

**GTZ/UNESCO-ANSTI/UNEP
TRAINING WORKSHOP
ON
ENVIRONMENTAL EDUCATION AND
RESOURCE MANAGEMENT
IN
AFRICAN TERTIARY-LEVEL INSTITUTIONS.
(UNEP, NAIROBI, 23-27 NOVEMBER 1987)**

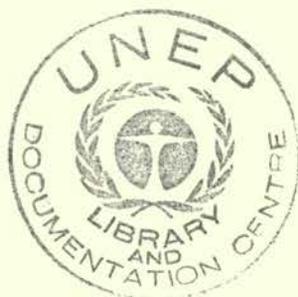
FINAL REPORT

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F O R E W O R D

Major environmental problems in Africa result from the deterioration of both the natural and rural resources base. Deforestation, desertification and the underlying drought situation, together pose the greatest threat to the environment in Africa whilst industrial development coupled with urbanisation pose the second major threat to the African environment.

In spite of the growing awareness, among the African people, of the extent and seriousness of their environmental problems, there still appears a lack of institutions at the national, subregional and regional levels in Africa which are properly staffed to competently address themselves to the most pressing problems facing the African continent. It appears that there are too many inadequately prepared lecturers in tertiary-level institutions, teaching or training students for performing tasks which no longer exist.

It is precisely for this reason that GTZ, UNESCO-ANSTI and UNEP organised a training workshop on "Environmental Education and Resource Management in African Tertiary-Level Institutions" in Nairobi, Kenya from 23-27 November 1987. The main objectives of the workshop were:

- a) to enable participants from 13 Anglophone African countries to competently assess present needs and priorities for promoting environmental education and/or training in their respective countries;
- b) to equip the above participants with the skills necessary for incorporating environmental considerations into the educational curricula and/or training programmes of their respective institutions;
- c) to strengthen links among the participating tertiary level institutions located in 13 Anglophone African countries as well as between them and the German Agency for Technical Cooperation (GTZ), UNESCO-ANSTI and UNEP.

The report is in two parts: The first part deals with organizational matters and presentations viz., attendance, opening of workshop, organization of work, presentation of resource papers, recommendations, evaluation and closing of workshop whilst the second part consists of Annexes relating to workshop programme, evaluation questionnaire, results of evaluation of workshop by participants, opening speeches, closing speeches, organising and drafting committees and list of participants.

On behalf of UNESCO-ANSTI and UNEP, GTZ wishes to thank the participants, resource persons and supporting staff from Conference Services of UNEP, for their untiring efforts in contributing, both individually and collectively, towards the success of the Workshop.

GTZ.

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ORGANIZATIONAL MATTERS AND PRESENTATIONS

A. ATTENDANCE

1. The Training Workshop on Environmental Education and Resource Management in African Tertiary-Level Institutions, jointly convened by the German Agency for Technical Cooperation (GTZ), UNESCO - African Network of Scientific and Technological Institutions (UNESCO-ANSTI) and the United Nations Environment Programme (UNEP), was held in Nairobi, Kenya from 23-27 November 1987. The Workshop was attended by 50 participants, observers and resource persons from selected Engineering, Law and Natural Science Faculties of Universities, Agricultural Colleges as well as from Teacher Training Colleges in Africa.

B. OPENING OF WORKSHOP

2. The workshop was opened by Mr. W.H. Mansfield III, Deputy Executive Director of UNEP. In welcoming the participants, on behalf of the Executive Director of UNEP, he mentioned that UNEP, which recognised education as an important component of environmental needs, was spending about one-fifth of its budget on education and training.

Mr. Mansfield also mentioned that as the African continent was undergoing rapid change affecting aspects of development and environment, education was one of the main tools available to assist African people meet this great developmental challenge. Traditionally, mentioned Mr. Mansfield, the formal education system had played a pivotal role in bringing about change by inculcating new perceptions and values.

Mr. Mansfield next made reference to the recently concluded International Congress on Environmental Education and Training which was held in Moscow within the framework of the joint UNESCO-UNEP International Environmental Education Programme (IEEP). He mentioned that the Congress, which outlined important new priorities and emphasized new directions, set forth a formidable but essential agenda.

Before declaring the workshop open, Mr. Mansfield left the participants to ponder over the following theme for next year's World Environment Day, namely, "When people put environment first, development will last". This theme, he said, could have relevance for the present workshop.

3. There were two other addresses, one by Mr. A. Abdinaser of UNESCO and the other by Prof. I. Loidl of ENVIRON, on behalf of GTZ.

4. In his address, Mr. Abdinaser, on behalf of the UNESCO Director-General, also welcomed the participants, especially those who had come from outside Kenya to attend the workshop. He mentioned that it was timely for a workshop of this nature to be held and congratulated GTZ on having taken the initiative to organize the event.

As follow-up to other regional and international-level meetings, he mentioned that manufacturing companies in several industrialised countries had taken effective measures to reduce or eliminate environmental pollution resulting from ill-conceived manufacturing processes. The measures taken, he mentioned, had resulted in the accumulation of knowledge which, to be effective, needed to be disseminated through educational action.

In conclusion, Mr. Abdinaser said that he hoped the catalytic action following this workshop will have the widest possible impact in creating environmental literacy in Africa.

5. Prof. Loidl's opening remarks placed emphasis on the increasing importance African countries were giving to environmental education with the participation of 50 key personnel from more than twelve African countries in this workshop.

He went on to add that the present workshop is part of a larger project that the German Agency for Technical Cooperation (GTZ) is conducting in institutions of higher education and universities throughout the Third World. The emphasis of the GTZ project, according to Prof. Loidl, is on development and design of curricula and incorporation of environmental components into curricula of tertiary-level institutions.

Prof. Loidl then went on to outline the objectives of the workshop from GTZ's point of view, reminding the participants at the same time to keep in mind the job situation/perspectives as well as the job profiles of both agrarian and engineering professionals.

(Full text of the opening speeches are given in Annex IV)

C. ORGANIZATION OF WORK

6. The workshop met in plenary for the first two and a half days, after which it broke up into three working groups. Each working group discussed elements of environmental education/training specifically for industrial/urban areas, rural areas as well as for teacher training. For each of the working groups, the participants elected their own chairman and rapporteur. The recommendations arising from the discussions of each of the working groups appear in E.

D. PRESENTATION OF RESOURCE PAPERS

PLENARY SESSION 1

7. During the first day of the Workshop, a series of papers were presented in plenary followed by discussions.

The first presentation by Dr. W. Ponniah dealt with the "*Global Strategy for Environmental Education and Training through the 1990's*" with specific reference to tertiary-level education and training. The presentation highlighted the outcome of the International Congress on Environmental Education and Training which took place in Moscow from August 17-21, 1987 as a follow-up to the 1977 Tbilisi Intergovernmental Conference on Environmental Education.

The specific areas of education and training (viz. environmental education and training of teaching staff, environmental education and training in general university education, etc), spelt out as terms of reference for each of the 3 Commissions was discussed in some depth. Finally, the speaker emphasised specific actions recommended by each of the 3 Commissions as follow-up actions to the Moscow Congress.

8. The second presentation by Dr. M. Atchia on "*UNEP's Environmental Education and Training Policy in the Perspective of Sustainable Development*" provided the working definition for environmental education and training, its goals, objectives and guiding principles. Using a case study approach, this paper highlighted significant steps that could be taken by decision-makers, planners, and administrators in the protection and management of the environment. The paper underscored the significance of professional training in the field of the environment as an integrated development towards achieving the objectives of sound eco-development in the continent of Africa.

