LIBRARY, INFORMATION AND DOCUMENTATION (Head: O. O. Fagbami**)**

The Library's principal function of information provision as required by researchers. Demands of groups and various stakeholders of the Institute mandate crops were met. With lack of funds, purchase of text materials was done locally. More books were sent to the Substations libraries at Uhonmora, Ochaja and Owena, while a proposal was received for the establishment of mini-library at the Ibeku Substation.

The Library made use of various websites on CRIN mandate crops for information retrieval apart from sourcing for relevant materials through Inter-library loans. The profiles of Researchers for Selective Dissemination of Information (SDI) were improved with inputs of searches from website on CRIN mandate crops. Collection of materials on Institute's mandate crops available in some organizations was done to boost information available on the research crops. 10 published articles of research staff were submitted in the year 2002. Books and materials relevant to the mandate crops and newsletters as gifts and exchange were received. 1,428 users visited the Library, while 2,242 books, 1,582 journal titles and 448 newspapers were consulted. The Photostat machine served as source of revenue which reduced mutilation of Library materials. Many books were spiral bound and research materials were laminated. The E-mail service was boosted with new E-mail address for the Institute. Correspondences were sent and received for the Institute on E-mail and Fax services. G.S.M service for the Institute was coordinated by the Library for the Institute. A monthly Information bulletin was published by the Library for the Institute.

Constraints: The media of information transfer and acquisition available in the Institute are few, due to lack of fund and this has affected the acquisition of electronic and print information. Suggestion is for the Institute to acquire some information communication technologies, to further enhance the communication media of the Institute. The Printing Unit started sub-commercialization services as well as the printing of some information materials. The Photographic Unit provided coverage of experimental plots for representations needed in research work. Also, coverage of distinguished visits to the Institute was done.

A RESEARCH INSTITUTE OF NIGERIA, IBADAN
FEDERAL MINISTRY OF AGRICULTURE &RURAL DEVELOPMENT
BALANCE SHEET AS AT 31ST DECEMBER, 2002

	Notes		2002		2001
	N		N		N
N					
Fixed Assets	1		65,287,615		68,927,464
Current Assets					
Stock	2	2,972,893			2,425,969
Debtors	3	5,671,034			1,220,625
Bank & Cash Balances	4	4,977,117			7,407,237
		13,621,044			11,053,831
Current Liabilities					
Creditors & Accruals	5	(14,885,727)			(12,566,465)
Net Current Assets			(1,264,63)		
(1,512,634)					
			64,022,932		
67,414,830					
			=========		
=========					
Represented:-					
Consolidated Fund					
Capital Fund		**7a**			**(76,959,646)**
			(73,567,748)		
Accumulated fund	6		140,012,578		
140,012,578					
Housing loan fund			570,000		
570,000					
Car loan fund			400,000		
400,000					
			64,022,932		
67,414,830					
			==========		
==========					

Executive Director

Head of Finance and Account

COCOA RESEARCH INSTITUTE OF NIGERIA, IBADAN
FEDERAL MINISTRY OF AGRICULTURE &RURAL DEVELOPMENT
INCOME AND EXPENDITURE ACCOUNTS FOR THE YEAR ENDED 31ST DECEMBER, 2002.

	Notes	2002		2001	
		N	N	N	N
INCOME					
Recurrent Allocation	7b		195,829,307		175,821,323
Other Income	8		11,356,763		11,106,209
			207,186,070		**186,927,542**
Expenditure					
Research & Personnel Cost	9	189,058,661		179,469,528	
Administrative Expenses	10	20,520,549		78,772,508	
Financial & Professional Chr.	11	8,993,829		13,547,988	
			(218,573,039)		(271,790,024)
			(11,386,969)		**(84,862,482)**
			==========		==========

Executive Director

Head of Finance and Account

INTERNAL AUDIT UNIT (Head: A. S. B. Akanni)

Audit of all Financial Records at the Headquarters and the six Substations were checked during the period of report. It was observed that all revenues were promptly lodged into banks and expenditures obeyed all extant financial rules.

In addition, procurement audit was carried out before purchase on most goods and services acquired during the period of report.

ENGINEERING GROUP (Leader**:** G. E. Ubani**)**

The year 2002 witnessed the successful execution of several jobs in the eight -(8) functional sections of the Group, namely: -

1. Mechanical Section (Automobile, Agricultural Equipment and Production Units)
2. Electrical/Telecommunications Section
3. Carpentry Section
4. Civil (Building/Roads) Section
5. Painting/Sign-writing Section
6. Water Works and Plumbing Section
7. Drawing Office
8. Transport Office

Achievements
Listed below are the jobs recorded in each section: -

1.1 Mechanical Section-Automobile Unit

1. Maintenance of the Institute's fleet of vehicles when due and at the release of funds/materials.
2. Major repair works were carried out as stated below on: -
   1. Eicher Staff Bus FG 845 B03: Replacement of Clutch Plate and Disc.
   2. Pajero FG 743 B03: Replacement of the Crankshaft.
   3. Toyota Tercel FG 240 B03: Dismantling of the engine to rectify oil leakage.
   4. Peugeot 504 Best line FG 511 S03: Rectification of noise from the rear axle.
   5. Toyota Hilux-FG 507 S03: Replacement of the Gear Box.
   6. Mercedes Benz 911 Lorry FG 266 A03: Changing of the Brake system's governor.
   7. Toyota Diesel Hilux FG 07 G03: Replacement of the Engine.
   8. Hyundai Excel FG 06 G03: Ringing of the Engine.

1.2 Mechanical Section-Agric. Equipment Unit

1. Installation of new Massey Ferguson 375E Tractor.
2. Repair/maintenance of Case International 595 Tractor.
3. Routine maintenance of the Institute's Slasher.
4. Servicing/maintenance of Massey Ferguson 245 Tractor.

1.3 Mechanical Section-Production Unit

1. Reconditioning of Bolts and Nuts, Clutch Plate and Gear Plate for the Eicher Staff Bus and Brackets for Vehicles' Flywheel.
2. Production of Bushings for Generators and U joints for the Water Tanker.
3. Production of Sprockets, Cones and Slasher blades for the Tractors.
4. Production of sundry parts for maintenance works such as engine seats, battery seats, bearing and bearing seats, studs.
5. Fabrication of Burglary proofs, Iron gates and Doors.
6. Repair of office chairs, Water Storage tanks and Vehicles.
7. Repair of leaked Radiators, Fencing Wires and fitting of Keys.

2. Electrical/Telecommunications Section

1. Regular maintenance and rapid response to fault reports in the offices and residential quarters.
2. Collaborated with NEPA to maintain improved power supply from the national grid, sometimes-contributing personnel, vehicle, tools and materials to assist NEPA's fault clearing efforts.
3. Regular Maintenance of CRIN High Tension (HT) and Low Tension (LT.) power lines.

4. Regular maintenance of the Institute's 12.5kVA, 17.5kVA, 27kVA, 50kVA and the 250 kVA Power Generators.
5. Breakdown maintenance of the HT and LT. equipment. Viz.: Transformers, RMUs, Control Panels, Oil-cooled Circuit Breakers (OCBs) and Tripping Units.
6. Maintenance of the Air-conditioners in the Institute.
7. Routine electrical engineering services support to all segments of the Institute.
8. Involved with Contractors on the installation of the Radio Communications Equipment to link the Headquarters with the Substations.
9. Installation of the new 250 kVA power Generator (decentralized) to serve the Junior Staff Quarters.

3. Carpentry Section:

1. Renovation works at quarters PRO3, PRO4 and other residential and office buildings.
2. Design and construction of side tables for Director's office.
3. Construction of formwork for all civil engineering jobs.
4. Sundry repair of doors/replacement of lock sets.
5. Construction of wooden snailery pens for the CPU.
6. Provision of temporary roof for the new 250 kVA generator in the newly constructed SSQ powerhouse.

