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Training Seminar on Environmental Management

for Industrial Managers and Engineers

XP/INT/96/083

Evaluation Report*

Prepared by:

Quality Assurance and Evaluation Branch of
United Nations Industrial Development Organization
in co-operation with
the Project Design and Evaluation Unit of
United Nations Environmental Programme

* This document has not been edited

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List of Acronyms

CEST:	*Centre for Environmental Science and Technology (Tanzania)*
CIP:	*Centre for International Projects*
EIA:	*Environmental Impact Assessment*
EMS:	*Environmental Management Systems*
ESID:	*Environmentally Sustainable Industrial Development*
FINNIDA:	*Finnish International Development Agency*
GIS:	*Geographical Information System*
HRD:	*Human Resource Development*
HTO:	*Host Training Organization*
IT:	*Information Technology*
NCPC:	*National Cleaner Production Centres*
PER/GTP:	*Project Evaluation Report/Group Training Projects*
PPP:	*Pollution Prevention Pays*
SME:	*Small and Medium Enterprise*
TCDC:	*Technical Co-operation among Developing Countries*
TOR:	*Terms of Reference*
TUT:	*Tampere University of Technology (Finland)*
UNEP/COM:	*Review Committee for UNEP*
UNEP-EETU:	*United Nations Environmental Programme - Environmental Education and Training Unit*
UNESCO:	*United Nations Educational, Scientific and Cultural Organization*
UNIDO:	*United Nations Industrial Development Organization*
WICEM:	*World Industry Conference on Environmental Management*

CHAPTER I - INTRODUCTION

The joint UNEP/UNIDO/FINLAND/USSR Training Programme on environmental management represents a major effort to provide industrial managers and engineers in the developing countries with adequate knowledge and skills to address environmental problems, application of clean technologies and in the development/implementation of national environmental policies and strategies.

The training programme is also in line with UNEP's mandate and scope of work and follows the recommendations of the UNEP-sponsored World Industry Conference on Environmental Management (WICEM).

UNIDO's involvement in the Training Programme takes its relevance from UNIDO's support programme "Environmentally Sustainable Industrial Development (ESID) Strategies"- which addresses environmental awareness creation and training.

The joint effort in this case by UNEP and UNIDO to address the need of environmental concerns in the developing countries is a good example on how two sister UN agencies can collaborate and complement each other by sharing expertise where each has experience, and in joining hands to deliver a more qualitative service.

The training programme commenced in 1989, and has since been held on a bi-annual basis. As of date, four training programmes have been held; 98 participants have been trained during the period of 1989-1995. Since sufficient time has elapsed and the programme has matured enough it was jointly decided by UNEP and UNIDO that it was an opportune time to conduct an in-depth evaluation of the programme.

The primary purpose of the in-depth evaluation is to ascertain the relevance of the programme, its efficiency, effectiveness and impact. It is expected that the findings of the evaluation would be useful to UNEP and UNIDO, as well as the host training organizations in determining the course of action for similar training programmes in the future.

1. Evaluation Methodology

The evaluation exercise was carried out within the framework of the Terms of Reference (TOR) and with structured questionnaires prepared for interviewing former participants. The TOR and the questionnaires are attached as Annex I and Annex II respectively to this report. Both the structure of the TOR and the questionnaires were agreed upon by UNEP and UNIDO.

Evaluation activities included:

- *Discussions with substantive officers at UNEP and UNIDO;*
- *A review of the following:*
  - *project documents and files;*
  - *Aide mémoire/Fact Sheets;*

* *UNIDO-end programme evaluation reports;*
* *UNEP-evaluation reports;*
* *Working Group Meeting reports;*
* *Analysis of structured questionnaires from the interviews conducted in the countries visited and of responses received through mail correspondence;*

- *Preparation of draft evaluation report;*

- *Completion of final report.*

2. *Scope of the Evaluation*

The following countries were visited for the purpose of field investigations/interviews:

Country	*No of participants at the workshop*	*No of participants interviewed*
Kenya	*6*	*5*
Tanzania	*6*	*3*
Nepal	*4*	*2*

Two participants from Slovakia were interviewed in Vienna, at the UNIDO Secretariat.

The duration of the field mission was two weeks (21 May to 4 June 1996).

Additionally, questionnaires were mailed to all other former participants. 11 responses were received from six countries comprising Ethiopia (1), China (3), Malawi (3), Uganda (2), Indonesia (1), and Thailand (1). The information received was relevant and was used by the evaluation team in analysing the relevance and effectiveness of the training and was an important input which contributed in the findings of the evaluation. The eleven responses received from these six countries increased the geographical coverage and scope of data collection, thus providing a 24% coverage of the total participants. Thus a total of 23 former participants were interviewed by the evaluation team. A graphical presentation of the sample coverage in terms of countries and participants covered are presented on page 8 (Graph I and Graph II).

The mission team also, during its field trip, had discussions with relevant ministry officials who provided information on future training needs and requirements.

The mission took note of the following issues highlighted by Mr. B. Sibanda, Chief, Project Design and Evaluation Unit, UNEP, during the conduct of the evaluation exercise:

- *To maintain objectivity of the exercise;*
- *To determine how future training should be designed;*
- *To concentrate and focus on the training subject;*
- *To assess the outputs produced and the objectives achieved;*

- *To determine what lessons can be drawn for the future; and*
- *To determine future UNEP and UNIDO co-operation.*

The evaluation mission received full support from the officials at UNEP and UNIDO (both in the Secretariat and in the field). The mission also received full support from all the former participants and officials from the Ministries during its field trip. The evaluation mission wishes to extend its sincere thanks to all these officials and individuals for the support and valuable information provided, which facilitated the mission's work.

3. The Evaluation Report

This evaluation report consists of the following chapters:

Chapter I:	*Introduction*
Chapter II:	*Executive Summary*
Chapter III:	*Programme Design and Documentation*
Chapter IV:	*Programme Implementation*
Chapter V:	*Programme Results*
Chapter VI:	*Conclusions*
Chapter VII:	*Recommendations*
Chapter VIII:	*Lessons Learned*

Annexes:

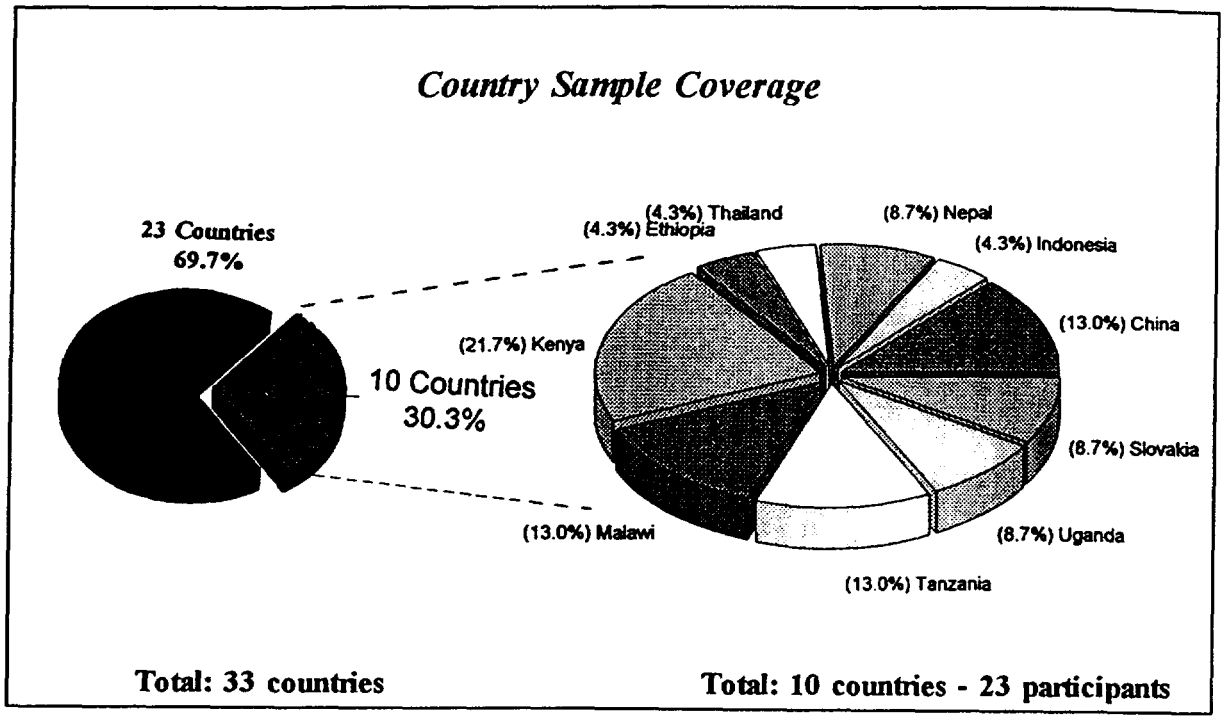
I.	*Terms of Reference*	
II.	*Questionnaire for former participants*	
III.	*Country Reports*	
	a.	*Kenya*
	b.	*Tanzania*
	c.	*Nepal*
	d.	*Slovakia*
IV.	*List of Persons Met*	

The evaluation mission team comprised of:

Mr. I. Farooque, Evaluation Officer, UNIDO.
Mr. M. Gajraj, independent consultant, Environmental Resources Management (UK), selected by both UNIDO and UNEP.

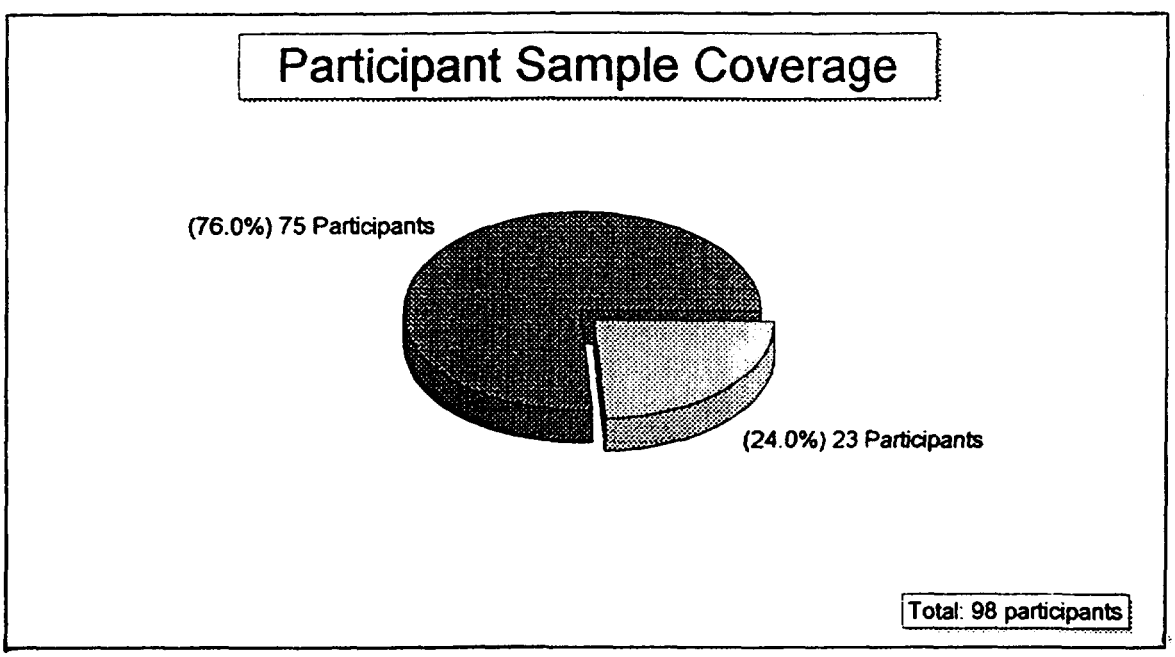
The cost of the joint UNEP and UNIDO evaluation exercise was jointly shared between UNEP and UNIDO.

Graph I



Among the 33 countries covered by the four training programmes, the evaluation mission covered 11 countries, which is 30% of the total and therefore, constitutes a fairly good representation of the total sample.

Graph II



The four training courses imparted training to a total of 98 participants. The evaluation mission findings is based on information obtained from 23 participants - which is 24% of the total- thus constituting a fairly good representation of the total sample.

CHAPTER II - EXECUTIVE SUMMARY

1. Introduction

The joint UNEP/UNIDO/FINLAND/USSR Training Course on Environmental Management for Industrial Managers and Engineers was intended to provide industry professionals and relevant Government officials in developing countries with adequate knowledge and skills:

- *to address industrial environmental problems;*
- *to apply the concepts of clean technologies; and*
- *to develop and implement national environmental management strategies.*

The training programme commenced in 1989 and the course has been held bi-annually since then; in 1991, 1993 and 1995.

After seven years and four courses, UNEP and UNIDO jointly decided that an in-depth evaluation should be made. This evaluation was to determine the relevance of the programme, its efficiency, effectiveness and impact. It is expected that the findings of the evaluation would be useful to UNEP and UNIDO as well as the host training organizations (HTO) in determining the course of action to be taken for similar programmes in the future.

This report reflects the results of the in-depth evaluation.

2. Programme Concept

The Programme which aimed at providing participants with the necessary knowledge and skills to address environmental concerns is relevant and confirms to present concepts of environmentally sustainable development.

For the purpose of clarity the project objectives and outputs are recommended for reformulation to read as follows:

2.1 <u>Objectives</u>

- *To provide participants with information on industrial environmental issues and concerns and in demonstrating the techniques to address and control industrial environmental problems both at policy level and plant level;*

- *To provide the opportunity to review and discuss these techniques, their use, application and adaptation in the working environment of the participants' countries.*

2.2 <u>Outputs</u>

- *Participants from developing countries provided with broad-based skills and knowledge on industrial environmental management related issues;*

- *Country specific assessments of problems and needs on the subjects covered as well as the applicability of the new techniques, in the participants' countries, and the possibilities for introducing them;*

- *A consolidated set of materials reflecting the training course, together with other related supporting documents.*

The evaluation was conducted against this reconstructed design (project objective and outputs).

3. Programme Implementation

The course was conducted four times: twice in Russia and Finland; once in Tanzania and once in Ethiopia. Details of the number of participants and their countries are presented in Table 1 of the report. An overall summary breakdown of the entire Programme is also shown in Table 1. In Chapter IV of the report, details of the project management responsibilities are provided. Within the scope of the project, project implementation and conduct of the training itself was satisfactory. Problems were with regard to lack of adequate information in the fact sheets, language problems, participants mix and no follow-up mechanism built into the programme. A detailed discussion on them is provided in Chapter IV of this report.

4. Programme Achievements

The achievements of the Programme are summarised below under the following headings:

- *Production of Outputs*
- *Use of Outputs*
- *Impact of the Use of Outputs*

4.1 Production of Outputs

The volume of information provided on environmental management was detailed. The information provided led to increased knowledge and awareness of environmental management issues and made participants conversant with such concepts.

4.2 Use of Outputs

Individual initiatives have been undertaken by some participants, and some reports on environmental audits and impact assessment were produced. However, the mission has not been able to trace any evidence of their actual application, either as an input to policy making or at plant level operations.

4.3 Impact of the Use of Outputs

The mission was not able to establish the existence of any concrete benefits derived from the use of the outputs produced. While some participants did make presentations at locally organized workshops, other than the dissemination of some knowledge, the mission could not

discern their resultant impact, if any. For the most part the knowledge gained has remained entirely with the trainees.

5. Conclusions

The conclusions are summarised below under the following headings: relevance, efficiency, effectiveness and impact.

5.1 Relevance

The Programme was perceived as relevant by the course participants and their Governments. Given the recent developments and concerns on the subject, the mission shares the same view.

The recipient Governments and the nominated participants perceived that such international support in the form of training will facilitate in generating awareness on environmental issues, contribute in formulation of environmental policies and in their implementation to address environmental problems. It was firmly conceived by the beneficiaries that the provision of such training would contribute in upgrading their personal skills and knowledge with regard to cleaner production systems.

5.2 Efficiency

On the positive side, the Programme in general was well co-ordinated by the implementation team. Expenditures made were within the budget available. Course material/handouts were detailed and well structured. Duration was adequate. On the negative side, the Fact Sheets/Aide-mémoires of the training courses need considerable improvements and the participants-mix was considered to have been too heterogeneous.

5.3 Effectiveness

Outputs 1 and 3 were satisfactorily achieved with respect to creating an awareness and making participants conversant on the subject matter of the Training Programme.

Output 2 was partially achieved. Country papers were not presented by all. There was insufficient time to discuss and exchange views on them. There is scarce information available on the use of the outputs. There was no strategy of a follow-up mechanism to determine the use of the outputs.

5.4 Impact

The uptake of the information has been good by individual participants - the individual knowledge base has been improved, applications of knowledge were initiated by some participants - however, these attempts are yet to be put into practice. Consequently, little impact was found by the mission team, therefore, no multiplier effect occurred.

6. Main Findings

Based on interviews of participants, supervisors and responses to questionnaires, the following is a summary of the evaluation team's findings.