9. The third presentation by Dr. A. Loidl was based on the GTZ curriculum proposal on "*Environmental Protection and Ecology*". He mentioned that the main objective in preparing the above-mentioned curriculum was to fulfil the essential requirements of environmental education and training in developing countries.

Dr. Loidl also made reference to the two well-known approaches to environmental education, namely the interdisciplinary and multidisciplinary approaches as well as to the causes and effects of environmental problems in the Third World.

PLENARY SESSION II

10. There were no formal papers presented on "*Need for Environmental Experts, Qualifications and Quantitative Requirement, Native vs. Foreign Experts*". However, the Chairman of the day's session requested Dr. Okidi of the University of Nairobi to provide the broad issues surrounding the need for experts in environmental matters. Dr. Okidi outlined the following points.

1. Highest qualifications in postgraduate studies are necessary in many areas of environmental studies e.g. soil management, environmental health, resource management, etc.
2. Quantitative requirements of the experts in the above outlined areas of environmental expertise are infinite. In order to be able to provide potential solutions to myriads of environmental problems, qualified personnel is required.

PLENARY SESSION III

11. During the second day of the Workshop, eight papers were presented and discussed. Below are the highlights of these papers.

12. The first presentation on "*The Dilemma of Soil Degradation in Africa*" by Mr. A. Ayoub provided vital statistics regarding soil degradation as a result of human population pressures on land. Due to the need to produce more food for the increasing human numbers, Mr. Ayoub mentioned that thousands of tonnes of top soil are being eroded due to improper management of soils. In addition to the apparent soil loss problems, the paper provided some potential methods of curbing soil degradation problems. These included establishing effective terracing, contouring, ploughing, mulching and alley-cropping, amongst others.

13. The second presentation by Mr. M. Nakayama on "*Environmentally Sound Management of Water Resources*" focused its attention on UNEP's new programme which seeks to strike a balance between water's role as a resource for development and its environmental value. The new programme on "Environmentally Sound Management of Inland Waters" (EMINWA) comprises the following activities:

- * To assist governments to develop, approve and implement environmentally sound water management programmes in river basins.
- * To train experts so as to implement an institution-building programme.
- * To make regular worldwide assessments of the state of the environment in inland water systems, and
- * To keep the mass media informed of developments.

14. The third presentation by Mr. B. Zentilli on "*Actual Problems of Forests and Forest Management*," highlighted some of the problems of tropical forests. He pointed out that there are many species of trees that use different amounts of water in their habitats. For example, he mentioned that there are 600 types of eucalyptus trees, some of which use huge quantities of water whilst others use less water. Hence it was mentioned that species that consume less water could be selected for tree growing at appropriate localities. The paper also suggested the importance of agro-forestry, a process of integrating plants and crops in the farms.

15. The fourth presentation entitled "*Towards Sustainable Energy Policies*" was delivered by Dr. K. Alibhai. In an effort to arrive at the notion of sustainable energy development, the speaker defined the concept of sustainable development based on the definition provided in the recently published report of the World Commission on Environment and Development entitled "Our Common Future."

According to him, any sustainable energy policy which tries to satisfy the energy needs of all, with particular emphasis on the poor, must also concern itself with the fact that limits exist in the environment's ability to provide for the required energy needs.

Finally, it was mentioned that UNEP would endeavour to integrate environmental considerations into national energy policy, planning and development, both at the technical and institutional levels.

PLENARY SESSION IV

16. The fifth presentation by Dr. M. Korir-Koech on "*Environmental Education, Training and Curricula at the Tertiary Level in Kenya*" provided the evolution of Environmental Education and Training (EET) at Kenya's tertiary level institutions of higher learning. It focused on the Teacher Diploma Colleges (T.D.C.) and the EET curricula of the four national universities (Nairobi, Kenyatta, Moi, and Egerton), including the incorporation of environmental considerations in these curricula. The paper also discussed in some detail the teaching and training models employed at these institutions. The models

discussed were centred on the interdisciplinary and multidisciplinary approaches. To clarify and elaborate on these models, examples of their applications were provided. The paper concluded by indicating that the Kenya government is committed to the improvement of the existing environmental education and training programmes as well as the creation of new programmes in the developing institutions of higher learning.

17. The sixth presentation on "*Reflections on Teaching and Research of Environmental Law in African Universities*" by Dr. C.O. Okidi focused on the concept of environmental law and on research studies in environmental law in Africa. He mentioned limited publications on the subject in the African continent and high costs of procuring journals and other materials on the subject from overseas, namely, U.S.A. & Canada as some of the constraints. The paper concluded by providing six recommendations to be implemented in the teaching and researching of environmental law in the African institutions of higher learning.

PLENARY SESSION V

18. On the third day, the plenary session and paper presentations took place in the morning as afternoon sessions were devoted to working group discussions.

19. The seventh presentation on "*The Integrated Project on Arid Lands (IPAL), Kenya*" by Dr. W.J. Lusigi discussed the problems of desertification as a result of an ongoing dependence on livestock among the pastoralists e.g. Boranas of northern Kenya. The paper also discussed the physical, environmental and resource management aspects namely, human land use in the areas of agriculture and livestock husbandry. The two activities agriculture and livestock husbandry, according to Dr. Lusigi, depended on the physical environment and thus could contribute towards desertification in the absence of proper and appropriate environmental management skills. The paper provided a comprehensive analysis of socio-cultural factors, vegetation, climate, grazing, land tenure, etc.

20. The eighth presentation by Dr. D. Prinz on "*Integration of Ecology and Systems-oriented Know-how*" focused on ways to integrate ecological systems with existing knowledge, such as utilizing the input-output type models. The paper went into some detail in elaborating space, time, macro, meso and micro levels of ecosystem concepts. The presentation also made reference to how environmental education, including research, could be integrated into agricultural science, engineering, social sciences, medicine, economics and basic sciences.

21. The ninth presentation on, "*Livestock Ecology in Agricultural Training*" by Dr. J. Steinback centred around the diverse ecological areas of the African continent and discussed how resources in these areas could be managed for long-term use. The paper pointed out that one of the common problems in the African ecosystem is the lack of management skills, coupled with the ever increasing human population growth, which currently stands at around 3 per cent. This human population growth, if unchecked, could contribute to further degradation of the environment. For instance, extensive agricultural practices and overgrazing as a result of keeping "too" many domestic animals have resulted in soil erosion in many areas.

The tenth presentation by Dr. M. Ferrari on "*Environmental Action in Africa: The Cairo Plan of Action*" started by outlining some of the environmental crises in the African continent, e.g. famines and the need for food for the growing human population, the mismanagement of resources, etc. Following this, he discussed the Cairo Programme of Action and pointed out that African governments and African peoples must take the continent's development into their own hands and in so doing must make use of the continent's natural and human resources. It was also mentioned that the success of any environmental activity, aimed at solving ecological problems, must be rooted in sound environmental management practices, such as (a) halting environmental degradation, (b) enhancing the food-producing capacity of the continent, (c) achieving self-sufficiency in energy; and (d) correcting the imbalance between population and resources.

WORKING GROUP SESSIONS

22. In the afternoon of the third day, the participants went to work in three groups to discuss issues pertaining to the following areas of concern:

- Group I: Industrial/Urban Areas*
(low-waste technology, low-cost technology, urban planning)
- Group II: Rural Areas*
(land use, soil/water/forest/animal
productivity/agricultural technologies)
- Group III: Teacher Training.*

23. Before each working group began discussions on the specific areas assigned to it, various resource persons gave short lectures on different aspects of the three areas mentioned above. (A list of lecture titles is presented in the Workshop Programme in Annex I)

E. RECOMMENDATIONS

24. The brief reports of the 3 working groups including recommendations (both general and specific) arrived at by each one of them is presented below:

Report of Working Group I: Industrial/Urban Areas

PREAMBLE

The deliberations and recommendations focussed on low-waste technology, low-cost technology and urban planning. The group discussed at length various methods of incorporating environmental education and training into existing programmes in the undergraduate curricula in engineering and other fields of study deliberated on by the group.