4. Civil (Buildings/Roads) Section:

1 Rehabilitation of CRIN net work of roads using earth to patch the potholes.
2. Building of the new powerhouse at the SSQ for the 250 kVA Electric generator.
3. Repair of damaged everite water pipes at the JSQ.
4. Construction of water tank platforms in the Zones.
5. Construction of septic tanks and chambers at the JSQ.
6. Fortification of the Main Booster Station's Block wall.
7. Supervision of contractors working on the construction of drainage at the JSQ.
8. Supervision of contractors working on the construction of embankments for some houses at the JSQ.
9. Channeling of floodwater and clearing of some blocked culverts within the Institute.

5. Painting/Sign-Writing Section:

1. Repainting of residential buildings such as JSA: 35, 37, 79, & 67, TO: 4, 5, SS 1B, Duplex: 8B and 11B
2. Numbering of CRIN vehicles.
3. Repainting and rewriting of the CRIN signboard at the main gate.
4. Attending to all other painting and sign-writing jobs within the Institute.

6. Water Works And Plumbing:

1. Servicing and overhauling of water valves in the JS and TO Quarters.
2. General plumbing maintenance in the Central Nursery
3. Laying of new pipeline and direct connection of water supply to CFC plot near Zone 7
4. Continuation of the plumbing renovation work at the PRO 3 Quarter.
5. Installation of overhead tank in the Isotope Laboratory.
6. Installation of water tank at Zone 5.
7. Re-installation of the Electric water pump at the Water works.
8. Plumbing renovations in staff quarters. .
9. Construction of Water Tanker Loading Point at the Bore hole site.
10. Replacement of the damaged 3 inch A/C pressure pipes between the Water Works and the major Service water reservoir.

7. Drawing Office:

1. Preparation of all engineering drawings for project planning and execution as appropriate.
2. Writing of scientific tables, figures and posters for seminars, conferences and exhibitions.
3. Tracing of scientific graphs, histograms and pie charts, etc.
4. Writing of flow charts for the processes of CRIN mandate crops i.e. cocoa, kola, cashew, coffee and tea.
5. Layout plan of Ibeku and Ajassor Substations.
6. Drawing and tracing of the existing Carpentry Workshop for repairs.

8. Transport Office:

1. Driving of vehicles attached to the Institute's executives.
2. Driving of vehicles attached to Programs and Groups.
3. Vehicular movement of personnel and materials to approved locations with vehicles from the pool and staff bus.
4. Staff transportation to and from Ibadan City.
5. Supply of potable water from the Borehole for use by the Institute and members of the Institute's community.

Constraints:

In the course of providing the necessary services by the Group, several constraints were experienced. However, the most severe ones were delays in the supply of funds / materials and shortage of skilled manpower in some sections.

Suggestions To Eliminate/Alleviate Constraints:

The recruitment of skilled personnel to support each of the sections within the Group was recommended and is hopefully receiving attention.

The stocking of commonly used spare parts on a "re-order level system" would go a long way at improving the "rate of response " to fault clearing. We also advocate the provision of working tools, safety wears for all the engineering staff.

The auto-mechanical workshop requires attention to the leaking roof. While office accommodation is required for the Higher Technical officer, Mechanical Productions members of Engineering Group remained committed to contributing the- best to supporting the Institute's achievement of her corporate goals in the ensuing year.

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PLANTATION AND ESTATE MANAGEMENT: (Ag Head : A. Borokini)

Staff and Labour Matters: In the year under reference, the plantation management section maintained permanent staff of 73 made up of 21 senior staff and 62 junior staff and 244 casual workers.

Labour Force: As usual, the periodic recruitment of casual workers to supplement the efforts of the established staff in the farms and other general maintenance operations on the Estate and Allied outstation continued during the year.

Plot Maintenance: Routine cultural and maintenance operations were carried out in most of the Experimental and Commercial Plots.

New Plots Development: Gapping up of the newly Established plots under the FED programme was carried out during the year.

Cocoa Pods Harvesting:

Processing: A total of 236,986 pods were harvested in which 37,094 were black pods 7,574 issued out and 184,937 fermented. Details of the cocoa pods harvested during the year 2002 is indicated in Table I.

Revenue Generation: During the year under review, a sum of N1,881,765.00 was generated as revenue from the sales of farm produce and dried cocoa beans.
Details of the revenue generation is indicated in Table II.

Ground Maintenance: The major handicap against much improvement on the Ground Maintenance operations during the year was that of the faulty farm machineries, notably, the lawn mowers, tractor and tractor- drawn slasher. However, manual-slashing of the grounds and Lawns at offices, roadsides, and residential premises was carried out at regular interval. "The filling of pot holes on major roads with laterites and opening up of blocked culverts and water ways were also carried out with trimming of hedges along roads sides and public places of the Institute.

The procurement and good use of new lawn mowers and full repairs of the tractor and slasher would in no small measure improve the standard and extent of the Institute's Ground Maintenance activities in the year ahead.

Suggestions for Improvement: For the year ahead, the plantation and Estate Management requires the following to increase production and services.

(1) Chemicals – to combat pests and diseases.
(2) Repairs of Lawn Mowers and the purchase of new ones
(3) Repairs of other Farm Machineries notably tractor -drawn slasher
(4) Adequate number of casual labour to work in the plots and in the Ground Maintenance Section
(5) Provision of functional vehicle to supervise the Field work
(6) Repairs of Zonal Offices/huts with provision of furniture
(7) Provision of protective wears, Rain boots, cutlasses, etc.

Table I : Cocoa Yield Record

1	2	3	4	5		6	7	8	9	10	11	12	13
No	**Harve Field**		**Total No. o f Pods Harvested**	**B/Pods**	**D/Pods**	**No. of Pods Issued**	**No. of Pods Obtained**	**No. of B/Pods At Breaking**	**No. of Fermented Pods**	**Wet Weight (Kg)**	**Weight After Fermentation**	**Dry Weight (Kg)**	**Discarded Bean**
1	January		50392	3772	1024	1666	43930	10585	37117	3431.4	3224.2	1552.2	
2	February		12029	1372	410	2005	8242	3548	6066	523.6	470.6	204.2	
3	March		11507	1298	499	2058	7652	2014	6936	633.8	580.6	272.4	
4	April		11103	804	492	710	9097	2412	7489	563.0	509.0	219.7	
5	May		5594	360	323	200	4711	1922	3149	251.2	226.8	91.8	
6	June		4803	450	355	215	3783	1399	2834	247.6	219.9	83.6	
7	July		5589	692	442	-	4455	1568	3579	323.8	278.6	99.4	
8	August		6553	1977	374	60	4142	1411	4708	442.8	387.8	135.2	
9	September		9991	3990	262	-	5739	1318	8411	814.4	718.0	255.8	
10	October		38174	10589	619	120	26846	4258	33177	3224.8	2943.6	1524.4	
11	November		54611	10156	1201	540	42714	4428	48442	4749.4	4363.8	1836.6	
12	December		26640	1634	786	-	24220	2825	23029	2214.2	2027.4	964.6	
	Total		**236986**	**37094**	**6787**	**7574**	**185531**	**37688**	**184937**	**17419.8**	**15949.2**	**7239.7**	

Table II : Revenue generated for the Year 2002 (₦1,881,765.00)

S/No	Item	Jan. To March Amount ₦	April To June Amount ₦	July - Sept Amount ₦	Oct - Dec Amount ₦	Total ₦
1	Cocoa beans	586,000.00	26,160.00	-	730,700.00	1,342,860.00
2	Cocoa seedlings	-	36,860.00	23,960.00	200.00	61,020.00
3	Cocoa pods	18,520.00	9,500.00	1,480.00	13,800.00	43,300.00
4	Kola seedlings	5,000.00	13,875.00	7,700.00	-	
5	Cashew seedlings	-	-	6,400.00	1,200.00	
6	Cashew nuts	-	-	2,940.00	1,200.00	
7	Coffee seedlings	-	-	150.00	-	
8	Plantain suckers	-	30,000.00	5,305.00	-	
9	Plantain	25,425.00	-	11,550.00	25,125.00	
10	Banana	460.00	1,275.00	345.00	1,620.00	
11 a	Wine	1,800.00	1,400.00	-	800.00	
11 b	Chocolate	8,200.00	1,690.00	3,080.00	3,600.00	
11 c	Soap	200.00	200.00	100.00	-	
11 d	Cream	80.00	-	-	-	
12	Sundries	60,050.00	12,650.00	4,850.00	4,960.00	
13	Bus Ticket	34,930.00	8,750.00	14,630.00	15,920.00	
14	Palm fruit	4,640.00	-	1,400.00	1,000.00	
15	Access to Road	-	-	-	66,500.00	
16	Other farm produce	3,660.00	17,740.00	24,015.00	-	
TOTAL		**748,965.00**	**160,100.00**	**107,905.00**	**864,795.00**	**1,881,765.00**

OWENA SUBSTATION (Officer In-Charge - Akinrowo, S.E. (Mrs.)

