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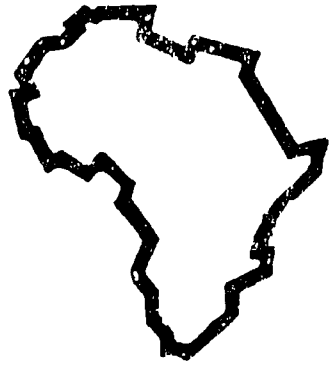
UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT
ENVIRONMENTAL TRAINING AND MANAGEMENT IN AFRICA

Final Report for the
Workshop on

ROLE OF EXTENSION IN ENVIRONMENTAL MANAGEMENT AND AGRICULTURE



SIERRA LEONE
May 16 - June 3, 1983

Prepared by

ALABAMA A&M UNIVERSITY
HUNTSVILLE, ALABAMA 35762

TABLE OF CONTENTS

ACRONYMS USED IN THE FINAL REPORT

AAMU	=	Alabama Agricultural and Mechanical University
ACRE	=	Adaptive Crop Research and Extension, A USAID Project
ETMA	=	Environmental Training and Management for Africa
GOSL	=	Government of Sierra Leone
IADP	=	Integrated Agricultural Development Project
LWDD	=	Land and Water Development Division
MAF	=	Ministry of Agriculture and Forestry/GOSL
SECID	=	South East Consortium for International Development
USAID	=	United States Agency for International Development
USIS	=	United States Information Service

I. BACKGROUND

This is the final report of the ETMA workshop entitled Role of Extension in Environmental Management and Agriculture held in Freetown, Sierra Leone, West Africa, May 16 to June 3, 1983.

There are several documents that have been developed which supplement this final report and provide the necessary background. In order to be succinct and to avoid redundancy, such documents are identified below and cross-tabulated against their subject content.

a. Workshop Design and Planning Subcontract

This was personal services subcontract with G. C. Sharma and E. W. Gooding for pre-workshop planning trip to Sierra Leone. It outlined terms reference and SECID's assignment of responsibility in terms of workshop planning.

b. Working Agreement/Workshop Design Paper.

A formal workshop plan cosigned by GOSL, SECID, AAMU, and USAID which outlines workshop objectives, identifies host-country agencies, outlines the workshop evaluation approaches, identifies themes and broad principles of the workshop, identifies participants and target groups, outlines schedule of planning and implementation, delineates AAMU and host institution LWDD/MAF responsibilities, provides schedules of subtopics of the workshop, provides host institutions budget, and provides background related to host institution. A review of Working Agreement is essential for a full understanding of workshop parameters.

c. AAMU Budget Request for Workshop Implementation

AAMU having been designated to implement the workshop, submitted a budget and justification which outlined tasks and budget categories for services to be provided by AAMU.

d. SECID's Subcontract with AAMU for Workshop Implementation

SECID subcontracted with AAMU to retain it as the ETMA institution for the implementation of the workshop. The subcontract was a finalized version of AAMU's responsibilities and budget allocation.

e. Workshop Program

The final version of the workshop program as developed and finalized by LWDD which identifies subtopics, timing and speakers associated with each topic (APPENDIX 1).

f. Final Report by the External Evaluators for the Workshop

This report outlines structure of the workshop content, workshop evaluation, general policy recommendations, specific recommendations, summary of recommendations of participants, and provides a detailed and partial summary of workshop evaluation by the participants. This report was provided by the External Evaluators who were retained by SECID at the recommendation of AAMU team and LWDD senior workshop organizer staff. The report is being submitted concurrent to this Final Report.

g. Participant Workbook

The workbook was developed by AAMU and provided to each workshop participant. Its preface identifies the role of AAMU Staff and provided 430 pages of reading material selected by AAMU team and staff; covered each topic and subtopic, included a list of audiovisuals selected for the workshop. Copies of the workbook have been supplied to SECID under separate cover.

h. The Mega Book

This is a form of Environmental Management reading materials-Library Set. It included the product of DIALOG literature retrieval

(b) Identification of Workshop Audiovisual Materials: During the workshop planning phase it was realized that the effectiveness of information transfer in the workshop could be markedly improved if relevant audiovisual aids could be identified, acquired in U.S. and utilized in the workshop sessions.

With support from AAMU's Library Media Center, particularly utilizing the expert assistance of Ms. Barbara Woolnough, the process was initiated in March, 1983. In order to identify relevant materials, the collection of the Library Media Center was evaluated and several media materials in AAMU's collection were identified and provided for usage in Sierra Leone at no cost to the ETMA program. Additional materials were selected using The Film Locator (Bowker, New York), Iowa State University and University of Iowa Media Center, Time/Life Audiovisuals, Public Broadcasting Service Materials, Encyclopedia Britannica's Audiovisuals and from a plethora of other commercial vendors who specialize in the development of visuals in natural resource and agriculture areas. A final list of selected materials taken to Sierra Leone was included in the workbook and is included here as Appendix 5 for ready reference. As it can be observed, audiovisuals for each workshop topic were included. The impact of audiovisual materials was assessed by the participants and the response is summarized in the External Evaluators report.

(c) Identification of Reading Materials: The identification process began during the planning visit to Sierra Leone. Materials were collected at Njala University College and USAID Library, Freetown, Sierra Leone. In both places the entire natural resources, agriculture and extension related publications were scanned and relevant materials were selected. In April, 1983, Dr. Basil Pinker, Forester and Ecologist

was employed for 1 month as Research Associate by AAMU to assist the team in the processing and compilation of material. A Dialog literature search was done utilizing two search strategies. One was to locate major reference works in the twelve subject areas. Second, was to identify all published works listed in the various DIALOG databases related to Africa, West Africa, and Sierra Leone related to the workshop topics. In both cases DIALOG's commonwealth Agricultural Bureau (CAB) abstracts were found invaluable and were extensively searched. The printouts of such literature searches were utilized in identifying relevant papers at three libraries: AAMU, University of Tennessee, Knoxville, and North Carolina State University, Raleigh. Also special visual aids on malnutrition in LDCs were ordered and received from England and various other materials were received from Cornell and Swansen Nutrition Center, Nebraska. In addition, professional contacts of several AAMU faculty, SECID's ETMA library were also utilized in identifying the reading materials. As a result of these efforts some 2,800 pages from various papers and chapters of books, etc. were located and photocopied. This entire collection was organized in an Environmental management reading materials library set which was provided to LWDD. From such material 430 pages of the most significant background material was painstakingly selected, and 100 copies were made for distribution among participants by LWDD to various key organizations and individuals in Sierra Leone, for SECID, and AAMU's file copies. Most of the reading material was size-reduced to accommodate two pages of text on each printed page of the workbook in an attempt to provide the maximum amount of useful material to the participants.

(d) Collection of other materials: During workshop planning LWDD, ETMA and AAMU personnel who met in Freetown identified several office supply materials useful for a successful workshop but unavailable in Sierra Leone. These included several stationary items. These materials were acquired and taken to Freetown, Sierra Leone.

III. AAMU, ETMA, & U.S. EMBASSY'S WORKSHOP PARTICIPATION

As identified in the workshop program (Appendix 1) the team members presented and moderated the sessions specified. G. C. Sharma presented papers on the basic ecological and environmental concepts, and on agricultural mechanization. He moderated sessions on forestry and wildlife management. B. O. Okezie presented a paper on nutritional problems and corrective activities and moderated sessions on human ecology and also moderated the session on upland farming at the request of LWDD and AAMU organizing committee. McArthur Floyd presented a paper on environmental stress and moderated two sessions on modern agricultural practices and their impact on environment. G. C. Sharma delivered the vote of thanks at the opening ceremony of the workshop which included an introduction to FTMA, SECID and AAMU. B. O. Okezie delivered a statement at the closing ceremony which included a summary of ETMA/AAMU team's salient observations during the workshop.

Equally important was AAMU team's workshop participation in several key areas during the workshop. The AAMU team participated in major day-to-day decisions during the workshop. The team generally kept a 10-hour-day schedule whereby team members were available for discussion in all sessions. At the end of the workshop day, they participated in evaluation of that day's sessions and developed

strategies that could improve the effectiveness of the workshop in the subsequent sessions. During evenings the AAMU team reviewed the next day's audiovisual materials to be shown. This was done in the presence of Sierra Leonean counterparts and external evaluators so that the most relevant aids were utilized. The host-country organizers always consulted with AAMU team about last-minute changes in the program if any had to be made. The presence of the entire team for the duration of the workshop was a clear asset in the success this workshop achieved.

SECID's ETMA staff, particularly Dr. Earle Buckley, Mr. Steve Shoaf and Ms. June Thompson, provided invaluable support during workshop planning phase. Mr. Julien Engel, ETMA/SECID representative in West Africa, also remained in contact with AAMU Team leader during the planning phase of the workshop. He also participated in the summary and conclusion session and in the closing ceremony of the workshop.

AAMU's team was gratified by the active participation by Her Excellency, the U. S. Ambassador to Sierra Leone, Ms. Ann Healey. She formally participated in delivering the key note address at the opening ceremony and in the presentation of workshop certificates at the Closing Ceremony (see Appendix 2). Prior to the workshop, the Ambassador met with the team and also requested a second meeting towards the end of the workshop to personally obtain the team's impression of the workshop's deliberation and recommendations. The USAID staff of the Embassy, Mr. W. Sefas, AID Officer, Mr. Winston Weber and Mr. Will Scarborough provided excellent support. The USIS officer and USAID officer jointly invited workshop participants to a reception and for the showing of certain audiovisuals utilizing video cassette recorder and TV equipment.

forestry, the firewood crisis, loss of primary forest and lack of reforestation activities, indiscriminate loss of wildlife and steps taken for wildlife preservation, animal husbandry practices and constraints related to veterinary medicine. Agricultural mechanization discussions centered around subsidized tractorization and relatively more environmentally sound oxenization schemes. Unregulated import and commerce of pesticides and their misuse, for example in fishing, among the fishermen drew considerable discussion. Lack of water as an environmental stress factor along with the constraints placed by excess of it during rainy season, aluminum and low pH toxicity, salinity and other stress factors were discussed. Rehabilitation of mined-out areas resulted in extensive discussion of all factors under which mining is practiced in Sierra Leone. The apparent lack of rehabilitation activities was evident. The rate of population growth, impact of migration, the status of public health and human nutrition concerns were discussed. The lack of a comprehensive extension service in Sierra Leone was highlighted, and how extension activities are under taken by MAF, IADP, ACRE and other projects were evaluated.

The workshop recommendations as they related to aforementioned discussions are provided in the external evaluator's report.

4. On each day concurrent to each of the workshop discussions the national radio and television covered the topics discussed. All of the AAMU's team members and many other speakers and moderators and organizers were interviewed. Such interviews were broadcast during a special half-hour radio program in the evenings. The workshop was truly a national event. In Freetown and in the provinces, many people knew about the workshop.

5. For posterity, certain weaknesses of the approach taken in conduct of workshop should also be mentioned. For certain topics there were too many speakers which resulted in reducing time for discussion and some overlapping. More comprehensive treatment of issues at hand by fewer speakers could have been more effective. The participants shared their feeling about the limited opportunity for discussion.

How much time is adequate for discussion is a challenging question for any working organizers. When adequate time was available, on numerous occassions, the discussion tended to digress from the main issues. The ability of moderators to steer the discussion varied considerably. Many were quite effective in doing so while others permitted a broad, general discussion. Each morning and afternoon session allowed for at least 30 to 45-minute discussion period.

Some criticism emerged related to the limited time alloted to the topic of extension. Altogether, one full day was devoted to extension and information delivery and one day designated as the farmers' day. Agroforestry extension needs, and public health and nutrition extension activities were also part of the program. Several participants commented that it was still insufficient. The workshop organizers, during the planning period, placed greater emphasis on bringing environmental management information to participants and extension workers rather than on how to deliver such information to the clientele. For future programming, greater balance between issues, subject matter and information delivery should merit consideration.

V. WORKSHOP RELATED RECOMMENDATIONS AND IDENTIFICATION OF FUTURE ETMA ACTIVITIES IN SIERRA LEONE.

(For recommendations--as they emerged--related to the subject content of the workshop, refer to external evaluators' report).

1. Based on the efficient manner in which this and the previous two ETMA workshops were conducted, it is evident that LWDD has similar interest as ETMA program, and has the ability and willingness to participate in ETMA activities. Future ETMA activities in Sierra Leone should be undertaken jointly with LWDD.

2. Having conducted two workshops in Sierra Loene, AAMU's team feels that ETMA's future activities should include bolstering Sierra Leone's capability to resolve its environmental problems utilizing operational projects. One area that emerged as a potential ETMA project dealt with aiding GOSL in improving its environmental monitoring capability. This will permit LWDD to undertake studies to evaluate impact of upland farming on soil loss; impact of swamp development on swamp ecology and fresh water quality; extent and type of environmental disruptions caused by diamond, gold, bauxite, iron, and lignite mining; monitoring of pesticide imports; use and assessment of pesticidal pollution and pesticidal misuse. Human health problems, problems associated with improper sewage disposal, extent of mosquito breeding grounds are all environmentally related problems in which monitoring is the first step before such problems can be tackled. The ETMA program should give serious consideration to supporting such activities. Alabama A&M University stands ready to assist LWDD/GOSL development of such monitoring capability.

APPENDICES

WORKSHOP ON "THE ROLE OF EXTENSION
IN ENVIRONMENTAL MANAGEMENT AND AGRICULTURE"

16TH MAY - 3RD JUNE 1983

ORGANISED BY:

- LAND AND WATER DEVELOPMENT DIVISION
  FAO/UNDP-MAF

- ALABAMA AGRICULTURAL AND MECHANICAL
  UNIVERSITY U.S.A.

FREETOWN, SIERRA LEONE

APPENDIX 1

The Workshop will be co-sponsored by:

- The Ministry of Agriculture and Forestry (MAF), Government of Sierra Leone.

- The South-east Consortium for International Development (SECID)

within the framework of the Environmental Training and Management in Africa (ETMA) Programme with support from the United States Agency for International Development (USAID).