RECOMMENDATIONS

1. Course Structure

- 1.1. Incorporation of environmental education (EE) into existing courses for undergraduate levels.
- 1.2. Introduction of new courses within the framework of existing engineering curricula.
- 1.3. Post graduate studies in Environmental Science/Engineering in existing environmental institutes and/or new centers.

2. Course Content

The course content should address itself to the control of waste material discharge into the environment as well as to the safe production, handling, transport, storage and use of wastes. Alternative methods for the disposal of wastes to be proposed whilst taking into consideration low-waste technologies.

3. Teaching Techniques

- 3.1. Balance should be maintained between lectures, field work and case studies.
- 3.2. Balance should be maintained between theory, research and extension services.
- 3.3. Environmental education should be problem-oriented.
- 3.4. Strengthening of co-operation between teaching personnel was strongly emphasized.

4. Teaching Materials

- 4.1. Dissemination of information on existing teaching materials.
- 4.2. Preparation and production of relevant environmental teaching materials.

- 4.3. Establishment of a network for disseminating environmental teaching materials. This can take place within an existing information centre or environmental institute.
5. **Organization of Workshop**
- 5.1. National, subregional, regional level.
- 5.2. Invited participants to represent the following:
- universities (engineers, scientists, administrators)
 - governmental institutions
 - industrial institutes
- 5.3. The proposed objectives of the workshop to focus on:
- development of guidelines for EE
 - strengthening of existing EE programmes
 - development of new curricula
6. Environmental Education should be planned according to the needs and capabilities of respective universities and institutions.

Report of Working Group II: Rural Areas

PREAMBLE

A number of papers were presented highlighting the type of personnel needed to solve environmental problems and how sound environmental education could be taught in African tertiary-level institutions. The discussions brought to light two basic problems which, in many countries, could hinder the transmission and application of environmental knowledge:

1. The **language of communication** in higher level institutions of learning in most African countries is the colonial language not understood by the majority of the population. It is regarded as essential that the students learn to communicate environmental problems in the languages used by the final target groups.
2. The majority of rural producers, and therefore, users of resources, are women.
 - (i) In many countries, women do not have access to training and extension services. Special provisions should be made to train **female teachers** and experts, as well as to employ **female extension staff**, who may be the only ones to have access to the female part of the population.
 - (ii) **The work load of the female producers** has to be taken into account, when recommendations (by scientists and extension staff) are made to alleviate environmental problems.

These aspects should be considered when implementing the guidelines given below:

RECOMMENDATIONS

I. *Qualifications of Staff*

To improve the situation of environmental education and training (EET) at tertiary institutions in Africa, better staffing and better qualifications of the existing staff are needed.

The staff engaged in EET should:

1. Be knowledgeable in their respective areas of specialization. In addition they should have:

- (i) a broad knowledge of ecological subjects; and
 - (ii) a broad knowledge of other environmental subjects.
2. Show competence in research, that is:
 - (i) an ability to identify needs;
 - (ii) an ability to realize/recognize problems of development and environment; and
 - (iii) an ability to design, conduct, analyse and interpret investigations for problem-solving.
 3. Demonstrate teaching capability, that is:
 - (i) an ability to prepare audio-visual teaching materials in accordance with the training level of the target group;
 - (ii) an ability to communicate with target groups of various levels; and
 - (iii) an ability to create awareness (among target groups) to location-specific as well as to regional environmental problems.
 4. Show ability to design, transfer, and monitor sustainable production systems.

II. *Types of professionals to train*

Two types of professionals will be needed to solve environmental problems and to avoid further degradation:

1. Environmentally aware professionals/generalists at the Diploma and B.Sc. levels, who could identify and tackle problems. If problems are beyond their level of competence, they could refer to specialists or solve the problem in team work.
2. Specialists at the M.Sc. and Ph.D levels, who are either specialised in environmental subjects or have, in addition to their areas of specialization, enough knowledge in this field to guide other professionals.

III. *Types of courses needed*

1. For Diploma and B.Sc. students:

(a) *Broad environmental courses.*

These broad courses should be designed to include:

- (i) Principles of soil and water conservation
- (ii) Land use systems/problems
- (iii) General ecology
- (iv) Rural development/rural sociology.

(b) *Incorporating environmental dimension into existing courses.*

Environmental dimension should be incorporated into existing courses/studies in different disciplines.

2. For M.Sc. and Ph.D. students special courses have to be mounted.

IV. *Curriculum development*

1. Universities should look individually at their curricula and identify areas where there is need to introduce the environmental dimension.
2. Where necessary, help should be sought from outside, i.e. other African universities and/or national and international bodies.

3. This environmental dimension should be approached from a problem - oriented view point. It is important that research be strengthened in the environmental field so as to be able to adapt technologies which are compatible with ecological principles, economically feasible and socially acceptable.
4. Exposure to village extension activities should be part of the overall effort.
5. A strong teaching - research - extension linkage is emphasized.

V *Teaching materials*

1. Teaching materials should be related to African conditions.
2. Textbooks may take two forms:
 - (a) New textbooks on environmental sciences
 - (b) Present textbooks in the different disciplines modified to incorporate the environmental dimension.
3. Audio-visual materials should be produced to assist in the teaching of environmental science. These should include examples or case studies from Africa.

VI *Teacher training*

1. Short courses and seminars should be organized to train university staff involved in teaching environmental science. Donor institutions like DAAD may be approached to sponsor this training.
2. Participation of university teachers in research and case studies would strengthen their teaching capabilities.

VII. *Regional centres*

1. Regional networks, including regional centres, should be developed in existing tertiary institutions engaged in EET.
2. Students from their universities may be trained at these centres.
3. Institutions interested in being strengthened as regional centres may apply for funds from national/international agencies like EEC, GTZ, CIDA, etc.
4. Members of two universities (Awassa College, Ethiopia, and University of Science and Technology, Ghana) indicated interest for their institutions to develop into regional centres.

VIII. *Follow-up action*

1. A newsletter on EET in Africa should be published and circulated covering topics like EET activities at African universities and providing information on funding of scholarships and research activities of other organizations in the area of EET. The newsletter will be organized by one of the regional centres, and financed by a donor agency to be identified later.
2. Each university should identify staff members interested in EET. They should come together to organize seminars, workshops etc. Where necessary, outside help may be sought for these activities.
3. Organizing bodies of this workshop should send the different recommendations to African universities and faculties concerned, various donor agencies, and other relevant national and international bodies.

4. Donors engaged in the field of education and training like DSE, DAAD, are asked to concentrate more on EET activities. These agencies should increase the quota of their scholarships to African students for EET studies either incountry or in a third-country, and more specifically at the regional centres.

Report of Working Group III - Teacher Training

PREAMBLE

Group III discussed the issues surrounding Teacher Training. This Group felt the need to spread environmental education to all sectors of the population. They recognised that the tool for doing this is the teacher or tertiary graduate who may come in contact with other sectors during his/her service, as well as with specialized experts in the field of environmental studies.