Physical Developments: While maintaining the existing ones and with few labour force and inadequate fund, the station was able to carry out the following operations during the year 2002.

(a) Removal of mistletoe from most of the plots in the station as almost all the plots have been infested by mistletoe for many years.
(b) Maintenance of all the plantations
(c) 2 hectares of new plantain plantation was opened up while the former plantation of about 2 hectares close to the office was rehabilitated.
(d) Maintenance of water and Electricity projects and prompt payment of bills.
(e) Construction of a car park in the office to allow for parking space.
(f) Erection of signboard at the 2nd gate in the quarters to replace the old dilapidated one.
(g) Erection of signpost at the entrance of the office gate.
(h) Erection and rehabilitation of the fallen electricity poles along the office-quarters area.
(i) Provision of street lights in the quarters.
(j) Fencing of the new meteorological station in readiness for the installation of new equipment.

Vehicles: The Mitsubishi pick-up van and tractor were the two functioning vehicles at the station.

The 404 pick-up van had an accident at Ondo/Ile-Oluji junction on the 9th January 2002. The case is on at Ondo Magistrate Court I and the vehicle together with the tipper lorry that were involved in the accident are in the custody of the police. The Volkswagen staff bus needs a replacement of the engine.

Radio-Phone: The Station's radio-phone was faulty and has been taken away for repairs by Bentaen Communications as instructed by the Management.

Revenue: A total of Four hundred and twenty-four thousand, One hundred and ninety-four Naira fifty-four kobo (N424,194.54k) was realized from the sales of farm produce and other services during the year under review.

The break-down is as shown in the table below:

Nos.	Item	1st quarter	2nd quarter	3rd quarter	4th quarter	Total
1.	Cocoa beans	3,680.00	33,680.00	68,420.00	63,690.00	169,470.00
2.	Cocoa pods	100.00	3,450.00	1,470.00	700.00	5,720.00
3.	Cocoa seedling	23,400.00	31,600.00	3,460.00	400.00	58,860.00
4.	Plantain bunches	2,400.00	-	2,250.00	4,350.00	9,000.00
5.	Plantain suckers	-	900.00	200.00	-	1,100.00
6.	Rent (payroll)	28,219.98	25,224.56	26,000.00	29,500.00	108,944.54
7.	Rent (tenant)	5,300.00	6,750.00	16,450.00	39,350.00	67,850.00
8.	Rest house services	250.00	-	-	2,000.00	2,250.00
9.	Tractor services	-	1,000.00	-	-	1,000.00
	Total =	**63,349.98**	**102,604.56**	**118,250.00**	**139,990.00**	**424,194.54**

Staff Disposition: The staff strength remained at 22 as at 31st December 2002. It is as shown in the list below.

		Owena	**Ibule**	**Ile-Oluji**	**Onisere**	**Total**
1.	Principal Agric. Supt . I (Hatiss 11)	1	-	-	-	1
2.	Principal Agric. Supt . II (Hatiss 9)	2	-	-	-	2
3.	Senior Agric. (HATISS 8)	-	1	-	-	1
4.	Senior Executive Officer (Hatiss 8)	1	-	-	-	1
5.	Chief Typist (HATISS 8)	1	-	-	-	1
6.	" Driver (HATISS 6) `	1	-	-	-	1
7.	" Agric. Field Overseer(Hatiss 6)	2	-	-	-	2
8.	Ass. " " " " (" 5)	1	1	-	1	3
9.	Security Supt. (" 5)	-	-	1	-	1
10.	Senior Clerical Officer (" 5)	1	-	-	-	1

	Owena	Ibule	Ile-Oluji	Onisere	Total
11. Senior Agric. Field Overseer (Hatiss 4)	1	-	-	-	1
12. Driver					
Tractor Driver/Mechanic (" 3)	1	-	-	-	1
13. Store Keeper (" 3)	1	-	-	-	1
14. Asst. Clerical Officer (" 2)	1	-	-	-	1
15. Security guard (" 2)	1	-	-	-	1
16. Asst. Field Attendant (" 2)	2	1	-	-	3

Research Activities: All necessary operations were carried out on the experiments sited in the station. The experimental plots were also taken care of.

Some of the experiments include:

(a) Fungicide – Trial experiment
(b) Seed Garden Reactivation
(c) High Density Experiment in cashew
(d) Trinidad Introduction Experiment at Ibule

Nursery: About eighteen thousand (18,000) cocoa seedlings were raised during the year under review and about 14,715 that survived were sold at the rate of N4.00 per seedlings.

Weather Records: Fencing of the new meteorological station was completed in readiness for installation of the equipment.

The total rainfall data is stated below:

Quarter	Rainfall (mm)	No. of Days
First	145.6	11
Second	525.3	29
Third	797.2	55
Fourth	420.7	21
Total =	1888.8 (mm)	116 days

Retirement From Service: The station's Principal Executive Officer II in person of Mrs.A.O. Kuti retired from service after spending 35 years in service.

Appreciation: The station is very grateful to the Management for Seventeen (17) members of staff who were promoted during the year under review, while looking forward to the promotion of the remaining seven (7) members of the station who are already due for promotion.

UHONMORA SUBSTATION : (Officer-in-Charge: J. A. O. Akinboboye)

Farm Operations Performed: These included collection of research data, harvesting and processing of cocoa beans, nursing of cocoa, coffee and other fruit seedlings, spraying against black pod disease, capsid pest and sale of farm products. Others are planting of plantain and pineapple suckers, gapping up in cocoa plots, quarter maintenance and University of Benin Students of Agriculture were also taken through their Annual Industrial practical Training.

Research Activities:- As records on coffee shade trial, coffee farming system and fertilizer trial on cashew have been terminated, we are now left with organic fertilizer trial on coffee, organic fertilizer and mycorrhiza inoculation on the growth of cashew, 25 genotype cashew trial, fungicide screening on cocoa and cocoa yield records.

The need to deploy or employ more qualified staff (senior and junior) for the Substation is pertinent as the Officer-in-Charge is now the only senior staff (field) left in the Substation.

Efforts At Revenue Generation:- We planted about an hectare of maize during the year. We also planted pineapple suckers and 400 plantains to serve as shade crop and prevent serious weedy conditions during the rains.

Revenue: A grand total of three hundred and ninety one thousand, five hundred and forty four Naira, eighty one kobo revenue was generated during the year, as follows:

Cocoa Beans	-	₦122,472.80
Cocoa Seedlings	-	62,942.00
Timber	-	59,000.00
Cashew Nuts	-	8,400.00
Plantain	-	4,440.00
Vegetable	-	3,530.00
Pineapple	-	1,745.00
Cocoa pods	-	600.00
Rent on Quarters	-	111,770.00
Dukanuts	-	1,800.00
Kola Seedlings	-	420.00
Mangoes	-	2,000.00
Palm Fruits	-	2,480.00
Oranges	-	2,805.00
Pears	-	1,500.00
Oriri Fruit	-	870.00
Maize	-	4,770.00
Total =	-	₦391,544.81

Rain-fall:- The rainfall data for the year are as follows:

Month	Rainfall in mm	No. of Days
Jnauary	-	-
February	2.1	1
March	174.4	10
April	221.2	11
May	61.9	5
June	152.2	11
July	132.8	12
August	212.9	13
September	267.7	13
October	191.6	10
November	79.3	3
December	-	-

Gapping up in plots:- One thousand, three hundred and thirty three F3 Amazon cocoa seedlings were used in gapping up in plots E1, C2 and 220 were used in Trinidad plots A1, D3. Whereas the three plots should be eleven hectares, what is left there today will not be more than 5.5 ha. due to death of the trees. More manpower would be needed for rehabilitation and plot maintenance during the dry season.