INTRODUCTION

This workshop on the "Role of Extension in Environmental Management and Agriculture" is a follow up of the first workshop on Environmental and Resources Management which was held in Freetown in November, 1982 with the title "Landuse Planning for Rural Development with special attention to environmental management".

The main objectives of the workshop are:

a) to examine the present agricultural and other resources management techniques in the different ecosystem of the country

b) to demonstrate the feasibility of improved resources consideration and utilization by proper environmental management

c) to describe the role of the extension worker in promoting sound environmental techniques

d) to present extension methods of environmental information transfer to the farmers

The first two days of the workshop will cover registration and opening formalities and a one day overview of four broad interdisciplinary topics related to environmental and resources management. The second part will cover ten specific environmental topics namely: Upland farming, Swamp Management, Marine and fresh water aquaculture, Forestry, Wildlife management, Livestock management, modern agricultural practices and their impact on environment, environmental stress, mining, human ecology and effective rural information delivery system for environmental management.

Two days will be spent on field excursions to areas which present explicit illustrations of environmental and resources management problems relevant to the specific environmental topics.

O.L.A. Gordon
Workshop Coordinator

LIST OF ABBREVIATIONS

ACRE - Adaptive Crop Research and Extension

AA&MU - Alabama Agricultural and Mechanical University

ETMA - Environmental Training and Management in Africa

FAO - Food and Agricultural Organisation of the United Nations

FBC - Fourah Bay College, University of Sierra Leone

FIC - Forest Industry Cooperation

IITA - InInternational Institute for Tropical Agriculture

LRSP - Land Resources Survey Project (Now LWDD)

LWDD - Land and Water Development Division

MAF - Ministry of Agriculture and Forestry

NAO - National Authorising Office

NUC - Njala University College

PEMSU - Planning Evaluation Monitoring and Services Unit

SECID - The South-East Consortium for International Development

USAID - United States Agency for International Development

United States Agency for International Development

3031

ROGRAMME

Monday 16th May - Friday 3rd June, 1983 at the Institute of Public Administration and Management Conference Hall, Tower Hill.

onday 16th May, 1983

pening Ceremony

9,45 a.m.	Arrival of Guests
10.00 a.m.	Opening remarks and introduction of Chairman - Mr. A.A.W. Jalloh, Director, Land and Water Development Division.
hairman	Mr. J.D. Sandy, Permanent Secretary Ministry of Agriculture and Forestry
	Chairman's remarks
	Keynote address - H.E. Ms Ann Healy American Ambassador to Sierra Leone
pening ddress	Minister of Agriculture and Forestry
tatement	Chief Agriculturist - Mr. C.B. Sesay
ote of hanks	Dr. G. Sharma, Alabama A & M University, U.S.A.

Tuesday 17th May, 1983

8.30 - 9.30 Registration

1 THE OVER VIEW

9.30 - 10.30 Session One: Moderator - *Mr A.A.W. Jalloh Director, LWDD*

- **The Basic Ecological and Environmental Concepts**

  Presentors - *Dr G. Sharma - AA&MU*
  Prof. Harry Turay - NUC

- **The Landuse Pattern and Practices in Sierra Leone**

  Presentor - *Prof. Harry Turay - NUC*

10.45 - 12.30 Session Two: Moderator - *Mr A.A. Sandy - NUC*

- **The influence of Agriculture on Environment and Effects of vironment on Agriculture in Sierra Leone**

  Presentors - *Mrs. Fonda Akiwumi - LWDD*
  Dr. Andrew Bona - NUC

- **Function of Extension in Environmental Management and Agricultural Development**

  Presentor - *Mr A.J. Kaikai - LWDD*

2. UPLAND FARMING

14.00 - 15.30 Session Three: Moderator - *Hon M.S. Kargbo PSA II, MAF*

- **The past and present of Upland Farming in Sierra Leone**

  Presentors - *Mr F.M. Kargbo PAO, Kenema*
  Mr L.M. Feika DCA, MAF

- **The Bush/Fallow Cultivation**

  Presentors - *Dr C. Cusani-Visconti, LWDD*
  Mr A.A. Sandy, NUC
  Mr Gilbert A. Sekgoma, FBC

45 - 17.15 Session Four: Moderator - *Mr A.J. Kai Kai - LWDD*

The Upland Farming in Boliland - The Problems and Potential

Presentors - *Mr F.M. Kargbo, PAO, Kenema*
Mr B.T. Johnson ACA, MAF

A Plan for Environmentally Sound Upland Farming and Forestry Practices

Presentors - *Mr A.P. Koroma DCCP, MAF*
Mr M.S. Mansaray, Rokupr

sday 18th May, 1983

SWAMP DEVELOPMENT AND UTILISATION

0 - 10.30 Session One: *Presented by LWDD staff*

Swamp Ecosystems in Sierra Leone

45 - 12.00 Session Two: Moderator - *Mr W. Ferguson FAO/LWDD*

Methods and Environmental Considerations for Inland Valley Swamp Development

Presentors - *Dr G. Sharma, AA&MU*
Mr W.R. Dingle, FAO/MAF

00 - 15.00 Session Three: Moderator-- *Mr L.M. Feika DCA, MAF*

Methods and Environmental Considerations for Riverain Swamp Development

Presentors - *Mr A.A.W. Jalloh, Director LWDD*
Mr M.B. Ngele, NUC

50 - 17.15 Session Four: Moderator - *Mr L.M. Feika, MAF*

Methods and Environmental Considerations for Boliland Swamp Development

Presentor - *Agriculture Division*

- **Methods and Environmental Considerations for Mangrove Swamp Development**

Presentor - *Mr Solomon Saidu, Agricultural Economist, MAF*

Thursday 19th May, 1983

4 MARINE AND FRESH WATER AQUACULTURE

9.00 - 10.30 Session One: Moderator - *Prof. D.E.B. Chaytor, FBC*

- **The Fresh Water Ecology**

Presentor - *Dr I.W.O. Findlay, FBC*

10.45 - 12.00 Session Two: Moderator - *Prof. D.E.B. Chaytor, FBC*

- **The Marine Water Ecology**

Presentor - *Dr R.A. Basimi, FBC*

14.00 - 15.30 Session Three: Moderator - *Prof. D.E.B. Chaytor, FBC*

- **The Fresh Water Aquaculture**

Presentors - *Miss Bernie McCarton, NUC*
Mr M.F. Sheriff

- **The Coastal Water Aquaculture**

Presentor - *Mr M.F. Sheriff*

15.45 - 17.00 Session Four: Moderator - *Prof. D.E.B. Chaytor, FBC*

- **The Offshore Fisheries**

Presentors - *Mr A.B.C. Jones, [illegible], Fisheries Division*
Mr P.P. Jones, F.D., Fisheries

iday 20th May, 1983

5 FORESTRY

9.00 - 10.00 Session One: Moderator - *Dr G Sharma, AA&MU*

- Forestry in Sierra Leone - A Historical View

  Presentor - *Mr M.B.D. Feika, CCF, MAF*

10.30 - 12.00 Session Two: Moderator - *Dr G. Sharma, AA&MU*

Ecological and Commercially Important Flora and Agro-Forestry Systems of Sierra Leone

Presentors - *Mr M. Jambawai, C.F., Kenema*
Mr E.K. Allieu, DFO, Bo

The Present status and Innovative Approaches to Forestry

Presentors - *Dr D.S. Amara, NUC*
Mr B. Kamara, C.F., MAF

4.00 - 15.30 Session Three: Moderator - *Mr M. Jambawai, C.F., Kenema*

Utilisation of Forest Resources - Fuel wood needs of Sierra Leone

Presentors - *Mr O.R. Davidson, FBC*
Mr Abdulai Wurie, Asst. Director, FIC
Dr W. Johnson, FBC
Mr A.P. Koroma, DCCF, MAF

.45 - 17.15 Session Four: Moderator - *Mr Mansa Musa,*

The Agroforestry Extension Training Needs, Constraints and Approaches

Presentors *Mr A.P. Koroma, DCCF, MAF*
Mr S.A. Mansaray, CP, MAF

Monday 23rd May, 1983

6. WILD LIFE MANAGEMENT

9.00 - 10.00 Session One: Moderator - *Dr G. Sharma, AA&MU*

- Historical and Present Status of Wild Life and Wild Life Preservation in Sierra Leone

  Presentors - *Mr Mansaray - Makeni*
  Mr C. Teleki, Ontamba - Kilimi National Park, Kamakwie

10.30 - 12.00 Session Two: Moderator - *Mr G. Teleki, Ontamb National Park, Kamakwie*

- Sound Wild Life Preservation Habitat Development - Case Studies from other countries

  Presentor - *Mr Alphonsou Turay*

7 LIVESTOCK MANAGEMENT

14.00 - 15.30 Session Three: Moderator - *Mr M.E.S. Lamin, ACA, MAF*

- Historical Background and Present Programmes of Animal Husbandary in Sierra Leone
- Small Ruminant and Poultry Husnhandry

  Presentor - *Dr. I.C. Hassan, D.C.V.O. Vet. MNR*

15.45 - 17.15 Session Four: Moderator - *Mr M.E.S. Lamin, AC MAF*

- Animal Health and Veterinary Activities in Sierra Leone

  Presentor - *Dr. K.A. Kamara, S.V.O. Vet. MNR*

Tuesday 24th May, 1983

- Field Trip to Njala University College

  Co-ordinators - *Mr Paul Starkey, NUC*
  Dr Al Agard - ACRE

Wednesday 25th May, 1983

8 MODERN AGRICULTURAL PRACTICES AND THEIR IMPACT ON ENVIRONMENT

9.00 - 10.30 Session One: Moderator - *Mr L.M. Feika DCA, MAF*

- **Agricultural Mechanization and its Impact on Environment**

  Presentors - *Dr G. Sharma, AA&MU*
  Mr Paul Starkey, NUC
  Dr Rashid Noah, NUC

- **Appropriate Mechanization and Oxenization for Sierra Leone**

  Presentors - *Mr Paul Starkey, NUC*
  Dr D. Jaschke, LWDD

10.45 - 12.30 Session Two: Moderator - *Dr Rashid Noah, NUC*

- **Dry Land Irrigation and Drainage Activities**

  Presentor - *Mr Thimi, LWDD*

14.00 - 15.30 Session Three: Moderator - *Dr M. Floyd, AA&MU*

- **Pesticides Common to Sierra Leone and Their Environmental Impact**

  Presentors - *Dr Cyrus Macfoy, FBC*
  Mr Lamin Seray, MAF
  Mr A.C. Lahai, NUC
  Dr. B.D. James, FBC

15.45 - 17.15 Session Four: Moderator - *Dr. M. Floyd, AA&MU*

- **Fertilizer Usage and its Effect on Water Quality**

  Presentors - *Prof. E.J. Thompson, NUC*
  Dr. Nana Pratt, FBC
  Mr A.J.O. Williams, LWDD
  Mr O.A. Amara, NUC

Thursday 26th May, 1983

9 ENVIRONMENTAL STRESS

9.00 - 10.00 Session One: Moderator - *Mr A.S. Lamin, LWDD*

- **Environmental Stress Factor Affecting Crop Production and Corrective Measures Employed in Sierra Leone**

  Presentors - *Dr J.B. George, NUC*
  Dr M.T. Dahniya, NUC
  Mr S.I. Kamara, NUC
  Mr R.K. Rajos, NUC

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10.30 - 12.00 Session Two: Moderator - *Dr Cyrus Macfoy, FBC*

- **Environmental Stress Factors and their Corrective Measures - Case studies from other countries**

  Presentors - *Mr Andrew Boma, NUC*
  Dr M. Floyd, AA&MU

14.00 - 17.00 Session Three: Moderator - *Dr. M Floyd, AA&MU*

- **Presentation of Slides and Films related to Wild Life, Environmental Principles and Practices**

Friday 27th May, 1983

10 MINING

9.00 - 10.00 Session One: Moderator - *Mr A.A. Koroma, Managing Director, NDMC*

- **Historical and present status of Mining Activities in Sierra Leone**

  Presentors - *Mr Abdulai Rashim, Asst. Director, Mines Division, Kenema*
  Dr A.Y.S. Kamara, Geological Survey
  Representative - Mines Department

0.30 - 12.00 Session Two: Moderator - *Dr V. Strasser-King, FBC*

Environmental Disruptions caused by Mining and Corrective Approaches taken in Sierra Leone

Presentors - *Mr Umaru B. Wurie, Magbosi, IADP*
Mr Alvin Royston-Davies NUC(Student)
Mr. Sylvester Dumber NDMC

Methods of rehabilitation - Case studies from other countries

Presentor - *Mr Umaru B Wurie, Magoosi IADP*

HUMAN ECOLOGY

4.00 - 15.30 Session Three: Moderator - *Dr Arthur Abraham, MRU*

Human Ecological Considerations in Environmental Management

Presentor - *Dr Paul Richards, NUC*

Demographic Patterns of Sierra Leone - Past, Present and Future

Moderator - *Mr Armand Thomas, FBC*

Presentors - *Dr H.R.S. Kandeh, NUC*
Dr Arthur Abraham, MRU
Dr John Karimu, FBC

5.45 - 17.15 Session Four: Moderator - *Mr Alpha Dumbuya, P.S., MAF*

Family Planning Efforts in Sierra Leone

Presentor - *Mr Clifford Roberts, MSFC*

Socio-Economic Problems in Environmental Management

Presentors - *Dr John Karimu, FBC*
Mr Clifford Roberts, MSFC
Mr T.S. Bangura, [illegible]
Mr Sam Kargbo, [illegible]

Monday 30th May, 1983

FIELD TRIP TO MARAMPA MINES

Tuesday 31st May, 1983

9.00 - 10.00 Session One: Moderator - *Dr Okezie, AA&MU*

- **Public Health Activities in Rural Sierra Leone**

Presentor - *Mrs Fatu Yumkella, Min. of Health*

10.15 - 12.00 Session Two: Moderator - *Mrs P.N. Njai*

- **Nutritional Problems and Corrective Activities in Sierra Leone**

Presentor - *Miss S. Scott, Senior Nutritionist, Min. of Health*

- **Nutritional Problems and Corrective Activities - Case studies from Africa**

Presentor - *Dr Okezie, AA&MU*

14.00 - 17.00

- **Slide Presentation**

Wednesday 1st June, 1983

- **Farmers Session** - Moderator - *Hon. M.S. Kargbo, PSA II, M*

Thursday 2nd June, 1983

12 **Effective Rural Information Delivery Systems for Environmental Management**

9.00 - 10.30 Session One: Moderator - *Mr B.T. Johnson, ACA, M*

- **Historical and Present Status of Extension Activities - T Constraints and accomplishments in Sierra Leone**