6.1 On justification to continue

- *Exchange of experiences from different countries is valuable;*
- *Exchange of information informally with course lecturers is useful;*
- *The Programme helps to create awareness of environmental problems;*
- *The Programme provides a basis for trainees to become conversant with industrial environmental management concepts, and on approaches to resolution of environmental problems.*

6.2 On making the programme more efficient and effective

- *Plant visits where clean technologies are applied should be made;*
- *More case studies and practical exercises should be included;*
- *Video support material should be distributed, if it is not proprietary;*
- *Ensure a better homogeneity of participants;*
- *Ensure no language barriers (either on the part of the instructor or the trainees);*
- *Programmes should be delivered through institutions with better linkages to industry (see section 7 below).*

6.3 On difficulties in transferring acquired knowledge

- *Financial and human resource constraints for national training courses;*
- *Unavailability of up-to-date literature and other support material such as audio-visuals;*
- *Lack of motivation on part of participants;*
- *Absence of firm Government policy or legislation to put sound industrial environmental management into practice.*

6.4 On expected difficulties in applying acquired knowledge

- *Government and industry management policy obstacles;*
- *Deficiencies related to motivation or recognition;*

- *Lack of funding for new investment or for changes in production/process technologies;*

6.5 On subjects to be included in future training programme

The following could either be added to the existing Programme or be developed as separate, more specialised courses:

- *Waste management, including hazardous wastes*
- *Economic indicators and instruments/cost-benefit analysis*
- *Air pollution/emissions monitoring and control*
- *Health and safety standards and monitoring*

7. Recommendations

Detailed recommendations and their justification are presented in Chapter VII of the main report under the following headings:

- *Project documentation*
- *Target countries*
- *Participant profile*
- *Duration of the training course*
- *Project course implementation*
- *Co-ordination of the Programme*
- *Training course content and methodology*
- *Follow-up*
- *Recommendations for UNEP and UNIDO including the use of National Cleaner Production Centres*
- *Strengthening the National Information Systems*

In this Executive Summary the evaluation team wishes to emphasise those recommendations related to: follow-up; UNEP and UNIDO; and the National Cleaner Production Centres (NCPCs).

7.1 Follow-up

Neither UNEP nor UNIDO had any information on the use of the project outputs at the country level. A training programme should be viewed as a means/tool to promote capacity building with the aim of ensuring human resource development. Therefore, each training programme designed, should have a strategy on "Follow-up". By this the mission means:

- *A strategy/mechanism which would allow to know the status and whereabouts of the trainees;*

- *To ascertain to what degree they are being able to apply the newly acquired knowledge and skills and their upward mobility;*

- *To determine what constraints they are facing in the application of the skills;*

- *To prioritize what areas of the course content should be emphasized and/or de-emphasized in future training courses;*

- *To highlight on how to maintain contacts with fellow participants and co-ordinators of the training programme, facilitate exchange of information either to resolve present problems and/or how to keep abreast of up-to-date recent developments covering environmental management issues;*

- *To what degree national HTOs (trainers) are being able to conduct their own training course covering the same subject (multiplier effect);*

- *To determine to what extent the course has influenced Governments in developing environmental management policies.*

Essentially this would mean developing a strategy at the project design stage with adequate funds to conduct a refresher course by recalling former participants to address issues raised above to enable to draw appropriate measures to make future programmes more effective and efficient. To this effect, it would be useful if both UNIDO and UNEP training branch can inform fellow colleagues from their respective substantive technical branch to contact former participants during any field trips undertaken to a trainee country. Therefore, there should be a strong linkage between the training branch and the substantive technical branch of UNIDO and UNEP such that they may complement each other by way of adding value to each others work. UNIDO/UNEP field offices could also be utilized to facilitate this work.

7.2 Recommendations for UNEP and UNIDO

Future joint UNEP/UNIDO training programmes should consider the following:

- *To focus more on training of trainers;*

- *To hold programmes in institutions in developing countries, using their facilities and staff as much as possible (see 7.3 below);*

- *To seek greater involvement of their respective substantive technical branches to enable more technical course content input, both at the design and the delivery stages;*

- *To seek nominations from industry associations - like Chamber of Commerce, etc.*

7.3 National Cleaner Production Centres (NCPCs)

As NCPCs are expected to render services to industry on various issues covering industrial environmental management, the organisers of training programmes should, through their respective technical branches, forge linkages, ensuring that the NCPCs are contacted to nominate candidates to attend the training programmes. Conversely regional courses should be conducted in countries that have established NCPCs, with NCPC being the HTO.

8. Lessons Learned

The lessons learned are as follows:

- *This type of a broad-based Programme can be relevant even in the absence of a needs assessment carried out in the field;*

- *Selection of participants is important to ensure homogeneity and fluency in language of tuition;*

- *Participants from Government and industry can be mixed (50:50); participants from industry should be drawn primarily from chambers of industry, trade associations and trade unions (professionals);*

- *Programmes of this nature with a mixture of theory, demonstrations and plant site visits are effective means of transferring knowledge and information and could encourage TCDC, but only if effective follow-up is pursued.*

CHAPTER III - PROJECT DESIGN AND DOCUMENTATION

The term "programme" is used in this context to describe the series of four training courses conducted, each one of which is considered to be an individual technical cooperation project, for which respective project documentation (project document, fact sheet and training course programme) was prepared.

The programme implementation was carried out by UNEP, UNIDO, USSR-Centre for International Projects (CIP), and the Tampere University of Technology in Finland (TUT).

1. Origin of the Programme

The legislative authority of UNEP - UNEP/GC.14/16 provides for incorporation of environmental components into training programmes for decision makers and professionals. The training programmes developed are in line with the recommendations of the UNEP-sponsored World Industry Conference on Environmental Management (WICEM) held in Versailles, France, in November 1984.

The training programme and UNIDO's involvement takes its relevance under one of UNIDO's development objective - Environmentally Sustainable Industrial Development (ESID) where it states "... UNIDO aims to build national capacities and capabilities for attaining ESID. A cornerstone of capacity building is the need to have trained human resources in governments, industry support institutions and in industry itself, which can analyze issues and have the skills to initiate industry-related environmental protection initiations" (UNIDO Annual Report 1994).

UNIDO's involvement in the training programme takes its origin by way of a UNEP letter dated 19 May 1988 wherein UNIDO was requested to convey its willingness to participate jointly with UNEP, UNEP/COM and Tampere University of Technology in the implementation of the training programme. Through subsequent exchange of correspondence between UNIDO and UNEP which determined the scope of the training programme and established the role, UNIDO's willingness to participate jointly with UNEP in the implementation of the programme was confirmed. This joint cooperation and collaboration between UNEP and UNIDO, was the beginning of a relationship which has continued up to the time of this evaluation (1996), covering a span of 6 years, during which a further three such training programmes were carried out jointly.

2. The Training Programme

Since the inception of the programme, four training courses of about four weeks each were conducted. The following table provides an overall picture of the training programmes which have been carried out:

Table 1: ***Joint UNEP/UNIDO Training Courses on Environmental Management for Industrial Managers and Engineers: 1989-1995.***

DATES	*HTO*	*Number of Participants*	*Participating Countries*
11 Oct. - 15 Nov. 1989	*St. Petersburg University of Plant Polymers and Tampere University of Technology Finland*	*26*	*Afghanistan, Indonesia, Malaysia, Nepal, Papua New Guinea, Philippines, P.R.China, DPR Korea, Sri Lanka, Thailand, Vietnam (9 countries)*
15 July - 24 Aug. 1991		*27*	*Botswana, P.R.China, Czechoslovakia, Ghana, Hungary, Kenya, Mauritius, Nigeria, Poland, Romania, Tanzania, Uganda, Zaire (13 countries)*
15 Sept. - 15 October 1993	*ESAMI Arusha Tanzania*	*25*	*Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Tanzania, Uganda, Zambia (8 countries)*
13 November - 8 December 1995	*EMI Debre Zeits Ethiopia*	*20*	*Egypt, Ethiopia, Gambia, Ghana, Kenya, Malawi, Mauritius, Nigeria, South Africa, Swaziland, Uganda, Zimbabwe (12 countries)*

The first training programme was targeted at Asian countries; the second was targeted at English-speaking African countries, Eastern Europe and China; the third was aimed at African countries and was held at Arusha (Tanzania) in East Africa; the fourth was aimed at African developing countries and was held at the Debre-Zeits Management Training Centre of Ethiopian Management Institute (EMI).

3. The Project Document

As indicated earlier, the programme entailed four training courses. The title (Training Seminar on Environmental Management for Industrial Managers and Engineers) of each of the training courses of the four projects has remained the same. Their objective and output as reflected in the respective project document are presented below in Table 2.

Table 2: ***The Stated Objectives and the Stated Outputs for the Four Training Courses***

Project	***Stated Objectives*** *(Short term)*	***Stated Outputs***
First - Leningrad/Tampere (1991)	*To identify specific environmental problems arising from badly planned industrial activities;* *To develop in the Asia and Pacific Region a cadre of industrial managers and engineers who will be better informed about the need to use clean technologies (ie low- and non-waste) in industry and skilled in making use of such technologies.*	*30 specialists from 15 developing countries of the Asia and Pacific Region who, after undergoing the training course and on returning to their respective countries, will be capable of managing industrial enterprises in an environmentally sound manner, by use of clean technologies (ie low and non waste).* *1000 copies of a Training Manual on 'Environmental Management of Industrial Enterprises'* *The distribution list for the Training Manual prepared by ROAP (not spelled out) in consultation with UNEP/IEO and UNIDO.*
Second - Leningrad/Tampere (1993)	*To formulate sound strategies for preventing/mitigating negative environmental impact arising from all-conceived industrial development activities.* *To provide industrial managers and engineers with relevant knowledge (scientific, technological, and economical) in the use of clean technologies (ie low and non waste) in various industrial sectors.* *To strengthen the training course through the logistical support of training institutions in Leningrad and contribution to the high-quality standard training in Finland.*	*30 specialists from 16 countries in Anglophone Africa, Eastern Europe and China, who, after undergoing the training course and on return to their respective countries, will be capable of managing industrial enterprises in an environmentally sound manner by resorting to clean technologies (ie low and non waste technologies).*
Third - Nairobi/Arusha (1993)	*To provide industrial managers and engineers with relevant knowledge (scientific, technological and economics) in the use of clean technologies (ie low and non waste) in various industrial sectors.*	*30 specialists from African developing countries who after undergoing the training course and on their return to their respective countries will be capable of managing industrial enterprises in an environmentally sound manner.*
Fourth - Addis Ababa (Ethiopia) 1995	*To facilitate practical application of environmentally sound methods, techniques and technologies at plant level, which will contribute to improve environmental conditions in participating countries.*	*25 industrial specialists from African developing countries with acquired broad-based skills in environmental issues, auditing and environment-related industrial management and abilities to apply them at the enterprise level.*
Source: The above has been quoted from Project Documents		

4. *Analysis*

The project objective and outputs as indicated for training programme I and II appear to be ambitious and in all probability cannot be achieved within the scope and resources available under the two projects. The project objective and outputs as indicated in training programme III and IV are better formulated.

Formulation of Project Objectives and Outputs should follow the design principles:

- *A training programme should indicate the intended application of the newly acquired knowledge and skills to achieve a specific end;*

- *Outputs should be realistic in the sense that their production is within the authority and capability of the project management. In other words, the project management can ensure the production of the outputs;*

- *Use of the project outputs by the beneficiaries (outside the project) results in the achievement of the project objective (purpose);*

Therefore, for clarity an improved formulation of project objectives and outputs based on above will read as follows:

5. *Recommended Outputs*

- *Twenty participants from developing countries (industrial managers and engineers) provided with relevant knowledge in the use of clean technologies (i.e. low and non-waste), auditing and on environmental-related industrial management.*

- *Country specific assessments of problems and needs on the subject covered as well as the applicability of the new techniques in the participants countries and possibilities for introducing them.*

- *A consolidated set of reference materials reflecting the training course with other related supporting documents.*

6. *Recommended Objectives*

- *Participants equipped with information and knowledge on environmental management issues (scientific, technological and economics) and able to apply in demonstrating these techniques required to address and control environmental concerns both at policy level and plant level.*

- *To provide the opportunity to review and discuss these techniques, their application and adaptation in the work environment of the participating countries.*

7. Participant Profile

The participant profile was determined by UNEP. The selection of participants was based on the following criteria:

- *The participants should be key personnel from developing countries in the Asia and Pacific Region, primarily industrial managers and engineers but could also include trainers and environmental inspectors who possess a sound knowledge of environmental management strategies and who have had at least three years working experience at the enterprise level;*

- *the participants to be fluent in English; and*

- *each participant to agree to:*

  * *prepare a paper on their country's experiences in environmental management, with a focus on clean technologies where appropriate, for presentation at one of the training sessions; and*

  * *complete the evaluation questionnaire and to return same to UNEP/COM a year after the completion of the training course.*

8. Aide-mémoires/Fact Sheets

The purpose of the fact sheets was to provide the invited organizations and probable participants with comprehensive information about the training course to enable proper selection of candidates and in the preparation of the participants the training course. The fact sheet was expected to serve the purpose of a programme prospectus.

The shortcomings of the selection criteria and the fact sheets are discussed in Chapter IV of the report.

9. The Training Course Content

As mentioned earlier UNEP was the main initiator and contributor to the training programme. The training course outlined in the project document is summarised in Table 3; each training course lasted about four weeks and included classroom lectures, working group sessions and plant site visits.

Table 3 - Summary of Course Content

Project I	*Project II*	*Project III*	*Project IV*
1 Ecology - the scientific basis for modern nature utilisation	*1 Clean and resource-saving technologies*	*1 Principles - Ecosystem*	*1 Understanding of environmental issues and processes*
2 Industrialisation and environmentalism	*2 Impact of waste waters on the environment*	*2 Standards of permissible impacts of pollution emission*	*2 Environmental monitoring*
3 Environmental management in industry	*3 Impact of emission on the environment quality standards for atmospheric air*	*3 Principles of resource screening technologies "Clean Technologies"*	*3 Information - Communication Collaboration*
4 Fundamental and resource gaining production	*4 Microbiological method of chromium extraction from industrial effluents*	*4 Management of industrial effluent treatments*	*4 Environmental Economies*
5 Theory and technology of pollutant treatment	*5 Use of land and underground spaces*	*5 Theory and methods for treatment and control of industrial changes into atmosphere*	*5 Environmental management*
6 Environmental quality monitoring	*6 Theoretical principles and technology of water treatment*	*6 Hazardous waste management*	*6 Industrial sources of environmental efforts and risks*
	7 Monitoring of atmospheric environment	*7 Control of Content (monitoring) of pollutants in the environment*	*7 Chemical safety*
	8 Economics of environmental protection activities	*8 International information services for environment protection*	*8 Environmental assessment tools*
	9 Principles of ecological-economic systems functioning	*9 Economy of environment investments*	*9 Cleaner production*
	10 Theoretical principles and technology of industrial effluent treatment	*10 Planning and implementation of projects for environmental protection in industrial enterprises*	*10 Government Strategies and policies*
	11 Monitoring and quality control of natural environments		*11 Project Design*
	12 Environmental Impact Assessment		

Source: UNEP

10. Needs Analysis

The training programmes were not designed/formulated on the basis of any "Needs Assessment" analysis. Therefore, it cannot be truly interpreted that the programme so designed and developed was based on the actual needs and demands of the targeted developing countries - as beneficiaries to the project. However, some tools were used to determine the effectiveness of the training programmes and to establish parameters for future training programmes which enable changes to be made resulting in reformulated course content, based on the needs of the participating countries. These tools were:

- *PER/GTP prepared by HTO*
- *Evaluations carried out by UNEP, and*
- *Working Group meetings*

These elements are further discussed in Chapter IV stipulating their role, function and purpose in the implementation of the training programme.

11. The Functions and the Role of Implementation Bodies

The responsibilities and functions of the implementation bodies (UNEP/UNIDO/TUPP and TUT) are indicated in each of the four respective project documents. Each training programme was concluded by an end-programme evaluation exercise which was undertaken just after the training by UNIDO. Additionally, UNEP evaluated each training one year after its completion by means of questionnaires to former participants. Furthermore, working group meetings were also held at the end of each training course among the various parties involved in implementation to determine future training course contents and other administrative matters.

The details of the functions and responsibilities in the conduct of the training programme are discussed in Chapter IV of this report. It may suffice here to state that the training programme was envisaged by both UNEP and UNIDO as a joint effort, which attempted to assist developing countries in determining on how to cope with environmental problems both at policy level and at plant-level operations The main initiator and financial contributor to the programme was UNEP and supporting implementation organizations comprised of UNIDO, CIP and TUT. The above-mentioned training programmes were primarily backstopped in UNIDO by Human Resource Development Branch in cooperation with the UNIDO/ISED Branch, while at UNEP by EETU.

As a whole, the mission considered the intervention proposed under the programme to address environmental problems and the tools adopted to resolve them through provision of capacity building of the target beneficiary as relevant.

CHAPTER IV - PROGRAMME IMPLEMENTATION

As discussed in the previous chapters (II and III), from 1989 to 1995, four training courses were held. The training programme was jointly co-ordinated and implemented by: UNEP, UNIDO, TUT (Finland) and by CIP, LTI, PPI (Russia).