Staff Disposition and Welfare:- The staff number remained 23 and 10 casual workers at the end of the year after the deployment of Mr. O.I. Adegbola (PAS II) to Headquarters and the transfer of Mr. Charles O. Imade (AAS) from the Headquarters. 901 patients were treated at the dispensary during the year. The number of patients treated could have been more than this but for drugs which got out of stock from the middle of the year. I requested for new supply in April, the approval and supply has not come uptil the time of writing this report.

I wish on behalf of workers to be grateful to the Director/Chief Executive and all who were instrumental for previous supplies and implore you Sir to set up machinery for a new supply.

Because of lack of funds, I wish to suggest the employment of a female casual worker to understudy the health technician in the dispensary should he go on leave, or retire in year 2006.

Recommendation on Farming System Experimental Plot: Records on the farming system experiment was terminated at the beginning of the year. We had to stop records on the plot when I learnt from the pioneer field overseers here that the top soil of the plot where the experiment was sited had once been scrapped. Recommendation on this was sent to the Headquarters/

Theft Cases/Security: - Between May and June, resident workers on the estate lived in fears as there were rumours of some people planning armed robbery against the Substation with only three watchmen (staff) and one casual worker. We had to resort to fasting and prayers for God to take control in order to avert bloodshed.

By 30th September, 2002, we discovered that 266 cocoa pods were harvested, the beans extracted and taken away. Again on 3rd October, thieves came through the forest, entered the administration block, removed four louver blades from the back windows of an office and carted away cocoa beans still undergoing sun-drying in different baskets and bags. I reported a suspect now at large (Ikhajuangbe Aigbodion) to the Sabongida Police Station on the issue. Up till the time of writing this report he has not been apprehended

Since then the little number of staff resident on the estate has formed ourselves into vigilante groups.

During the last visit of the late Director/Chief Executive Dr. Fasina, I complained to him on the acute shortage of watchmen for the Substation and he told me to make case for it which I did and wrote reminders. At this stage I wish to inform the Director/Chief Executive that lives of CRIN workers resident on the estate and Government properties here are not safe. There is hardly any month that armed robbery is not carried out in one or all of the three junctions that lead to the substation.

Timber Excavation: Timber merchants who were given approval to fell trees on the Substation estate came and paid for stumps approved for them. Henry Iyayi the notorious son of Pa Iyayi of Benin, despite the fact that approval was not given to him, led his gang into CRIN forest felling, cross cutting and evacuating a lot of logs illegally. A combined effort of CRIN workers, the forestry department and the police kept watch over some logs for more than one month, day and night before they were auctioned. He stole away 140 best trees on the estate in year 2001.

Fire Problems: Between January and March before the first rain, hardly had the few residents of the estate any time of rest day and night. The situation was so bad that I had to lead a delegation of the workforce here to the Royal Majesties, the Onotare of Ozalla and the Odion-Urukpa of Uhonmora that if indigenes of the communities successfully burn all the mandate crops here, we shall have no option than to pack our loads and go and report to the Director/Chief Executive that the Federal presence here has been destroyed. Burning of cocoa farms in the local government was so much that I had to instruct an increase in the number of cocoa seedlings we raised for sales. I decry the high degree of lawlessness and indiscipline of people around us here.

Dilapidated Buildings: It will not be too much to remind the Director/Chief Executive that apart from my in depth report I have written letters and reminders about the dilapidation of all buildings in the Substation. It may be necessary that building engineers from the Headquarters come and assess

the situation on ground with a view to finding solution (repairs). The degree of dilapidation is beyond the Substation financial's scope.

Student Practical Training: The University of Benin, Faculty of Agric. Students were here during the period of report on their annual field practical training. We did all we could for them within the limited manpower available. Some of them in turn organized evening lecture for primary and secondary school students resident on the CRIN Substation estate.

Visitors: Visitors to the Substation during the year included:

Dr. John E.V.O. Ogbeide	-	Benin
Dr. G. Akhigbese and Co.	-	Lagos
S.O. Iyalekeche Edo ADP	-	Benin
S.E. Ozigbo Edo ADP	-	Benin
O.A. Asikha Edo ADP	-	Benin
Dr. A.A. Arhereatu UNIBEN	-	Benin
Mr. Akin Ayodele	-	CRIN Headquarters - Ibadan
P.O. Adebola	-	CRIN Headquarters - Ibadan
S.O. Esezobor Tax Office	-	Sabongidda-Ora
I.S. Udeosor UNIBEN	-	Benin
J.S. Ogheh UNIBEN	-	Benin
Emuanta Elhis A.A.U.	-	Ekpoma
Rev. J. Unuigbe Farm	-	Lagos
P.A. Ayo		
R.M. Unuigbe	-	Iuleha
Mr. J.O. Ehigiator – Uniben	-	Benin
Mr. O. Usiobaifo Senate	-	Abuja
L.O. Omokpo	-	Benin City
Mrs. V.V.T. Adeyeye	-	Auditor-General's Office, Abuja
Mr. D. Jayeoba	-	" " " "
Chief J.O. Ogunbayo,	-	CRIN Headquarters – Ibadan
Mr. S.A. Osun	-	" " " "
Mr. E.O. Bakare	-	" " "
Mr. K.O. Ilevbare	-	Benin
Dr. A. Aryemiva A.A.U.	-	Ekpoma
Mr. Ibukun-Olu - Coffee Farmer	-	Benin
Mrs. Lilian Akinkugbe, Coffee Farmer	-	Benin
Mr. C.A. Akinkugbe	-	" " "
Mr. Mustapha	-	Benin
Mr. S. Ekpo	-	Nigerian Police Sabongidda
Dr. Clifford Omomedre,	-	MANR Oghara
Mr. R.I. Aghughu T.C.U.	-	Benin
Mr. J.I. Isuramen - Coffee	-	Iruekpen
Miss Taiwo Omokinovo A.A.U.	-	Ekpoma
Mr. S.E. Okoidegun, C.B.N.	-	Benin
Mr. Abdulazeez Suleiman Asoda	-	Kaduna
Mr. Okun Adelaja Idowu	-	Ebele Iguenben
Edwin Usifo Idwu	-	Ebele Igueben
Mr. Nath. Okhawen	-	Lagos Road – Benin City
Mr. Sunday Akpan		
Mr. Oigbochie AAU	-	Ekpoma
Mr. Elder Ogunsede	-	Farmer, Egbeta

Electricity Generation:. The Substation was connected to the National grid on January 18th 2002. During windy rain of 9th March the electricity got cut off. I went to report at NEPA Ekpoma and the Manager told me they were about to come and cut the light as the CRIN Management has not settled NEPA and the contractor who handled the electricity project. However by December 20th I went to NEPA to come and cut our lines from the transformer and install our 35 KVA generating set. We started to use it immediately one hour at night every three days. I wish to remind the Director/Chief Executive that I sent quotation for its servicing and changing of some parts which has not been done up till the time of writing because of lack of funds from the Headquarters. However it should be on record that we drained out the old engine oil and replaced it with 25 litres of new oil got from the Headquarters.

Release of Tractor from Edo State Ministry of Agriculture: The functional tractor with its bucket promised the CRIN Uhonmora Substation on November 20th, 2000 by the Executive Governor of Edo State, Chief Lucky Nosakhare Igbinedion, was released by Edo State Ministry of Agriculture's letter of 31/3/2002 Mr. Phillip Oguigo visited the Ministry of Agriculture Tractor hiring unit Irrua for its formal collection. The situation I met the Tractor was that, CRIN Substation will need 2 back tyres, 2 bucket tyres, Hobbs, 2 front tyres, Battery, 2 rims (6 holes) and General servicing.