Presentors - *Mr Mansa Musa, Training Officer, MAF*
Mr J.C. Abdulai ACA, MAF

10.45 - 12.00 Session Two: Moderator - *Dr Arthur Abraham, MRU*

- **Traditional Methods of Rural Information Delivery**

  Presentors - *Dr Paul Richards, NUC*
  Dr John Karimu, FBC
  Dr George Carew
  Mr Mansa Musa, Training Officer, MAF

14.00 - 17.00 Session Three: Moderator - *Mr F.S. Dumbuya, PEMSU*

- **IADP's and ACRE's Extension Approaches and Principles in Extension Training**

  Presentors - *Dr Harry Will - Project Manager, EIADP*
  Dr Al Agard - ACRE
  Mr J Moody - P.M. Mayamba IADP
  Mr J.A. Amara

SUMMARY AND EVALUATION

.00 - 9.30 Session One:

Evaluation - (Participants)

.45 - 10.30 Session Two

Summary and Recommendations

0.45 - 12.00 Session Three

Conclusions and concluding remarks

.00 - 21.00 Closing Ceremonies

Welcome address

Closing address

Statements

Distribution of Certificates

Vote of thanks

RAPPORTEURS

Dr Arthur Abraham	-	MRU
Dr George Carew	-	FBC
Dr Cyrus Macfoy	-	FBC

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NAO - National Authorising Office

NUC - Njala University College

PEMSU - Planning Evaluation Monitoring and Services Unit

SECID - The South-East Consortium for International Development

USAID - United States Agency for International Development

United States Agency for International Development

Professional Experience (cont.):

1966 to 1967 - Agricultural Training Coordinator, Instructor - General Dynamics - 1966 San Diego
1967 University of Wisconsin
Taught plant science and crop production in two training programs for Peace Corps volunteers going to Northern India.

1965 to 1966 - Graduate Research Assistant - University of Florida
Citrus propagation and propagation greenhouse management.

Pesticide Residue Analyst - University of Florida and at Kansas State University.

TEACHING EXPERIENCE:
Taught the following undergraduate and graduate level courses:
- o General Botany
- o Plant Breeding
- o Plant Physiology
- o Vegetable Crops Production
- o Plant Growth and Development
- o Pesticides and the Environment
- o Soil, Plant and Water Analysis
- o Commercial Greenhouse Management

RESEARCH PROJECTS:

- o Effect of sulfur fertilization on yield and and protein content of soybeans.
  TVA, 1970-71. (Principal Investigator)

- o Remote sensing of natural resources and ground truth support.
  NASA, 1971-75. (Principal Investigator)

- o Sulfur-coated urea and its utilization in vegetable crops.
  TVA, 1971-74. (Principal Investigator)

- o Development of triticale varieties as grain and forage crop for Southeastern United States.
  USDA 1972-76. (Principal Investigator)

- o Controlled release fertilizers for horticultural crops.
  TVA 1974-80. (Principal Investigator)

- o Cytogenetics and tissue culture aspects of triticale.
  USDA, 1979-. (Co-Investigator)

Research Projects (cont.):

- o Characterization of space environment using plant cells. NASA, 1978-. (Principal Investigator).
- o A study of the soft rot of irises. Amer. Iris. Soc. 1978-.
- o A low cost solar rock collector and storage system. RIAS, NSF, 1978-79. (Co-Investigator)
- o Determination of above ground woody biomass residues. DOE, 1977-78. (Program Manager)
- o Genetic effects of fluoride (HF) on selected plant species. EPA, 1980-. (Co-Investigator)
- o Evaluation of herbaceous crops as raw materials for energy production. TVA, 1981-. (Principal Investigator)
- o The adaptability and production of vegetables on small farms. U.S. Vegetable Lab, SEA/USDA, 1982-84. (Principal Investigator)

CONSULTING AND PROGRAM DEVELOPMENT:

- o Consultant - Effects of pesticides on the aquatic environment of Southeastern U.S. Study conducted by Brown Engineering and Alabama A&M University in 1972 for the U.S. Environmental Protection Agency.
- o Horticulture and Agri. Extension Specialist - Design team for Resource Conservation and Utilization project - Nepal with South Easte Consortium for International Development (SECID) for USAID May-June 1979.
- o Consultant for area high schools, junior colleges and 4 year degree colleges for:
  - Environmental Education
  - Special Services for females, minority and physically handicapped college students.
  - Advanced Institutional Development Program (AIDP) and Strengthening Developing institutions programs (SDIP).
  - Comprehensive Assistance in Undergraduate Science Education (CAUSE) - utilizing solar energy demonstrations.

THESIS ADVISEMENT (M.S.):

- Performance of controlled release fertilizers for horticultural crops - Patel.
- The tissue culture of triticale - Bello
- Agronomical anatomical and biochemical aspects of yellow berry in triticale - Paul.
- Characterization of cereal cells in suspension cultures - Wang.

MAJOR COMMITTEE ASSIGNMENT:

- Member, Planning Committees of Southern Regional Education Board for:
  - Workshop on Agricultural Production (March 1972)
  - Environmental Education Planning Committee (November 1973)
  - Regional workshop to develop series of courses for non-agricultural students (October 1973)
- Member, team of 7 faculty members for development of Institutional Development Program (AIDP) proposal for Alabama A&M University during 1976. Developed a comprehensive university-wide improvement proposal. Funded by HEW for 3 million dollars.
- Member of a 7 member steering committee for formulation of the South East Consortium for International Development (SECID) 1977. The consortium has a current membership of 30 universities interested in the international development and training. Served as an alternate Member, to SECID, Board of Trustees 1977-79.
- Member, Advisory Committee, Office of International, Training Programs, South East Consortium for International Development, 1979-82.
- Member, Mineral Nutrition and Tissue Culture Working Groups, American Society for Horticultural Science.
- Member, Solar Energy Task Force, Alabama A&M University.

- Coordinator, International Agricultural Programs. Developed Strengthening grant program for Alabama A&M University (BIFAD/AID). 1977-79.

- Member, International Program Committee, Alabama A&M 1979-.

- Member, graduate Advisory committee for the M.S. program in Agricultural Sciences, North Carolina A&T State University.

- Initiated the first Master Gardener Program for the State of Alabama.

PROFESSIONAL SOCIETIES AND HONORS:

- Memberships:
  - International Society of Hroticultural Science
  - American Society for Horticultural Science
  - American Society of Agronomy
  - Crop Science Society of America
  - Huntsville Botanical Garden Society

- Honors:
  - Marion W. Meadows Award for outstanding graduate research in vegetable crops - 1972, by the American Society for Horticultural Science

- Selected Mention In:
  - American Men and Women of Science
  - Who's Who in South and Southwestern U.S.
  - Leaders of Black America
  - Who's Who is Frontier Science and Technology
  - Personalities of America

INTERNATIONAL AGRICULTURAL DEVELOPMENT RELATED EXPERIENCES:

- Participated in operation of a 30-acre family farm from age 14 to 20 located in Semi-arid climate in Northwestern India. Major crops: barley, wheat, peanuts, cumin and sesame.

- Served as Assistant and Agricultural Training Coordinator for two Peace Corps programs in 1965-66.

- Member, Steering Committee for the development of By-Laws and the Articles of Incorporation for establishment of South East Consortium for International Development (SECID) 1977.

- Design Team member, Resource Conservation and Utilization Project, Nepal. April to July, 1979, developed agricutural extension and horticultural components of the Project Paper.

- Co-Investigator, Nepal Watershed analysis using Landsat Data. 1978-.

- Senior author in a writing team to develop plant disease and nematode sections of the State-of-the-art document for Integrated Crop Protection/Collaborative Research Support Program, 1980.

- Participant American- Caribbean Linkage program. Visted St. Kitts and Nevis to review Crop Production research on the islands and to intiate cooperative training and research programs between 1890 Land Grant Colleges and developing caribbean countries. May, 1981.

- Consultant for developing an Environmental Training and Management for Africans workshop in agricultural extension and rural development, Sierra Leonne, February 1983.

PUBLICATIONS:

1. Sharma, G. C. Charles V. Hall, 1969. Changing concepts in the role of plant terpenoids. Adv. Front. Plant Sci. 24: 189-202.

2. Sharma, G. C. and Charles V. Hall, 1971. Influence of cucurbitacins, total sugar and fatty acids to spotted cucumber bettle feeding. J. Amer. Soc. Hort. Sci. 96:675-680.

3. Sharma, G. C. and Charles V. Hall, 1971. Cucurbitacin B and total sugar inheritance in Cucurbita peop L. as related to spotted Cucumber Bettle Feeding. J. Amer. Soc. Hort. Sci. 96:750-754.

4. Sapra, V. T., G. C. Sharma, J. L. Hughes, and R. R. Bradford, 1973. Triticale, a Wheat X Rye hybrid. J. Tenn. Acad. Sci. 48(2): 59-61.

5. Sharma, G. C. and Charles V. Hall, 1973. Relative attractance of spotted cucumber bettle to fruits of fifteen species of cucurbitaceae. Environ. Entomol. 2(1): 154-156.

6. Sharma, G. C. and Charles V. Hall, 1973. Identifying cucurbitacin in Cucurbita peop L. Black Zucchini cotyledons. HortScience, 8(2): 136-137.

7. Sharma, G. C. and R. R. Bradford, 1973. Effect of Sulfur on yield and amino acids of soybeans. Comm. in Soil Sci. and Plant Anal. 4(2): 77-82.

8. Sharma, G. C., B. S. Mangat and R. A. Baker, 1973. Alternatives to pesticides in southeastern United States. Science of the Total Environment. 2: 21-44.

9. Sapra, V. T., G. C. Sharma and John L. Hughes, 1974. Chemical induction of male sterility in hexaploid triticale. Euphytica 23: 685-690.

10. Sapra, V. T., J. L. Hughes and G. C. Sharma, 1975. Frequency, size and distribution of stomata in triticale, wheat and rye leaves. Crop Sci. 15: 356-358.

11. Sharma, G. C., A. J. Patel and D. A. Mays, 1976. Effect of sulfur-coated urea on yield, N uptake and nitrate content in turnip greens, cabbage and tomato, J. Amer. Soc. Hort. Sci. 101(2): 142-145.

Publications (cont.):

12. Bagwell, C., G. C. Sharma, and Sanford W. Downs, 1976. Ground truth study of a computer generated land use map of north Alabama. Proc. Remote Sensing of Earth Resources, University of Tenn. Space Inst., Tullahoma, Tenn., Vol. V.

13. Sapra, V. T., J. L. Hughes and G. C. Sharma, 1976. Effect of sodium azide and N-nitroso-N-methylurea on M_1 and M_2 generations of hexaploid triticale. Wheat Information Service No. 41-42: 52-55.

14. Hughes, J. L., V. T. Sapra and G. C. Sharma, 1976. Cross pollination in hexaploid triticale. Cereal Res. Comm. 4(3): 355-362.

15. Patel, A. J. and G. C. Sharma, 1977. Nitrogen release characteristics of controlled-release fertilizers during a four-month soil incubation. J. Amer. Soc. Hort. Sci. 102: 364-367.

16. Sharma, G. C., V. T. Sapra and John L. Hughes, 1977. breeding winter triticales for the southeastern United States. Proc. Intern. Triticale Symp., Lubbock, Texas, held September 1973, p. 43-46.

17. Hughes, J. L., V. T. Sapra, G. C. Sharma, and J. L. Walker, 1977. Registration of AM 2147 and AM 2149 germ plasm. Crop Sci. 17: 487 p.

18. Downs, S. W., Jr., G. C. Sharma and C. Bagwell, 1977. A procedure used for a ground truth study of a land use map of north Alabama generated from landsat data. NASA Technical Note. NASA TN D-8420, Washington D. C. 56 p.

19. Sharma, G. C., 1977. Careers in agriculture and food science. The Black Collegian. Nov/Dec. p. 49-61.

20. Sharma, G. C. and A. J. Patel, 1978. Effect of nine controlled release fertilizers on chrysanthemum growth and foliar analysis. J. Amer. Soc. Hort. Sci. 103(2): 148-150.

21. Sharma, G. C. and A. J. Patel, 1978. Role of controlled release fertilizers in chrysanthemum fertilization. The chrysanthemum. 34(4): 162-167.

22. Sharma, G. C., 1979. Controlled release fertilizers and horticultural applications. Scientia Horticulturae 11: 107-129.

Publications (cont.):

23. Sapra, V. T., J. L. Hughes, G. C. Sharma and U. R. Bishnoi. 1979. Registration of Councill triticale. Crop Sci. 19:930.

24. Sharma, G. C., L. L. Bello and V. T. Sapra, 1980. Genotypic difference in organogenesis from callus of ten triticale lines. Euphytica 29: 751-754.

25. Sharma, G. C., L. Gashaw, D. Saxton, 1981. Research on bacterial soft rot of iris. Bulletin Amer. Iris Soc. 62(3): Series No. 242: 38-45.

26. Sharma, G. C., L. L. Bello, V. T. Sapra and C. M. Peterson, 1981. Callus initiation and plant regeneration from triticale embryos. Crop Science. 21: 113-118.

27. Sharma, G.C., L. Gashaw and L. M. Mugwira. 1982. Japanese Holly growth and release pattern of ammonium and nitrate from controlled release fertilizers. Scientia Hort. (Accepted for publication).

28. Sharma, G.C. and L. Bello. 1982. A scanning electron microscope study of surface differentiation in triticale callus. Crop Sci. 22:428-430.

29. Sharma, G. C., W. C. Wang and V. T. Sapra. 1982. Effect of genotype, media and temperature pretreatment on callus initiation in triticale, wheat and rye anther cultures. Cereal Res. Comm. 10:143-150.