The following table and graphs provide a detailed break-down of the:

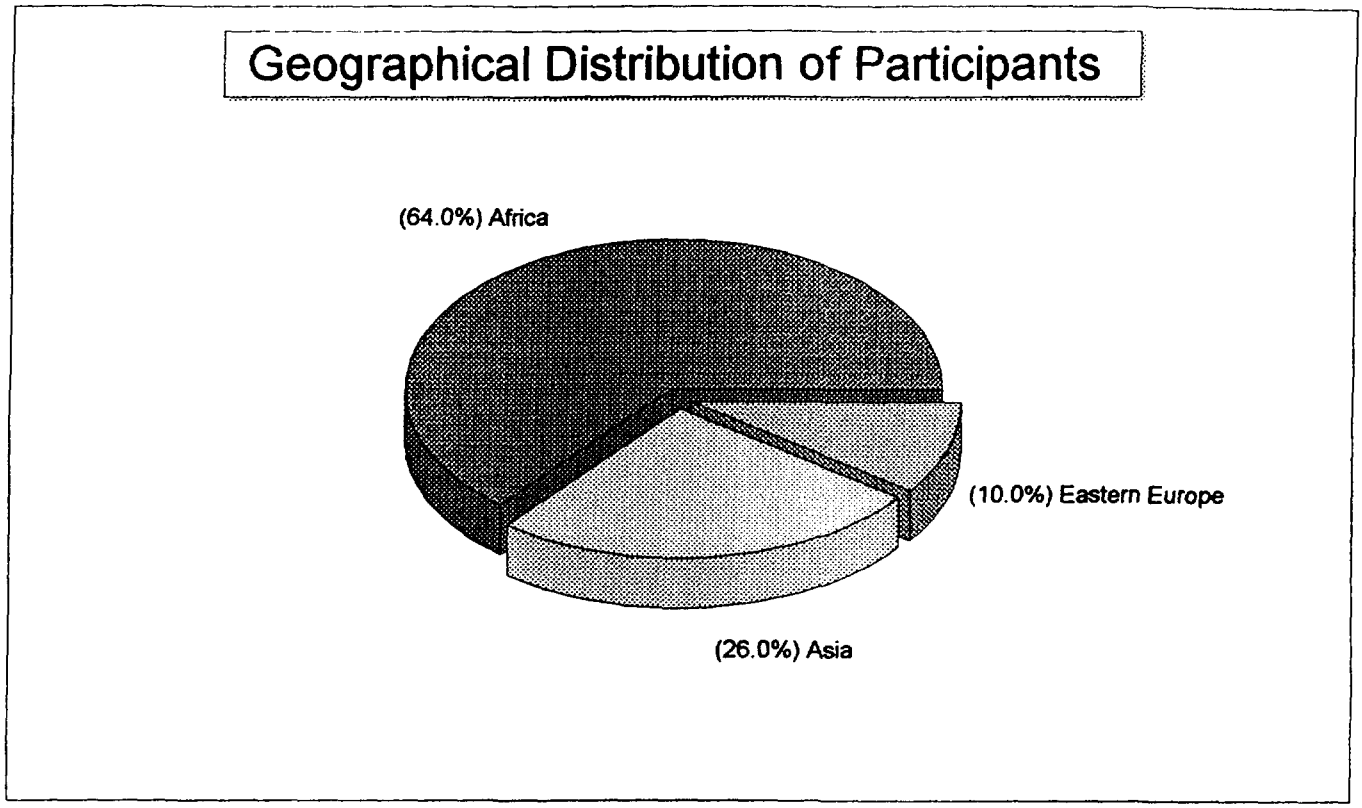
- *Table 4: The Training Programme*
- *participants' profile [geographical distribution of participants (Graph III)]*
- *participants' background distribution (Graph IV)*
- *percentage of women participation (Graph V)*
- *country coverage of the participants (Graph VI)*

Table 4 - The Training Programme

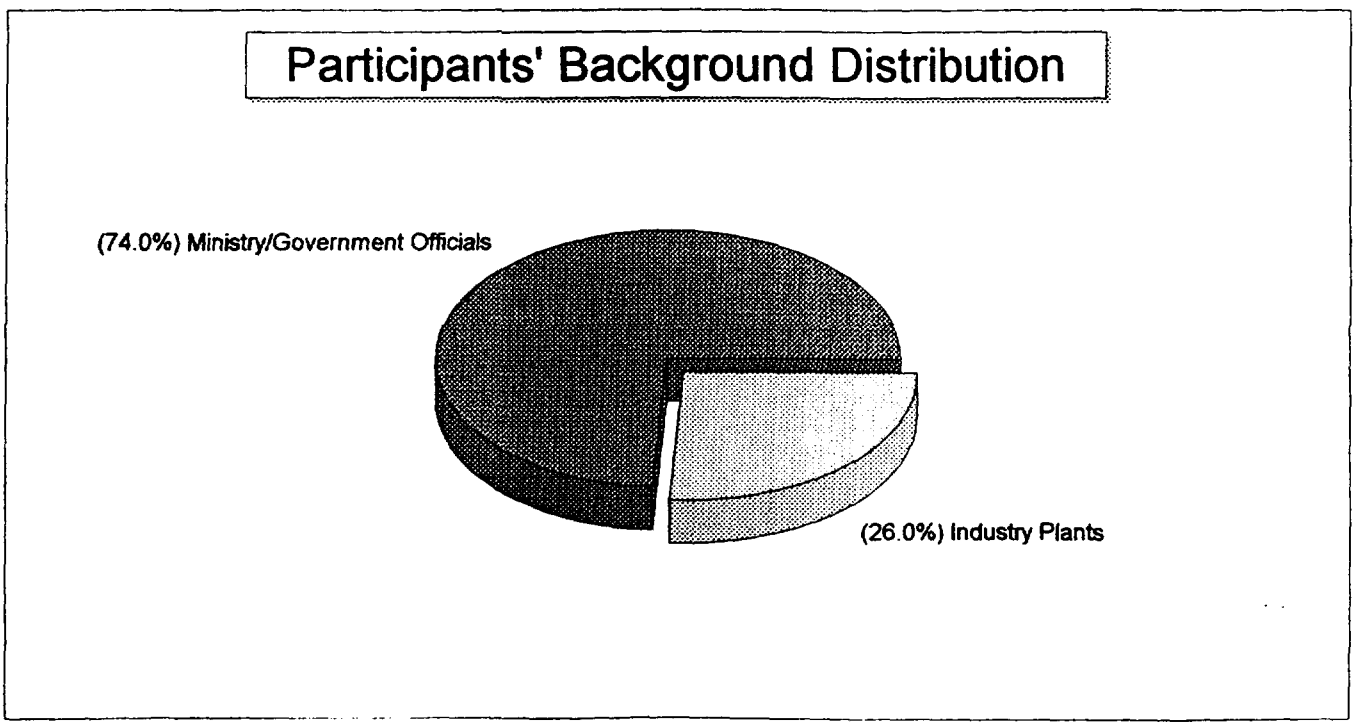
4	***Trainings were held***
98	***Total participants***
25	*Participants in each training (average)*
18	*Women participants*
31	*Countries covered*

Region-wide Distribution							
	Africa		***Asia***		***Eastern Europe***		***Total***
Participants	*63*	*64%*	*25*	*26%*	*10*	*10%*	*98*
Of which Women	*9*	*50%*	*3*	*17%*	*6*	*33%*	*18*
No. of Countries	*19*	*58%*	*10*	*30%*	*4*	*12%*	*33*

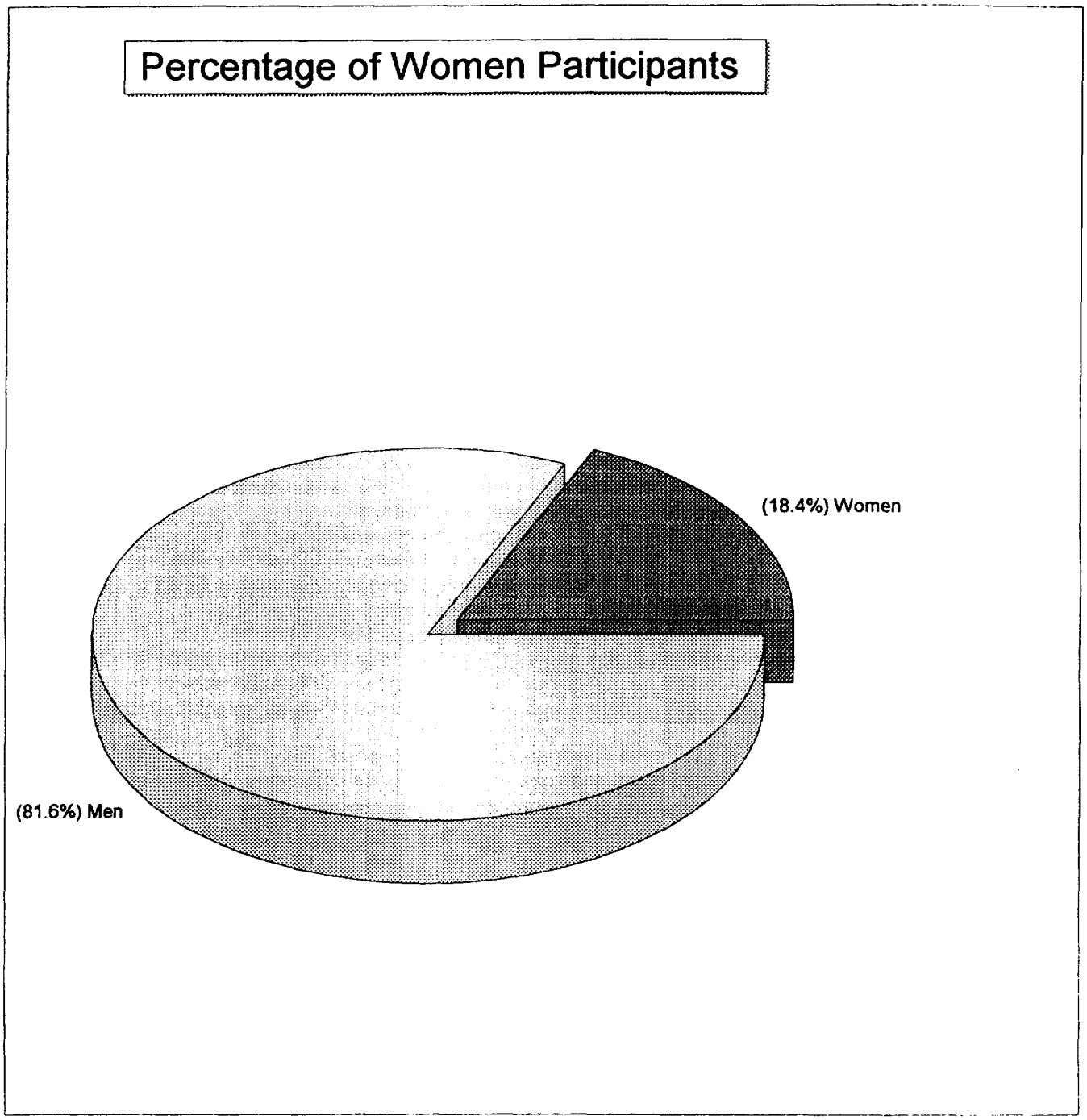
Graph III



Graph IV



Graph V



1. *Project Management responsibilities*

The division of responsibilities was established and understood by the implementation team as follows:

Preparation of project document	*UNEP*
Preparation of fact sheet (aide-mémoire)	*TUT, UNEP/EETU*
Terms of reference for the country papers	*TUT, UNEP/EETU*
Selection of targeted regions/countries	*UNEP*
Selection of HTO	*UNEP, UNIDO*
Sending out invitations	*UNEP*
Selection of participants	*UNEP*
Training course programme	*TUT*
Logistics/administration	*UNEP*
Delivery of lectures	*TUT (primarily), UNEP/COM, UNEP/IE-PAC,UNIDO*
In-plant visits/demonstrations	*1989 TUT, 1993 UNEP and Kenya Federation of Employers, 1995 UNEP*
Case study presentations	*TUT and UNEP/COM*
Country paper presentations	*Participants*
Organisation and purchasing airtickets	*UNEP*
Paying DSA to participants	*UNEP*
Conduct of the training course	*TUT, UNEP/COM*
Follow-up	*UNEP*
End-programme evaluation	*UNIDO*
Bi-annual evaluations	*UNEP*
Working Group meetings	*All parties*
PER - GTP	*HTO and UNIDO*

Each of the training programme comprised of two distinct parts and financial earmarking was accordingly split into two years. The first part of the training programme comprised of conducting the training programme itself and the carrying out of the end-programme evaluation by UNIDO during the first year. The second year of the programme entailed follow-up actions in forms of sending out questionnaires to participants by UNEP for the evaluation of the programme and holding the working group meetings by all parties which provided for discussion on the performance of the training programme, in deciding future training programmes in terms of content, delivery and methodology.

The first training programme was targeted at Asian countries, the second was targeted at English-speaking African countries, Eastern Europe and China, the third aimed at East African countries and the fourth was targeted at African countries. It appears from above that the main focus of the training programme was directed at Africa region which participated in three of the workshops.

There was general satisfaction with the way the lectures were delivered, the visits conducted and the training courses managed. Clear instructions were provided to the participants on their daily schedule. There was no divergence or lack of communication and

understanding between the participants and the organizers. Plant/company visits were useful, particularly in view of the time provided for questions and answers.

Implementation was frequently affected by insufficient notification of participants to enable them to prepare their country papers properly and to prepare adequately for the training.

As a rule, the selection of regions/countries to be invited was made by UNEP.

Fifteen to twenty countries were usually invited to submit candidates. As a rule each country was expected to submit nominations which were supposed to be screened by UNEP/EETU for final selection.

The Programme at UNIDO was managed by the HRD Branch. The HRD Branch was also responsible for the development of the programme covering the UNIDO portion. In the implementation, the HRD Branch cooperated with the UNIDO ENV Branch. The end-programme evaluation was conducted by UNIDO staff either from the ENV Branch or other branches - independent of the HRD Branch.

The mission did not evident any co-ordination problems among the different parties involved in the implementation of the Training Programme.

2. Training Course Content and its Perception by Participants

The course content as indicated in Chapter III was positively perceived by all the former participants interviewed and with the Government officials. This was particularly viewed with respect to present concerns with regard to environmental problems. The participants were aware of the lack of understanding at each country level on how to manage environmental pollution problems evident by absence of any firm Government policies to support measures on minimizing environmental problems. It was clear to the recipient Governments and the nominated participants that international support through such technical co-operation in the form of training will facilitate in generating awareness and contribute in formulation policies and in their implementation to address environmental problems. It was firmly viewed by the participants that the training provided would contribute in upgrading their personal skills and knowledge with regard to cleaner production systems.

The first two training courses were conducted in the Tampere University of Technology in Finland and CIP Russia. The theoretical parts of the training courses were done in Russia and in Finland. The practical parts were all done in Finland. Sometimes the participants felt that the theoretical parts conducted in Russia did not match the practical parts in Finland.

The third training course was conducted in ESAMI - Arusha (Tanzania), however plant visits were made in Kenya. The fourth training course was held at EMI, Debre Zeits (Ethiopia). The holding of the training courses in the developing countries was very positively rated by the participants as they provided an opportunity to address environmental issues on the home ground.

Each training course was concluded with an end-programme evaluation and completion of the PER/GTP by the HTO. These activities conducted by UNIDO provided an opportunity to understand the degree of skills and knowledge acquired, on how the individual participants planned to apply their knowledge and transfer them to others. However, such an exercise limits itself to personal perception and drawing up of a personal action plan. It does not guarantee actual realization of personal proposed action plans nor to ascertain the degree of utilization of the newly acquired knowledge and skills. A summation of this self-evaluation system reveals the following with regard to project implementation:

- *Pre-course information is received late, therefore, insufficient time to prepare for the training programme;*
- *Participant-mix should be more homogeneous, preferably a separate focus for Government personnel and a different approach with participants from the industry;*
- *More practical/study visits;*
- *Each theoretical lecture should not be longer than 45 minutes;*
- *Theoretical lectures should be followed up by practicals;*
- *Lecturers should have good command of the language of instruction;*
- *Clear instruction in the preparation of the aide-mémoire/Fact Sheets on course content.*

Future courses to include:

- *Air pollution problems in conjunction with water wastes;*
- *Hazardous waste management;*
- *Detailed product life-cycle analysis;*
- *Noise management and control;*
- *Detailed EIA.*

2.1 Working Group Meetings and UNEP Bi-annual evaluations

The training programme was also subject to working group meetings by the implementation team and self-evaluation on a bi-annual basis by UNEP. These reviews provided an opportunity to discuss the modalities of the training courses. It appears from documents in the file that the self-evaluations carried out by UNEP were less than satisfactory in providing an adequate feedback on training programme results. The questionnaires were sent to forum participants, usually less than 25% responses were received. No reason had been provided for this by UNEP in any documentation. It appears that UNEP, after a year, was not fully aware of the whereabouts and current status of the trainees.