RECOMMENDATIONS

1. Where it exists in our tertiary institutions, faculties of education should embark on introducing environmental dimensions into the teacher training programmes. Such programmes should be designed to increase the environmental awareness, knowledge, and skills of the teacher so that he can use it to project environmental aspects as it relates to his specialisation.
2. For teachers who have missed the opportunity to benefit from such designed programmes, in-service training should be organised to expose them to environmental aspects.
3. Relevant organisations should be encouraged to embark on developing programmes and teaching materials in environmental education.
4. For the other tertiary graduates where the Course Unit System is practised, it is recommended that specially designed environmental courses be made a university graduation requirement for all disciplines. Where the term "system" exists with sessional **examinations**, **environmental dimensions should be introduced into curricula of all disciplines.**
5. For producing environmental experts with specialised skills to tackle environmental problems, specialised training is needed. Such training can only be provided in specialised institutions. We therefore recommend:-
 - (a) Tertiary Institutions should embark on creating such specialised training programmes to produce specialised experts and to cater for inter-action of research, consultancy, and extension services with teaching.
 - (b) Where this is not possible, existing specialised institutions should be strengthened to cater for the needs of the region.
 - (c) Networks should be created among the existing and the newly created specialised institutions to promote exchange of expertise, publications, information and manpower.

F. EVALUATION

After the adoption of the observations, recommendations and conclusions by the Workshop participants, copies of the evaluation questionnaire (see Annex II) were handed out to the participants with the request that they complete them. It is hoped that the evaluation results will enable the workshop organisers to obtain feedback on aspects of the workshop and thus to improve the organization of future workshops of a similar nature. (Results of the evaluation exercise are provided in Annex III.)

G. CLOSING OF WORKSHOP

25. At the closing session, the Chairman invited representatives from the Germany Agency for Technical Corporation (GTZ), UNESCO-ANSTI and UNEP respectively to make their closing remarks. But prior to this, Prof. K.O. Iwugo, on behalf of the participants present, gave a vote of thanks to the organisers for the excellent way in which they had managed the workshop.

26. In his closing address Prof. A. Loidl, on behalf of GTZ, mentioned how developing countries, which used to consider environmental protection as a luxury they could not afford, were now taking it seriously in all their development activities.

He went on to express his gratitude and thanks to the organising committee as well as to UNEP, UNESCO-ANSTI, DAAD and GTZ-PAS for a job well done. Last but not least, Prof. Loidl went on to thank the participants for their contributions which, he said, added to the success of the workshop.

27. Prof. K. Adotevi-Akue of UNESCO-ANSTI mentioned that the workshop was a resounding success and thanked the organisers and participants who helped contribute to its success.

He went on to add that the close and fruitful association UNESCO-ANSTI has enjoyed with GTZ has led to ANSTI's involvement in the organisation of the workshop.

Prof. Adotevi-Akue also mentioned that with ANSTI's vast experience in the running of its network, it was prepared to assist the region in setting up a network of tertiary level institutions involved in environmental education, as recommended by the workshop.

He concluded his address by wishing the participants a safe and pleasant trip back to their respective countries.

28. In his turn, Dr. M. Atchia of UNEP, began his closing address by making reference to a well known saying:

"No man is an island whole unto himself".

In the same way, he mentioned that no organisation "is an island" sufficient unto itself.

Dr. Atchia also mentioned the great satisfaction he had witnessed in the coming together of three different organisations, namely GTZ, UNESCO-ANSTI and UNEP, together with participants from over 12 countries to achieve a common goal.

He went on to add that university education in Africa would be thoroughly incomplete if the graduates coming out of universities were ignorant of the African cultural heritage, of the African environment under its multifaceted nature, and of such key concepts as sustainable development.

Dr. Atchia concluded his address by thanking the participants for their active participation in the workshop and wishing each of them a safe journey home.

(Full text of the closing remarks are given in Annex V)

Annex I
PROGRAMME

Monday, 23.11.1987

- 09.00 — 10.00 Registration of Participants
10.00 — 10.30 Opening of Workshop
—Speech by Dr. A. Abdinaser, UNESCO-ROSTA
—Speech by Prof. Dr. A. Loidl, ENVIRON
—Speech by Mr. W.H. Mansfield III,
Deputy Executive Director, UNEP
- 10.30 — 11.00 Coffee Break
- Papers presented as follows:
- 11.00 — 12.30 —Implications of the “*Global Strategy for EET through the 1990’s*” for Tertiary Level Environmental Education and Training.
by Dr. W. Ponniah, UNEP
followed by discussion.
- 12.30 — 14.00 Lunch
- 14.00 — 15.00 —“*UNEP’s Environmental Education and Training Policy in the Perspective of Sustainable Development*”
by Dr. M. Atchia, Chief EETU, UNEP
followed by discussion.
- 15.00 — 15.15 Tea Break
- 15.15 — 16.15 —“*Presentation of GTZ Curriculum Proposal on Environmental Protection and Ecology*”
by Prof. Dr. A. Loidl, ENVIRON
followed by discussion.
- 16.15 - 17.15 - “*Need for Environmental Experts, Qualifications and Quantitative Requirements, Native vs. Foreign Expertise*”
followed by discussion.
- 18.30 - 20.00 Reception at Norfolk Hotel

Tuesday, 24.11.1987

- Papers presented as follows:
- 09.00 - 09.45 - “*Dilemma of Soil Degradation in Africa*”
(including discussion of National Soils Policies)
by Dr. A. Ayoub, UNEP
followed by discussion.
- 09.45 - 10.30 - “*Environmentally Sound Management of Water Resources*”(including discussion of Zambezi Action Plan)
by Mr. M. Nakayama, UNEP
followed by discussion.
- 10.30 - 11.00 Coffee Break
- 11.00 - 11.45 - “*Actual Problems of Forests and Forest Management*” (including discussion of the Tropical Forestry Action Plan)
by Dr. B. Zentilli, UNEP
followed by discussion.

- 11.45 - 12.30 - *"Towards Sustainable Energy Policies"*
by Dr. K. Alibhai, UNEP Consultant
followed by discussion.
- 12.30 - 14.00 Lunch
- 14.00 - 14.45 - *"Environmental Education, Training and Curricula at the Tertiary Level in Kenya"*
by Dr. M. Korir-Koech, Kenyatta University,
Dept. of Environmental Education
followed by discussion.
- 14.45 - 15.30 - *"Institutional Profiles on Environmental Technology Education and Training in African Universities and Tertiary Institutions"*
by Prof. K.O. Iwugo, University of Lagos,
Dept. of Civil Engineering
followed by discussion.
- 15.30 - 15.45 Tea Break
- 15.45 - 16.15 - *"Status Report on Environmental Legislation Actual Situation, Deficiencies in Enforcement"*
by Ms. I. Rummel - Bulska, UNEP
followed by discussion.
- 16.15 - 17.00 - *"Environmental Law"*
by Dr. C. Okidi, University of Nairobi,
Institute for Development Studies
followed by discussion.

Wednesday, 25.11.87

Papers presented:

- 09.00 - 10.30 - *"The Integrated Project on Arid Lands (IPAL) Kenya"*
by Dr. W.J. Lusigi, UNESCO
followed by discussion.
- *"Integration of Ecology and System-oriented Know-how"*
by Prof. Dr. D. Prinz, ENVIRON,
University of Karlsruhe
followed by discussion.
- *"Livestock Ecology in Agricultural Training"*
by Prof. Dr. J. Steinbach, ENVIRON,
University of Giessen
followed by discussion.
- 10.30 - 11.00 Coffee Break
- 11.00 - 12.30 - *"Environmental Action in Africa: The Cairo Plan of Action"*
by Dr. M. Ferrari, UNEP - ROA
followed by discussion.
- 12.30 - 14.00 Lunch
- 14.00 - 17.00 WORKING GROUP SESSIONS

NOTE

Each participant is requested to present his paper in a "summary" form, to ensure that discussion, questioning, recommendations, etc. can readily take place during the session.