30. Wang, W. C., C. Beyl and G. C. Sharma. 1983. Characterization of Ward durum wheat suspension culture. Plant Sci. Letters (Accepted January 1983).

31. Sharma, G. C., A. D. Paul and J. A. Bietz. 1983. Nitrogen fertilization effects and anatomical, protein and amino acid characteristics of yellow berry in triticale. Crop Sci. (Accepted for publication).

32. Bietz, J. A. and G. C. Sharma. 1983. Differences in endosperm protein between yellow berry and normal triticales. Crop Sci. (Accepted for publication).

33. Beyl, C. A. and G. C. Sharma. 1983. Picloram induced somatic embryogenesis in Gasteria and Haworthia. Plant Cell Tissue and Organ Culture. (Accepted for publication).

PAPERS PRESENTED:

1. Sharma, Govind C. and Charles V. Hall, 1970. The inheritance of biochemical constituents of curcurbila pepo L. Seedlings and their relationship to spotted cucumber bettle feeding. 67th Meeting American Soc. Hort. Sci, Miami Beach, FL.

2. Sharma, Govind C., and Charles V. Hall, 1970. Spotted cucumber beetle feeding as influenced by cucurbitacin, total sugar and fatty acid content of seedlings of 15 cucurbilaceous species. 67th Meeting American Soc. of Horticultural Science, Miami Beach, FL.

3. Sharma, Govind C., V. T. Sapra and John L. Hughes, 1973. Breeding triticale for the southeastern U.S. Intern. Triticale Symp., Lubbock, TX.

4. Sapra, V. T., J. L. Hughes, and G. C. Sharma, 1975. Frequency, size and distribution of stomata in triticale, wheat and rye leaves. American Soc. Agron. Southern Branch, New Orleans, LA.

5. Hughes, J. L., V. T. Sapra and G. C. Sharma, 1975. Cross-pollination in hexaploid triticale. Southern Small Grain Conference, Baton Rouge, LA.

6. Sapra, V. T., J. L. Hughes, G. C. Sharma and M. J. Constantin, 1976. The use of chemical and physical mutagens in hexaploid triticale. American Soc. Agron., Southern Branch, Mobile, AL.

7. Bagwell, C., G. C. Sharma and S. W. Downs, 1976. Ground truth study of a computer generated land use map of North Alabama. 5th Annual Remote Sensing of Earth Resources Conference, U. T. Space Inst., Tullahoma, TN.

8. Patel, A. J. and G. C. Sharma, 1976. Effect of controlled-release fertilizers on plant growth and nutrient level in chrysanthemum. Amer. Soc. Horticultural Sci., Southern Region, Mobile, AL.

9. Patel, A. J. and G. C. Sharma, 1976. N-release characteristics of 14 controlled-release fertilizers during a 14-month soil incubation period. Amer. Soc. Hort. Sci., Baton Rouge, LA.

APPENDIX 3

VITAE

Biographical Information

Name: B. Onuma Okezie

Address:

Phone:

Marital Status: Married; four children

Educational Information

B.S. Animal Husbandry, University of California, Davis, January 1966

M.S. Animal Nutrition, University of California, Davis, December 1966

Ph.D. Food Science (International) with minor in Human Nutrition, Cornell University, Ithaca, N.Y., January 1975

Career Information

Oct. 1979 - Present: Director, Office of International Programs, Alabama A & M University, Normal, Alabama. Responsible for planning, implementing and management of international programs at the university.

Oct. 1975 - Oct. 1979: Associate Professor of Food Science and Technology, Alabama A & M University, Normal, Alabama. Undergraduate curriculum development in Food Science and Nutrition. Teaching undergraduate and graduate courses - Food Processing, Dairy Products Technology, Food Engineering, Food Sanitation, New Products Development, Food Processing and Nutrients, Proteins in Food and Nutrition. Serving in various departmental and university-wide committees.

Jan. 1975 - Oct. 1975: Assistant Professor of International Food Science and Nutrition. Program in International Studies, School of Human Ecology, Howard University, Washington, D.C. Assisted in the setting up of a program in International Dimensions in Human Ecology. Taught undergraduate and graduate courses in Food Development and Nutrition.

Oct. 1974 - Jan. 1975:	Research Associate of the Department of Food Science, Cornell University. Research related to protein isolation and functionality.
Aug. 1971 - Sept. 1974:	Teaching/Research Assistant of the Department of Food Science, Cornell University. Research related to dairy products, high protein food development, food microbiology, single cell protein; teaching undergraduate courses in High Protein Food Technology, International Food Development.
July 1970 - June 1971:	Executive Advisor on Nutrition to the International Union for Child Welfare, Geneva, Switzerland. Assessment of nutritional status of malnourished war affected Biafran children.
Feb. 1970 - June 1971:	Research Fellow of the Department of Animal Science, University of Ife, Nigeria. Research related to leaf proteins.
1968 - 1970:	Advisor on Nutrition, Biafran Rehabilitation Commission. Organization and supervision of feeding centres, orphanages and refugee nutrition.
1967 - 1968:	Scientific Officer, Biafran Ministry of Animal Health and Forestry. Organization and supervision of research in animal protein production.

Research Projects Developed

Preliminary Studies and Resource Acquisition for the Development of Research Program on the Winged Bean. Funded by the NSF. Principal Investigator - B. Onuma Okezie.

Chemical, Nutritional and Food Application Studies on the Winged Bean. Funded by the African American Scholars Council, Inc. Principal Investigator - B. Onuma Okezie ($27,685).

Triticale Applications in New Product Development, Protein Extraction and Functionality. Furded by USDA/CSRS. Principal Investigator - B. Onuma Okezie ($119,830).

Phosphorus Fertilizer Effects on Yields and Nutrient Composition of Bean/Cowpea. Submitted to BIFAD/CRSP. Coinvestigator - B. Onuma Okezie ($80,455).

Utilization of Woody and Herbaceous Biomass for Liquid Fuel Production. Submitted to Department of Energy. Coinvestigator - B. Onuma Okezie ($99,994).

Physicochemical Characterization of Proteins, Fats and Carbohydrates of Winged Bean varieties and Their Food Applications. Submitted to NSF. Principal Investigator - B. Onuma Okezie ($179,721).

Inhibitory Factors Affecting Digestability and Protein Availability of Soybean and Other Pulses in Human Nutrition. Submitted to USDA/CSRS. Principal Investigator - B. Onuma Okezie ($147,829).

Biological - Physiological Factors of Winged Bean Seed Flours. A collaborative research program with USDA SEA/AR Sourthern Regional Research Centre. Principal Investigator - B. Onuma Okezie.

Publications

Okezie, B. Onuma, 1968. Performance of Weaning pigs on basal ration of cassava. Proceedings of the 1st Annual Meeting of Technical Officers Biafra Ministry of Animal Health and Forestry, 1:23.

Okezie, B. Onuma, 1969. Nutritional Needs of Refugees in Biafra. Biafra Rehabilitation Commission Bulletin.

Okezie, B. Onuma, 1975. Improved food uses of cassava (Manihot utilissima): Advances in research. Ph.D. Thesis, Cornell University, Ithaca, N.Y.

Okezie, B. Onuma, 1975. International Dimensions in Human Ecology. Howard University, School of Human Ecology Series.

Okezie, B. Onuma and Bishnoi, Udai, 1977. Winged bean adaptation studies in Alabama. Winged Bean Flyer, 1:18.

Okezie, B. Onuma and Martin, F. 1980. Chemical composition of dry seeds and fresh leaves of winged bean varieties grown in the U.S. and Puerto Rico. J. Food Sci. 45:1045.

Okezie, B. Onuma and Dobo, S. B., 1980. Rheological characteristics of winged bean (Psophcarpus tetragonolobus) (L) DC)composite flour. Bakers Digest, 54(1):35.

Dobo, S. B. and Okezie, B. Onuma, 1980. Baking and organoleptic quality of composite flour bread with winged bean, triticale and wheat. Bakers Digest 54(6):23.

Okezie, B. Onuma and Kosikowski, F. V., 1981. Acid whey powder modification of gari from cassava. J. Dairy Sci. 64(3):416.

Okezie, B. Onuma & Kosikowski, F. V., 1981. Extractability and functionality of proteins from yeast cells grown on cassava hydrolysate. J. Food Chem. 6:71.

Okezie, B. Onuma and Kosikowski, F. V., 1981. Microflora in fermenting cassava mash: I. Bacteria - Isolation and Characterization. Submitted to J. Food Sci.

Okezie, B. Onuma and Kosikowski, F. V., 1981. Single cell portein (SCP) production from cassava hydrolysate by batch method. Submitted to J. Food Sci.

Okezie, B. Onuma and Kosikowski, F. V., 1982. Cassava as a food. Critical Reviews in Food Science and Nutrition . 17 (3): 259.

Nmorka, G. O. and Okezie, B. Onuma, 1982. Nutritional quality of winged bean breads. Cereal Chem. 60 (3).

Papers Presented at Professional Meetings

Okezie, B. Onuma and Dobo, S. B., 1979. Physical and baking characteristics of winged bean composite flour. IFT meeting St. Louis, June.

Okezie, B. Onuma, 1979. Chemical composition of dry seeds and fresh leaves of winged bean varieties grown in the U.S. and Puerto Rico. IFT meeting, St. Louis, June.

Okezie, B. Onuma, 1981. The winged bean: (Psophocarpus tetragonolobus): Its Nutrients and utilization. Am. Chem. Soc. 182nd National Meeting, New York N.Y., August 23-28.

Okezie, B. Onuma and Nmorka, G. O., 1981. Nutritional Quality of composite flour breads from winged bean. AACC 66th Annual Meeting, Denver, CO, October 25-29.

Okezie, B. Onuma, 1981. Triticale protein extraction and process optimization. AACC 66th Annual Meeting, Denver, CO, October 25-29.

Membership in Honor and Professional Societies

Alpha Zeta
Institute of Food Technologists
American Dairy Science Association
American Society of Cereal Chemists
American Dietetics Association
American Chemical Society
Association of Official Analytical Chemists
Association of U.S. University Directors of International Agricultural Programs (AUSUDIAP)

Research Interests

Characterization and functionality of protein from cereals and oil seeds.

New product applications of cereals and oil seeds and food quality evaluation.

Development of food applications of under-utilized plants.

Effects of processing on nutrient quality, International Food and Agricultural Development.

Courses Developed and/or Taught at Alabama A & M University and/or Cornell University

Dairy Products Technology; Food Engineering; Food Toxicology; Food Processing; Food Sanitation and Plant Management; Food Processing and Nutrients; Development and Teaching of Food Sanitation Certification Course for Food Service Managers in Madison County in collaboration with the County Public Health Department. Proteins in Food and Nutrition; Product Development, International Food Development.

Other Activities

Member, IFT Freshman/ Sophomore Fellowship Awards Committee. 1980 - Present.

Member, Research and Publications Committee, Alabama A & M University, 1977 - Present.

Member, Academic Standards Committee, Alabama A & M University. 1978 - Present.

Member, Admissions and Recruitment Committee, Alabama A & M University. 1977 - Present.

Member, Ad Hoc Committee on General Education, Alabama A & M University. 1979.

Member, International Food and Agricultural Development Advisory Council, Alabama A & M University. 1979 - Present.

Member, Recruitment Committee, Department of Food Science and Technology. 1976 - 1979.

Member, Curriculum Committee, Department of Food Science and Technology. 1976 - Present.

Chairman, Graduate Admissions Committee, Department of Food Science and Technology. 1978-1981.

Chairman, Committee on Graduate Admissions Advisement, Department of Food Science and Technology, 1978 - Present.

Chairman, Faculty Recruitment Ad Hoc Committee, Department of Food Science and Technology.

Faculty Advisor, Alpha Zeta Fraternity, 1976 - 1980.

Visiting Professor on International Food Development, Department of Food Science, Cornell University, Ithaca, N.Y., 1975, 1977, 1980.

Member, Cornell University Senate. 1973 - 1974.

Member, Admissions and Scholarship Committee, Cornell University. 1973 - 1974.

Thesis Advisor at Alabama A & M University

Rheological, baking and organoleptic characteristics of winged bean composite flours - Sassi B. Dobo, 1979.

Cooking and eating quality of winged bean - Basil Ekpeti (in progress).

Nutritional quality of winged bean composite flour - Gabriel Nmorka, July, 1981.

Winged bean protein extraction and functionality - Anthony Bello - July, 1982.

Characterization of biological - physiological factors that interfere with winged bean nutrient utilization - Christian Ashibogu - July 1982.

International Activities

Major role in developing a proposal resulting in a $500,000 strengthening grant for an International Food and Agricultural Development Program at Alabama A & M University.

Serves as a member, Southeast Consortium for International Development (SECID) Board of Trustees. Member of SECID Program Development Committees (Anglophone, West Africa).

Served as Assistant Planning Director, USAID/BIFAD Peanut Collaborative Research Support Program (CRSP) - A worldwide research planning program.

Member of a Cornell University team to study food production and management. In Puerto Rico and the Dominican Republic, 1973.

Member of a Cornell University team to study food development in Mexico, 1974.

Worked as an advisor on nutrition to the International Union for Child Welfare, Geneva, Switzerland.

Serves as a member of the project management committee and Home Campus coordinator of SECID'S Environmental Training and Management in Africa (ETMA) Project.

Serves as a member of the Egerton (Kenya) Project Management Advisory Council (SECID'S Project).

A member of the Board of Directors of the Peanut Colloborative Research Support Program.

A member of the Institutional Participation Committee (IPC) under AID/DIFAD.

Organized and directed an International development conference on Effective Participation of Small Universities in International Technical Assistance Programs. Huntsville, AL, October 19-21, 1981.

Have worked in or visited India, Kenya, Malawi, Mexico, Niger, Nigeria, Puerto Rico, Sudan, and many other countries in Europe.