The Working Group Meetings reviewed project training content and delivery, its costing/financial arrangements. Training programme implementations, its methodology and delivery were jointly discussed and agreed upon on such occasions.

3. *Current Availability Status of Former Trainees (as per mission field trip)*

A total of 20 participants were trained among the four countries covered by the mission. However, only 60% were found available for interviews. The balance 40% participants were not traced in view of: some were no longer in their original work place and whereabouts are presently unknown, some have left his/her country and one had expired. Following is the break down:

Table 5: Availability Status of Participants

Country	*No. of participants trained*	*No. of participants available for interviews*	*No. of participants not available for interviews*
Kenya	*6*	*5*	*1*
Tanzania	*6*	*3*	*3*
Nepal	*4*	*2*	*2*
Slovakia	*4*	*2*	*2*
Total:	***20***	***12 (60%)***	***8 (40%)***

4. *The Fact Sheets/Aide-Mémoires*

The Fact Sheets prepared by UNEP did not provide adequate details of course content and what the participants are likely to benefit by attending the training programme. Most often, the Fact Sheets did not reflect clearly the outline of the country reports to be produced. The selection criteria of the participants were not clearly spelled out. The Fact Sheets often reached the participants quite late. Though the objectives of the training programme emphasized on to facilitate use of the acquired knowledge at the industry level, however, only 26% of participants came from the industry. In future, Industry Associations should also be targeted by the organizers.

4.1 Administration

Project administration and logistics were adequate and satisfactorily noted by the participants. However, there was some confusion with regard to DSA payments. Participants felt that costs were higher in Finland compared to what they were provided with. Confusions were also highlighted with respect to DSA payments in Russia particularly for the 1991 course (internal problems prevailing at that point of time).

5. *Training Programme Cost and Structure (Financial Contribution)*

Table 6: Break-down of Financial Contribution

	Year	UNIDO	UNEP
1	1989	30,000	180,967
	1990	9,000	9,960
2	1991	31,350	51,429
	1992	15,083	-
3	1993	48,490	145,290
	1994	38,096	21,439
4	1995	21,000	103,885
	1996	26,500	10,000
T o t a l :		219,519 (30%)	522,970 (70%)

Contributions from Russia were in kind.
Contributions from Finland were both in cash and in kind.

As can be seen from above, the main contribution to the training programme was by UNEP constituting 70 % of the total costs..

Despite the contributions of FINNIDA to the training programme, the evaluation mission understood from UNEP that these contributions were directly transferred to the Tampere University of Technology, Finland as their fees for delivery of the training course. The mission noted that despite this contribution by FINNIDA, there was no established procedure to report to FINNIDA on the implementation and the results of the training programme.

The mission was made aware of other similar training programmes which UNEP was undertaking jointly:

- *UNEP/ILO - environmental management training;*
- *UNEP/UNESCO/Germany - The "Dresden Courses" on environmental management for developing countries;*
- *UNEP and the University of Adelaide - joint programme on environmental management;*
- *Training manuals were also developed by UNEP in co-operation with ILO.*

The mission could not ascertain the common vision of UNEP's-EETU's approach to human resources development (HRD) and/or how each of these training programmes are linked to promote and build HRD, or as to whether each of these trainings were individual attempts. If this so be the case, then training programmes are not being viewed upon as a tool/means to promote human resource development with societal implications, rather they are being viewed as a stand-alone activity without any interlinkages.

CHAPTER V - PROGRAMME RESULTS

The Training Programme results will be addressed at three levels:

- *Production of Outputs;*
- *Use of the Outputs; and*
- *Impact (of the use of the outputs)*

1. Production of Outputs

In Chapter III of this report, project outputs as indicated in the project documents have been reflected. On the basis of the analysis of these project documents, the mission recommends the reformulation of the project outputs to read as follows:

- *Participants from developing countries provided with broad-based skills and knowledge on industrial environmental management related issues;*

- *Country specific assessments of problems and needs on the subjects covered as well as the applicability of the new techniques, in the participants' countries, and the possibilities for introducing them;*

- *A consolidated set of materials reflecting the training course, together with other related supporting documents.*

With the reformulation, Output 1 was produced.

The volume of information provided on environmental management was detailed and adequate. The high quality delivery of the training course particularly by the Tampere University of Technology, Finland - who was also the main architect in designing the course content - facilitated the retention of much of the information provided. The trainees highlighted on the continued validity and usefulness of the training material/handouts provided.

The following specific areas were highlighted by the participants with regard to increased knowledge and information acquired:

1.1 K E N Y A

- *Undertaking of a preliminary environmental audit*
- *Undertaking risk assessment analysis*
- *Cleaner production technologies*
- *Environmental audit and risk analysis*

1.2 T A N Z A N I A

- *Industrial environmental management*
- *Environmental auditing*
- *Waste water treatment and disposal*
- *Cleaner production technologies*

1.3 N E P A L

- *Environmental impact assessment*
- *Cleaner production technologies*

1.4 S L O V A K I A

- *Environmental impact assessment*
- *Waste water management*

1.5 C H I N A

- *Chemical safety*
- *Cleaner production*
- *Environment regulation and standards*
- *Environmental management*

1.6 M A L A W I

- *Environmental impact assessment*
- *Waste water treatment*
- *Preventive maintenance*
- *Risk assessment*

1.7 U G A N D A

- *Cleaner production*
- *Waste water treatment*
- *Solid and hazardous waste management*

1.8 I N D O N E S I A

- *Waste water treatment; (planning and control measures)*

1.9 E T H I O P I A

- *Assessing dust pollution in cement factory*

1.10 T H A I L A N D

- *Evaluation of impact to water quality*

On inclusion to future training programmes

To emphasize	*To de-emphasize*
- *cost/benefit analysis*	- *general environmental management principles*
- *hazardous waste management*	- *public relations/activities*
- *air pollution monitoring*	
- *computer simulations*	
- *solid waste management*	
- *waste reuse/recycle*	
- *industrial waste water treatment and sewerage treatment*	

Output 2 - This output appears to have been only partially produced.

A portion of the workshop was devoted to the preparation and delivery of country position/situation papers. An outline for the preparation of country papers was not provided to the participants at the first two training courses; this was corrected for the subsequent courses. Participants in Kenya and Tanzania did, nevertheless, say that they had not been informed about who else from their country would be attending the course; as a consequence, there had been no prior consultation about the content of their country papers, which then had to be consolidated during the course. One participant felt that the amount of time allocated for the preparation of the country papers and their subsequent delivery was too long and reduced the time that could have been better spent on course work or site visits. To summarise, the reasons for partial achievement of this output are as follows:

- *Late receipt of the Fact Sheets by the participants, thereby not allowing sufficient time for country report preparation;*

- *Individual participants were not aware of who among them, within the same country was participating; hence a consolidated country report could not be prepared;*

- *Time was lost by course co-ordinators because of the need to examine individual country reports, to provide suggestions for revision reports; to integrate different reports from the same country and to distil the information in as few pages as possible - normally three pages. Participants were only asked to take hard copies of their reports; so nothing was available on computer diskette. The time taken doing the above meant that insufficient time was left to discuss the papers and to exchange views;*

- *An assessment of the documented technology on environmental management issues of GMP was more a matter of each individual participant's personal judgement and beliefs. It would have been better to have a more structured and organised interaction within the group.*

The positive aspect has been that all the concise country reports have been compiled into a single document, with a common structure and this document has been sent to all

participants (only one participant - from Kenya - intimated that he had not received the compilation of country reports).

All participants interviewed by the evaluators, indicated that the information contained in the country reports helped them to understand the common environmental management problems faced by other countries.

Output 3 was produced fully.

The sets of documentation provided to the participants, consisting of lectures, descriptions of technology and other supporting information was of a high quality. The material was well structured, all the participants reported that it is still valid today and they still use it as reference material.

2. Use of Outputs

The evaluation team found that there had been inadequate professional interaction, there has been little or no contact between participants since the courses. UNEP and UNIDO appear not to have facilitated this aspect. Indeed, participants said that the concept of informal or formal networking was not mentioned by the UNEP or UNIDO representatives at the courses. It would appear to the evaluators that both UNEP and UNIDO considered the courses to be an end by themselves.

UNEP asked the participants to fill in a questionnaire at the end of each course and sent the same questionnaire to the participants one year after completion of the courses. Participants indicated that even after they had sent back the questionnaires, no acknowledgement was sent to them. The questionnaire asked participants which specific UNEP publications they would like to be sent to them. With one exception, the trainees interviewed by the evaluators said that they were not sent the documents that they had requested.

2.1. Achievement of the Project Immediate Objectives (Purpose)

The project immediate objectives as indicated in the project documents are reflected in Chapter III of this report. The project immediate objectives of the last three training courses are almost identical. In the first training course an additional objective was the preparation of a manual "Training of Trainers on Environmental Management". In this regard, the mission received a copy of this manual prepared in 1990 and subsequently revised in 1991. On hindsight, the manual appeared to contain and address issues more at technical level than at management level. The mission was also not able to trace the use of this manual, its distribution to any institutions or Government concerned. It appeared that the time, money and effort spent on the preparation of this manual did not serve any useful purpose.

Taking into consideration the trial and error process - the mission proceeds with the analysis based on the objectives stipulated in the last three training course and in line with the recommended project objectives as indicated on page 19 of this report.

The recommended project objectives are:

- *Participants equipped with information and knowledge on environmental management issues (scientific, technological and economics) and able to apply in demonstrating these techniques required to address and control environmental concerns both at policy level and plant level;*

- *To provide the opportunity to review and discuss these techniques, their application and adaptation in the work environment of the participating countries.*

Based on the findings of the interviews with the former participants and supervisors, it can be safely concluded that the project did effectively contribute to building and promoting an awareness of environmental management issues and concerns. However, apart from the training and knowledge gained, its usage and application has not met with the same success. With this qualification, the mission is of the opinion that the project objectives have been partially achieved. The responsibility of the recipient Government and institution should also be made accountable for the lack of application of the knowledge gained. This lack of application can be attributed to the lack of firm government legislation in the recipient countries on environmental control measures, lack of a mechanism to ensure compliance to such policies and the lack of provision of any kind of incentives to attract industry to invest to address environmental concerns in their respective plants.

In addition, the mission team did not find any evidence either on the part of UNEP or UNIDO of any follow-up measures initiated by them to learn and to verify whether the outputs produced were being used.

The evaluation mission did find the outputs were being used in terms of:

- *some participants were often using the course documentation as reference materials;*

- *some participants were printing the same literature and presenting them in other workshops;*

- *some participants prepared proposals on ways to address environmental problems and submitted them to their respective supervisors in the ministry, however, nothing transpired from them.*

With regard to specific application of the newly acquired knowledge, the following areas of application were mentioned:

In Zinc galvanizing plants:

* *waste management*
* *reduction of surplus content*
* *risking procedures*

In cement plants:

* *preventive maintenance*
* *reducing leakage*
* *electrostatic procedures*
* *red soil management*

In bottling plants:

* *wasting of bottles*
* *handling procedures*
* *prevention of caustic soda*

Preparation of proposal on environmental topics:

* *EIA on mining in the Kathmandu Valley*
* *draft a proposal to start Centre for Science and Technology*
* *draft an "Environmental Policy" for a company*

3. Impact

The use of the outputs and the benefits derived as distinguished from the knowledge acquired has been good. However, little use has been made of the newly acquired knowledge and skills either in the formulation of policies or at plant level operations.

The mission has been able to establish that a certain level of skills and knowledge were acquired by the participants and that these participants have initiated actions to disseminate their newly acquired knowledge through a combination of the following:

- *dissemination of training material;*
- *the generation of special reports;*
- *directly in their day-to-day contact with their fellow workers;*
- *development of environmental policies;*
- *the organisation of seminars.*

These attempts were made by participants from government bodies.

It has been found however, that in general, these initiatives were not taken up by the supervisors of the trainees, few of the trainees received promotions or special recognition of their enhanced skills; however, the mission has not been able to assess to what extent this could be attributed to the training provided.

The picture is somewhat more disappointing in the case of the participants from industry. While uptake of information by some participants was good and initiatives were taken by some participants to introduce the newly acquired knowledge, however:

- *hardly any attempt seems to have been made by the supervisors to use the new knowledge and skills of the trainees;*

- *the supervisions of the individual plants have not adopted any formal environmental management policies, even though in one case a trainee took it upon himself to prepare a written environmental policy for his company.*

The end-programme evaluation and terminal reports reflect that participants stated a programme of action which they would initiate on return. Most of the personal actions, though based on a sound understanding, were essentially ambitious, given the local constraints and conditions.

This lack of use of the knowledge gained at the courses can partly be linked to the absence of firm government policies on industrial environmental management and the lack of finance by companies to make the initial investment. Legislation, regulations and an enforcement strategy are lacking in most of the countries visited by the evaluators. It was interesting to note however, that in Kenya and Tanzania, the Ministry responsible for trade and industry was more proactive in the environmental field than was the Ministry responsible for the environment. It became clear to the evaluators however, that economic incentives/disincentives had not yet entered into the thinking of the ministry officials. In part this could be due to the relative weakness of the economic aspects of the training courses; without exception, trainees said that 'Cost-Benefit Analysis' ought to be added to the course, either as a separate more specialised course, or as part of the main course.

Based on the above observations, it could be argued that government policy, legislation, regulations and enforcement procedures, including the use of economic instruments should be developed as part of any future course.

Many trainees and their supervisors said that more (public) awareness material should be made available by UNEP and UNIDO, particularly with regard to the economic benefits of adopting cleaner technologies.

CHAPTER VI - CONCLUSIONS

The evaluation team found that on the whole the four courses were reasonably successful in so far as the production of the outputs is concerned and were well targeted.

Throughout the Programme the course evolved to meet changing circumstances and the needs of the countries. This process resulted partly from feedback from the participants and from the Working Group meetings: the development of the course can be seen from Table 3. According to most participants interviewed by the evaluation team, the major weakness was in the area of cost-benefit analysis. They well understood that pollution prevention, waste minimisation and resource management and control could lead to more economical operations; however, they felt that the course did not give them the necessary tools to persuade industrialists in their own countries that 'pollution prevention pays' (PPP).

The wide coverage of the course from the fairly general to the specific meant that some areas were not dealt with in sufficient depth, while others were too technical for some of the participants. This in part reflects the comparatively broad objectives of the programme as well as less than appropriate selection of candidates in some instances.

1. Relevance

Despite the fact that no systematic detailed needs analysis was carried out before the Training Programme was conceived, and each training course was prepared, the Programme as a whole was perceived as relevant by all the participants. This argument is further augmented by the fact that to-day "ENV" is of prime concern to all manufacturing and service industries. Given the degree of importance at various levels by international bodies at various conferences and the regulations introduced - the perception of the relevance of the Programme by the participants is understandable and reasonable.

In this regard, the programme sponsor should design the programme in such a manner that actionable targets are set and project outputs and objectives are not ambitious. Therefore project objectives and outputs should be stipulated as reflected in page 19 of this report.

- *Programme contents should not be too broad, covering a whole range of issues;*
- *Participant selection criteria should be clear and specific. Organizers should ensure that there is a mix and the target group is well defined;*
- *Sometimes, the theoretical part of the training programme is not supported by the plant visits made;*
- *Some plant visits were useful in demonstrating skills/expertise required with supporting technology injection to address environmental concerns and/or how to incorporate adequate measures to reduce environmental pollution;*

- *Plant visits through practical demonstrations were valuable in setting reference standards for future application.*

2. ***Efficiency***

- *The division of responsibilities between the implementation team UNEP, UNIDO, TAMPERE and Russia was well established - although there were some problems with the payments of DSA - particularly during the 1991 programme;*

- *Fact sheets transmitted by the sponsors were often late and did not provide enough time for the participants to prepare adequately the country reports;*

- *The selection criteria of participants was not always indicated in the fact sheets;*

- *Though the target group for the training programme was both for government/semi government personnel and industrial plants, among the 98 so far trained only 25 were from industry. Women constituted 18%;*

- *The participant mix was not always what was desired. Government officials comprised of 74% as against 26% from industrial plants. Some participants conveyed that some trainees were above 50 years of age; such participants do not easily adapt to changes in training (considering the fact that 55 is the average age of retirement in most African countries);*

- *The choice of African trainees as the main beneficiaries which constitute 58% of the trainees can perhaps be construed as a positive sign - and emphasis should be given to Africa since this is the least developed region;*

- *The delivery of lectures, technology demonstrations during plant visits were positively received and well conducted. However, some participants felt that at times, some lectures were too theoretical, had little relevance and there were some language problems - mostly when delivered in Russian which constantly needed translation - similarly, participants from Vietnam and Korea found it difficult to understand English;*

- *Handouts/course materials provided were well organized and presented with supporting documents to all participants;*

- *Plant visits were considered to be a very useful form of exposure. Most participants felt that visits to plants should be increased;*

- *Most participants felt that the training duration was short - should be extended by at least one week to enable more plant visits and allow the exchange of views among participants;*

- *The management of the workshop was well organized;*

- *The actual core course content was determined by the Tampere University of Technology, Finland - with some theoretical lectures provided by Russia (CIP). UNEP had the primary role of organizing the course, inviting the participants and one lecture on UNEP's policy and environmental issues. UNIDO was involved in arranging the provision of lecturers from Russia, a lecture on UNIDO's role and policy on environmental issues and in conducting the end-programme evaluation;*

- *Expenditures in all cases were within the stipulated amounts as indicated in each project. No additional budget was required. However, budget revisions were required to reflect actual expenditures. Project travel and DSA were the main cost factors. Estimated total expenditures compare well with actual expenditures. Total actual costs may actually be more since many in kind contributions were made. The mission was not involved in estimating the support costs (including UNEP, UNIDO, Finland and Russia) in coordinating and establishing the training, the flow of documentation and the intensive work required to contact a large number of countries inviting to submit candidates, nomination forms to be screened and the extensive communication required.*

Project co-ordination between UNEP/UNIDO/Tampere University, Finland and Russia was good. Terminal reports - given that they were undertaken, soon after the training programme, hence it was not possible to reflect on application - were in general well prepared. PER/GTPs prepared by the HTO were also well prepared. Based on the documentation and work-group meetings, course programmes were modified to meet new developments on the basis of resource availability.