WORKING GROUP I

INDUSTRIAL/URBAN AREAS

"LOW-WASTE TECHNOLOGY, LOW-COST TECHNOLOGY, URBAN PLANNING"

- A.S. Issangya

University of Dar es Salaam
Dept. of Chemical and Process Engineering
"Status of Environmental Engineering Education in Tanzania"-a postgraduate course

- H. Sarakikya

University of Dar es Salaam
Dept. of Chemical and Process Engineering
"Integrated Approach to Environmental Education for Engineers (Chemical)"

- Prof. Gichaga

University of Nairobi
College of Architecture and Engineering
"Elements of Environmental Studies in the College of Architecture and Engineering"

WORKING GROUP II

RURAL AREAS

"LAND USE, SOIL/WATER/FOREST/ANIMAL PRODUCTIVITY/AGRICULTURAL TECHNOLOGIES"

-Prof. Khaled-El-Shazly

University of Alexandria
Faculty of Agriculture
"Interrelations between Agricultural Education and Environmental Pollution"

-Dr. Fatma A. El-Gohary

Water Pollution Control Laboratories
National Research Centre, Egypt
"Environment and Development"

-Dr. T. Njoka

University of Nairobi
Dept. of Range Management
"Status of Environmental Education and Training in the Department"

WORKING GROUP III

TEACHER TRAINING

-Prof. M. El Khalifa

University of Khartoum
"Establishment of an Institute of Environmental Studies at the University of Khartoum"

-Prof. G. Irumba

Makerere University, Kampala
Dept. of Environmental Engineering
"Environmental Education at Makerere University"

-Prof. M.T. Ige

University of Ife
Dept. of Agricultural Engineering
"Environmental Education and Training at the Faculty of Technology and other Faculties at Obafemi Awolowo University, Ile-Ife"

- Prof. A.J. Lutalo-Bosa
Makerere University, Kampala
Dept. of Biochemistry
"Status of Environmental Education and Training in my Institute"
- Dr. Bisrat Dilnesahu
University of Addis Ababa
Faculty of Science
"Report on Environmental Science at the Faculty of Science"
- Mr. A. Allybokus
University of Mauritius
"Environmental Education in Mauritius"
- Dr. B. Gatawa
"Status of Environmental Education and Training in Schools and Colleges in Zimbabwe"

Thursday, 26.11.1987

09.00 - 12.30 Working Groups continued.

14.00 - 17.00 Drafting reports of working groups
(Rapporteurs and Chairmen only)

Free afternoon for all others.

Friday, 27.11.1987

09.00 - 12.30 Plenary Session on:

1. Discussion about Strategies for the Implementation of Environmental Education Programmes at African Universities - Interaction of Research, Consultancy and Extension Services with Teaching.
2. Reports from working groups, including proposals and recommendations.
3. Adoption of observations, recommendations and conclusions.
4. Evaluation of the Workshop by the participants.
5. Closure of Workshop.

Farewell Lunch at the Carnivore Restaurant.

Annex II

**GTZ/UNESCO-ANSTI/UNEP
TRAINING WORKSHOP ON ENVIRONMENTAL EDUCATION
AND RESOURCE MANAGEMENT IN AFRICAN TERTIARY-
LEVEL INSTITUTIONS**

EVALUATION QUESTIONNAIRE OF THE WORKSHOP

1. PERSONAL DATA

1.1 Personal

Your Name Mr./Ms./Dr.....

Age last Birthday.....

Country of Origin.....

Position in your country.....

Place of Employment.....

Academic/professional qualification.....

1.2 How were you selected:

Interview

Nomination

Other

Please indicate your quantitative RATING of various aspects of the Workshop by ticking the appropriate box, according to the following guide:

RATING	1 = POOR
	2 = UNSATISFACTORY
	3 = SATISFACTORY
	4 = GOOD
	5 = EXCELLENT

Kindly also write down any qualitative comments you may have in the spaces provided.

2. ATTAINMENT OF WORKSHOP OBJECTIVES

OBJECTIVE	Rating				
	1	2	3	4	5
2.1 Sharing Experiences and Exchange of Ideas					
2.2 Gain in knowledge & skills					
COMMENTS					

3 PRESENTATION

PROGRAMME ELEMENTS	Rating				
	1	2	3	4	5
3.1 Adequacy of CONTENT					
3.2 Efficiency of PROCEDURES					
3.3 Effectiveness of METHODS					
COMMENTS					

4. **ADEQUACY OF RESOURCE PROVISIONS**

RESOURCES	Rating				
	1	2	3	4	5
4.1 Basic working documents					
4.2 Case Studies					
4.3 Thematic Papers					
4.4 Country Reports					
4.5 Resource Personnel					
COMMENTS					

5. **APPROPRIATENESS OF STRATEGIES/ACTIVITIES**

ACTIVITIES	Rating				
	1	2	3	4	5
5.1 Plenary Presentations/Discussions					
5.2 Group Work					
5.3 Other Activities (e.g. reporting back)					
COMMENTS					

6. IMPACT ASSESSMENT OF WORKSHOP

IMPACT RESOURCES	Rating				
	1	2	3	4	5
6.1 Knowledge gained/techniques learned in relation to environmental situation in your country					
6.2 Applicability to your future work/activities					
6.3 Recommendations for future action					
6.4 Guide to follow-up activities					
COMMENTS					

7. PRE-WORKSHOP COMMUNICATION TO PARTICIPANTS

COMMUNICATION	Rating				
	1	2	3	4	5
7.1 Adequacy of information related to the aims, objectives and purpose of the workshop					
7.2 Criteria for selection of participants					
7.3 Time frame for preparation towards attending the workshop					
7.4 Understanding of what was expected of each participant					
COMMENTS					

8. **WORKSHOP ORGANISATION**

ORGANISATION	Rating				
	1	2	3	4	5
8.1 Accommodation					
8.2 Meals					
8.3 Transportation					
8.4 Technical Resources (Papers, etc.)					
8.5 Other Workshop Facilities					
8.6 Workshop venue (conference room, seating, etc)					
COMMENTS					

9. **FOLLOW-UP**

9.1 A workshop such as this one can only cater for a small number of participants in order to be effective. From your experience of participation, do you think it is worth holding other such workshops for the other countries?

YES _____
NO _____

9.2 If your answer is YES, Please indicate ways in which we can improve future workshops.

.....

.....

.....

.....

.....

.....

9.3 A regional workshop, such as this one, will prove to be effective if similar **In-Country** workshops for tertiary-level personnel are implemented as follow-up activities.

Is that a good idea?

Do you think your country would wish such a workshop?

Who should organise these In-country Workshops?

9.4 What concrete activities do you plan upon return to your country in order to implement some of the recommendations and what you have learnt in this workshop.

(i)
.....
.....

(ii)
.....
.....

(iii)
.....
.....

(iv)
.....
.....

Annex III

RESULTS OF THE EVALUATION OF WORKSHOP BY PARTICIPANTS

1. PERSONAL DATA

As regards **Personal Data**, not all the 30 participants who replied to the questionnaire answered this section. However, for sub-section 1.1 regarding "Academic/professional qualifications," it was found that of the 21 replies received, 1 holds a BSc degree (Environmental Studies), 5 hold MSc degrees (3 in Chemical Engineering, 1 in Hydrology and Pollution Control and 1 unspecified), 14 hold PhD degrees (5 in Civil Engineering, 1 each in Agricultural Engineering, Biochemistry and Law and 8 unspecified) and 1 holds a degree in Civil Engineering. For sub-section 1.2 on "mode of selection", 21 of the 26 respondents indicated that they were nominated for the workshop, whilst 5 mentioned that they were selected by other means (unspecified).