APPENDIX 4

RESUME
OF
McARTHUR FLOYD

Soil Microbiologist and Biochemist

ADDRESS

Work: P. O. Box 183
Alabama A&M University
Normal, AL 35762
Telephone: (205) 859-7316 or 7266

EDUCATION

University	Degree	Year	Major
Alabama A&M University	B.S.	1967	Agronomy/Chemistry
Purdue University	M.S.	1974	Soil Microbiology
Purdue University	Ph.D.	1976	Soil Microbiology/ Biochemistry

EMPLOYMENT

1980 - Present	Associate Professor, Research and Teaching, Alabama A&M University.
1976-80	Assistant Professor, Research and Teaching, Alabama A&M University
1971-75	Research Assistant, Purdue University.
1970-71	Soil Conservationist, (USDA-Soil Conservation Service).
1968-70	U. S. Army (1st Lieutenant Infantry)
1967-68	Soil Conservationist, (USDA-Soil Conservationist).
Summer 1965-66	Student Trainee (USDA-SCS).

THESIS AND DISSERTATION TITLES

Master of Science, "Microbial Transformation of Mercury in Aquatic Environments". L. E. Sommers, Major Professor.

Doctor of Philosophy, (I) "Dynamics of Mercury in Lake Sediments". (II) "Studies on Organic Phosphorus Dynamics in Soil Irrigated with Municipal Wastewaters. L. E. Sommers, Major Professor.

PUBLISHED PAPERS, AND REPORTS

1974 Microbial Transformation of Mercury in Aquatic Environments. M. Floyd and L. E. sommers, Technical Report No. 54, Purdue University, Water Resources Research Center.

1975 Determination of Alkylmercury Compounds in Lake Sediments by Stream Distillation-flameless Atomic Absorption. M. Floyd and L. E. Sommers, Analytical Letters: 8(8) 525-535.

1975 Determination of Total Mercury in Soils and Sediments. M. Floyd and L. E. Sommers, Journal of Environmental Quality: 4(3) 323-325.

1977 Phosphorus Dynamics in Soils Irrigated with Municipal Wastewater. L. E. Sommers, D. W. Nelson, L. B. Ownens, and M. Floyd Technical Report Number 99, Purdue Water Resources Research Center.

1981 Tolerances of Triticale Lines to Manganese in Soils and Nutrient Solution. L. M. Mugwira, M. Floyd, and S. U. Patel. Agronomy Journal, 73:319-322.

1981 Triticale, Wheat, and Rye Responses to Nitrogen and Lime in Two Alabama Soils. L. M. Mugwira, M. Floyd, and S. U. Patel. Agronomy Journal (In Review).

ABSTRACTS PUBLISHED

1974 Mercury Transformation in Lake Sediments. American Society of Agronomy Abstracts. Annual Meetings. Chicago, IL. M. Floyd and L. E. Sommers.

1975 Organic Phosphorus Dynamics in Soils Irrigated with Wastewater. American Society of Agronomy Abstracts. Annual Meetings. University of Tennessee, Knoxville, Tennessee. M. Floyd and L. E. Sommers.

1976 Properties and stability of phosphatase enzymes in soils irrigated with wastewater. American Society of Agronomy Abstracts. Annual Meetings. Houston, Texas. M. Floyd and L. E. Sommers.

1978 Levels of Al, P, and phosphatase enzymes in selected triticale cultivars. Symposium of 1890 Land Grant Universities. St. Louis, Missouri. L. M. Mugwira and M. Floyd.

1979 Triticale, wheat and rye response to N fertilization in Alabama. Southern Branch American Society of Agronomy. New Orleans, Louisiana. L. M. Mugwira, M. Floyd and S. Patel.

RESEARCH AND PROFESSIONAL EXPERIENCE AND INTEREST

Training in the area of Soil Chemistry, Biochemistry and Microbiology. Special training in the area of chemical and biological transformations of mercury and mercury compounds in soils and sediments with particular reference to the final product of these chemical and biochemical processes in the transformation cycle.

A study on the dynamics of organic phosphorus in soils irrigated with wastewater effluent has been completed. This study involved evaluating the accumulation of organic carbon and organic phosphorus, phosphatase activity and the effect of substrate and enzyme sorption on the rate of organic P hydrolsis in these soils.

Present

Project leader of a study to evaluate Rhizobia Japonicum strains and soybean germplasm for their adaptability to acid soils.

Co-investigator in a study of phosphorus and nitrogen fertilization and utilization by triticale and related small grains, etc. (completed).

Other studies include: (1) evaluating the bonding and stability of P incorporated into "synthetically" prepared humic type polymers and (2) developing and audiotutorial approach to teaching introductory soil and plant science courses at A&M Universitiy (completed).

COLLEGE ACTIVITIES AND COMMITTEE ASSIGNMENTS

Workshops and Short Courses: Attended the Bicentennial Research Symposium for USDA 1890 Land Grant Universities and Tuskegee Institute. Washington D.C., November 10-14, 1976.

Attended the Third North American Conference on Mycorrhizae. University of Georgia, Athens, Georgia. August 22-25, 1977. Purpose of the conference was to examine the biology of mycorrhizal associations and their importance in Agriculture and Forestry.

Participated on a panel to evaluate proposals submitted to NSF's Undergraduate Research Program (URP). Washington, D.C., October 6-8, 1977.

International Congress of Audio Tutorial method of Instruction and Individualized Instruction. Purdue University, November 5-9, 1977.

Attended a workshop on Soybean Production and Utilization, Memphis, Tennessee, February 20-22, 1978.

Basis short course on Remote Sensing Application Technology. Purdue University-LARS, August 7-12, 1978.

Workshops and Short Courses Cont.

Advanced short course (Hands-On Experience) on Remote Sensing Application Technology. Purdue University-LARS, August 7-12, 1978.

Attended a training workshop for Designing Effective Instruction for Faculty of Colleges of Agriculture in the Southern Region. Mississippi State University, June 25-28, 1979.

Reviewer for Special Grants Proposals (USDA) Washington, D.C. March 18-19, 1981.

Twenty-fourth Annual Meeting and Workshop, National Council of University Research Administrators. Washington D.C. (Nov. 8-10, 1982).

Regional Research Committee

Regional Soybean Research Needs Committee (RSRNC) for 1890 Land-Grant Universities and Tuskegee Institute, Chairman, August, 1979-Present.

University-Committee

Retirement, Recognitions and Awards Committee, August 1976-Present.

Dean's College Advisory Committee, March, 1977-Present.

Career Education Advisory Council, April, 1978-Present.

Faculty-Student Career Advisory and Placement Committee, September, 1978-Present.

General Education Study Committee, November 1978-80.

Campus Organization Policy and Regulations Review Task Force, April-May, 1979.

Departmental Faculty Representative for Graduate Professional Opportunity Program (GPOP) 1981-Present.

Departmental Committee

Recruiting Committee
Curriculum Committee
Graduate Admission/Standards Committee

MEMBER OF: Phi Beta Sigma Fraternity, Inc.
Soil Science Society of America
Huntsville Chapter of Human Relations Council
Outstanding Young Men of America Awards (1977 and 1978)
Scoutmaster, Troop 129, Boy Scouts of America.

COURSES TAUGHT

Course Number	Name	Credit	Average Enrollment	Frequency
NES 251	Introduction to Soil Science	4	45	Annually
AGB 411	Land Use, planning and Conservation	2	16	Annually
NES 351	Soil & Water Conservation	3	10	Bi-annually
NES 406	Soil Microbiology	4	12	Bi-annually
NES 452	Soil Fertility & Fertilizer	3	10	(1981 only)
NES 170	Man & Environment	3	40	Guest Lecturer
NES 491	Soils Seminar	1	8	As assigned
NES 591	Graduate Seminar	1	8	As assigned

ACADEMIC ADVISEMENT

Graduate Students -	Major Advisor	3
	Co-advisor	10
Undergraduate Advisees		17

PERSONAL DATA

Height: 6' 1" Weight: 210 lbs
Health: Excellent Marital Status: Single

APPENDIX 5

AUDIO VISUALS
FOR
THE ROLE OF EXTENSION IN ENVIRONMENTAL MANAGEMENT AND AGRICULTURE
FREETOWN, SIERRA LEONE

I. Basic Ecology and Environmental Concepts

Land and the Soil . . . . . .Filmstrip/cassette
Kinds of Environment . . . . . .Filmstrip/cassette
Ecosystem: Network of Life . . . . . .Motion Picture
Ecology and Agricultural Environment . . . . . .Filmstrip/cassette

II. Upland Farming

Life in a Cubic Foot of Soil . . . . . .Motion Picture
Soil and Agricultural Environment . . . . . .Filmstrip/cassette

III. Swamp Ecology

Small Worlds of Life . . . . . Filmstrip/cassette
Salt Marshes . . . . . Filmstrip/cassette
Watershed Management . . . . . Filmstrip/cassette

IV. Aquaculture: Fresh Water Ecology

Modern Fish Farming . . . . . .Filmstrip/cassette

Aquaculture: Salt Water Ecology

Will the Fishing Have to Stop? . . . . . .Filmstrip/cassette

V. Forestry

Tropical Rain Forest . . . . . Motion Picture
Problems of Conservation: Forest and Range. . . Motion Picture
Firewood . . . . . Motion Picture

VI. Wildlife Mangement

Africa's Vanishing Wildlife . . . . . .Motion Picture
Habitat: A Special Place . . . . . .Motion Picture
Rare and Endangered Mammals . . . . . .Slides
It's a Matter of Life or Death - Adaptation . . .Filmstrip/cassette
Balloon Safari . . . . . .Motion Picture
Castles of Clay . . . . . .Motion Picture

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Salt Marshes . . . . . Filmstrip/cassette
Watershed Management . . . . . Filmstrip/cassette

IV. Aquaculture: Fresh Water Ecology

Modern Fish Farming . . . . . .Filmstrip/cassette

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It's a Matter of Life or Death - Adaptation . . .Filmstrip/cassette
Balloon Safari . . . . . .Motion Picture
Castles of Clay . . . . . .Motion Picture

VII. Livestock Management

Dairy Goat Management . . . . . .Filmstrip/Cassette
Swine Management . . . . . .Filmstrip/cassette

VIII. Agricultural Practices

Biogas for the Farm . . . . . .Slides/Cassette
Pests, Pesticides and People . . . . . .Filmstrip/cassette
Introduction to Intergrated Pest Management . . .Filmstrip/cassette
Components of Intergrated Pest Management . . . .Filmstrip/cassette
The Insect Alternative . . . . . .Videocassette
Water and the Agricultural Environment . . . . .Filmstrip/cassette
Irrigation Kit . . . . . .Filmstrip/cassette

IX. Environmental Stress

Correcting Problems with Soil Amendments . . . .Slides

X. Mining

Strip Mining . . . . . .Slides/cassette
Strip Mined Land can be Reclaimed . . . . . .Videocassette

XI. Human Ecology

Nutrition: Food, Fraud, Facts . . . . . .Filmstrip/cassette
Food and Population: Striking a Balance . . . .Filmstrip/cassette
Scarcity and Plenty . . . . . .Filmstrip/cassette
Food Customs . . . . . .Filmstrip/cassette
Critical Issues in Science and Society: A World to Feed ...Slides/cassette
Science and Ethics of Population Control . . . .Slides/cassette

XII. Extension

The Challenge Remains . . . . . .Slides/cassette

United States Agency for International Development (USAID)
Environmental Training and Management in Africa (ETMA)
South East Consortium for International Development (SECID)

FINAL REPORT AND EVALUATION

on the workshop on

"THE ROLE OF EXTENSION IN ENVIRONMENTAL MANAGEMENT AND AGRICULTURE"

16th May - 3rd June, 1983

Submitted by

Prof Harry Turay
Njala University College
Sierra Leone

and

Dr. George Carew
Fourah Bay College
Sierra Leone

Land and Water Development Division (LWDD)
Sierra Leone Ministry of Agric. & Forestry (MAF)

Alabama A & M University
Huntsville, Alabama

June 13 1983
Freetown

[illegible] Introduction

The workshop was in two phases:

Phase 1 was intended for high level government officials and policy makers from the relevant Ministries and Agencies. These officials were in attendance for both the opening formalities and the general introductory session. Attendance at subsequent sessions was not mandatory but many of these same officials attended and took active part whenever time permitted.

The second phase of the workshop was a 13 day session of counting the workshop. It was aimed at the actual participants: senior technicians and other professional staff and allied agencies directly involved with Environmental Management and Agriculture as well as agricultural related disciplines.

The workshop featured lectures, discussions, audio visual presentations, formal paper presentations and two field trips. Each lecture was followed by discussions and questions.

WORKSHOP TOPICS

Some 70 papers were presented at the workshop. There were in all about a 100 papers listed to be presented.

The majority of the papers presented were well researched and is indicative of the ample supply of highly trained personnel in the country. Workshops like these could harness and coordinate the valuable human resources for the general good of the nation.

An issue was raised at the last workshop about the need to keep academic presentations within reasonable limits. Similar concerns would indeed be expressed about the second workshop. The presentation of too many papers is bound to encroach on discussion time. Moreover, participants, embarked by too many issues simultaneously, might lose sight of the salient facts which should be brought out in the discussions. On one or two occasions there were really key issues of significance discussed after a fourth paper on the day's theme was delivered. If no more than two papers per day are delivered there is a chance that many of the problems highlighted can be avoided. Alternatively, a new approach can be adopted with one lead paper and two or three short critical comments on it. This should stimulate discussion and limit the amount of time involved in presentation of the papers.

The issues discussed were diverse but all related to environmental concerns. The following areas were covered.

a) Present agricultural and other resource management techniques in the different ecosystems of the country.

b) The possibility of improved resource consideration and utilization by proper environmental management.

c) The role of the extension worker in promoting sound environmental techniques.

d) Present extension methods of environmental information transfer to the farmers.

Two days were devoted largely to introductory matters and opening formalities. Subsequent sessions covered more specific topics, namely: Upland farming; Swamp Management; Marine and Fresh Water Aqua-culture, Forestry, Wildlife Management, Livestock Management, Modern Agricultural Practice and their impact on environment, Environmental Stress, Mining, Human Ecology and Effective Rural Information Delivery System for Environmental Management.