3. Effectiveness (Production of Outputs and Their Use to Achieve Project Objective)

Considering that outputs as recommended for reformulations are taken, and on the basis of the analysis provided in this report, the following may be concluded:

- *Output 1 and 3 have been satisfactorily achieved. Output 2 has been achieved partially. Country papers were not submitted by all the participants, the time spent to consolidate them did not leave enough time to discuss and exchange information;*

- *While the mission findings do establish clearly that the knowledge gained has been good by the participants, some participants have been able to use this knowledge and that some positive achievements have been made at the individual level. However, the mission has not been able to trace any consequential effects;*

- *None of the implementation team (UNEP, UNIDO, TAMPERE/Russia) had any information on the use of the outputs produced. There was virtually no effective strategy of a follow-up mechanism to determine:*

  * *where are the participants to-day after having received the training;*

  * *are there suitable jobs for a better placement;*

  * *to what use are they putting the newly acquired knowledge and skills;*

* *what additional support measures might be needed;*

* *what support are the participants getting from the government and other institutional bodies to enable them to use the outputs produced under each of the training programmes;*

* *whether a needs assessment of training requirement should be undertaken to determine any specific training required - or whether a separate one is required, one each for ministry officials and the other for plant officials; and,*

4. Impact

The information gained and its usage might have improved the expertise of some participants as well as accounted for some applications. However, these benefits and their impact at this stage cannot be easily determined. This perhaps can be attributed to the absence of firm governmental regulations and policies to address environmental concerns and the lack of finance or incentives at plant level for any desire to invest for changing the present production system.

CHAPTER VII - RECOMMENDATIONS

The recommendations contained in this chapter should be seen as reflecting positive hindsight. At the time of project delivery it is not normally possible to foresee all shortfalls; that is one of the main purposes of in-depth evaluations such as this one.

1. Project Documentation

1.1 Project Document

The project document, with respect to objectives and outputs should be reformulated as proposed in Chapter III of this report.

1.2 Fact Sheets

The Fact Sheets should be more user friendly and convey rather more information about the course. They should indicate as succinctly as possible the following:

- *the benefits to be derived from the course, for the country as a whole, the government, industry and the individual trainee;*
- *the academic achievement level or equivalent expected from the course;*
- *the contribution expected from participants;*
- *a precise outline of any country report to be prepared by the participant; and*
- *what actions would be expected by trainees when they return to their country.*

1.3 Country Papers

The terms of reference, with details of structure and content for country papers should be received by the participants at least four to five weeks before they are due to attend the course. Many participants said that not only did they receive notification that they were expected to prepare a Country Report too late, but also that they were given no guidelines as to the structure of the report. This meant that often, they arrived at the course without a Country Report and had to prepare it there, or they had to restructure the report during the course.

Some participants said that too much time at the course was allocated to preparation, change and presentation of country reports. They said that the reports should just have been distributed to the participants and then either discussed informally by the participants or at one or two group sessions only.

Based on the above observation, it is recommended that UNEP should specifically request their focal points to inform all participants from individual countries as to who else

from their country will be taking part in a course and this would enable them to at least contact each other to discuss a common approach to the development of a single country paper.

2. Target Countries

The selection of countries to be invited to nominate participants should be targeted at those countries within the region which are most likely to embark on a programme of encouraging the adoption of environmentally sound technologies and environmentally sound policies.

In this regard, the organisers of the training programme should have prior knowledge of existing programmes of assistance being provided by other agencies, bi-lateral or multilateral, on the same or similar subjects, thereby enabling linkages to be formed and avoiding duplication of efforts. Such co-operation can only improve the benefits to the countries concerned and the donor organisations.

The evaluation team was apprised of the fact that several participants expressed the view that they might have gained more, had there been a more global spread of countries; in particular, the absence of participants from Latin America and the Caribbean was mentioned.

3. Participant Profile

The Fact Sheet sent to the participants should clearly indicate selection criteria to enable the country focal points to choose the most ideal candidates; ie those who would benefit the most from the training and who would be in a position to pass on their newly acquired skills when they return to their respective countries.

The training programme should target at primarily the top and middle management from government and industry. It is felt however that industry representatives should be key persons involved in the Chambers of Industry or their equivalent. It is also felt that professionally qualified Trade Union Officials could also be invited, as they have a lot of influence on the workforce and could be trained to inform their members about the benefits of good house-keeping and safe practices. Indeed, in many developing countries, Trade Union Officials have more way than do the management, when it comes to occupational health, safety and good house-keeping.

The ratio of participants from governmental bodies and industrial facilities should be approximately 50:50. Of the four training courses conducted to date it was found that participants from government bodies have by far, outweighed those from industry.

The evaluation team noted that the participants from industrial facilities all came from state sector plants/corporations; with one exception - one participant from Kenya was a member of the Kenya Employers Federation.

Special consideration should be given to participation of women. Thus so far, 18 women have attended the training course. It is recommended therefore, that invitation letters sent to the focal points should stress the importance of nominating suitably qualified women.

UNEP and UNIDO should find a suitable mechanism to ensure that participants nominated by governments are fluent in the language in which the course is given (in this case, English).

4. Duration of the Training Course

Given the scope and nature of the training courses, the duration of each of the course was adequate. However, additional subjects could be developed as specialist add-on short-term courses of about two weeks' duration.

5. Project Course Implementation

- *More time should be allocated to site visits and practical training/demonstrations;*
- *More time should be allocated for group work, through which trainees can exchange views and experiences in their respective countries;*
- *It would appear from the interviews that, participants would prefer the use of resource persons with `hands on' experience rather than those with essentially, academic knowledge;*

6. Co-ordination of the Programme

The main organiser of the training programme was UNEP, who also was the main financial contributor. During their discussions at UNEP, the mission members were unable to ascertain from the Environmental Education and Training Unit (EETU) whether or not the course had been cost effective and worth continuing with the programme under existing arrangements, or whether or not it would be more cost-effective to continue the programme using the UNEP Industry and Environment Programme Activity Centre (IE-PAC), based in Paris. It should be noted that under UNEP's mandate, the IE-PAC has the authority to handle all UNEP matters relating to industrial environmental management.

The evaluators were able to analyze the mechanism used for organizing the courses, developing the curriculum and their dissemination to participant countries which to them appeared to be administratively time consuming and not very cost effective.

- *The project was developed jointly by UNEP/IE-PAC, UNEP/EETU and UNIDO;*
- *UNEP/EETU was the implementing agency;*
- *UNEP/COM and Tampere University personnel prepared the training material;*

- *The drafts of the training material were sent to UNEP/EETU who forwarded it to UNEP/IE-PAC;*

- *UNEP/IE-PAC 'approved' the material and sent a representative to the training courses;*

- *All administrative work - preparation of Fact Sheets, letters of invitation, screening of proposals of participants, etc. - were handled directly by UNEP/EETU with the co-operation of UNEP/COM and Tampere University.*

The evaluators feel that the above procedure was unnecessarily complicated and bureaucratic and that UNEP/IE-PAC could have been the main avenue for UNEP's participation.

The third largest contributor, financially, to the programme was FINNIDA. The evaluators understood, no official reporting was required by UNEP to report on the training results to FINNIDA.

In the future a formal and unified procedure of reporting should be established between the donor and the implementation body to report on resutls achieved and to account for the resources expended.

UNIDO's responsibility regarding the arrangements for course delivery by the (now) Russian Federation bodies appears to have been well organised. However, several participants indicated that the presentations were somewhat too theoretical, were not matched by practical demonstrations - held in Finland, and that one of the lecturer's command of English was not good; the written material however was in good English.

As with our comment about the distinctive abilities of UNEP/EETU and the IE-PAC Office, within UNIDO, it will be conducive if the substantive branch within UNIDO (Environment) becomes more directly involved, with the HRD branch.

It appeared to the evaluation mission team that neither UNIDO's HRD branch nor UNEP's EETU had the necessary technical expertise and they were entirely dependent on Tampere University of Technology, Finland to articulate the training course programme. Given the degree of technicality of the programme, the evaluators feel that both UNEP's and UNIDO's substantive officers should have been involved more closely and would have been effective partners to discuss relevant technical issues with, for example, TUT officers. This is not to say that TUT alone could not perform adequately - on the contrary TUT did a good job and all trainees met, made it abundantly clear that the preparation and performance of TUT was of the highest order.

7. Training Course Content and Methodology

7.1 Existing Programme

It is possible for the content of some of the training course material to be reduced, at least the lectures. Many participants felt that the course contained too many generalities;

so by reducing the time taken to talk about general issues, more time could be spent on specific themes. This might also enable more time to be spent on site visits.

The fourth training course consisted of the following topics:

- *Industrialisation in the social and economic context*
- *Environmental Management systems and tools*
- *Environmental effects and risks*
- *Environmental monitoring*
- *Industrial sources of environmental effects*
- *Environmental assessment tools*
- *Environmental Review and auditing*
- *Cleaner production*
- *Field trips to selected industries around Addis Ababa*
- *Country reports of participants*
- *Presentation of Agency programmes and services*

The inclusion of topics such as Industrialisation in the social and economic context and environmental management systems and tools, together with more highly technical subjects such as Industrial Sources of Environmental Effects and Environmental Review and auditing, in such a short course that also includes plant site visits and three days allocated to country papers does seem to the evaluation team to be a strange mixture. For this reason, an alternative strategy and course structure is being proposed to make it more specific and demand oriented.

7.2 *An Alternative Approach*

If it is agreed that the programme should continue then the following is recommended:

The course could be presented in three modules

- *Module 1 - Pollution Prevention and Abatement*
- *Module 2 - Environmental Effects and Modelling*
- *Module 3 - Environmental Management Systems*

The recommended contents of the modules are as follows.

Module 1 - Pollution Prevention and Abatement

* *source management and control*
* *environmental and energy auditing*
* *concepts of cleaner production and waste minimisation*
* *emissions and effluent monitoring and control*
* *waste management, including hazardous waste*
* *cost-benefit analysis*
* *economic instruments as a means to promote sound environmental management*

This module would cover a period of two to three weeks and include visits to at least two SMEs. Each SME would be visited twice to enable trainees to undertake group exercise work after the first visit and to present their findings to the plant management during the second visit. This module will be targeted at government policy makers, environmental enforcement officers and middle management in industry.

Trainees should have a good grounding in one of the engineering professions, or applied chemistry.

Module 2 - Environmental Effects and Modelling

* *principles of environmental impact assessment*
* *use of geographical information systems (GIS)*
* *computerised emissions modelling*
* *accessing and using information technology (IT) and other international information systems*

This module should be of at least two weeks duration and include hands on practical exercises. The target group would be the same as for module 1.

Module 3 - Environmental Management Systems

The course content for environmental management systems should be designed around the principles of ISO 14000.

* *how to develop a company environmental mandate and policy*
* *how to develop environmental objectives and targets*
* *how to implement the policy and to monitor compliance with company objectives and targets*
* *organisation of the line management for industrial environmental management*
* *product life-cycle analysis*

This module will include the basics of an environmental regulatory programme, data collection, analysis and management and compliance reporting.

It will be targeted primarily at industrial plant managers, who should have a grounding in chemical, mechanical or environmental engineering, or applied chemistry and at least five years managerial experience. It will be of two years' duration and will include site visits and hands on experience in the use of computerised data bases.

Trainees may attend any one or all of the modules, but Module 3 is not particularly relevant for government officials.

8. Follow-up

It would appear that no proper strategy was devised by UNEP or UNIDO to follow-up on what has been happening since the first course held in 1989.

Four courses have been held: i) 1989 - Leningrad (St Petersburg), Russia/Tampere, ii) 1991 - Finland; iii) 1993 - Arusha, Tanzania; and iv) 1995 - Addis Ababa, Ethiopia. Yet, the evaluators have been unable to find any evidence of a systematic follow-up procedure which would provide regular information to the organizers on:

- *actual application of the knowledge acquired during the training course; directly, through the organisation of seminars or workshops; or, indirectly through 'influence' at the political or industrial facility level;*

- *behavioural changes in the trainees; ie they might have become more aggressive in promoting sound industrial environmental management;*

- *changes in the working environmental ethic of the plant staff in the case of industrial facilities; changes in policy at governmental level or private sector level; changes in mechanisms to ensure compliance with pollution control standards and other environmental management regulations; and actual changes at the industrial facilities directly resulting from knowledge gained from the course.*

The mission noted the evaluations conducted by UNEP through questionnaires. However, in the three courses that have been followed up, participant response was marginal. Subsequently, the evaluation team found that the analysis was cursory at best.

Working group meetings were held between the partners supplying the course, but these were mainly concerned with the curricula for subsequent courses; they did not reflect any comments on the results of previous training courses.

The mission feels strongly that a mechanism for follow-up should be developed along the following lines:

- *The training material provided by the trainers, together with any audio-visual used should be received by the monitoring group (in this case UNEP and UNIDO). A review should be undertaken by the sponsoring organisations and the course developers (TUT). Changes to the course should only be agreed upon based on direct feed-back from trainees and the subsequent review;*

- *UNEP and UNIDO should take the opportunity when visiting different countries on official business, to contact trainees and/or their supervisors to ascertain how they have been using the knowledge gained during the course. Such action would not only provide useful feed-back to UNEP and UNIDO, but would also act as a positive stimulus to the trainees.*

Essentially this would mean developing a strategy at the project design stage with adequate funds to conduct a refresher course by recalling former participants to address issues raised above to enable to draw appropriate measures to make future programmes more

effective and efficient. To this effect, it would be useful if both UNIDO and UNEP training branch can inform fellow colleagues from their respective substantive technical branch to contact former participants during any field trips undertaken to a trainee country. Therefore, there should be a strong linkage between the training branch and the substantive technical branch of UNIDO (Environment and Energy Branch) and equally with UNEP such that they may complement each other by way of adding value to each others work. UNIDO/UNEP field offices could also be utilized to facilitate this work.

9. Recommendations for UNEP and UNIDO

Future joint UNEP/UNIDO training programmes should consider the following:

- *to focus more on training the trainers;*
- *holding programmes in institutions in developing countries, using their facilities and staff as much as possible;*
- *to seek greater involvement of their respective substantive technical branches to enable more technical course content based on the demand of target beneficiaries;*
- *to include Industry Associations in future training programmes.*

UNIDO's HRD branch should bring to the attention of UNEP the training course "Ecologically Sustainable Industrial Development" developed by the Environment Branch of UNIDO - this will facilitate the involvement of the substantive technical branch in the design and conduct of similar training courses in the future.

10. National Cleaner Production Centres (NCPC)

Since both UNIDO and UNEP have joint programmes in the establishment of National Cleaner Production Centres (NCPC), based on a mutually agreed framework, and given the aims of these NCPCs, which are expected to render services to industry on various issues covering environmental management, the organisers of the training programme should, through their respective substantive technical branches, forge a linkage ensuring that these NCPCs are contacted to nominate candidates to attend the training programmes. Currently, nine NCPCs have been established of which three are in Africa: Zimbabwe, Tanzania and Tunisia. None of the persons trained under the programme came from these countries.

Due consideration of the above issues by UNIDO and UNEP would be a catalytic factor, contributing to a greater multiplier effect, with greater impact and thus contributing to the sustainability of the training programmes. This will enable a more effective and efficient dissemination of information to a wider segment of the industry level operators (critical mass) and will also promote the application of the training.

This procedure is strongly recommended, as its effectiveness is most likely to be of far greater significance as opposed to training individuals on a one off basis. The message is that the training provided should be through institutions that have linkages with industry.

11. Strengthening The National Information Systems

During the Evaluation Mission, the opportunity was taken to determine whether or not there was interest in a CD-I based information system. Great interest was shown in this and interviewees (trainees and supervisors from government and industry) expressed the view that such a system would be best located within the Chambers of Commerce or Industry. Another possibility would be to locate such a system in the National Cleaner Production Centres wherever they have been, or will be established. The mission team was not able to determine what back-up assistance was available and/or might be required to sustain the system.