In order to move the tractor out of Irrua. I immediately wrote the Director/Chief Executive that the observation of the Engineer of the Institute would be needed to professionally assess the situation for eventual collection to guard against vandalisation.

Release of Tractor: As the Headquarters is handicapped financially to effect its removal to the Substation, I have been directed to source for funds for its removal. All I have done uptill today was pumping and vulcanizing of some old tractor tyres that have been lying in the sun since 1993. I am now negotiating for a pick-up van that will carry these tyres to Irrua, I will still have to look for a tractor that will tow it down to our substation.

Repair of CRIN Primary School Roof: While CRIN Primary School roof was going to be blown off during the rains I used planks and roofing sheets available on the estate to effect repairs, making use of our labour and the Parents and Teachers' Association provided funds for workmanship.

Radio-phone Problem: Our old radio-phone box did not function throughout the period of report, I have taken it to Bentaen Communications, Benin-City for repairs. The Engineer said he wishes to change a plate in the box, I have directed him to do the repairs provided it will not cost more than two thousand Naira which we can pay for at this end.

Communication: I wish to suggest that it should be made mandatory for officers travelling from the Headquarters to, or through substation to collect information from Co-ordinator's offices for the substation. All arms of the Headquarters should also let information/correspondences reach the Coordinators office timely. All these will enhance speedy communication with the Headquarters and other Substations.

Unclaimed Pension: One of our retirees, Mr. Jacob Igbedosa has not been coming forth for his pension since January, 2001 I went to enquire about him at Evohimi in August, 2002 only to be told that he was ill and was taken to Lagos for care by his children. We have discussed this with the Assistant Chief Accountant and CRIN Pension Office who have advised that the accumulated money be sent to the Headquarters, Ibadan. His accumulated arrears at December, 2002 is N176,999.40.

Appreciation: On behalf of all staff of the Uhonmora Substation, I thank the Governing Board, the Director/Chief Executive and the entire Management of CRIN for keeping us in employment and solemnly promise our continued loyalty to the Institute and the Federal Republic of Nigeria. I also promise, if given the wherewithal to work, to restore the Uhonmora Substation to the glorious position it was before the 1985 mass retrenchment of staff.

I wish the Governing Board, Director/chief Executive and the entire Management, all staff of CRIN a prosperous and more resourceful year 2003.

OCHAJA SUBSTATION : (Officer-in-Charge: A. Ajani)

Personnel Report:

(a) The staff strength as at 31st of December 2002 was 19 made up of 5 senior staff and 14 junior members. In addition casual workers were recruited at various times of the year to carry out maintenance of experimental and commercial plots, picking of cashew nuts and security.

(b) **Staff Posting:** Mr. Abdullahi an HAS was posted from Headquarters to Ochaja substation with effect from 1st February 2002.

Maintenance of Research and Commercial Plots:

(i) Regular maintenance of both research and commercial plots and close supervision of all experiments were carried out. In addition, the substation maintained a high standard of environmental sanitation in both the office premises and residential quarters.

(ii) **Production of Cashew Seedlings:** Due to the low patronage of cashew seedlings by the local farmers who prefer to purchase cashew nuts due to lack of transportation only 5,000 cashew seedlings were raised. I made personal contacts with the various local government but the farmers did not turn up as expected.

(iii) Fire Traces: This exercise was carried out round the whole plots so as to guard against fire out-break that might threaten the plantations. Also farm roads were opened up and maintained for easy accessibility.

Data Collection: Proper experimental data were collected for on-going experiments. Viz:

(i) Studies of the distribution, biology and damage by the stem girdler

(ii) Study of flowering pattern TT11 and T12 clones of cashew to identify trees with early flowering ability.

(iii) Evaluation of single spray chemical application on the control of inflorescence blight disease of cashew.

Dispensary: Few members of staff and casualworkers were treated at our dispensary between January – May 2002. None of the patient was referred to the hospital and no death was recorded.

The dispensary, for a very long time had been handicapped by shortage of drugs. A request for the drugs was forwarded to the Headquarters since April last year.

Water Pump: The water pump is the Station's major source of revenue generation. The engine had a major problem and the quotation to effect the repairs was forwarded to the Headquarters as requested by the Director since last year December. (Re: Internal Audit inspection report on Ochaja Substation January-December 2001). Water supply especially during the dry season is one of the amenities enjoyed from CRIN by this community.

Extension Service: During the year some farmers visited the station in connection with purchase of planting materials and technical advice on cashew production. I and my assistant were at the State Ministry of Agriculture, Lokoja and State's ADP's Office also in Lokoja for extension services.

Students on Industrial Attachment: About 12 students from Kogi State College of Education Ankpa, 2 students from Kogi State Polytechnic, Lokoja, 2 students from Federal College of Education Okene in Kogi State and 1 student, Mr. Adejo Elijah, a 500 level at Ahmadu Bello University Zaria were here for industrial work experience scheme during the year under review.

Educational Visit: About 150 students from Audu Oyidi Memorial College Ogbonicha in Kogi State visited the Substation on educational excursion.

Revenue Generated in 2002 (₦)

Particulars	January	February	March	April	May	June	July	August	September	October	November	December	Total
Water supplied	2900	4600	-	-	-	-	-	-	-	-	-	-	7500.
Rent by pay roll	9448.89	6815.89	7839.89	6815.89	7839.89	9565.81	9565.81	10500	10500	10500	10500	10500	110392.07
Rent by cash Bk.	500.	300.	200	500	1700.	-	300.00	-	1550.	1650	1000	1000	8700.
Cashew seedling	3950	1330.	-	-	-	280.00	1980.00	12280	600.	--	50.	-	20470.
Cashew nut	-	-	73740	35340.	-	-	200.00	-	-	-	-	-	109280.
Tractor Hiring	-	-	-	-	2600	1500	5000	-	9000	-	2550	-	20650.
Palm fruits	-	-	-	-	480.	-	-	-	-	-	-	-	480.
Soft wood	-	-	-	-	-	1800	-	-	-	-	-	-	1800.
Total	**16798.89**	**13045.89**	**81779.89**	**42655.89**	**12619.89**	**13145.81**	**17045.81**	**22780.**	**21650.**	**12150.**	**14100**	**11500.**	**279272.07**

-

Weather Records : Rainfall for 2002 (mm)

Month	No. of Rainy Days/ Per Month	Total Rainfall Month (mm)
January	-	-
February	2	8.5
March	2	17.5
April	3	191.83
May	7	124.5
June	8	104.7
July	13	164.7
August	13	218.8
September	12	376.8
October	7	163.4
November	3	14.0
December	1	0.5
Total	71	1385.23
Average	6.454	125.93

Visitors: A host of visitors from public sector, other government organizations, local farmers and CRIN staff from Headquarters visited the Station. The prominent visitors are as presented below.

Visitors To The Substation

Date	Name	Address	Purpose
24/01/02	Adah O.C.	Kogi State College of Education, Ankpa	Supervision of students on IT.
"	Elder Ameloko	Ochaja Boys Sec.Schl.	Official
12/02/02	Adebola, P.O.	CRIN Headquarters	"
"	E. Akin Ayodele	" "	Valedictory Inspection Visit and handover.
13/02/02	Osagbemi C.O.	Prince Abubakar University, Ayangba In Kogi State.	Official
15/02/02	Abel Abah	Prince Abubaka University, Ayangba In Kogi State	Official
"	David Alabi	"	"
14/03/02	Ojegbure Gabriel	Kogi Agric. Dept., Alloma	"
8/04/02	J.O. Ogunbayo	CRIN Headquarters	Pay Parade for Pensioners
"	S.A. Osun	"	" "
"	E.O. Bakare	"	" "
9/04/02	Mrs. V.O.T. Adeyeye	Office of Auditor-General, Abuja	Auditing

"	Mr. Kola Adeoye	"	"
"	Mr. Dejo Jayeoba	"	"
16/04/02	Daniel K. Ofud	Ochaja	Official
23/04/02	L.I. Ojobo	Bassa in Kogi State	Official
"	F.A. Okeke	S.M.U. Enugu	Official
3/05/02	Adaji, A.U.	Kogi State College of Education	Supervision of SIWES Programme
14/06/02	L.A. Hammed	CRIN Hqts.	Official
29/07/02	Attah Okonyi Lee	Radio Kogi Ochaja	Official
13/11/02	Attah S.N.	Azue Ogbonicha Kogi State	"
12/12/02	S.O. Oyeranmi	CRIN Hqrts.	"

Achievements In Ochaja Substation For The Past Six Months

Since I took over the mantle of leadership of CRIN Ochaja Substation in March 2002, I wish to record the following achievements.