As the workshop progressed it was obvious from the many discussions and the consensus of opinions achieved that upland farming is fret with a lot of problems and has, so far, proven to be unprofitable. It was noted that swamp farming held greater promise for increased yield and profitability. The participants, observed a general reticence on the part of subsistence farmers to undertake swamp farming. Some of the problems generated by upland farming have far-reaching implications for human ecology and the environment in general. The slash and burn operations and the bush fallow system are an important source of deforestation. If the forest is not eaten-up by bush fires, it is slowly depleted by the bush fallow system. With deforestation, wildlife is threatened and climatic conditions are altered resulting in serious ecological imbalances.

[illegible] to provide a policy of conservation was urgent for all the [illegible] ecologies. A sound environmental [illegible] to foster a spirit of [illegible] amongst all our environment will [illegible] the problem.

[illegible] for the target group and ensuring its effective delivery was however a problematic issue. As noted in the previous workshop, the rural farmer's [illegible], an [illegible], experiences and world view are [illegible] to contend with [illegible] the form technical information must take if it is to reach the rural farmer.

WORKSHOP EVALUATION

This is the second workshop sponsored by ETMA. It is an outgrowth of the first workshop which was devoted mainly to land use planning in Sierra Leone. This current workshop has as its theme "The Role of Extension in Environmental Management and Agriculture". Like the last workshop, the evaluation process aims at determining the extent to which the objectives of this workshop were met. The methods of evaluation employed at this workshop are similar to those used in the last workshop, i.e. a three-level scheme described in the following manner:

a) Daily evaluation by Alabama Agricultural and Mechanical University personnel.

b) A general evaluation committee consisting of Sierra Leoneans and their counterparts from Alabama Agricultural and Mechanical University met regularly to assess each days proceedings with the intention of ensuring that the workshop was on course and had not lost sight of its declared objectives.

c) The third scheme utilized an evaluation instrument, which was administered on the last day to the workshop participants. These instruments were designed to elicit individual and personal opinions on the conduct and achievements of the workshop.

The responsibilities of the external evaluators covered the following:

a) To develop summaries of each day's activities, not excluding the summaries of each paper discussed and their recommendations.

b) To critically assess the general conduct of the seminar and to report any problems that might endanger the workshop. On one occasion, for example, it was observed that certain individuals were using the workshop as a platform for airing anti-government feelings. Attempts were made to bring the situation back under control. The workshop proceeded smoothly thereafter.

c) To administer and analyse the evaluation instruments.

WORKSHOP PARTICIPANTS EVALUATION

At the end of the three weeks, participants were served with evaluation forms (Appendix A) and asked to submit their individual impressions of vital elements of the workshop. No staff member of UNDO and the guest team from Alabama participated in this exercise.

The questionnaire was simple. Clear cut responses were required concerning the way different aspects of the workshop were treated. Respondents were asked to point out various aspects of weakness, themes they would have liked to see included and suggestion for further action as a follow up of the workshop.

The Evaluators

The attendance was very good. Participants who had not sat in at least 6 sessions were not allowed to complete the evaluation forms. Yet, there was a total of 43 eligible evaluators. Of these, 39 were males and 4, females. The quality of participation was very high and this is reflected in the level of openness and professionalism that prevailed throughout the sessions.

The bulk of the participants (63%) were within an early middle age group (31 - 40 years), 21% were within age 21 - 30 while 16% were between 41 and 50 years. Three of the participants were graduates from teacher training colleges. The rest were degree holders; 40% with a bachelor's degree 37% holding a Masters and 16%, a Doctorate in various specialist fields. The relative youthfulness of this early middle age participant population is reflected in years of work experiences reported. Only 7 of the 43 respondents have a work experience of between 16 - 25 years. There

are 15 out of 43 (35%) with total work experience of between 11 - 15 years while a substantial group of 12 (28%) are close to 10 years of total work experience.

An inspection of time spent on the respondents' current job demonstrates another element of youthfulness. The great majority of respondents (79%) have not been at their present jobs for more than 10 years. Six, or 14% of them have served in the same job for a period ranging 11 - 15 years, and only 3 have an on the job service record of 16 to 25 years. One is therefore faced with young professional evaluators, a lot of whom are either on the threshold of, or holding, managerial placements. They are a very responsible group with a professionalism that is not disturbed by traditional red tape and threat from establishment.

The Evaluation

Responses on the level of achievement in the 4 principal objectives varied rather distinctly. An achievement level of 91% is very significant. There was an overwhelming agreement that objective 'a' was very well (61%) achieved. The objective concerns an examination of present agricultural and other resource management techniques in the different ecosystems of Sierra Leone. The second objective had a second best appraisal, in that 35% said that it was very well achieved, 26% said it was well achieved while 33% said it was average.

The third objective " to describe the role of the extension worker in promoting sound environmental management" - was again, above average in terms of achievement, but the evaluators thought it was rather well (40%), than Very well (21%) achieved.

The score on "average" for this objective (33%) is the same as the second, but far higher than the first which scored a mere 7%. The fourth objective had the worst achievement scores with 42% of the response above average, 49% on average and 9% below average.

On the whole, the workshop objectives were well achieved. This conclusion is buttressed by the submission that technical professional's participation was 91% good and at least, 51% very good. This generalisation is strengthened by our deductions from workshop coverage of themes. Cumulative scores from a level of "Well" to "Excellent" were above 60% on all themes. The best achievements recorded were principally on the overview, swamp management and utilization, upland farming, marine and freshwater aquaculture environmental stress, forestry and modern agricultural practices and their impact on the environment. Mining and effective rural information delivery systems for environmental management are close second.

Rates of non-responsiveness tended to vary from one theme to the other. This tendency has a direct effect on the overall rating of the themes, though the act itself is probably due to absence from a particular session, and therefore the inability to assess it, or sheer indecision. For example, the theme on forestry had 14 no responses or 35% of the respondents. Of the 29 who responded, 26 agreed that this theme was treated "Well" and above, which is a cumulative score of 90%, discounting the non-responses.

On the substance of the workshop, there was 1 undecided (2.6%), 9 negative (21%), and 33 (77%) positive responses.

This level of workshop achievement (over 70%) should be rated very satisfactory. A further probe into negative responses should generate more reasons for satisfaction.

Questions 4 and 5 seem to have an in-built test for consistency. Indeed, of the 9 who said they were not satisfied with the substance of the workshop, only 3 had suggestions - 2 wanted air pollution included, 1 wanted the teaching of agricultural science to be considered as part of the extension service net work. Every negative respondent had a different suggestion on how to conduct the workshop differently. There is a suggestion for fewer but directly interrelated topics. The workshop is deemed too broad, field trips are to be conducted specifically to and for farmers and extension agents. One respondent wanted one workshop for every specific problem area. The other thought there were too many lead papers, and another saw too many conflicting views that made the participant confused. The workshop management should note these comments as they will be seen recurring in other sections of this report.

Responses on question 5 indicate how broad the workshop theme can be. It is interesting that while there is some criticism that the workshop theme encompasses a lot, there is a sizeable majority suggesting more topics. While there are 6 (14%) undecided on other topics to be included, 20 (46.5%) had no other topics in mind, but 17 (39.5%) had some additions. Two respondents want the teaching of agricultural science at all scholastic levels to be included as an extension service.

Two others suggest post harvest and marketing problems. Others are simple type suggestions like pollution, political will, plant breeding for conservation, land evaluation and cultural impact on extension work (see appendices). It is obvious that some judicious cut off point should be determined. There however seems to be a tendency for respondents to feel left out if their special areas of interest were not given the profile they deem fit. The question on the length of the workshop was rather controversial. No body thought it was too short, 23 (53.9%) thought it was adequate and 20 (40.9%) thought it was too long.

Suggestions for a follow up of the workshop are an interesting shopping list. Certain trends are however clear. A good proportion of the respondents - 19 (43.2%) - want the workshop recommendations/resolutions to be submitted to the appropriate quarters for implementation. Others - 10 (22.7%) - are keen on defining a strategy which will activate environmental awareness building. About 13.6% (6) suggest finding ways and means of improving the system of information flow. There are 4 respondents (9.1%) who think more workshops and publicity are necessary. Others 2 (4.5) think that action based strategies like providing better training for extension workers and establishing pilot projects in problem areas are overdue, not to talk of improvement in adaptive tools for small farmer management practice.

On the adequacy of information presented at the workshop 35 (81.4%) thought it was adequate, 7 (16.3%) said it was not, and there was one non-response. There are 6 different suggestions for modification. Two respondents asked for more detail. One suggest more consideration for practical experience. Field trip should be specific and demonstrative of

resources mis-management. One bemoaned a situation where problems were identified but solutions not adequately discussed; and another suggested that some technical papers should be used restrictively as aids to data storage and processing.

General statements regarding the workshop constitute an evaluation instrument to test consistency in response and provide a final check on areas of concern. This test case shows that of all the determinants in achieving objectives, the most critical seem to be items 9K ("The workshop provided adequate time for discussion and exchange of ideas") and 9L. ("There were adequate opportunities to express my own ideas during the workshop"). The worse situation is that of 9K, where there is a majority submission that adequate time was not provided for discussion. Besides these observations it is evident that all other responses are strongly in agreement with our expectations; ranging as they do from a score of 77 to 98% (See appendices).

Question 11 is a final look at the workshop and a hidden test on whether the workshop achieved the 4 original objectives. A summary of our list of significant perspectives gained, collapses some 31 recorded options to 4 main sectors. The area on <u>extension</u> training, information flow and related problems accounts for 28% of the perspective. <u>Resources exploitation and management</u> accounts for 26%. <u>Government's role</u> in providing the will, the legislation for implementation of recommendations and enforcement of legislation are perceived as crucial to environmental management by 24% of the respondents. The <u>environment</u> and the <u>purposes of its study</u> and constituents as a set of protected systems constitutes 22% of the respondents' perspectives.

[illegible] RECOMMENDATIONS

1. The Overview

Rights to exploit natural resources have tended to over-ride local concerns for environmental management and protection. Institutions and Government must take steps to enforce environmental laws and conservation practices.

2. Upland Farming

The traditional upland farming system is most predominant in Sierra Leone. The consequent diminishing fallow periods makes bush fallow farming the single most environmentally damaging farming practice leading to extensive denudation and soil loss. The workshop resolved that since the system does not seem to be economic and rational, some modifications are necessary, either through fixed field cultivation as already practiced by the rural development projects, or appropriate production packages in response to the different problems.

3. Swamp Development and Utilization

Swamp ecologies possess greatest biological productivity. In adapting these areas for agricultural production stringent consideration must be given to minimizing permanent environmental damage. Several swamp ecologies particularly riverain, boli and mangrove swamp areas can be subjected to large and small scale farming. Base line studies related to climatological, physical and biological characteristics of these swamp ecologies are needed to develop appropriate farming systems.

4. Forestry

The total primary forest area is presently below 5%, although 25% of the forest were originally intended for protection by the government.

The Forestry Division is currently not fully empowered to control/supervise commercial and domestic forest exploitation. This tends to create a serious deterrent towards afforestation. The workshop resolves that the Forestry Division be assigned the full responsibility of supervising and monitoring forest exploitation practices and developing a national awareness programme for conservation.

5. Marine and Freshwater Aquaculture

a) While there is need to support efforts for fresh water fish farming, marine aquaculture and fisheries research and extension, the workshop views with grave concern the lack of adequate information related to harvesting, sales and distribution of off-shore catches, especially at a difficult time like now when sea products can be a valuable foreign exchange earner. It is therefore resolved that the appropriate ministry be urged to explore the possibility of receiving payment in foreign currency for exported fish. Transhipment of catches should meanwhile be totally discouraged.

b) In view of the fact that the ancillary services such as processing, marketing, shipyard work, gear construction, food, fuel and other supplies could be of greater economic yield than the royalties, Government should consider the construction of a fish harbour complex.

c) In view of the fact that the young fisherman/seamen of today will form the backbone of the fishing industry of tomorrow, fishery subjects should be incorporated into the curriculum of schools and colleges.

6. Wild Life Management

The workshop gratefully acknowledges efforts of the President and the efforts of several international agencies to promote national wild life conservation and strongly resolves that areas representative of Sierra Leone's natural ecology be maintained as wild life sanctuaries. It further resolves that a national wild life conservation education programme be undertaken.

7. Livestock Management

The workshop resolves that greater emphasis should be placed on the production of wholesome animal protein by encouraging livestock production everywhere in Sierra Leone. This should be supported by improved animal husbandry and veterinary practices. In addition, some realistic settlement packages should be designed to minimize ecological degradation from land use competition between shifting cultivation and shifting animal husbandry.

8. Modern Agricultural Practices and their Impact on Environment

a) The workshop discussed various advantages and disadvantages of tractorisation and oxenization. The Ministry of Agriculture and Forestry's decision to allow farmer representatives to manage subsidised tractor services is considered a move towards the right direction. The workshop however, observes that options for land development cannot be raised too far above farmer's preference and, resolves that a prudent, monitored and evaluated policy of tractorisation and oxenisation be adopted in response to changing economic, environmental and cultural constraints.

b) Vast areas of Sierra Leone can be brought under cultivation, hence, the potential for transformation from a food deficient to a food surplus country. The main constraint in achieving this objective is the insufficient supply of inputs like a year around availability of water. The workshop resolves that a tacit irrigation and drainage policy be defined, based on studies, experiments and staff training packages that will facilitate environmentally sound irrigation systems for various agro-ecological zones in the country.

c) The workshop reviewed pest control activities in the country and resolves that non-chemical methods should be encouraged, and pesticides, used judiciously. For this reason, there is need for a mass education programme and the enforcement of relevant legislation. Steps should also be taken to monitor the impact of pesticides on the environment.

9. Environmental Stress

Adaptive research is needed to cope with environmental stress factors generated by the incidence of drought, excess water, limited nutrient supply and soil acidity in certain ecologies of Sierra Leone. The workshop resolves monitoring of environmental stress factors along with the adoption corrective measures be undertaken to maximize agricultural productivity without causing drastic imbalances in our ecosystem.

10. Mining

The workshop was deeply distressed by the adverse impact of mining on our land and water resources and also with lack of rehabilitation of mined out lands and surrounding water bodies. The workshop strongly recommends that a national policy of rehabilitation be instituted and effective monitoring and legislation be planned to effect such a policy.