CHAPTER VIII - LESSONS LEARNED

Given the nature, the magnitude and the scope of the training programme, covering such a wide range of subjects on industrial environmental management, it would appear that the training programme's basic purpose was to generate awareness among policy makers and industry managers and to make them conversant with the latest information and techniques to address environmental issues, rather than to provide them with specific information on industrial pollution control. This in itself is good basic training of the type that UNEP and UNIDO should provide; specialist courses should be provided by universities or through attachments to industries for longer periods of time and can be funded by UNIDO, UNDP, UNEP or a bi-lateral donor. For example, one of the officials from the Ministry of Industry in Nepal is to undertake a one year diploma course in the UK, sponsored by the British Council.

Given the above, the following issues emerge:

- *This type of training programme can be relevant without a detailed needs assessment/analysis conducted in the field. However, such training programmes should ensure that a homogeneous participant target group is selected and, if only one language (in this case, English) is to be used, some measures to check fluency should be adopted.*

- *This type of training programme enables an opportunity to select participants from relevant government ministries (policy makers) as well as from industrial plant management. Whether or not the industry representatives are from the private sector or from state owned enterprises is irrelevant. From the private sector however, it might be more appropriate to choose representatives from industry or trade associations. Such a mix of participants allows for a good interchange of views and ideas and should lead to a better understanding of the problems faced by each group and the best policies to be adopted. This ought to help to alleviate the problems of confrontation and facilitate the consultative approach.*

- *Environmental management training programmes of this nature, supported by plant visits and demonstrations, together with adequate documentation are effective means of transferring knowledge and information; and could encourage TCDC, if effective follow-ups were to be pursued by the sponsoring organisations and the participants.*

IN-DEPTH EVALUATION

DRAFT

TERMS OF REFERENCE

"Training Seminar on Environmental Management for Industrial Managers and Engineers."

I. INTRODUCTION

The training course on "environmental management for industrial managers and engineers" is in line with the recommendations of the UNEP-sponsored World Industry Conference on Environmental management (WICEM) held in Versailles, France, in November 1984. The mandate of UNIDO provides for the mobilization of human and material resources to cope with problems which threaten the environment. The main initiator and contributor of the project was UNEP and supporting implementation organizations comprised of UNIDO in association with the (former) USSR State Committee for Environment Protection through the Centre for International Projects (CIP) and the Tampere University of Technology (TUT), Finland. The emphasis of the project is in the use of clean technologies (i.e. low and non-waste) and aims at strengthening and building of national capability in the field of protection of the environment through training of industrial managers and engineers, training of trainers and environmental managers. Upon successful completion of the training it is expected that the training imparted will enable the participants to apply the knowledge and experience gained in the use of clean technologies and in formulating and implementing national environmental management strategies at the plant level.

II. BACKGROUND

The joint UNEP/UNIDO/Finland/USSR training course on environmental management for industrial managers and engineers have so far been held three times, with a duration of one to one and half months.

DATES	*HTO*	*NUMBER OF PARTICIPANTS*	*FROM*
11 Oct. - 15 Nov. 1989	*St.Petersburg University of Plant Polymers Russia and Tampere University*	*26*	*Afghanistan, Indonesia, Malaysia, Nepal, Papua New Guinea, Philippines, P.R.China, DPRKorea, Sri Lanka, Thailand, Vietnam (9 countries)*
15 July - 24 Aug. 1991		*27*	*Botswana, China, Czechoslovakia, Ghana, Hungary, Kenya, Mauritius, Nigeria, Poland, Romania, Tanzania, Uganda, Zaire (13 countries)*
15 Sept. - 15 Oct. 1993	*ESAMI Arusha Tanzania*	*25*	*Ethiopia, Kenya, Lesotho, Malawi, Mauritius, Tanzania, Uganda, Zambia (8 countries)*
13 November - 8 December 1995	*EMI Debre Zeits Ethiopia*	*20*	*Egypt, Ethiopia, Gambia, Ghana, Kenya, Malawi, Mauritius, Nigeria, South Africa, Swaziland, Uganda, Zimbabwe (12 countries)*

The first training programme was targeted at Asian countries, the second was targeted at English speaking African countries, Eastern Europe and China, the third was aimed at African countries and was held at Arusha (Tanzania) in Eastern and Southern Africa Management Institute (ESAMI).

The responsibilities and functions of the implementation bodies (UNEP/UNIDO/TUPP and TUT) are indicated in each of the three respective project document. Each training programme was concluded by an end programme evaluation exercise which was undertaken just after the training by UNIDO. Additionally, UNEP evaluated each seminar one year after the completion of the programme by means of questionnaires to former participants. Furthermore, working group meetings were also held at the end of each training course among the various parties involved in implementation to determine future training programme based on previous experiences.

Project Objective

To provide industrial managers and engineers with relevant knowledge (scientific, technological and economical) in the use of clean technologies (i.e. low and non-waste) in various industrial sectors.

Project output

Number of specialists from developing countries who after undergoing the training course and on return to their respective countries will be capable of managing industrial enterprises in an environmentally sound manner.

The project documents outlined the selection criteria of the participants to the training programme and also provided the training curriculum. Each participant was also expected to present a country paper addressing a particular problem related to environmental concern of their respective country/place of work.

Each of the training programme was financially contributed by UNEP and UNIDO, with a major share being provided by UNEP. CIP and the Tampere University contribution was in kind. Each project was of a two-year cycle despite that the actual training duration was much shorter - this was line in accordance to UNEP policies and procedures. In view of above - the three training courses have been carried over a period of 6 years, and the fourth training course is scheduled for September/October 1995.

III. PURPOSE, SCOPE AND METHOD OF THE EVALUATION

Purpose

It has been jointly decided that sufficient time has elapsed to conduct an in-depth evaluation of the programme to ascertain the relevance of the approach, programme and impact. Also to be ascertained whether the training programme addressed the problems of technologies. Were the course content, methodology and criteria for selecting the participants effective in delivering the expected outputs.

The purpose of the evaluation is to assess the overall achievements of the project, assess and identify factors which have facilitated quality of project achievements, ascertain the relevance and effectiveness of the programme, assess the impact and effect generated by the project, what follow-up actions were generated from one training course to another and what lessons can be drawn at operational, organizational and policy levels. The results of the findings of the evaluation would be useful to UNEP, UNIDO and host training organizations in determining future course of action pertaining to the training programme.

Scope

The evaluation will cover the three training courses conducted and give special emphasis to the end programme evaluation to the fourth training programme in Ethiopia. (Project objective and output follow the same for the three courses and project thrust/emphasis centres on the same subject.)

The evaluation will focus on:

a. Assess the achievement of the training courses against project objective and expected results (outputs).

b. Identify and assess factors which facilitated or impeded project progress.

c. Examine the extent to which the results of the project in terms of the training imparted have contributed towards strengthening/ building national capabilities with respect to improved knowledge and skills, their application with respect to introduction of clean technologies, and in the formulation/implementation of national environmental strategies at the plant level.

As part of the above mentioned tasks, the evaluation will include a review of the following:

* Relevance

- Origin of the project.
- Needs analysis and its role in project planning.
- Adequacy of project planning.
- Clarity and adequacy of the outputs in relation to project purpose.
- Clarity and adequacy of the intended participants profile.
- Perception of the programme by the participants and their managers.
- The relationship between the project document, aide-mémoire and operational description of training programme curriculum.

* Efficiency of Project Implementation

- Procedures for country/region selection.
- Procedures for recruitment and selection of participants.
- Project management responsibilities (UNEP, UNIDO, CIP, Tampere University, TUPP).
- Monitoring and end programme evaluations as feedback to training design and implementation.
- Cost structure.

- Comparison with alternative approaches (location, number of countries, duration, implementation team).
- Problems concerning administrative and logistic support.

* Effectiveness

- Quality of the training programme/curriculum.
- Actual profile of the participants.
- Quality of training materials/manuals/handouts given during the training and its usefulness.
- Extent of acquisition of knowledge and skills as specified in the project document.
- Extent of training - skills taught on the programmes.

* Impact

- To what extent are the increased knowledge and skills being applied and what impact is this creating?
- Dissemination and diffusion of the knowledge acquired to others.
- Resultant changes from the use of clean technologies at plant level.
- Can participant countries carry out similar training programmes?

* Programme Level Analysis

- Was there any connection or complementarity between the individual training courses?
- Was there any specific focus on region/country?
- Was there any feedback from the participants on the training manuals developed?
- Advantages and disadvantages of the cooperation between UNEP/UNIDO/CIP/Tampere University.

* Lessons Learned

- What are the main positive and negative lessons that can be learned from the experience of these training courses?

Method

The final evaluation report will be based on the result of a desk study which will include analysis of project documents, training materials/manuals and other relevant documentation), interviews in relevant section of UNIDO (HRD and ENV Branch) and interviews with UNEP and HTO and interviews with former participants of the programme and their supervisors (based on

structured questionnaires). The countries selected for field visits are identified following the criteria of representation of the three regions, number of participants and costs. Questionnaires will also be mailed to those countries where visits will not be made.

Special attention will be given to the end programme evaluation of 1995 seminar scheduled to be held in Ethiopia in September/October 1995. This will provide the opportunity of having direct dialogue with participants, HTO, teaching staff, etc. and also analyzing practical part of the training through joining the group during study visits or laboratory exercises. Special evaluation questionnaires will be worked out to conduct the end programme evaluation. This end programme evaluation will constitute an integral part of the proposed in-depth evaluation of the training programme.

Composition of Evaluation Team

The evaluation will be carried out by one independent consultant and one UNIDO staff member. The evaluation team will have a combination of experience pertaining to industrial environmental concerns, knowledge of evaluation methodology and knowledge of training programmes.

Report

The evaluation report (in English) will adopt the following structure:

- Summary of conclusions and recommendations
- Background to the Evaluation
- Design
- Implementation
- Results
- Conclusions
- Recommendations
- Lessons learned

ANNEXES

I Terms of Reference
II Evaluation Team
III Work Programme and Itinerary
IV Persons consulted

The evaluation report will be submitted to the Director-General of UNIDO and UNEP. The evaluation team will make an oral presentation of the findings and recommendations at UNIDO Headquarters.

V WORK PROGRAMME

The evaluation exercise will be conducted in three phases.

Phase (Date)	*Description*
1st phase, March 1996 *UNIDO/UNEP Headquarters*	*1) Desk review of programme documentation, technical reports, training manual, interviews with relevant substantive officers backstopping the programme.* *2) Special attention to be given to the end-programme evaluation for the scheduled programme in Ethiopia in September/October 1995.*
2nd Phase, March-April 1996 *Field missions*	*Field trips as identified. Meet/discuss/interviews with former participants and their supervisors.*
3rd Phase, April 1996 *UNIDO Headquarters*	*Follow-up of interviews, synthesis of findings, preparation of the evaluation report and presentation of conclusions and recommendations to relevant parties.*

Field trips will comprise of:

Region/Country	*Year*	*No.of Participants*
Africa, Tanzania *Kenya* *(During end-programme evaluation of 1995 course)*	*1991* *1993*	*2* *4* *Discussion with UNEP officials*
Eastern Europe, Czech, Slovakia	*1991*	*4*
Asia, Nepal (LDC)	*1991*	*4*

Note: The 1995 fourth training programme will also be within the scope of the in-depth evaluation - the investigations of this course will be within the project budget of the training course as explained in 2nd para on page 6.

UNIDO

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Annex 2

EVALUATION - GROUP TRAINING PROGRAMMES

Name of participant: Home country:

Programme: Host country:

Year:

I. PRE-COURSE INFORMATION:

1. How was the introductory information you received in your home country about: (please mark an x in the suitable column)

	Sufficient	Not sufficent	Missing
Aim of the training	/ /	/ /	/ /
Content of the programme	/ /	/ /	/ /
Level of the programme	/ /	/ /	/ /

What, if any, other information do you feel should have been included:

2. How many weeks before the beginning of the training programme did you receive the following information:

Information about the programme	/ /	weeks
Being accepted to the programme	/ /	weeks

Comments:

II. PROGRAMME CONTENT AND ORGANIZATION:

3. What is your opinion of the total duration of the course:

Too long / /

Just right / /

Too short / /

If not "just right", what, in your opinion would be the most suitable duration for the course?

/ / weeks

Please comment:

4. State your opinion about the daily schedule:

Too heavy / /

Just right / /

Too light / /

Comments:

5. Would you suggest any changes in the general nature of the training programme?

6. Do you feel that the training corresponded to your professional needs?

To a very large extent	/ /
To a large extent	/ /
To a sufficient extent	/ /
To a small extent	/ /
To a very small extent	/ /

Please comment:

7. Please give your opinion about the study visits (if any):

Please suggest other study visits that might have been valuable:

8. What do you think of the general level of the training?

Much too high	/ /
Too high	/ /
Adequate	/ /
Too low	/ /
Much too low	/ /

Comments:

9. Which subjects of the programme did you find most valuable? (Please state reason; for example new subject, my speciality, relevant to my work, new information, etc.).

Subject	Reason

10. Which subjects of the programme did you find least valuable? State why (for example too elementary, inadequate instruction, irrelevant to my work, etc.).

Subject	Reason

11. Were there in your opinion any relevant subjects that were not adequately covered in the programme?

Yes / /

No / /

If yes, what did you miss?

12. Which changes would you have preferred in the methods of instructions?

	no changes	more	less
a) lectures	/ /	/ /	/ /
b) group work	/ /	/ /	/ /
c) demonstrations	/ /	/ /	/ /

Comments:

13. How did you find the general standard of the instructors with respect to:

	i) command of English	ii) method of instruction
Very good	/ /	/ /
Rather good	/ /	/ /
Fair	/ /	/ /
Poor	/ /	/ /
Very poor	/ /	/ /

Please comment:

14. Did you have sufficient time for professional exchange of views with:

	i) the programme staff	ii) fellow-participants
Yes	/ /	/ /
No	/ /	/ /

15. How much did you benefit from these exchanges of views with:

	i) the programme staff	ii) fellow-participants
A great deal	/ /	/ /
Much	/ /	/ /
Somewhat	/ /	/ /
Little	/ /	/ /
Not at all	/ /	/ /

Please comment:

III. RELEVANCE AND APPLICABILITY:

16. Did you find the contents of the programme relevant to conditions in your company (institute)?

To a very great extent	/ /
To a great extent	/ /
To a sufficient extent	/ /
To a small extent	/ /

Please state why:

17. Do you feel that by participating in this training programme you have benefitted professionally?

To a very great extent	/ /
To a great extent	/ /
To a sufficient extent	/ /
To a small extent	/ /
To a very small extent	/ /

Please state why:

18. On the basis of subjects covered by the programme you participated in and their intended purpose as indicated, please state to what extent they have been achieved and will be useful in your work.

	Achievement			Usefulness		
	Fully	Partially	Negligible	To a great extent	Sufficient extent	Very little
Understanding of environmental issues and processes						
1. The participants will be more knowledgeable on environmental agenda, on how it is managed and on instruments required to address environmental concerns.	☐	☐	☐	☐	☐	☐
Environmental monitoring						
2. The participants will be aware of environmental effects and links and be able to establish its identity, existence and classification.	☐	☐	☐	☐	☐	☐
Information-Communication-Collaboration						
3. The participants will be aware of various sources of information in know to communicate with authorities and public to find partners to cooperate on environmental actions.	☐	☐	☐	☐	☐	☐
Environmental economics						
4. The participants will be conversant on economic instruments which can be used to manage environmental issues.	☐	☐	☐	☐	☐	☐

	Achievement			Usefulness		
	Fully	Partially	Negligible	To a great extent	Sufficient extent	Very little
Environmental management						
5. The participants will have a working knowledge on environmental management techniques and on procedures on how to survey operational and managerial sources of environmental effects and risks in industry.	☐	☐	☐	☐	☐	☐
Industrial sources of environmental efforts and risks						
6. The participant will have a better understanding of environmental effects and risks. Participants will be more knowledgeable on how to identify, survey and monitor risks, emissions and wastes. The participants will be able to display skills in responding and interpreting environmental information. The participants will be conversant on environmental regulations and standards.	☐	☐	☐	☐	☐	☐
Chemical safety						
7. Participants will be aware of chemical safety and management practices to minimize pollution problems.	☐	☐	☐	☐	☐	☐

	Achievement			Usefulness		
	Fully	Partially	Negligible	To a great extent	Sufficient extent	Very little
Environmental assessment tools						
8. Participants will be conversant with the applications of assessment tools, their purpose and conditions of use.	☐	☐	☐	☐	☐	☐
Cleaner production						
9. The participants will be more knowledgeable and aware of on how permanent environmental damages and on management practices for prevention of pollution.	☐	☐	☐	☐	☐	☐
Government strategies and policies						
10. Participants will be aware of on-going efforts by some governments in formulating and implementing environmental strategies and policies	☐	☐	☐	☐	☐	☐
Project design						
11. Participants will have a better understanding of how to incorporate the environmental considerations with project planning	☐	☐	☐	☐	☐	☐

19. I) How would you assess the overall performance of the training programme?

_____ more than planned _____ satisfactory

_____ as planned _____ less than planned

20. What were the environmental problems you were facing before the training? Have you been able to find any solutions to any of the problems? What was your best achievement? Please comment

21. In terms of what you intend to do after the end of the training how would you evaluate your accomplishment. Please comment.