The payment of wages to the substation's casual workers which the station owed them for good 9 months was paid from the revenue realized during this period with the clearance from the Headquarters.

Construction of 8.5m x 8m cement slab near the office complex for drying cashew nuts during the processing period of cashew nuts, by direct labour it was the first of its kind since the establishment of the substation in 1969.

Distribution of improved genotype cashew nuts and seedlings to some farmers and government agencies in some States in the country i.,e. Kogi, Enugu, Benue and Nasarawa.

Bringing biotechnology to the door step of the substation by the processing of cashew juice from the experience shared from Mrs. T.O. Akinwale, a Food Scientist from the Headquarters.

Grounded 504 station wagon was reactivated and made available for official use in the substation.

Construction of big security gate at the main road that leads to the office complex and residential quarters through direct labour.

The station appreciates the management's present support and will also appreciate any urgent steps taken to effect the repairs on our water pumping engine since it is the main source of our revenue generation.

MAMBILLA SUBSTATION (Officer-in-Charge: Madehin Aderemi)

Kusuku: General maintenance of all the plots carrying the two mandate crops of Coffee Arabica and Tea commenced with the first rain that came up on the 27th of February with 25.5m.m. recorded.

The general weeding covered the roads, residential quarters and office complex with the introduction of Banana suckers for revenue generation.

In addition to Fungicide and Insecticide sprayings, compound fertilizer and organo-mineral (animal dungs) were administered as directed.

For continuity in supply to peasant farmers and gapping up as found necessary, twenty thousand, seven hundred and forty (20,740) Tea cuttings were raised in year 2002 growing season.

Mayo-Selbe:

Plots carrying mandate crops and farm roads were well maintained throughout the report period. Fungicide (Bordeaux mixture) and Insecticide (Basudin) - as recommended by CRIN) were applied on available mandate crops of Cocoa, Coffee, Cashew and Tea for pests and disease control.

Control burning and fire traces were undertaken at the onset of dry season to curb the incidence of fire as experienced last five years from the neighbouring private farms.

Revenue:

The total sum of One hundred and eighty eight thousand, six hundred and seventy-three Naira four kobo (N188,673.04) was realized as revenue for the year 2002 and the breakdown on quarterly basis is reflected in tabular form underneath:

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
January – March (₦)	April-June (₦)	July-Sept. (₦)	October-Dec. (₦)	(₦)
17,460.28	63,916.76	67,926.00	39,370.00	188,673.04

Weather Record:

The total amount of rainfall recorded for the year was 2,738.60m.m. and the table below indicates the breakdown on monthly and quarterly basis

.1st Quarter			2nd Quarter			3rd Quarter			4th Quarter			Total
Jan.	Feb	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
-	-	44.1	325.6	169.3	339.2	560.40	547.0	463	273.	17.0	-	2,738.60
44.1m.m			834.1 m.m.			1,570.40 m.m.			290 m.m.			

Personnel:

CRIN Kusuku and the generality of workers in the substation were appreciative of the kind gesture of CRIN Management Ibadan in filling the vacant posts existing for years in 2002.

Notwithstanding, the substation is still full of expectations for the remaining vacancies of two Health Assistants/Attendants to the Substation that went on retirement/resignation at the end of first quarter of year 2000, two security personnel with the conversion of some casual workers that had served the substation into permanent establishment as promised by the Chairman, CRIN Governing Board while on working visit first quarter year 2002. This will go a long way in alleviating the problem of shortage of workers within the field unit as presently experienced.

Visitation:

The year 2002 was remarkable in the history of the substation for hosting for the second time since inception the highest ruling body of CRIN. The Governing Board together with some members of Internal Management Committee of CRIN embarked on a working visit to the substation between 20th – 22nd March 2002. It was a lso a unique occasion, as the 9th Business meeting of the Board was held for the first time outside CRIN Headquarters within the Substation's Office Complex.

Other visitors to the substation during the year are highlighted in the Table below:

Date	Name (s)	Position	Address	Purpose
21/2/02	Ipinmoroti R.R.	Senior Research Officer	CRIN Headquarters Ibadan	Research Mission
9/3/02	Bolarinwa A.A.	P.E.O.	CRIN Headquarters, Ibadan	Auditing Programme
9/4/02	Chief J.O. Ogunbayo; S.A. Osun; E.O. Bakare	Admin. Officer P.E.O.	CRIN Headquarters Ibadan	Pay parade to Pensioners
22/5/02	Rosemary D. Wilson	Agric. Personnel	T.A.D.P. Gembu	Coffee Seedlings collection
27/5/02	Abdulahi Ahmed	Undergraduate Student	University of Technology, Yola	Possible assistance on Coffee write-up.
10/6/02	Alhaji Akin Gbadamosi, Alhaji Abdulmumini Umar Hon. Ishaku Fei	Executive of Coffee & Tea Growers Association of Nigeria	39 Lagos Street Benin; Bashar Abba Nguroje; Vom, Jos South	Confirmation on release of planting materials to Adamawa and Taraba States.
14/6/02	Ishaku Yomu	Cocoa Farmers' Representative	Baissa Area	Cocoa Marketing & Chemical needs
16/9/02	Ipinmoroti R.R. Oloyede A.A.	S.R.O.; R.O.	CRIN Headquarters	Research Mission
16/10/02	Jauro Hammajulde Alim Gwale Alhaji Umaru	Chief of Kabri Farmer from Kabri	Kabri Ward	Situation on Coffee Marketing and Securing chemical for farmers
15/11/02	Abdulkarim Aliyu	Assistant Divisional Agric. Officer	Ministry of Agric. Gembu Taraba State	Coffee berries collection for planting.

Physical Development:

Restructuring of the Office Complex to provide offices for the four newly employed indigenes from Mambilla Plateau.

Construction of a pair of pit Latrine in three locations within the Residential quarters to augment the under utilized soak-away water system due to inadequate water supply.

Renovation of the Club House in line with the directive of the Chairman CRIN Governing Board while on working visit to the Substation. This also involved re-introduction of electricity (Rewiring) into the building.

Tractor shed relocation to reduce coverage area for the inadequate Security network

Substation Requirements:

Conversion of six or more casual workers presently engaged by the Substation within field unit into permanent staff to alleviate the problem of labour shortage in the day to day activities of the Station.

Payment of compensation to land owners. There is an urgent need to pay these both at Kusuku and Mayo-Selbe to keep at bay the pressure at both ends and to prevent further trespassing on the substation lands.

Extension of pipe-borne water to the Nursery to facilitate heavy watering during harsh dry seasons.

Replacement of the official vehicle mainly used to the Headquarters when need be or general overhauling of the vehicle, 504 Station Wagon where replacement is not feasible. The vehicle is the only link with Headquarters apart from Radio-phone.

Lastly, provision of fund to meet up with the day to day effective running of the Substation because of the high and non-comparable prices of commodities with Headquarters and other CRIN Substations especially fuel and lubricants on the Plateau.

IBEKU SUBSTATION (Officer-in-charge: O. Adebayo)

Field Operation: General maintenance was carried out throughout the year both in the commercial and experimental plots at Ibeku and Ugbenu. This involved slashing and weeding, pruning, removal of chupons, dry branches mistletoes, black pods, Harvesting and processing of cocoa pods, spraying of fungicide and insecticides against black pods disease and mirids.