11. Human Ecology

a) Because of present trends in rural-urban migration, and the increase in population and its attendant problems, i.e. overcrowding, inadequate health facilities, poor and inadequate housing, this workshop recommends that planning address the problem of servicing and present population adequately, and provide a much needed education in family planning.

b) Nutritional problems in Sierra Leone are due to a complex of factors influenced by rapid rate of population growth, migration, depressed agricultural productivity and limited nutritional extension programmes. The workshop resolves that agricultural and rural development effort is incomplete without due attention to public health and nutrition programme concomitantly supported by education and extension. Future development efforts must incorporate public health and nutrition and health education programmes. The workshop realises that Public Health in Sierra Leone has still not been given the attention it deserves. Therefore all efforts should be made to increase the preventive component of our medical practice in Sierra Leone.

12. Effective Rural Information Deliver Systems for Environmental Management

Rural information delivery and extension programme are fragmentary and at times duplicate various out-reach programmes. The workshop debated whether the rural information delivery in Sierra Leone is coherent enough to be designated as a 'service' or it simply is a disorganized infrastructure. The lack of village level presence of forestry, fisheries and public health services was evident. Lack of support of extension personnel, lack of esteem in which extension personnel are held, discrepancies in salary structures in various sponsored programme and governmental extension employees have hampered extension's effectiveness. The workshop resolves that both extension policy as well as extension education be critically reviewed to be responsive to rural needs and fair to extension personnel and in which environmentally sound conservation is emphasized.

13. Sierra Leone Environmental Management Association

At the concluding session of the Workshop on the "Role of Extension in Environmental Management and Agriculture" the participants agreed that an inter-disciplinary workshop committee be formed to establish the Sierra Leone "Environmental Management Association". A working committee involving the following people was selected:

Prof. D.B.Chaytor	Fourah Bay College
Mr. Taylor-Morgan	Freetown
Prof. Harry Turay	Njala University College
Dr. Cyrus Macfoy	Fourah Bay College
LWDD. Representative	
Mrs. F. Yumkella	Ministry of Health
Mr. M.Jambawai	Ministry of Agric. & Forestry

SPECIFIC RECOMMENDATIONS

1. Land Use Patterns and Practices in Sierra Leone

(a) There is a definite need to provide a structure that will serve as an information base for monitoring changing patterns of ecologies through different levels of environmental management.

2. The Influence of Agriculture on Environment

(a) An efficient and effective extension service is essential to ensure the proper management of catchment areas and irrigated lands.

(b) Adequate numbers of forest rangers must be employed to control deforestation in catchment areas.

(c) People should be aware that soils, water and fertilisers are an integrated complex in irrigation.

(d) There is need to contain excessive soil erosion in Sierra Leone.

3. Upland Farming

That a judicious cultivation of the uplands be carried out taking into account key environmental and ecological issues e.g.

(a) To implement a four year crop sequence of cereals, legumes and root crops so that the same tract of land can be farmed for 4 successive years.

(b) To perform crop production with a complete but minimal package of inputs making the best use of low cost improved agricultural practices such as proper weeding, proper density and inter-cropping.

4. Swamp Development and Utilization

That swamps should be used for rice production. That mangrove swamps in particular be developed to support multiple eco-systems.

That a loan scheme for farmers be re-introduced to assist with the heavy cost of labour involved in mangrove clearing in particular.

5. Marine and Fresh Water Aqua-culture

(a) That management measures by government as far as industrial fishery is concerned be rigidly enforced in the following areas:

(1) Licensing of vessels
(2) Prohibited fishing areas
(3) Restricted zones
(4) Mesh size regulations

(b) That there is a need for laws to cover marine pollution

(c) That inland fisheries should be encouraged and developed

(d) That more fish farms should be developed and greater protection accorded oyster farming.

(e) That the construction of a fish harbour complex be considered.

6. Forestry

(a) That a judicious policy for the utilisation of forest resources be adopted.

(b) That a forestry awareness day be observed annually to draw attention to the need for conservation.

(c) That a judicious policy of agro-forestry be adopted.

(d) That the forestry department be empowered to police and enforce forestry laws.

(e) That the extension programme of forestry should be strengthened.

7. Wild-Life Management

(a) That many of our wild animals belong in the endangered species list; they should therefore be kept in game reserves.

(b) That legislation favouring wild-life conservation should be enacted.

(c) That a judicious approach to the exploitation of our wild life should be adopted.

8. Livestock Management

(a) Funds and equipment to support an efficient programme of livestock development are needed.

(b) That a Livestock Production Officer be appointed to head the production section of the department.

(c) That we should encourage livestock as part of mixed farming and plantation operations.

(d) That we should contemplate a complete re-organisation of the veterinary services for disease investigation studies.

(e) That a national cattle and small ruminant multiplication and improvement programme should be instituted

9. Modern Agricultural Practices

(a) That a programme of tractorization be adopted simultaneously with the programme of oxenization.

(b) That control and management of tractors be transferred to farmers.

(c) That a system of equipment evaluation be established.

10. Fertilizer Usage and Its effect on Water Quality

(a) That the pollution situation involving fertilizers should be closely watched.

(b) That a soil fertility map of Sierra Leone should be researched.

(c) That Land and Water Development Division should be assigned the task of monitoring the effects of fertilizer usage and other chemical pollutants on our rivers.

(d) That pesticides imported into the country should be monitored.

11. Environmental Stress Factors affecting Crop Production

(a) That irrigation be undertaken to ease the water stress factor in crop production

(b) That perennial crops be bred which are drought resistant in the dry seasons.

(c) That more research and information be made available on all stress related factors affecting crop production.

12. Mining

(a) That a Government Agency be set up to ensure that the mining companies undertake land reclamation policies.

(b) That reclamation studies be undertaken in areas such as flood - plains, mined - out areas, and bolilands.

13. Human Ecology

(a) That adequate housing provision be made for the urban areas, particularly Freetown.

(b) That rural areas be strengthened with agro-based industries to stem the tide of rural-urban migration.

(c) That greater incentives be offered to farmers to encourage them to stay on their farms.

(d) That family planning efforts be stepped-up and improved health care be made available to all.

(e) That the Bennimix Industry should be revived.

14. Extension Services

(a) That extension services in the various units or divisions of the Ministry of Agriculture and Forestry be coordinated.

(b) That extension workers should be provided with the necessary equipments and facilities to do their job.

(c) That better and effective training programme for extension workers be designed to help them adapt their research findings to the farming methods of the farmer.

SUMMARY OF RECOMMENDATION OF PARTICIPANTS

1. There is need to consider modifying time allocation between the presentation of papers and discussions.

2. Management should consider experimenting with smaller discussion groups. Participants would have greater opportunity to discuss topics.

3. In future workshops, management should devise avenues to increase the level of participation of policy makers.

4. The use of a lead paper for each theme may be an efficient time saving devise worth implementing.

5. Future workshops should be held at a time when most of the target participants would be able to attend.

6. There is need to pre-test for a workshop location with prospective participants.

APPENDIX A

WORKSHOP ON "THE ROLE OF EXTENSION IN ENVIRONMENTAL MANAGEMENT AND AGRICULTURE"

FREETOWN, SIERRA LEONE
May 16-June 3, 1983

EVALUATION QUESTIONNAIRE

INTRODUCTION

This questionnaire is an important part of the process of evaluating the results of this workshop. It seeks to obtain data on your assessment, as a participant, of its overall effectiveness.

The stated objectives of the workshop were:

a. To examine the present agricultural and other resource management techniques in the different ecosystems of Sierra Leone.

b. To demonstrate the feasibility of improved resources conservation and utilization by proper environmental management.

c. To describe the role of the extension worker in promoting sound environmental techniques.

d. To present extension methods of environmental information transfer to the farmer.

1. Indicate to what extent you feel the above 4 objectives were achieved:

	VERY WELL	WELL	AVERAGE	POORLY	VERY POORLY
Objective (a)	_____	___	_____	_____	_____
Objective (b)	_____	___	_____	_____	_____
Objective (c)	_____	___	_____	_____	_____
Objective (d)	_____	___	_____	_____	_____

2. [redacted]

[redacted] ____

a. Technical professionals participation in the workshop was:

1. Very Good ____ 2. Good ____ 3. Poor ____ 4. Very Poor ____

3. Indicate how you feel about each of the themes covered during the workshop:

	THEMES	EXCELLENT	VERY WELL	WELL	POORLY	VERY POORLY
a.	Basic Ecological and Environmental Management Considerations in Land Use Planning--The Overview					
b.	Upland Farming					
c.	Swamp Management and Utilization					
d.	Marine and Freshwater Aquaculture					
e.	Forestry					
f.	Wildlife Management					
g.	Livestock Management					
h.	Modern Agricultural Practices and their Impact on Environment					
i.	Environmental Stress					
j.	Mining					
k.	Human Ecology					
l.	Effective Rural Information Delivery Systems for Environmental Management					

4. Are you fully satisfied with the substance of the workshop?

YES _____ NO _____

If NO, please state what you feel should be added, subtracted, or done differently

_____

_____

5. Are there other topics which you feel should have been included?

YES _____ NO _____

If YES, please list the topic(s) below:

_____

_____

6. How do you feel about the length of the workshop?

a. Too Long _____

b. Adequate Length _____

c. Too Short _____

7. State briefly what you would like to see as a follow-up of the workshop.

_____

_____

_____

8. Was the information presented in the workshop adequate?

YES _____ NO _____

If NO, please state what you feel should be added, subtracted, or done differently

_____

_____

9. Following is a list of statements with regards to the workshop. Circle the number which represents your response to each statement.

Strongly Agree (1) Agree (2) Disagree (3) Strongly Disagree (4)

a.	The materials presented in the workshop were clearly in line with the workshop objectives.	1	2	3	4
b.	My understanding of the role of extension in environmental management and agriculture was greatly increased by the workshop.	1	2	3	4
c.	The workshop objectives were adequately met.	1	2	3	4
d.	The quality of the materials presented in the workshop was excellent.	1	2	3	4
e.	The workshop dealt with priority problems of Sierra Leone.	1	2	3	4
f.	The workshop was professionally rewarding.	1	2	3	4
g.	The purpose of the workshop was clearly understood.	1	2	3	4
h.	Some of the content of the workshop is applicable to my work.	1	2	3	4
i.	The workshop stimulated new ideas.	1	2	3	4
j.	Workshops of this nature contribute little to the solution of vital problems.	1	2	3	4

k.	The workshop provided adequate time for discussion and exchange of ideas.	1	2	3	4
l	There were adequate opportunities to express my own ideas during the workshop.	1	2	3	4
m.	The field trips were a useful part of the workshop.	1	2	3	4
n.	The reference and other resource materials provided in the workbook are valuable to me.	1	2	3	4
o.	The audio visuals used in the workshop were helpful in achieving a better understanding of the subject matter.	1	2	3	4
p.	The workshop was a step in the direction of solving vital problems.	1	2	3	4
q.	Much of the workshop presentations were too technical for me.	1	2	3	4
r.	Much of the workshop presentations were too simple for me.	1	2	3	4
s.	The workshop has helped me to develop some new ideas with regards to my own work.	1	2	3	4
t.	The workshop was well arranged and conducted.	1	2	3	4
u.	Interest in the workshop remained throughout.	1	2	3	4
v.	Interest in the workshop tended to decline towards the end.	1	2	3	4

11. What were the three (3) most significant perspectives gained from the workshop?

_____

_____

_____

12. Please indicate in the space provided below any other relevant statement or comment you may wish to make of the workshop.

_____

_____

_____

13. What action can be taken towards further understanding the environmental issues of Sierra Leone.

14. What action can be taken towards resolving these issues?

BACKGROUND INFORMATION ON WORKSHOP PARTICIPANTS

1. Sex: Male _____ Female _____

2. Indicate the age range in which you are:

   a. 18-20 _____

   b. 21-30 _____

   c. 31-40 _____

   d. 41-50 _____

   e. Above 50 _____

3. What is your present level of formal education?

   a. Secondary School (O Levels) _____

   b. Secondary School (A Levels) _____

   c. Training College Graduate _____

   d. Bachelor's Degree or Equivalent _____

   e. Master's Degree _____

   f. Doctor's Degree _____

4. What is your field of training?

   _____

5. What is your present occupation. (State exact title)

   _____

6. Length of time with present job. _____

7. What is your total work experience?

   _____

   _____

8. What is your country of origin.

   _____

Appendix B 1

ACHIEVEMENT OF WORKSHOP OBJECTIVES

OBJECTIVE	Very Well		Well		Average		Poor		Very Poor	
	No.	%	No.	%	No.	%	No.	%	No.	%
A. Examination of present agricultural and other resource management techniques in different ecosystems of Sierra Leone.	26	60.5	13	30.3	3	7.0	0	0.0	0	0.0
B. Demonstrate feasibility of improved resources conservation and utilization by proper environmental management.	15	34.9	11	25.6	14	32.6	1	2.3	0	0.0
C. Describe the role of the extension worker in promoting sound environmental techniques.	9	20.9	17	39.5	14	32.6	2	4.7	0	0.0
D. Present extension methods of environmental information transfer to the farmer.	4	9.3	14	32.6	21	48.8	3	7.0	1	2.3

Appendix B 2

COVERAGE OF WORKSHOP TOPICS

	Excellent		Very Well		Well			Poor		Very Poor		No Response	
	No.	%	No.	%	No.	%	+%	No.	%	No.	%	No.	%
The Overview	8	18.6	23	53.5	7	16.3	88.4	0	0	0	0	5	11.6.
Upland Farming	3	7.0	20	46.5	14	32.6	86.1	2	4.7	0	0	4	9.3
Swamp Management	7	16.3	22	51.0	10	23.3	90.6	0	0	0	0	4	9.3
Marine/Fresh Water	7	16.3	10	23.3	20	46.5	86.1	1	2.3	0	0	5	11.6
Forestry	2	4.7	14	32.6	10	23.3	60.6*	3	7.0	0	0	14	32.6
Wild Life	11	25.6	9	20.9	12	27.9	74.4	4	9.3	0	0	7	16.3
Livestock	0	0	13	30.2	19	44.2	74.4	4	9.3	0	0	7	16.3
Modern Agriculture	5	11.6	17	39.5	13	30.2	81.3	2	4.7	1	2.3	5	11.6
Environmental Stress	7	16.3	17	39.5	12	27.9	83.7	2	4.7	0	0	5	11.6
Mining	6	13.9	14	32.6	14	32.6	79.1	2	4.7	0	0	7	16.3
Human Ecology	5	11.6	15	34.9	13	30.2	76.7	3	7.0	0	0	7	16.3
Rural Information Delivery	0	0	14	32.6	20	46.5	79.1	3	7.0	0	0	5	11.6

* 89% if 14 no responses are discarded

Appendix B 3 RESPONSES TO STATEMENTS ON WORKSHOP.