22. Do you think you will have an opportunity to apply your newly acquired knowledge and experience in your present job?

To a very great extent _____

To a great extent _____

To a sufficient extent _____

To a small extent _____

To a very small extent _____

What difficulties, if any, would you expect to meet?

23. Will you be in a position to transfer your acquired knowledge to others in your home country?

To a very great extent _____

To a great extent _____

To a sufficient extent _____

To a small extent _____

To a very small extent _____

24. How will this transfer be done?

a) In a day-to-day work to colleagues and subordinates _____

b) In specific training activities inside present employment _____

c) In specific training activities outside present employment _____

What difficulties, if any, would you expect to meet?

25. Would you recommend continuation of this training programme?

_____ Yes _____ No

If yes, please state why and its location

26. Do you recommend a more specialized programme?

Please specify: a) specialization _____

b) suggested duration _____

27. Would you suggest introducing new subjects into the programme?

_____ Yes _____ No

Please specify:

28. Do you have any suggestions to make the programme more effective?

IV. SOCIAL ASPECTS OF THE PROGRAMME

29. Please state your opinion about the leisure time activities organized by the programme staff:

30. What additional activities would have appreciated?

31. Please give any comments you choose on aspects not adequately covered by this questionnaire:

Annex 3 (a)

Country Report

COUNTRY:	KENYA
MISSION DATES:	22 TO 24 MAY 1996
PURPOSE OF MISSION:	IN-DEPTH EVALUATION OF TRAINING SEMINAR ON ENVIRONMENTAL MANAGEMENT FOR INDUSTRIAL MANAGERS AND ENGINEERS

PERSONS INTERVIEWED:

UNEP:	Mr B Sibanda, Chief, Project Design & Evaluation Unit, UNEP Mr M Atchiya, Head, EETU Mr Ulf Carlsson, Programme Officer, EETU
UNIDO:	Mr. George Tabah UNIDO Country Director

TRAINEES:

Mr Hezekiah B Okey	Ministry of Commerce and Industry
Mr Erastus Kimuri	Ministry of Commerce and Industry
Mr Boniface Mwange	National Environment Secretariat
Mr Aly Murji	Federation of Kenya Employers
Mr Johnson Karani	Electrical Engineer, EAP Cement Company

SUPERVISORS OF TRAINEES:

Mr John Masilu	Director of Industries, Ministry of Commerce and Industries
Mr Ndegwa K Kagio	Work Manager, EAP Cement Company

1 *TRAINEES' AND SUPERVISORS' PERCEPTIONS*

1.1 *THE TRAINING COURSE*

All of the participants said that the course content, the material and the delivery of the lectures were good. In one or two instances, the trainees said that there had been a problem with the language. It should be recorded that the lecturers were not native English speakers; nor were the trainees.

1.2 *Relevance of the Programme*

It was pleasing to the evaluators to find that the government sector employees retained the course material and they were readily available. The government officials claimed that they referred to the material often and they felt that it was still very useful to them in their daily jobs.

One trainee, from industry, felt that the course was not particularly relevant to his work; it was too general and did not provide him with the knowledge to solve his company's environmental problems.

1.3 *Participant Selection Criteria*

The participants did not appear to be aware of any particular selection criteria, but thought that with a few exceptions, the participants were well chosen. The major criticism was that some participants from Asian countries had insufficient command of the English language.

The evaluators found, on the whole, that the participants from Kenya were well qualified and were of the right calibre. Kenyan participants did however, mention that some of the participants from other countries were not appropriate:

- In two cases participants (from Egypt) were `over-qualified' and as a result somewhat disruptive.
- Participants did not have a sufficient technical educational background (Town and country planners).
- Participants were too old and close to retirement.

UNEP officials informed the evaluators that the selection of participants was done jointly by UNEP and Tampere University and that every care was taken to ensure that `properly' qualified participants were sent to the courses. The mission understands that selection, based on official government nominations is difficult. However, UNEP officials assured that any government that did not nominate an appropriate candidate, was denied access to the course.

In the case of Kenya, it is believed that the system worked well with one exception. The participant from a factory was inappropriate - he said that he was not the right person for the course and that the private sector should only be involved if the course is specific. In this particular case, the trainee's supervisor stated that the participant was not their first choice; the first choice, a chemical engineer could not attend the course. UNEP quite correctly had sent the invitation to an NGO - the Kenyan Federation of Employers; they forwarded the invitation to the EAP Company. The trainee had not taken any initiative within his own company.

1.4 *Training Methodology*

The Kenyan trainees thought that on the whole, the training methodology was satisfactory, however, some thought that it could have fewer lectures and more group work.

1.5 *Training Materials and Handouts*

All trainees thought that the training material was of a very high quality; and they still use it.

1.6 *Country Report Preparation and Presentation*

As is standard practice for UNEP and UNIDO, all participants were asked to prepare country reports. Participants who went to the first two courses (Leningrad/ St Petersburg - Tampere) intimated that they were given no guidance from UNEP concerning expected content or structure for the country report. Equally, individual trainees were not informed about other participants from their own country resulting in the fact that each individual prepared his or her own country reports which was subsequently changed once the other participants got together. This seemed to be an additional burden to the participants.

One participant complained that since the course (Ethiopia, November 1995), he had not received the compiled set of country reports which had been promised.

1.7 *Information Exchange*

All participants seemed to be satisfied with the interactions and exchange of information that occurred outside normal course time. None of the trainees had however, maintained contact with other trainees since the conclusion of the course.

1.8 *Presentation of Lectures*

The participants thought that on the whole the lectures were well presented; there was occasionally a problem with language, but this was not considered to be too serious.

1.9 *Case Studies*

The case studies were considered to be satisfactory, but they could at times have been better integrated with the site visits.

1.10 *Plant Site Visits*

The trainees thought that during the course they had learned how to undertake a preliminary environmental audit. In the case of the first two training courses, it was felt that the theoretical aspects of the course were not particularly well integrated with the site visits.

2 *RESULTS ACHIEVED*

2.1 *Skills Acquired*

The mission believes that all of the participants gained personally from the training course. All participants claimed to have retained the knowledge gained, but no concrete evidence could be found to support this. The skills had not been transferred to others and it did not appear to have been used to influence industry or government policy. One participant from industry felt that he was the wrong person from his company to have been trained, yet he had kept all of the training material at his home!

2.2 *Accomplishments*

There is no doubt that the course increased the personal skills and awareness about industrial environmental management, but in the absence of evidence that the skills have been used in their jobs, or that there has been any skills transfer (no multiplier effect), it cannot be confirmed that the training course fully achieved the expected results.

2.3 *Degree of Application of Acquired Knowledge and Skills in the Trainees' Own Work Environment*

This appears to have been minimal in Kenya. Indeed one Ministry official said that in the absence of a national environmental policy (now under preparation), there was little that they could do to implement many of the ideas conveyed in the course. The same official said that awareness raising was necessary even before they can think of insisting on environmental assessments.

This would imply that not even the concept of cleaner production and waste minimisation has got through to the ministry.

2.4 *Difficulties Faced in Transferring Acquired Knowledge*

Essentially, the lack of government and industry policy and commitment are the main difficulties; this also effects the willingness to provide finance for the organisation and implementation of workshops.

2.5 *Overall Achievements*

The following is an average provided by the trainees themselves.

[*On a scale of one to ten - ascending order*]

- skills acquired 7 - 8
- skills applied 5 - 6
- skills transferred 5 - 6

The mission could not establish the basis on which the participants provided such a positive rating nor could it verify this assessment. However, it was clear to the mission that this reflected the interest and uptake of the knowledge and information at the personal level.

2.6 *Impact of Training Results*

Nationally the training has had very little impact.

Individual trainees have had their awareness raised and are quite prepared to use that knowledge given the right circumstances.

3 *OUTLOOK FOR THE FUTURE*

3.1 *Follow-up*

It is not clear what UNEP and UNIDO expected as a follow-up to the course, or what was to `happen'. The participants all had the impression that UNEP and UNIDO would keep in touch with them. This belief was partly fed by the UNEP and UNIDO representatives who encouraged participants to contact their (UNEP and UNIDO) organisations to obtain literature and other information. More than one trainee said that even though they filled in a questionnaire that asked them what *specific* publications they would like to receive, they have never received anything. Another criticism was that when UNEP sent its follow-up questionnaire one year after the course, no acknowledgement was ever sent by that organisation.

There was no follow-up mechanism which would allow the organizers of the training programme to know the results of the training delivered. On the other hand, it also appeared (based on the interviews) that neither UNEP nor UNIDO representatives at the courses endeavoured or suggested to the participants that they should build their own network of contacts. There has been a distinctive lack of initiative on the part of the participants in this regard as not one trainee indicated that they had been in contact with participants from other countries. This observation should be juxtaposed with the opinion of all participants that one of the most valuable aspects of the course was that they learned from each other about industrial environmental problems of other countries.

3.2 *Continuity of the Training Course*

All trainees felt that the course material was relevant at the time and is still relevant; should UNIDO and UNEP consider mounting more courses of a similar nature, nothing in the present course should be dropped. However, there are some additional topics that should be added; either to the existing course or, preferably as follow-up courses (see 3.3 below).

3.3 *Subjects to Emphasise and De-emphasise*

The following additional topics were recommended for inclusion in future courses or, preferably in follow-up courses:

- Cost-Benefit Analysis: it was felt, particularly by the public sector/governments officials and the Kenya Employers Federation, that even though they had been persuaded that '*pollution prevention pays*', they did not have the tools, as delivered by the course, to convince entrepreneurs and SMEs that PPP is indeed a viable concept.

- Environmental management: this was an area which, although covered by the course, the trainees felt that it did not provide them with sufficient confidence to enable them to promote the concept.

- Emergency prevention and preparedness: It would appear that this topic was hardly mentioned. It was not in the original project document and had not been considered for inclusion in the course. UNEP, through its APELL programme mounts separate courses and seminars. Nevertheless, it should be included in a course on Environmental Management.

- Occupational Health and Safety: Again, this was not an area considered for the training courses, but one trainee felt that increasingly, health and safety cannot (should not) be separated

from environmental management and should therefore, be included in any further courses.

3.4 *Improvements in Efficiency in Project Delivery*

The reaction of the participants was mixed. By and large, the trainees thought that the organisation was satisfactory. There were some problems relating to the payment of DSAs, but it would appear that the fourth course held in Ethiopia was well organised. The course in Tanzania seems to have been less convenient from an administrative point of view.

The most common complaint was the lack of information in the *Fact Sheets* and the shortness of notification that participants had to prepare country papers and that participants were not informed in advance who the other participants from their own country would be.

3.5 *Future Co-operation*

All participants felt that UNEP and UNIDO should continue to co-operate in such programmes in the future. One participant felt that adding UNIDO's name to UNEP's was one way of persuading industry that industrial development and environmental protection were not mutually exclusive.

3.6 *Lessons Learned*

The major lessons learned from the programme is that more attention should be paid to:

- training the trainers
- promoting regional networking
- UNEP and UNIDO should tell the participants what they should do themselves
- UNEP and UNIDO should not promise to deliver anything unless they know that their system can deliver

COUNTRY:	TANZANIA
MISSION DATES:	26 TO 29 MAY 1996
PURPOSE OF MISSION:	IN-DEPTH EVALUATION OF TRAINING SEMINAR ON ENVIRONMENTAL MANAGEMENT FOR INDUSTRIAL MANAGERS AND ENGINEERS
PERSONS INTERVIEWED:	
UNIDO:	Mr Joseph Hebga, Country Director
TRAINEES:	Mr Mayongi, Technical Manager, Tanzania Textiles Ms Ruth Lugwisha, Ministry of Labour & Youth Development Mr Marwa, Ministry of Industry and Trade
SUPERVISORS OF TRAINEES:	Mr Mwalongo, General Manager, Tanzania Textiles Mr Wilfred Nyachia, Director of Planning, Investments and Implementation, Ministry of Industry and Trade and Member of Board of National Environmental Committee (NEC) Ms Eclune Manyesho, Principal Economist, Ministry of Industries

1 *TRAINEES' AND SUPERVISORS' PERCEPTIONS*

1.1 *THE TRAINING COURSE*

The trainees thought that the course was well prepared, well presented, personally valuable and relevant to their country's needs.

The training material had not been disseminated within their organisations or companies.

Trainees did however, have to prepare a short report for the government.

One government official said that he had used the material for three seminars/workshops organised by the Ministry of the Environment.

1.2 *Relevance of the Programme*

The course was considered to be relevant and important. The Tanzanians were of the opinion that industrial environmental pollution was not of a high priority within the government and this was reflected in the lack of legislation. However, by learning about the possibilities for cleaner production as provided through the course, they (the participants) could act, without legislation, to maintain a cleaner environment. It was felt that the economic aspects were missing (*see Section 3.3* below).

The participant from the Ministry of Industry and Trade intimated that he had undertaken audits, based on his training experience, and had persuaded the industry managers to institute cleaner and cost-saving procedures. He specifically mentioned three industrial facilities where he had made suggestions for changes in the following plants:

- a zinc galvanising plant, where counter-current washing was instituted and chemicals recovered.;
- a bottling plant, where water was saved by changing the circuit; and
- a cement plant, where energy, water and raw materials savings were made.

However, the mission could not ascertain as to whether these suggestions were put into actual practice by the respective plant management.

1.3 *Participant Selection Criteria*

The participants were not aware of any criteria for their selection; nevertheless, they were of the opinion that the trainees on the whole were well selected. They thought that it was a good idea to have representatives from the government (civil service) and from industry. Most participants at the Arusha (Tanzania)/Nairobi course had sufficient technical education to enable them to absorb the training properly.

1.4 *Training Methodology*

The Tanzanian participants felt that the method of training was adequate; in particular, the mix of classroom lectures, working group meetings and site visits was correct. There was a slight concern that the plant site visits were a bit too short, but the trainees felt that it would

have been difficult to extend the site visits without incurring penalties in the other areas.

1.5 Training Materials and Handouts

All trainees felt that the training material provided was of a high quality; and they still use it. They feel that it is still relevant today. One trainee thought that it would have been useful if they had been provided with the audio-visual material used during the course as, since he was not a `trainer' it would have helped him to pass on the information, both within industry in general, as well as within the government cadre.

1.6 Country Report Preparation and Presentation

As with the findings in Kenya, the Tanzanian trainees reported that they did not know, in advance who the other Tanzanian participants would be; they therefore could only prepare a common Country Report during the course. They did not receive any advice from UNEP about structure or content of the country report apart from the information provided in the invitation letter that they should prepare a country report on industrial environmental management.

1.7 Information Exchange

The participants reported that during the course, there was a good exchange of information; the interaction between trainees from different African countries was almost as valuable as the formal information provided by the lectures. Unfortunately, none of the participants have remained in contact with other participants nor have they initiated to do so. The development of informal `networking' was not proposed by the UNEP or UNIDO representatives.

1.8 Presentation of Lectures

The Tanzanian participants felt that the lectures were well presented; there was little problem with the language, although there were some problems during question times. These however,appear to have been resolved and the only problem, was that responses to questions needed more time.

1.9 Case Studies

The case studies were considered to be satisfactory. The participants thought that these should have been better integrated with the site visits (see *Section 1.10* below).

1.10 PLANT SITE VISITS

The trainees thought that they had learned how to conduct an environmental audit; yet none of them had tried to apply this knowledge after the course. Even the participant from industry had not undertaken an environmental audit of his facility. Participants felt that the economic aspects were lacking. The participants however, felt that the site visits should have been better co-ordinated with the theoretical aspects of the course and that an opportunity should have been given to re-visit some of the plants.

2 RESULTS ACHIEVED

2.1 SKILLS ACQUIRED

Based on the interviews, it is believed that the participants improved their understanding of the subject (in some cases knowledge of environmental management and cleaner production technologies was unknown) and acquired many skills regarding industrial environmental management. However, given the lack of follow-up on the part of the trainees, supervisors, UNEP and UNIDO, it is difficult to evaluate to what extent the trainees have retained the skills that the course was intended to impart.

All participants claimed to have retained the knowledge imparted during the course and that they still used the written course material.

2.2 ACCOMPLISHMENTS

There is no doubt that the course resulted in heightened awareness and provided the trainees with new skills. Whether or not the cost of the exercise was justified, particularly given the lack of follow-up, is questionable. All participants have indicated that the course was worthwhile; however, few of them have attempted to pass on their training to others within Tanzania.

It may be pointed out that one government official informed the mission that, following the course, one of his subordinates was consulted by the Ministry of the Environment and the Ministry of Industry and Trade on Industrial Environmental Management Issues. The same trainee helped to prepare the draft policy and regulations and wrote a project proposal for UNIDO to start a Centre for Environmental Science and Technology (CEST). CEST commenced operation one week before the mission arrived in Tanzania.

2.3 *Degree of Application of Acquired Knowledge and Skills in the Trainees' Own Work Environment*

One trainee indicated that upon his return to Tanzania, he developed a written `*Environmental Policy*' for his company. The policy was considered by the senior management and accepted, however, it was never formally adopted. This was mainly because the company had severe financial constraints; virtually ceased operation and has been undergoing a process of `rehabilitation' since. At a meeting with the trainee's immediate supervisor, the evaluators were assured that the rehabilitated company (which will soon be privatised) will adopt an environmental management policy.