Research Activities: Unlike the previous years, research activities had not been keen. The fungicide field trial had been suspended while the CFC programme was not attended to thoroughly. Other experimental projects needed to be reviewed by the Research Officers in charge.

Nursery Programme: The 5 million cocoa seedlings which were supposed to be raised by CRIN Ibeku Substation for Abia State was suspended and directed to be raised by the State Ministry of Agriculture and Natural Resources, in the year 2001. CRIN Ibeku Substation supplied the State Agricultural Department, the Hybrid Cocoa pods and we supervised their Nursery for Technical advice but in the year 2002 all efforts were made to encourage them for the continuation of the project but all was in vain, thus, no pods were sold to them and there was no action on the raising of the remaining 4 million cocoa seedlings by the State Ministry of Agriculture because of no funding.

Revenue: A total of ₦107,750.00 was realized as revenue for the year 2002. Armed bandits and thieves invaded the farms during the month of October and November.

Brake- down of the revenue realized:

Cashew nuts from Ugbenu	29030.00
Cocoa beans from Ibeku	73260.00
Bananas	380.00
Pineaples	80.00
Total	**₦107,750**

Staff Posting: The year witnessed the transfer of the former Officer-in-Charge, Mr. Marcus Efunla from Ibeku Substation to the Headquarters in March, 2002 while Segun Adebayo was retained as the Manager, Mr. Anuforo was transferred from Ibadan Headquarters to Ibeku Substation as the Deputy Manager of the Plantation.

Furthermore, 2 additional Agricultural personnel were employed to Ibeku Substation from Ibadan they are Miss Florence Nwanosike and Miss Uneka Asula Igwe. They both hold HND Agric. Extension and Crop Production, respectively.

Staff Strength: The staff strength increased to 6 senior staff and (11) junior staff.

Labour Workers: These are eight (8) but they are not very regular because of the little money (₦100/day) paid as wages. The situation had been bad since Umuahia has become State Capital, coupled with the fact that the estate is non-residential as it is miles away from where the labour force is available. The few casual workers are irregular because of the isolated situation of the Substation.

Promotions: The year 2002 was a significant year in terms of promotion in Ibeku Substation. About 95% of junior staff were promoted from HATISS I – HATISS 6). Among them were:

Mr. Anuforo, G.Z. - Promoted to HATISS 11
Mrs. J. Nzeh, Chief Typist - Promoted to HATISS 8
Mr. Cletus Onyebuchi from Messenger to Asst. Clerical Officer I
Mr. Uwadi Nmeregini - Clerical Officer I
Mrs. Anna Ikechi - Clerical Officer I
Mr. Festtus Onuh - Field Attendant
Mr. Chiara Innocent (of Ugbenu) - Field Attendant I
Mr. Jeremiah Nwachuku - Asst. Chief Agric. Field Overseer

We are very grateful for these.

Security: The station for now has 2 permanent security staff and one (1) casual security guard which is grossly inadequate. We need more casual security workers.

Transportation: The only 404 pick-up Peugeot is not reliable, when it works for a week, it develops mechanical fault for another 2 weeks because of the old age. A lot of money was spent on this vehicle to make it available on the road for the staff. Many letters had been written for a sound or

new vehicle for the station because it is the only substation which does not enjoy quarters facilities. We need a sound vehicle (reference to the 2nd, 3rd and 4th quarterly reports).

ERLS: Some private farmers and Government agencies came to the Station to inquire about some vital information on Cocoa Production Technology. We represented the Management very well on this.

Radio Phone: Not functioning. The masts had been removed and a letter informing the Management about the situation had been written but no reply had been given.

Overhead/Upkeep Allowance: presently, we are looking forward to the release of the 7 months overhead allowance for the Substation. Since the Management had requested us to send down the upkeep of June and July (N38,433.92, we have been denied the upkeep for 7 months. This made us to have a lot of liabilities to settle which include the following:-

Mr. Opara DTA for 2 nights	5,000.00
Mr. I.K. Ikoro for 2 nights	2,000.00
Adebayo DTA for 2 nights	10,000.00
Adebayo DTA for 2 nights	10,000.00
Non-accident bonus 2002	2,500.00
Leaking Office Roof	1,600.00
Vehicle maintenance 1	14,310.00
T& T Sundry for 4 staff	16,000.00
Post Office remittance to Abia State	6,900.00
Mr. Opara DTA (3)	7,500.00
Mr. Anuforo DTA (2)	10,000.00
Mr. Adebayo T & T	8,650.00
Odozor Book Allowance (approved)	4,530.00
Odozor T & T for Ugbenu	1,680.00
Plaque erected in front of the main office	13,500.00
Coop Ibadan yet to be settled Oct., November	69,400.00
FHS Fund Arrears	65,552.00
Vehicle maintenance II	9,850.00
Odozor	1,480.00
Adebayo T & T (December)	9,800.00
Total	**= N200,852.00 + N266,404.00**

Ugbenu Experimental Plot: Presently the office block can collapse at any time. A special report about the Substation had been written and action is yet to be taken on the issue. We are soliciting for the Director's visit to have a glance at the plantations.

AJASSOR SUBSTATION: (Officer-in-Charge : G. O. Adeyemo)

Cocoa Research Institute of Nigeria, Ajassor Substation in Etung Local Government Council of Cross River State started the year's operational activities with 6 senior members of staff, 32 junior staff and 15 casual workers.

Staff Strength: The staff strength cut across the Agricultural, Artisan and Administrative cadres. Only 15 casual workers covering the field and security sections were employed during the year ended. The substation with a total number of 77.03 effective hectarage with cocoa having 66.52 ha, kola 9.5 ha, coffee 3.03 ha., tea 0.16 ha.

Routine Activities:

These covered the areas of

(i) Research
(ii) General Maintenance of plots and quarter environment
(iii) Production and Revenue Generation
(iv) Weather Records
(v) Extension/Education Programme

Research: Prompt and adequate data collection were undertaken during the year under review. The 1967 F_3 Amazon, Fungicide Trial experiment in which Funguran Champ- D. Ridomil Gold and Ridomil Plus were sprayed on the plot.

The Farming System: Yield data were collected from the experimental plot for onward transmission to the Headquarters in Ibadan.

Cocoa Rehabilitation: At the Experimental II plot, data collected from the experiment were equally remitted to the Research Officer in-charge of the experiment for analysis.

The Tea Plot: At the tea experimental plot, efforts were geared towards the adequate maintenance of the plot.

The Meteorological Garden: In spite of reports on some of the damaged thermometers without replacement, the daily recording of rainfall and temperatures were taken during the period under review.

General Maintenance of Plots, Office and Quarter Environment: The in-adequate labour situation at the Ajassor substation hampered the effective maintenance of plots which probably contributed to incessant reported cases of pilfering of cocoa pods and kolanuts at the station.

The encroachment on CRIN land and plots could equally be attributed to poor maintenance of plots' low productivity because the few labour being used during the period were not enough to work round the plots; coupled with the high rate of weed growth in this part of the country.

Going by the zeal of the few workers in the substation, maximum efforts were put into concentrating on the plots; limiting the situation to the work force.

However, slashing, under- brushing, harvesting and ight pruning activities were undertaken on cocoa, kola, coffee and tea plots during the period under review.

Also, the T 38 experimental plot and the Okondi experimental plots were equally given the required attention.

As a result of the poor labour force, the idea was initiated in which every member of the CRIN community took part in every Tuesday-weekly environmental sanitation in which all residents were made to maintain the quarters and the road paths. This sanitation usually started by 3.00 p.m. and ended by 4 o'clock in the evening.

It was observed at the later part of the year under review that the people were now feeling adamant to come out for the exercise.

It would however be necessary to remind the CRIN Management of the promise made to the casual workers in which it was stated that "ten out of fifteen casual workers on CRIN pay-roll were pronounced converted to established staff with immediate effect" during the maiden visit to Ajassor substation by the Governing Board members in November 1999.