	+ %	-	Agree strongly No	%	Agree No	%	Disagree No.	%	Disagree strongly No	%	No response No	%
A. Material	93	7	13	30.2	27	62.8	2	4.7	0	0.0	1	2.3
B. Under-standing	86	14	16	37.2	21	48.8	2	4.7	1	2.3	3	7.0
C. Object-ives	88	12	9	20.9	29	67.4	4	9.3	0	0.0	1	2.3
D. Material Quality	91	9	13	30.2	26	60.5	3	7.0	0	0.0	1	2.3
E. Problem Priority	93	7	24	55.8	16	37.2	2	4.7	0	0.0	1	2.3
F. Reward	91	9	25	58.1	14	32.6	3	7.0	0	0.0	1	2.3
G. Purpose	93	7	18	41.9	22	51.2	2	4.7	0	0.0	1	2.3
H. Content	95	5	29	67.4	12	27.9	1	2.3	0	0.0	1	2.3
I. New Ideas	98	2	30	69.8	12	27.9	0	0.0	0	0.0	1	2.3
J. Little Contri-bution	9	91	1	2.3	3	7.0	13	30.2	25	58.1	1	2.3
K. Discussion Adequate	44	56	8	18.6	11	25.6	19	44.2	4	9.3	1	2.3
L. Own Ideas Adequate	56	44	7	16.3	17	39.5	16	37.2	2	4.7	1	2.3
M. Trips Useful	88	12	20	46.5	18	41.9	0	0.0	0	0.0	5	11.6
N. Resource Materials	88	12	22	51.2	16	37.2	2	4.7	0	0.0	3	7.0
O. A/V Helpful	95	5	30	69.8	11	25.6	0	0.0	0	0.0	2	4.7
P. Workshop Rightstep	98	2	19	44.2	23	53.5	0	0.0	0	0.0	1	2.3
Q. Papers too Tech	9	91	2	4.7	2	4.7	21	48.8	17	39.5	1	2.3
R. Papers too Simple	23	77	0	0	10	23.3	24	55.8	8	18.6	1	2.3
S. Gained More Ideas	91	9	20	46.5	19	44.2	3	7.0	0	0.0	1	2.3
T. Workshop Well arranged	84	16	15	34.9	23	53.5	4	9.3	0	0.0	1	2.3
U. Interest Continous	91	9	13	30.2	26	60.5	3	7.0	0	0.0	1	2.3
V. Interest Declined	12	88	2	4.7	3	7.0	21	48.8	16	37.2	1	2.3

Appendix B 4 OTHER RELEVANT COMMENTS

	Comment	No. of Respondents
1.	Low attendance of Policy Makers	6
2.	Workshop was well attended, organised and interesting	5
3.	There is need for other workshops	3
4.	More time should be provided for discussion	3
5.	There is need to devise a supportive machinery for implementing and monitoring workshop resolutions	2
6.	The appointment of moderators needs reconsideration some tended to be partial	2
7.	Workshop deliberations can only yield fruitful results through self reliance and hard work	1
8.	Sierra Leone will remain poor except more food is grown	1
9.	Papers should be presented in advance and vetted to avoid overlaps	1
10.	Local farmers should be invited	1
11.	Extension services should be divorced from politics	1
12.	There is too much emphasis on agriculture when people talk of national development	1
13.	Every participant agrees there is need to protect the environment	1
14.	More elements of extension should be included in field trips	1
15.	Other workshops should consider locations near target groups and environments	1

Appendix B 5

RESPONDENTS' FIELDS OF TRAINING

Field	No
1. Agriculture and Related Sciences	11
2. Geography and Related Sciences	5
3. Forestry	4
4. Entomology	3
5. Aquaculture	3
6. Marine Biology and Resources	2
7. Geology	2
8. Agricultural Economics	2
9. Medical Demography	2
10. Mineralogy	1
11. Finance and Agriculture	1
12. Geophysics	1
13. Personnel Management	1
14. Soil Chemistry	1
15. Eco - physiology	1
16. Weed Science	1
17. Pharmacology	1
18. Mining Engineering	1
19. Engineering	1

Appendix B 6 RESPONDENT'S OCCUPATIONS

	Occupation	No.
1.	Lecturers/Teachers	11
2.	Agriculture and Extension	10
3.	Mines/Mining	5
4.	Fisheries	5
5.	Forestry	4
6.	Agricultural Economist	2
7.	Pharmacist	1
8.	Farmer	1
9.	Entomologist	1
10.	Field Crop Specialist	1
11.	Medical Demographer	1
12.	Rehabilitation Officer	1
13.	Project Analyst	1

Appendix C

LIST OF PARTICIPANTS

1. Abdulai Joseph G
   Assistant Chief
   Agriculturist
   MAF.

2. Abraham Arthur
   Chief, Education and
   Research Section
   MRU.

3. Al Agard Jr
   Extension Agronomist
   ACRE.

4. Agwu-Jones Agatha C
   Mineralogist
   Geological Survey.

5. Akiwumi Fenda A
   Geologist/Hydrologist
   LWDD.

6. Alieu B K
   Division Forest
   Officer
   MAF.

7. Allen Winston J
   Land Resources
   Officer
   LWDD.

8. Allie Sam B
   A O
   MAF Moyamba.

9. Amara D S
   Lecuturer
   NUC.

10. Amara Patrick J
    P A O - Bo
    MAF.

11. Awuta-Coker Daphne
    L R O
    LWDD.

12. Bangura Alie B
    Field Technician
    LWDD.

13. Bangura Alpha A
    Fisheries Officer
    MNR.

14. Bangura David J
    Senior Field Technician
    LWDD.

15. Bangura J S
Senior Manager
Bank of Sierra Leone

16. Banya C S
Rice Officer
IADP.

17. Barrie I S
Lecturer
NUC.

18. Basimi R A
Lecturer
FBC.

19. Bassir Franklin
Agrohydrologist
LWDD.

20. Bomah Andrew K
Lecturer
NUC.

21. Buckle L B
Field Technician
LWDD.

22. Bundu Abdul R.
Field Technician
LWDD

23. Carew George
Lecturer
FBC.

24. Chaytor Daniel
Director
Inst.Mar.Biol.Oceanography

25 Chungang Irene
Student
NUC.

26. Cole Leslie R
L R O
MRU.

27. Cole Victor J
Project Officer
NDB.

28. Conteh Adama F
Agronomist
LWDD.

29. Conteh Marie Ann
Agriculturalist Chemist
LWDD.

30. Conteh Noah
PMEPI
Ministry of Health.

31. Cuthbert Farrel Kwesi
Asst. Director of Operation
NDB.

32. Dahniya M T
Senior Lecturer
NUC.

33. Davidson Ogulade Robert
Senior Lecturer
FBC.

34. Davies Alex M
Carto. Technician
LWDD.

35. Deen Mohamed S
Asst General Manager
NDMC.

36. De Haan Jeffrey A
Development
CRS.

37. Dingle Robin
FAO Senior Adviser
MAF.

38. Dixon C A
Associate Soil Scientist
WARMA.

39. Dumbar Sylvester
Rehabilitation Officer
NDMC.

40. Dumbuya Aruna F
Lab. Tech.
LWDD.

41. During S E
Fisheries Officer
MNR.

42. Faulkner Dalton F
Lecturer
FBC.

43. Fergusson W
Tech. Adviser
LWDD.

44. Floyd McArthur
NRES
Alabama

45. Fofanah S A
Interpreter
Translator
Met. Dept.

46. Frey - Makons R
Manager of womens programme
B P + R D P.

47. George B J
Lecturer
N U C

48. Gbanie B Anthony
Lecturer
N U C

49. Ghandi Abdul M
Communication Officer
I A D P
M A F.

50. Gordon Ivan C A
Admin. Manager
Marampa Mines.

51. Gordon C L A
Deputy Director
LWDD.

52. Griffin O L D
Librarian
LWDD.

53. Happel Ruth
Visiting Research Scholar
F B C

54. Jabati Micheal J
Photographer
A C U

55. Jalloh A A W
Director
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56. Jambawai Musa Samuel
Conservator of Forests
MAF.

57. James B D
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FBC.

58. Jaschke D U
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LWDD.

59. John Moody E A
Project Manager
M I A D P
M A F.

60. Johnson W S B
Lecturer
F B C.

61. Johnson S D
Research Officer
M A F.

62. Jonah Davidson O
SAST
MEHS.

63. John Agatha Evelyn
Chemist
Geological Survey.

64. Jones Arthur B C
Senior Fisheries Officer
M N R.

65. Jones Ritchie P
Fisheries Officer
M N R.

66. Kabba A B S
Technician (Soils)
LWDD.

67. Kaba Mamady Massa Elhadj
Director General
M A F.

68. Kai Kai A J
D P O
LWDD.

69. Kamara Abu Bakarr
Principal Fisheries Officer
M N R.

70. Kamara Abdul-Rahman
Tech. (Agronomy)
LWDD.

71. Kamara Alieu B
Reader/Editor
LWDD.

72. Kamara A H
Project Manager
W F P
M A F.

73. Kamara Alpha Y S
Geophysicist
Geological Survey

74. Kamara K A
Acting Senior Vet Officer
M N R.

75. Kamara Bartholomew
Asst. Conservator of Forest
M A F.

76. Kamara Cecilia
Computer Operator
LWDD.

77. Kamara Frank F
Agromet Tech.
LWDD.

78. Kamara Ibrahim F
Field Asst.
LWDD.

79. Kamara Kaprie
Field Tech.
LWDD.

80. Kamara Koleh A
Senior Vet. Officer
M N R.

81. Kamara A Osman
Pharmacist
Wilberforce.

82. Kamara Serrie I
Lecturer
N U C

83. Kandeh Mohamed
Soil Survey Officer
LWDD.

84. Kanu Max
News Editor
SLBS.

85. Kargbo S L
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86. Karim Abdul B
Research Asst.
FBC.

87. Karimu John A
Lecturer
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88. Kebbie Sahr E
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Ngotown R D Association

89. Khalu Isatu A
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90. Kamara A A
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NDMC.

91. Koroma Aiah P
Deputy Chief Conservator of Forests.
M A F.

92. Koroma Daniel B
Soil Conservation Officer
LWDD.

93. Koroma F M
Crop Protection Officer
M A F.

94. Labor Daniel K
Field Tech.
LWDD.

95. Lahai A C
Lecturer
N U C.

96. Lahai Franklin B
Tech.(Soils)
LWDD

97. Lahai John A
Coffee Officer
Eastern Area Project.

98. Lakko John A
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79. Kamara Kaprie
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80. Kamara Koleh A
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81. Kamara A Osman
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93. Koroma F M
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M A F.

94. Labor Daniel K
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95. Lahai A C
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96. Lahai Franklin B
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97. Lahai John A
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98. Lakko John A
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99. Lamin Songa Ahmed
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LWDD.

100. Lamin M E S
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M A F

101. Lebbi J B
P A O
M A F

102. Macfoy Cyrus
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F B C.

103. Mansaray Abdul K
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104. Mansaray M S
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Rice Research Station
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105. Mansaray Mohamed
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107. McCarton Bernie
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108. Molure D
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109. Mollish Amos C
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M R U.

110. Mensurah Joseph M
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111. Metzger Dayo
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112. Monoh Nicholas J
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113. Morgan - Taylor Thomas
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Self.

114. Musa Mohamed J
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K M T C.

115. Newman-Samuels W O
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117 Ngele M.B
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118. N'jai Possoh S
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119. O Hearn Jeffrey
Fisheries
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Service.

120. Okezie Ommen B
Professor
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121. Palmer Moira B
L R O
LWIDP

122. Paris B
Associate Expert
LWDP.

123. Pratt Johnny B S
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Engineer
Min. of Mines.

124. Pratt Nana C
Lecturer
F B C.

125. Rajoo H K
Senior Lecturer
N U C.

126. Rashid-Noah A B
Lecturer
N U C.

127. Roberts Clifford R
Lecturer
N M T C.

128. Roberts Julia
Entomologist -Crop Protection
N U C.

129. Royston Davies Alvin
Student
N U C.

130. Saidu Solomon M
Agric. Economist
M A F.

131. Sandi A A
Lecturer
N U C.

132. Scott P A
Lecturer
F B C.

133. Scott Sylvetta
Senior Nutritionist
Min. of Health.

134. Sekgoma Gilbert A
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F B C.

135. Sesay Lamin S
Phytosanitary Officer
M A F.

136. Sesay Mohamed P
Soil Scientist/Conservationist
LWDP.

137. Sesay Samuel A
S A O
M A F.

138. Sillah A B S
Lecturer
N U C.

139. Shamie Ibrahim M O
Senior Crop Protection
Instructor
M A F.

140. Sharma Govind C
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Alabama.

141. Sheriff M F
Fisheries Officer
M N R.

142. Squire James S
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ACRE.

143. Strusser-King V E
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144. Taylor Hilary J L
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145. Taylor Nat E A
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146. Taramali M K
L R O
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147. Thirugnanasambather S
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148. Tholley B A
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LWDD.

149. Thomas Armand
Lecturer
F B C.

150. Thompson E J
Professor
N U C.

151. Touray Alphonsou K
Conservation Officer
LWDD.

152. Tucker Edwin S
Agronomist
Rice Research Station
Rokupr.

153. Turay B M S
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