2. ATTAINMENT OF WORKSHOP OBJECTIVES

Of the 30 replies received, 11 rated the "Sharing of experiences and exchange of ideas" as excellent, whilst 12 rated them as good, 5 as satisfactory and 1 each as unsatisfactory and poor. On the other hand, 4 of the 30 replies received rated "gain in knowledge and skills" as excellent, 8 as good, 10 as satisfactory and 4 each as unsatisfactory and poor.

3. PRESENTATION OF PROGRAMME ELEMENTS

The majority (14) of the 30 replies received rated "Adequacy of content" as good whilst 4 rated it as excellent, 9 as satisfactory, 1 as unsatisfactory and 2 as poor. For "efficiency of procedures," 5 rated it as excellent, 16 as good, 4 as satisfactory, 3 as unsatisfactory and 1 as poor.

4. ADEQUACY OF RESOURCE PROVISIONS

7 of the 29 replies received rated "basic working documents" as excellent, 9 as good, 10 as satisfactory, 2 as unsatisfactory and 1 as poor. Of the 27 replies received for "case studies", 3 rated it as excellent, 9 each as good and satisfactory and 6 as unsatisfactory, whilst for "thematic papers" the majority (14) of the 28 replies received rated it as good, 3 as excellent, 5 as satisfactory and 6 as poor. Of the 27 replies received for "country reports", 2 rated it as excellent, 13 as good, 9 as satisfactory, 2 as unsatisfactory and 1 as poor, whilst for "resource personnel" 5 of the 27 replies received rated it as excellent, 13 as good, 7 as satisfactory and 1 each as unsatisfactory and poor.

5. APPROPRIATENESS OF STRATEGIES/ACTIVITIES

9 of the 30 replies received for "plenary presentation/discussions" rated them as excellent, 11 as good, 5 each as satisfactory and unsatisfactory. The majority (14) of the 30 replies received rated "group work" as good, 8 as excellent, 5 as satisfactory and 3 as unsatisfactory whilst for "other activities (reporting back)", 8 of the 26 replies received rated it as excellent, 12 as good, 4 as satisfactory and 1 each as unsatisfactory and poor.

6. 6 of the 30 replies received rated "knowledge gained/techniques learned in relation to environmental situation in your country" as excellent, 12 as good, 6 as satisfactory and 3 each as unsatisfactory and poor, whilst for "applicability to your future work activities" the majority (13) of the 29 replies received rated it as excellent, 7 as good, 5 as satisfactory, 3 as unsatisfactory and 2 as poor. On "recommendations for future action" 9 each of the 29 replies received rated it as excellent, good and satisfactory whilst 1 each rated it as unsatisfactory and poor. Of the 27 replies received for "guide to follow-up activities", the majority (11) rated it as good, 5 as excellent, 8 as satisfactory, 1 as unsatisfactory and 2 as poor.

7. PRE-WORKSHOP COMMUNICATION TO PARTICIPANTS

4 of the 29 replies received rated "adequacy of information related to the aims, objectives and purpose of the workshop" as excellent, 10 as good, 6 as satisfactory, 4 as unsatisfactory and 5 as poor

whilst for "criteria for selection of participants" the majority (11) of the 27 replies received rated it as satisfactory, 9 as good, 2 as excellent, 4 as unsatisfactory and 1 as poor. For "time frame for preparation towards attending the workshop", 3 of the 27 replies received rated it as excellent, 10 as good, 7 as satisfactory, 2 as unsatisfactory and 5 as poor whilst for "understanding of what was expected of each participant", the majority (11) of the 28 replies received rated it as good, 1 as excellent, 6 as satisfactory, 8 as unsatisfactory and 2 as poor.

8. WORKSHOP ORGANIZATION

25 replies were received of which 6 rated "accommodation" as excellent, 8 each as good and satisfactory, 2 as unsatisfactory and 1 as poor. For "meals" 10 of the 27 replies received rated it as excellent, 11 as good, 4 as satisfactory and 1 each as unsatisfactory and poor whilst for "transportation", 11 of the 26 replies received rated it as excellent, 7 as good, 3 as satisfactory, 4 as unsatisfactory and one as poor. Of the 29 replies received for "technical resources (papers, etc)", 8 each rated it as excellent and good, 9 as satisfactory, one unsatisfactory and 3 as poor whilst for "other workshop facilities" 9 of the 28 replies received rated it as excellent, 14 as good, 4 as satisfactory and 1 as poor. Finally, for "workshop venue (conference room, seating, etc)", 19 of the replies received rated it as excellent, 6 as good, 1 each as satisfactory and unsatisfactory and 2 as poor.

9. FOLLOW-UP

9.1 The majority of the replies received (28 out of a total of 30) expressed its desire to see similar workshops hosted for other countries (viz. Francophone African states), whilst 1 participant was against the idea and 1 other refrained from expressing his/her view.

9.2 On "ways to improve future workshops" various suggestions were received:

- a) Purpose and scope of workshop to be made known to participants before their arrival;
- b) Workshop programme to be sent to participants along with air-tickets;
- c) Organizers to be more specific when requesting resource papers from participants;
- d) Workshops of this nature to include case studies and visits to project sites;
- e) More use to be made of participants as resource persons;
- f) Out of 5 days, the equivalent of $2 \frac{1}{2}$ days to be devoted to working group sessions directed and reported by the participants themselves;
- g) Participants to be initially chosen from the same ecological zones in the African region and follow-up activities to include similar workshops at national level;
- h) Number of persons presenting papers to be limited to a manageable size for a 5 day workshop;
- i) Where transparencies are used, they should be photocopied and given to participants for use in their home countries.

9.3 On possible "implementation of in-country workshops as a follow-up to the regional workshop", 28 participants thought the above to be a good idea, with one participant being against it and another abstaining from expressing his/her view. As to who should organise the workshop, 22 participants stated that their respective countries **would** be ready to hold such an activity, one felt that his/her country **might** be interested in such a workshop whilst another was **not sure** if his/her country would be interested in hosting a similar workshop at the national level. 9 respondents felt that their respective universities or competent tertiary-level institution in the country should organise the workshop, 6 stated that the workshop at national level should be funded by GTZ, UNESCO-ANSTI and/or UNEP as well as other aid agencies in the country, 5 felt that universities in collaboration with appropriate Ministries, Agencies and/or Councils (viz. Ministry of Environment, Environmental Protection Agency, National Science Research Council) should organise the workshop whilst one stated that the in-country workshop should be conducted entirely by the UN or bi-lateral agency.

9.4 As regards "concrete activities they plan to undertake on their return home as a follow-up to implementing the workshop recommendations", the following are some of the suggestions made:

- a) Meet with relevant Ministry officials responsible for the Environment as well as Heads of Departments in universities and other tertiary-level institutions to brief them on the outcome of the Workshop;
- b) Convince staff members to begin introducing environmental problem-oriented issues related to their respective fields of expertise.
- c) Help revise the existing environmental curriculum at the tertiary level;
- d) Organise inter-university or inter-faculty workshops as **follow-up** to the recently concluded one;
- e) Propose plan of action for EET at the national level;
- f) Prepare a working paper on EET for submission to university authorities for possible implementation of wide-scale EET activities on a national basis;
- g) Re-examine teacher-training curricula presently being used to determine if the necessary environmental components have been incorporated in them;
- h) Convene a workshop for teachers and researchers in Environmental Law in English speaking African countries;
- i) Prepare, for publication in local newspapers, educational articles on the environment.