As it had been reflecting in my previous reports, nothing had been done in this regard up till now.

Production and Revenue Generated: Going by the limited available workforce, the substation was able to realize a total sum of six hundred and sixty four thousand, five hundred and eighty-nine Naira thirty four kobo (N664,589.34) for the year ended. The revenue generated came from the sales of

cocoa seedlings, cocoa beans, house rent, health care, kola seedlings, oranges, transport etc.

The station could have done better if there had not been diversion of efforts to the opening of new plots for Tea and cocoa. It is very sad that the crops were never planted.

Nursery Work: The nursery activities began in the month of October with the digging of top-soil and erection of shade.

A total of twenty-two thousand cocoa seedlings were raised by the end of the month of December, 2002. The nursery work would continue until the set target is met. Also, the coffee berries received from the Headquarters for the production of five thousand coffee seedlings to be supplied to Cross River, Akwa-Ibom and Ebonyi States as directed had been sown and had started sprouting at the pre-nursery site. It will later be transplanted into polythene bags.

Extension Education/Village Visits: During the year under review, extension visits were made in and around villages where CRIN scheduled crops were being cultivated. Among the villages visited were Bendeghe, Etomi, Akparabong, Effraya, all in Etung Local Government Area of Cross River State. Also, Boki, Akpabuyo, Ikom and Obubra Local Governments were touched. During the visits, cocoa farmers were further enlightened on the need to imbibe the most recent techniques involved in the cultivation/rehabilitation, harvesting, processing and maintenance culture on their farms.

During the year, twenty two agricultural students from three different colleges were on industrial field attachment for periods ranging from 8 weeks to 16 weeks. All were trained on various activities of CRIN mandate crops.

Weather Records: A total of four thousand five hundred and fourteen point three four millimeters of rainfall was recorded for the year under review (4,514.34mm).

The break down of the rainfall is as follows:

1st Quarter	-	630.00 mm
2nd Quarter	-	683.30 mm
3rd Quarter	-	2,096.90 mm
4th Quarter	-	1,104.14 mm
Total rainfall for the year	=	4,514.34 mm

Problems militating Against Effective Performance in Ajassor Substation And Suggested Solutions

In-adequate Labour : Ajassor substation being the largest and probably next to CRIN headquarters has not been adequately allocated the required labour force commensurate to the effective cropped land area. Many established staff that retired either on age or long service grounds were not replaced, thereby reducing the number of workers and at the same time affecting the overall performance of the station. It is however suggested that more hands be employed for the substation which would in effect improve revenue generation of the substation.

Poor Funding: Funds were not made available for the procurement of necessary materials and chemicals. If funds are provided for the purchase of items with a little autonomy in which a reasonable amount of money could be spent on some pressing items without first applying to the Headquarters which in the next six or twelve months one would be waiting for approval before such things or items could be procured, I think there would be tremendous achievements made rather than waiting for months for approval to come if at all. Some times, by the time such approval would come, the items would have been out of reach since prices earlier quoted would not be on the standstill.

Poor Living Conditions: Most houses and offices in which we operate at the substation are on the verge of collapse. During raining season, most occupants of our quarters are highly disturbed as a result of leakages from the roofs of the buildings.

The access roads to the office and quarters are nothing to write home about. The condition of the roads are so bad. It would be highly appreciated if the buildings could be refurbished and the roads be graded and laterites poured on them to encourage the visitors and CRIN inhabitants.

Poor Medical Facilities: It is a fact that CRIN has a health centre manned by a professional nursing sister, most times when workers or their families have cause to visit the place and prescriptions are

made, no single drug could be given. The poor staff that probably had not got about 2 months salary when given some drug prescription would not be able to buy, hence, can lead to one's untimely death.

It is suggested that regular supply of drugs to the health centre would encourage the workers to always put-in their best at work. Efforts should also be made to employ one more nurses for continuity at work whenever one is not around considering the danger involved when a patient is rushed to the health centre and no one to attend to the affected.

Delay in Salary and Wages: The delay of salaries and wages has been a serious problem that highly affected workers' performance at work and homes. Going by the saying, "A hungry man is an angry man." From experience, virtually all substations' salaries and wages are delayed. This affects greatly the performance of workers. Workers salaries at the headquarters are first paid before the processing of those for substations could be considered.

It is advised that substation staff and casual workers should equally be considered alongside with the Headquarters when machinery for payment is being put in place.

Having stayed and worked in the substation for quite some time, I am convinced that substation workers are highly dedicated and this is the reason why they need encouragement to reciprocate their dedication, hence, they need to be motivated by prompt and regular payment of salaries and wages.

Encroachment and Stealing: This had been a major prevailing problem in the substation. The community started the land encroachment in 1995 but was called to order with the intervention of the armed police men in a meeting with their chiefs.

After some time, it was observed that the illegal cultivation did not stop. The matter was reported to the clan head who proved his innocence about the whole problem. The Divisional Police Officer of Etung Local Government had equally been informed and the police had been on surveillance on the areas in question.

Also, most times, we discovered the un-authorized harvesting of cocoa and kola of which no person had been caught.

On encroachment, the management is advised to secure an approved survey plan of land area belonging to CRIN and a more permanent structure erected round the boundaries since almost all the *Melina aborea* trees planted round the boundaries had been cut off by the illegal farmers claiming themselves as the land-lords.

In order to curb stealing of CRIN farm produce, more hands should be employed to support the few security men presently serving.

Ajassor indigenes should be employed as staff. It was always being said that their people are not represented in CRIN that is placed on their land.

I believe if some of them are employed as staff, the encroachment issue would be reduced if not totally stopped.

With all the above highlighted problems and solutions, the CRIN management should try and look critically into them and solve them for improved and effective productivity in the year 2003.

Visitors to CRIN Ajassor:

During the year under review, many important dignitaries paid visits to CRIN Ajassor substation. Among who were the clan head of Ajassor Ntufam Raymand Nku, the Paramount Ruler of Etung Traditional Council of Chiefs and Chairman Cross River State Council of Chiefs HRH Ntufam Emmanauel Oru Ojong.

Also Messrs Peter Aikpokpodion – Senior Research Officer from Plant Breeding Group with Messrs Azeez Raji and M. Efunla were on official research assignment at the substation. Mr. Babalola Obatolu also came to administer some questionnaires based on farmers problems in cocoa growing local government areas of Cross River State.

CRIN SUBSTATION AJASSOR

SUMMARY OF REVENUE FOR YEAR 2002

Particulars of Revenue Items 4th Quarter ter

	Jan	Feb.	Mar.	Total	April	May	June.	Total	July	Aug.	Sept.	Total
	₦	₦	₦	₦	₦	₦	₦	₦	₦	₦	₦	₦
House Rent	3675	2325	56574.88	62574.88	2932754	1350	49802.84	80480.68	31903.08	27559.7	32075	91537.7
Cocoa pods	5510	750	2320	8580	2900	4700	2780	10380	500	400	450	135
Health Care	1700	-	1200	2800	500	700	1700	2900	700	700	1000	240
Cocoa Seedlings	3000	-	8000	11000	-	4000	51940	55940	-	-	-	
Transport	4200	-	7000	11200	-	2500	9000	11500	6400	1000	1400	880
Farm Fruit	-	2950	2900	5860	-	2820	-	2820	-	-	1140	114
Oranges	-	40	0	40	-	-	-	-	-	-	-	
Kola Seedlings	-	500	500	1000	-	-	3500	3500	-	-	-	
Plantain Banana	-	-	-	-	-	400	-	400	-	100	-	10
Cocoa Beans	-	-	-	-	-	37731	59500	97231	-	-	-	
Kolanuts		-	-	-	-	-	-	-	-	-	-	
Total	**18085**	**6675**	**78494.88**	**103154.88**	**32727.84**	**54201**	**178222.84**	**265151.68**	**39503.08**	**29759.7**	**36065**	**105327.7**