2.4 *Difficulties Faced in Transferring Acquired Knowledge*

It was difficult to ascertain what the difficulties in transferring the acquired knowledge were. Reasons could have been:

- lack of initiative by the participants;
- lack of management policy; and,
- lack of follow-up by UNEP/UNIDO.

Whatever the reason, there appears to have been negligible transfer of knowledge gained and there has been virtually no multiplicative effect.

2.5 *Overall Achievements*

One can only say that there was considerable success at a personal level. As mentioned above, there has been no effective multiplicative effect, and therefore, one could consider that the programme has not adequately met its objectives. However, given the keenness observed during the interviews, the evaluators believe that the programme could continue and be extended if it is more directed towards a `train the trainers' programme.

The evaluators asked the trainees to evaluate the course on an ascending scale of one to ten and their average response was as follows:

□ skills acquired	7.5
□ skills applied	8.0
□ skills transferred	8.5

The mission could not establish the basis on which the participants provided such a positive rating nor could it verify this assessment. However, it was clear to the mission that this reflected the interest and uptake of the knowledge and information at the personal level.

2.6 *Impact of Training Results*

Nationally, the training has had some impact; it has raised awareness of government policy at the Ministry of Industry and Trade and the same Ministry is expected to review its approach to industry with respect to maintaining a sound environment.

The individual trainees reported that their consciousness has been raised, but they have done little to pass on their new skills.

It is the opinion of the evaluators that UNEP and UNIDO should undertake a vigorous follow-up programme with all participants to ensure that the programme be multiplied in their country.

3 *OUTLOOK FOR THE FUTURE*

3.1 *Follow-up*

Former trainees should be contacted by UNEP an UNIDO to ensure that they:

- apply their new knowledge at their place of work
- transmit their knowledge to others
- form a co-operative network with their fellow trainees.

The evaluators would like to report that, as in Kenya, participants reported that although they were specifically asked to indicate what publications they would like to receive; in many instances, no publications were sent. This criticism also applied to the lecturers from the Russian Federation and Tampere University.

3.2 *Continuity of the Training Course*

Without exception, the trainees felt that the course was relevant at the time that they undertook it, and that it should continue in the same form. It is the opinion of the evaluators, that, given the lack of follow-up, initiative and inability of the participants to present similar courses themselves, more emphasis should be given to selecting participants who can continue the training in their own country - in other words, the course should focus on training trainers, rather than individual government or industry representatives, who for whatever reason cannot train other persons. However, we feel that the mix between policy makers and `doers' (i. e., industry managers) should be maintained.

3.3 *Subjects to Emphasise and De-emphasise*

None of the trainees thought that any of the subjects in the course were irrelevant and they could not see any justification in `dropping' any of the lectures. There were however, some additional subjects that they felt should be added; or treated separately in specialised short courses. The main subjects mentioned were:

- cost-benefit analysis
- computer simulation
- information technology (IT)
- hazards and risk analysis
- waste utilisation

3.4 *Improvements in Efficiency in Project Delivery*

The Tanzanian participants reported that the project was efficiently delivered. During the 1991 course, it was reported that there were some problems associated with the payment of the DSA.

3.5 *Future Co-operation*

Future training courses may include participants from industry associations and from the recently established centre "CEST".

3.6 *Lessons Learned*

The major lesson to be learned from this programme is that more attention should be paid to:

- training trainers
- promoting regional networking
- follow-up and delivering materials that were promised by UNEP and UNIDO

Country Report

COUNTRY: NEPAL

MISSION DATES: 30 May to 3 June 1996

PURPOSE OF MISSION: IN-DEPTH EVALUATION OF TRAINING SEMINAR ON ENVIRONMENTAL MANAGEMENT FOR INDUSTRIAL MANAGERS AND ENGINEERS

PERSONS INTERVIEWED:

UNIDO: Mr Arjun K Upadhya
UNIDO National Director for Nepal

TRAINEES:

Mr Dilip Kumar Pradhan, Deputy Manager Marketing, Nepal Orind Magnesite (P) Ltd

Mr Shiv Ratna Atal, Deputy Manager, Production, Hetauda Cement Industries Ltd

SUPERVISORS OF TRAINEES:

Mr Chiranjibi Gautam, Project Manager, Industrial Pollution Control Management Project, Ministry of Industry

Mr Bimal P Koirala, Joint Secretary, Ministry of Industry

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1. TRAINEES' AND SUPERVISORS' PERCEPTIONS

1.1 The Training Course

The trainees were of the opinion that the course was well prepared, very relevant, and still extremely useful today.

1.2 Relevance of the Programme

One trainee from the Ministry of Environment (was not interviewed because he is on a two-year leave of absence/secondment to the Asian and Pacific Centre of Technology in Japan) was instrumental in establishing an environmental cell in the Ministry of Industry. We were informed that after completing the course he prepared several environmental topic papers and organised seminars on the same theme. However, the mission was not provided with any of those reports.

Mr Pradhan, used his training to prepare an EIA on mining in the Kathmandu valley, wrote a paper for a recognized journal and has provided advice (particularly in the field of environmental auditing) to factory managers. The mission could not assess to what degree the advice provided was followed up by the factory management.

Both participants and supervisors, felt that not only was the course relevant at the time that it was given (1989 and 1991), but also it would still be relevant today, at least for Nepal.

1.3 Participant Selection Criteria

The supervisors and participants felt that the selection criteria were satisfactory. The Nepalese participants indicated that the trainees from China, South Korea and Vietnam did not appear to have sufficient command of the English language.

1.4 Training Methodology and Course Content

The training methodology, on the whole was considered to be adequate. Both participants felt that, insufficient attention was given to air pollution. However, it should be pointed out that the UNEP *Fact Sheets* indicated that water pollution would be stressed. The laboratory training in Finland related only to water pollution. One of the trainees thought that the course should have had a bit more `practice' and a little less theory.

1.5 Training Materials and Handouts

These were considered, by the trainees to be excellent.

1.6 Country Report Preparation and Presentation

The Nepalese participants did know well in advance who the other participants from their country would be. About four weeks notice

of acceptance to the course was given and the trainees felt that this was adequate.

The trainees felt that it was useful to have the country presentations, but felt that a wider geographical spread of participants would have been more valuable; in particular they thought that it would have been better, had there been participants from Latin America and the Caribbean.

1.7 Information Exchange

Informal information exchange between participants and lecturers was thought to have been good; with the one proviso mentioned in *Section 1.6* above, i.e. a better geographical spread of participants would have been better.

1.8 Presentation of Lectures

Lecture presentation, including the use of audio-visual material was considered to be good, especially in Finland.

1.9 Case Studies

Case study preparation and presentations were considered to be good. One trainee indicated that since he thought that environmental harm caused by mining was the biggest problem in Nepal, it was unfortunate that this was not covered.

1.10 Plant Site Visits

Plant site visits were considered to be relatively adequate. It was felt however, that more could have been gained if the plants could have been visited twice. The reason for this observation was that the visits could have been followed up by classroom discussion and then conclusions could have been discussed with plant management.

2. RESULTS ACHIEVED

In the case of Nepal, as noted in *Section 1.2*, it would appear that the course objectives for the short-term were fairly satisfactory.

2.1 Skills Acquired

The trainees indicated that the skills acquired during the courses were adequate. In particular, they mentioned that environmental

auditing and EIA had proven to be most useful, and they had put them into practice.

2.2 Overall Achievements

[On a scale of one to ten - ascending order] as perceived by the participants

- skills acquired 9
- skills applied 10
- skills transferred 9

The mission could not establish the basis on which the participants provided such a positive rating nor could it verify this assessment. However, it was clear to the mission that this reflected the interest and uptake of the knowledge and information at the personal level.

2.3 Impact of Training Results

Given the fact that Nepal still has no framework for environmental legislation (draft legislation has been prepared), the evaluators feel that the impact of the training programme has been beneficial to the country as a whole; for the first time (following the 1989 course), there was an appreciation that environmental degradation did not have to be a natural consequence of industrial development.

Both the trainees at the time of their training held officer level positions. Today they both hold Deputy Manager positions in their respective company. However, the mission could not determine to what degree the promotions could be attributed to the training provided.

3. OUTLOOK FOR THE FUTURE

3.1 Follow-up

The evaluators found that follow-up on the part of UNEP and UNIDO had not been particularly effective. In particular, documents requested had not been received. One participant said that he now obtains his publications from other sources. He did however indicate that he had received some information from the Finnish (Tampere University) lecturers.

No acknowledgement was received from UNEP following the return of the one-year follow-up questionnaire.

3.2 Continuity of the Training Course

The trainees and supervisors interviewed intimated that they thought that the course was still valid today and should be continued.

3.3 Subjects to Emphasise and De-emphasise

The trainees did not think that there were any subjects that should be de-emphasised. The following were mentioned for more in-depth treatment.

- Cost-benefit analysis
- Hazardous waste management
- Mining
- Air pollution monitoring
- Computer simulation

Cost-benefit analysis and computer simulation courses could be mounted as separate two week intensive training courses.

3.4 Improvements in Efficiency in Project Delivery

The site visits should be better integrated with the theoretical aspects of the course.

3.5 Future Co-operation

Based on the Nepal mission, the evaluators feel that this type of course should continue based on co-operation between UNEP and UNIDO as each organisation has different but complementary skills.

3.6 Lessons Learned

In the case of Nepal, it would appear that the Government initiative was forthcoming despite the lack of follow-up on the part of UNEP and UNIDO.

Annex 3 (d)

Country Report

COUNTRY: SLOVAKIA

MISSION DATES: 6 June 1996 (at UNIDO, Vienna)

PURPOSE OF MISSION: IN-DEPTH EVALUATION OF TRAINING SEMINAR ON ENVIRONMENTAL MANAGEMENT FOR INDUSTRIAL MANAGERS AND ENGINEERS

PERSONS INTERVIEWED:

TRAINEES:

Dr Roman Pal, Manager, EUROCAR (Holz, Metall, PKW Service)
Ms Jana Gustafikova, currently unemployed

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1 *TRAINEES' AND SUPERVISORS' PERCEPTIONS*

1.1 *THE TRAINING COURSE*

The trainees thought that the course had been well prepared, was essentially relevant and still useful today. One trainee could not see the relevance of the *public relations* part.

1.2 *RELEVANCE OF THE PROGRAMME*

Most of the course was considered to be relevant to the situation in Slovakia. However, both trainees said that the prevailing economic situation in the country and the poor state of industry precluded the use of much of the acquired knowledge.

1.3 *PARTICIPANT SELECTION CRITERIA*

The participants did not know how the selection was done. They thought that some participants at their course (1991) were not very keen to learn. They also thought that more attention should be given to ensure that participants could speak and understand the language of tuition.

1.4 *Training Methodology*

The training methodology on the whole was considered to be satisfactory, although they felt that the course was a bit heavy on the lecture side; more group work might have been useful.

1.5 *Training Materials and Handouts*

The quality of the training material was considered to be excellent. The trainees felt that it would have been more useful during the course if it had been distributed before the course; especially to those who had difficulties with spoken English.

1.6 *Country Report Preparation and Preparation*

The two trainees interviewed said that they had not known that such a report was required, until one or two days before the start of the course. Participants felt that too much time was set aside during the course for presentation of country reports; by and large they were irrelevant and that, although the information was of some use, the reports should have been distributed and participants could then have discussed reports at the personal level.

1.7 *Information Exchange*

Information exchange between participants and lecturers and between participants was not thought to have been good. The main reasons cited were that they were tired at the end of the day and, perhaps more important, because of language difficulties.

1.8 *Presentation of Lectures*

Language difficulties apart, lecture presentation was considered to be good.

1.9 *Case Studies*

Case study preparation was considered to be satisfactory.

1.10 *Plant Site Visits*

The participants thought that insufficient attention was paid to waste disposal facilities.

2 RESULTS ACHIEVED

Mainly because of political problems, it would appear that the course only partially achieved its objectives: i.e. the trainees acquired the knowledge and have maintained an interest in the subject.

2.1 SKILLS ACQUIRED

The trainees indicated that the skills acquired were adequate and given the opportunity they could build on them.

2.2 ACCOMPLISHMENTS

The accomplishments have been virtually zero, due to political changes.

2.3 DEGREE OF APPLICATION OF ACQUIRED KNOWLEDGE AND SKILLS IN THE TRAINEES' OWN WORK ENVIRONMENT

No opportunity was provided.

2.4 DIFFICULTIES FACED IN TRANSFERRING ACQUIRED KNOWLEDGE

Political changes did not permit any transfer of knowledge.

2.5 OVERALL ACHIEVEMENTS

[*On a scale of one to ten - ascending order*] as perceived by the participants

- skills acquired 7 to 8
- skills applied 2 to 3
- skills transferred 0 to 1

The above rating reflects the good uptake of the knowledge and the information at the individual level, however, on their application and transfer it appears to be significantly marginal.

2.6 IMPACT OF TRAINING RESULTS

Because of the afore-mentioned political changes there has been no impact of the training in Slovakia.

3 OUTLOOK FOR THE FUTURE

3.1 FOLLOW-UP

Apart from the evaluation questionnaire sent after one year, neither UNEP nor UNIDO have contacted the participants. One trainee had however been in contact with the organisations enquiring about courses and both participants receive the newsletters from UNEP/IE-PAC.

3.2 CONTINUITY OF THE TRAINING COURSE

The trainees thought that the course would still be valid today but that it should be structured differently for different target audiences. The more general environmental information should be given to younger engineers and government officials, while the more specialised information should be targeted at more senior engineers.

3.3 SUBJECTS TO EMPHASISE AND DE-EMPHASISE

Subjects to be de-emphasised are: public relations and general environmental management principles.

More in-depth treatment should be accorded to:

- cost-benefit analysis
- economic analysis
- waste disposal
- the use of computers
- clean technology

3.4 IMPROVEMENTS IN EFFICIENCY IN PROJECT DELIVERY

The participants thought that efficiency might have been improved if the course material could have been made available in advance of the course. More use of audio-visual material was also cited.

3.5 FUTURE CO-OPERATION

The trainees felt that this type of course should continue to be a joint effort between UNEP and UNIDO.

3.6 LESSONS LEARNED

In the case of Slovakia, the main lessons to be learned are that:

- efforts should be made to ensure that participants have an adequate understanding of the teaching language;
- political changes can have a significant impact on the attainment of the objectives.

List of Persons Met

UNIDO Headquarters, Vienna

Mr. C. Antonio, Acting Director, Human Resource Development Branch (HRD)
Mr. I. Loguinov, Industrial Development Officer, HRD
Ms. N. Schurink Postema, Industrial Development Officer, HRD

Mr. M. Rigola Lapena, Director, Environment and Energy Branch (ENV)
Mr. R.. Luken, Special Technical Adviser, ENV
Mr. S. A. Hasnain, Senior Industrial Development Officer, ENV
Mr. G. Ramsay, Industrial Development Officer, ENV

Kenya, Nairobi

Mr. B. Sibanda, Chief, Project Design and Evaluation Unit, UNEP
Mr. M. Atchiya, Head, Environmental Education and Training Unit (UNEP/EETU)
Mr. Ulf Carlsson, Programme Officer, UNEP/EETU

Mr. G. Tabah, UNIDO Country Director

Mr Hezekiah B Okey, Ministry of Commerce and Industry
Mr Erastus Kimuri, Ministry of Commerce and Industry
Mr John Masilu, Director of Industries, Ministry of Commerce and Industries
Mr Boniface Mwange, National Environment Secretariat
Mr Aly Murji, Federation of Kenya Employers
Mr Johnson Karani, Electrical Engineer, EAP Cement Company
Mr Ndegwa K Kagio, Works Manager, EAP Cement Company

Dar-es-Salaam, Tanzania

Mr Joseph Hebga, UNIDO Country Director

Mr. Mayongi, Technical Manager, Tanzania Textiles
Mr. Mwalongo, General Manager, Tanzania Textiles
Mr. Marwa, Ministry of Industry and Trade
Mr. Wilfred Nyachia
Director of Planning, Investments and Implementation, Ministry of Industry and Trade and Member of Board of National Environmental Committee (NEMC)
Mrs. Eclune Manyesho, Prinicipal Economist, Ministry of Industries
Ms. Ruth Lugwisha, Ministry of Labour and Youth Development

Kathmandu, Nepal

Mr. Arjun K. Upadhya, UNIDO National Director
Mr. Dilip Kumar Pradhan, Dy Manager Marketing, Nepal Orind Magnesite (P) Ltd
Mr. Shiv Ratna Atal, Dy Manager, Production, Hetauda Cement Industries Ltd
Mr. Chiranjibi Gautam, Project Manager, Industrial Pollution Control Management Project, Ministry of Industry
Mr. Bimal P. Koirala, Joint Secretary, Ministry of Industry

Bratislava, Slovakia

Dr Roman Pal, Manager, EUROCAR (Holz, Metall, PKW Service)

Ms Jana Gustafikova, presently unemployed