CONCLUSION

From the evaluation responses received on various aspects of the Workshop, it can be safely concluded that the Workshop was successful in achieving its main objective viz "to enable participants from selected Anglophone African countries to competently assess present needs and priorities for promoting environmental education and/or training in their respective countries".

What is even more important is that this Workshop helped strengthen links among the participating tertiary-level institutions located in Anglophone African countries as well as between them and GTZ, UNESCO-ANSTI and UNEP.

Annex IV

OPENING SPEECHES

Mr. W.H. Mansfield III, Deputy Executive Director, UNEP.

It is a pleasure for me to welcome you on behalf of Dr. Mostafa Tolba, UNEP's Executive Director. Environmental education is a major item on UNEP's agenda, because education is such an important component of the environmental needs and programme. Up to one-fifth of our budget is spent on education and training.

I would like to thank the German Agency for Technical Cooperation (GTZ) for initiating and implementing this tertiary-level workshop, and for the collaboration of the UNESCO African Network of Scientific and Technological Institutions (ANSTI). Thanks go as well to Environ which has contributed a number of resource people to participate. Finally, we are grateful to UNESCO-ANSTI for the warm and cordial collaboration with my UNEP colleagues in the Workshop's preparation.

In focusing your attention on incorporating environmental concerns into African tertiary-level education, you have devoted yourselves to a vital international educational need. The African continent is undergoing rapid change and the trend of that change, as it affects development and environment, is not encouraging. The outlook for the resource and environmental protection needed for continuing development is not good. Conditions on the continent have worsened in many ways in the past 20 years. Africa has the world's fastest growing population, amounting to approximately one more million mouths to feed every three weeks. As educators you know what that will mean for school systems in the years ahead.

This burden must be borne on a land base in which more than 80 percent of the soils have fertility limitations and where 47 percent of the land is too dry for rain-fed agriculture. It is not surprising then that Africa is the only region of the developing world that is not meeting its goal of increased agricultural production. Fuelwood and water are in short supply.

So there is a great need to help Africa at this time.

Also education is one of the main tools available to assist African people meet this great developmental challenge. Traditionally, the formal educational system has played a central role in bringing about change by inculcating new perceptions and values.

You will remember the story of the educator who was asked by an anxious mother, "When should my son's education begin?" To which the educator replied, "About two hundred years before he's born."

While that is certainly true, we face a staggering educational **change** today in the world, and especially on this continent. The process of change and needs of development are so great that there is no 200 years available to accomplish what is required. Rapid change in attitudes, values and lifestyles are called for. Much new and different information must be learned and assimilated by a wide range of people in all walks of life.

The situation we face in environmental education reminds me of a college classmate of mine who returned to our college in the United States to visit his son. When he found out that the boy was taking the same philosophy course under the same professor he had thirty years before, he decided to pay a visit to the class. To his dismay he found the same questions in a class test he had answered many years earlier. On this he challenged the professor, who said, "oh, yes, I give the same questions, but as the years go on I keep asking for different answers."

And I think it is important to recognize we are asking for different answers today in the field of the environment and environmental education. In 1972 we were talking at the Stockholm Conference about the environment as protection against pollution and as conservation. Environment was seen as a hinderance to development because it diverted resources to "lower priority" needs.

In 15 years that attitude has changed dramatically. Today we here come to recognize that environmental protection and renewable resource enhancement is essential and intimately related to economic development. The present need is to change our value system to reflect that new awareness and incorporate into our collective thinking the holistic, multidisciplinary approach required to achieve sustainable development, that is, development which will meet our current needs and not degrade the environment and resources of our children.

This viewpoint has long been the rally-cry of the environmental movement. It was forcefully re-emphasized at the international level by the UN World Commission on Environment and Development, chaired by Norway's Prime Minister Gro Harlem Brundtland. After a three year global study the 21 distinguished members published its findings in April. They are now before the UN General Assembly for action.

The Report, "Our Common Future" advocates growth. In diagnosing the deteriorating resource base confronting this urgent need -- decline of forests, loss of soils, mismanagement of water, increasing desertification -- the Commission notes that problems of the environment are deeply and strongly connected with each other and with global economic, political and strategic relationships. A more acute understanding of the development process and major policy and institutional behaviours and approaches, which it called sustainable development, are needed at all levels to manage the transition the world faces in the next few turbulent decades.

Mrs. Brundtland writes: "Unless we are able to translate our words into a language that can reach the minds and hearts of young and old, we shall not be able to undertake the extensive social changes needed to correct the course of development The changes in attitudes, in social values, and in aspirations that the report urges will depend on vast campaigns of education, debate, and public participation."

In UNEP we place a high priority in achieving this goal on the UNESCO/UNEP International Environmental Education Programme (IIEP). Its most recent Congress in August in Moscow set important new priorities and emphasized new directions. To promote sustainable development it called for better integration of general environmental education in the formal education process at all levels, increased environmental awareness among young people and adults, more training and interdisciplinary training for occupational and social groups, managers and decision-makers. These objectives fit well with the GTZ's proposal for a tertiary level, ecologically-oriented curriculum for developing countries, that is, "Environmental Protection and Ecology". The Congress sets a formidable but essential agenda.

This workshop clearly relates to UNEP's own work with ILO in a project to educate employers' organizations in environmental management, and next into the curricula of Asian and Latin American business schools. It ties directly to the initiatives of the UNESCO/UNEP IIEP Conferences, seminars and teacher workshops which by 1986 have covered some 140 countries, 10,000 educators and 250,000 or more students.

In UNEP we are looking for guidance where we see evidences of success. Our "Global 500" awards for environmental achievement this year went, among others, to several educators -- Ben Soans of India who used schools for farmers and school children as a grassroots means of planting millions of trees in two Indian states, and Chandi Bhatt, leader of India's famous Chipko movement to protect and plant forests in the Himalayas.

There are other successes worth emulating. For example, the Faculty of Education of the University of Malaya has been running, for the last few years, a successful programme to train teachers of science and the humanities on how to link their disciplines to the values and multidisciplinary of environmental education.

Australia's Murdoch University's School of Environment and Life Science has developed and tested an undergraduate course integrating environmental components, which traces environmental problems through their scientific, social, economic and other themes. They are worth your study.

While the challenges are great, favourable winds are blowing. Awareness of resource and environmental issues are much higher in Africa today than they were 15 years ago. The African Ministerial Meeting on the Environment in Cairo in December 1985 set out a major initiative for 150 sustainable villages in fuel and food and 30 grazing lands in Africa, (for which UNEP is the secretariat). In this programme the Ministers identified eight specialized African regional networks, one of which is education and training.

Likewise, African institutions and non-governmental organizations promoting environment and development are growing rapidly. The strongest natural level resource institutions are university based in Africa. They deserve encouragement and support. The Institute for Resource Assessment in Tanzania, the Institute for Development Studies in Kenya, the Institute for Environmental Studies in the Sudan are all well established. Also in the Sahel, L'Institut du Sahel, the northern Nigeria universities and the University of Dakar have important strengths and responsibilities. In the Ivory Coast the fledgling Institute of Natural Resources working with the UN University is developing a continental approach to environment and resource issues. There are others. So you have much already to work with.

In my enthusiasm, I fear I have exceeded my time. Let me conclude by extending sincerest wishes for the full success of the workshop - and one last thought about the importance of your task as it affects education. We are using a theme for next year's World Environment Day that says "When people put environment first, development will last". This is a theme which could have relevance for your work this week.

I wish you good luck. And I am now pleased to declare your workshop open.

Dr. A. Abdinaser, UNESCO-ROSTA

The Representative of the Executive Director of UNEP
The Representative of the GTZ
Your Excellencies
Ladies and Gentlemen

It is on behalf of the Director-General of UNESCO that I welcome you all to this opening ceremony, especially all those who have come from outside Kenya to participate in the training workshop on environmental education and resource management in African tertiary level institutions.

While the German Agency for Technical Cooperation, GTZ, is the prime mover of this workshop, the organisation fell to GTZ itself, the United Nations Environment Programme (UNEP) and UNESCO. We in UNESCO are grateful for the opportunity to be associated with the workshop and to have played a part in organising it.

The fact that environmental problems have arisen largely from the mismanagement of natural ecosystems and resources has been known for several years as has been the need to take serious and effective measures to protect the environment. UNESCO has participated in, or jointly organised with other organisations, a number of international conferences on different aspects of the environment, the latest being the UNESCO - UNEP International Congress on Environmental Education and Training held in Moscow (USSR) in August this year.

The recommendations emerging from these international conferences have not been without follow-up. Manufacturing companies in several industrialised countries have taken effective measures to reduce and, indeed, eliminate the pollution of the environment resulting from manufacturing processes. Other users of the earth's resources have also made the efforts called for to eliminate damage to the environment.

These measures which have been taken, these efforts which have been made, over the years have resulted in the accumulation of a body of knowledge on the environment which must be disseminated through educational action. The hour is now for an international environmental education and training action plan for the future. That is why I commend the GTZ idea to organise a training workshop on environmental education and resource management in African tertiary level institutions.

The participants in this workshop will be called upon to discuss various aspects of the environmental problem and then look into the methodology of incorporating the environmental dimension into the curricula of selected African tertiary level institutions. I hope that the action which will follow the workshop will have the widest possible impact and will result, among other things, in the creation of a genuine environmental literacy in the countries of Africa so that Africans can in concert face up to the challenge of their environment and reduce the damage that is still being done to it.

I wish the workshop participants very fruitful deliberations.

Prof. A. Loidl, GTZ-ENVIRON

Dear Mr. Mansfield!
Ladies and Gentlemen!

Before summarizing and commenting on the objectives and goals of this workshop on environmental education, I would like to express our gratitude and my warmest sentiments that you are going to participate and contribute to this workshop. I do feel that already the number of fifty participants from thirteen African countries does demonstrate the increasing importance and a broad interest in the topic of environmental education.

This workshop is embedded into a larger project. The German Agency for Technical Co-operation (GTZ) is currently conducting a project "environmental studies at technical, agricultural and natural sciences institutions of higher education/universities in Third World Countries" with emphasis on the development, design and integration of curricula in environmental protection and ecology into university level education. Last year a similar workshop was held in Salvador (Bahia) in Brazil, a further workshop will take place in January 1988 in Bombay/India.

What are the objectives of this workshop from our point of view?

- (i) We should try to evaluate the present status quo in environmental education at African universities
- (ii) We should develop concepts in environmental education keeping in mind the
 - general educational situation in the tertiary level
 - priority in environmental protection to define key subjects in environmental education
 - advantages and disadvantages of multidisciplinary and interdisciplinary approaches and
 - the appropriate tuition methods/techniques as e.g. lectures, field work, case studies etc.
- (iii) We should discuss strategies for the implementation of environmental education at East African Universities and finally
- (iv) While discussing all these topics we need to keep in mind the job situation/perspectives as well as the job profiles for both agrarian and engineering professionals.

Annex V

CLOSING SPEECHES

Prof. A. Loidl (ENVIRON), University of Mainz, West Germany

Before closing please be as kind as to allow a few personal remarks:

Often in the past, I have been confronted with people expressing sentiments against environmental protection. Such an approach often described environmental protection as a "luxury" item: the industrialization process is given top priority, whereas environmental protection can be tackled later. Of course, there is some truth in this sentiment in the short run. However, in the long run, only environmental protection will allow to save the natural resources. In the long run only an approach taking environmental protection into account will be able to allow for an ecologically and economically sound development of any country.

Last but not the least, I also want to express our gratitude and indebtedness to all those who were involved in the local organization and preparation of this workshop: Please let me express our thanks to UNEP, UNESCO-ANSTI, DAAD, GTZ-PAS for the enormous amount of work - an excellent job done. Thank you very much indeed.

Many thanks to you all for participating and contributing to this workshop.

Prof. K. Adotevi-Akue, Assistant Project Co-ordinator, UNESCO-ANSTI, Nairobi

There is no denying the fact that the workshop has been a resounding success and I seize the opportunity to thank the organizers and the participants for the precious contribution that each and everyone has made.

As a representative of the African Network of Scientific and Technological Institutions (ANSTI) I should like to stress that we are particularly pleased to be associated with the workshop. The brochure entitled "ANSTI - The Motive Force for Inter-University Cooperation in Africa", copies of which have been distributed, describes the history of ANSTI, what it does, how it does it and where it gets funds from. It is stated in the brochure that GTZ finances some of ANSTI's activities; it is this association between ANSTI and the GTZ which has led to ANSTI's involvement in the organisation of the workshop.

One of the recommendations of the workshop is that there should be created a network of the institutions that will be involved in environmental education. Those of us who work for ANSTI have acquired considerable experience in the running of a network. When, therefore, the time comes to set up your network we shall draw upon this experience and shall give the best of ourselves to ensure that the new network is built on a firm foundation and runs smoothly. In so doing we hope to be in touch with all of you in the future.

It only remains for me now to wish you a safe and pleasant trip back to your respective homes.

DR. M. ATCHIA, Chief, Environmental Education and Training Unit, UNEP, Nairobi

“No man is an island whole unto himself”.

In the same way no organisation “is an island” sufficient unto itself. It is therefore with great satisfaction that I have witnessed the coming together here of 3 different organizations (GTZ-UNESCO-ANSTI and UNEP) together with participants from over 12 countries to achieve a common goal. The collaborative efforts were excellent and the goal-which was to discuss the practicalities of introducing an environmental dimension into the curricula of selected African Universities-had been achieved.

Most problems besetting the world today have known solutions. What we need is to make these solutions available to people who may need them at the time and in the place where they are required. Thus university education in Africa (and elsewhere) would be thoroughly incomplete if our graduates were to be ignorant of the African cultural heritage, of the African environment under its multiple facets, and of such key concepts as **sustainable development**. We have during this workshop agreed on the above, but we have gone much further, in starting to define, in a practical way, how the engineer in training, how the architect in training, how the agriculturalist in training have to be addressed and made knowledgeable and skilled in environmental management.

You have given this workshop 1600 man-hours of thought and action (40 participants x 5 days x 8 hours per day). That is considerable! UNEP is particularly pleased that the other partners in this venture were able to accept its hospitality and hold this workshop here at UNEP Hq. in Nairobi. In the name of the Executive Director of UNEP I therefore thank each and everyone for their active participation and wish you a safe journey home.

Being on time is, in my view, very important. This meeting started at 8 a.m. this morning and was due to close at 12.30 p.m. It is now exactly 12.30 p.m. I therefore declare this workshop closed.

Annex VI

GTZ/UNESCO-ANSTI/UNEP

**TRAINING WORKSHOP ON ENVIRONMENTAL EDUCATION AND
RESOURCE MANAGEMENT IN AFRICAN TERTIARY LEVEL
INSTITUTIONS**

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Annex VII

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