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Report on the National Training Course on Air Quality Monitoring and Management in Lagos, Nigeria 25 – 28 February 2002

Bjarne Sivertsen

Contents

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1 Introduction and objectives

The World Health Organisation (WHO) initiated a programme for raising the awareness on air pollution problems in Central Africa. NILU was requested to participate in a Training Course and also support the programme financially. Funds were made available from the Norwegian Ministry of Foreign Affairs, and the Training Course was launched from 25 to 28 February 2002 in Lagos Nigeria.

The Training Course was hosted by the Government of Nigeria, through its Federal Ministry of Environment, in collaboration with the Norwegian Institute of Air Research, Norway; the World Health Organisation (WHO), Geneva, Switzerland; and Queensland University in Australia.

The Training Course was primarily designed to promote air quality monitoring and management in Africa, particularly in Nigeria. The specific objectives of the programme included:

- Raising awareness of the need for effective Air Quality Monitoring and management among participating State Environmental Protection Agencies (SEPAs);
- Fostering of national cooperation and collaboration through a forum of discussions and exchange of experiences;
- Strengthening of national air quality monitoring and assessment capabilities;
- Identification of problems relating to air quality monitoring in Nigeria and proffering possible solutions;
- Training the trainers to promote/propagate the programme;
- Training participants to, in turn, train other people in their own States; and
- Initiating plans of action for improvement of air quality monitoring and management in all the States of the Federation.

The request for funds as well as the proposal and a proposed agenda of the Training Course is presented in Appendix A.

NILU supported the programme through presentations of the key issues linked to the African air pollution problem and to methods and means for establishment of an air pollution planning system.

2 Reception by the Honourable Minister

Prior to the Training Course we were called for a reception at the Honourable Minister of State Federal Ministry of Environment of Nigeria Chief Imeh T

Okopido. Here we also met the Norwegian Ambassador to Nigeria, Mr. Dag Nissen.

The Minister expressed his gratitude to Norway for supporting the Training Course and he also told about his pleasant visit to Norway last year, when he was the guest of the Norwegian Minister of International Development Anne Kristin Sydnes among others.

3 Opening addresses

The Honourable Minister of State Federal Ministry of Environment Chief Imeh T Okopido presented his opening speech, which was very on the point and showed the Minister's insight in environmental issues and in air quality in particular.

The Honourable Minister several times thanked the Government of Norway for their financial support to Nigeria. He had become a friend of Norway, and a good cooperation had been established between Norway and Nigeria in the field of oil and gas. He further appreciated the presence of NILU and WHO as an international organisation that can help Nigeria to improve the air quality. He specifically thanked Norway for the financial and professional support of this specific Training Course.

In the address the Honourable Minister further stated that the Government of Nigeria is keen on developing a functional and result-oriented air quality management programme that will address both indoor and outdoor air pollution problems including their impacts on the human environment. The air management programme would include identification and establishment of air monitoring stations in different parts of the country; development of methodology and air monitoring network adapted to the specific needs of the country; and establishment of national air quality database, which shall feed into the global air quality network. (A written version of the address is presented in Appendix B)

Mrs Bogonjuko of the local WHO office in Lagos addressed the importance of awareness rising as part of the Training Course that is now being launched. She also, on behalf of Dr. A Moudi, the representative of WHO, delivered a good will message presented in Appendix C.

Dieter Schwela from the WHO office in Geneva pointed out the importance of air pollution in sub Saharan Africa. Between 30 and 60 000 persons die prematurely due to out door air pollution and up to 500 000 die due to indoor air pollution.

The Norwegian Ambassador to Nigeria, Mr Dag Nissen pointed out that Norway is actively following up Agenda 21 and that Norway plays a role in the Rio + 10 Conference in Johannesburg later this year. One of the priorities of the Norwegian Government is reduced pollution of air, water and soil.

He further indicated that the city of Lagos would in the near future need:

- Better quality cars,
- Improved diesel in all buses,

- Less open air burning of waste.

Norway has taken the initiative of reducing the gas-flaring problem in Nigeria. The air pollution problem in Lagos is considerable. UN estimates that Lagos will be the third largest city in the world by 2010 with more than 20 million inhabitants. To day Lagos is the sixth largest city with 15 million inhabitants.

4 The Technical sessions

The programme for the technical presentation during the Training Course is presented in Appendix D.

The lectures were divided between three experts:

- Dr Dietrich Schwela , WHO, Geneve, Switzerland
- Professor Lidia Morawska, Queensland University, Brisbane, Australia
- Mr. Bjarne Sivertsen, NILU, Kjeller, Norway

All the presentations had been prepared as paper copies of the transparencies presented. All papers were also prepared on a CD. All 35 participants received their own package of the complete set of papers and the CD. In addition the WHO had added the WHO Guidelines as well as the AMIS programme included data from 150 cities worldwide to the CD. I will thus not repeat any of the presentations by the international experts in this reprot. However two short statements from Nigerian representatives is summarised below.

To illustrate the air pollution and health problem connected to the fast growing urban areas world wide, Dr Schwela referred to UN statistics stating that:

- 68 cities worldwide had more than 3 million people in 1990
- 66 cities worldwide had more than 4 million people in 2000
- 135 cities worldwide will have more than 4 million people in 2025

Dr Imoh Obioh and Dr M.T. Odubela presented "Towards an Air Quality Management Programme for Nigeria". One automatic air quality station was installed in Lagos about ten years ago, but this has been out of operation for the last 3 years. Most of the measurements taken, if any, have been random sampling, and it cannot be used for planning purposes. Lead has been measure in Lagos showing levels from 0,5 to 15,7 $\mu g/m^3$ in commercial areas and between 0,2 and 19,4 $\mu g/m^3$ at a bus station. There is a basic need for training, spare parts, calibration gases and money.

Presently all air quality management and planning is solely based on legislation. The authors are asking for a more systematic process based on investigations and impact assessments. They are requesting a national long-term national air quality plan.

The Federal Republic of Nigeria issued in 1991 "Guidelines and standards for environmental pollution control in Nigeria". These include emission standards specified for a number of activities and pollutants as well as ambient standards. The ambient air quality standards and some tolerance limits are presented in Appendix E.

Dr L.A. Akela from the Meteorological Service of Nigeria talked on "Meteorology and air quality in Nigeria". The air pollution part presented Nigeria's participation in the GAW programme collecting data on climate change and stratospheric ozone. Two GAW stations have been established in Nigeria, one measuring the total ozone column with Dobson instruments. The Service operates 50 meteorological stations all over Nigeria (mostly manual). There is one automatic weather station in Lagos.

5 Short reports from the states

After the technical presentations, the participants were given the possibility to present short statements from their states. Twelve of the 40 states of Nigeria presented the situation concerning air pollution in their home states.

To summarise the impressions of these statements the following statements may be given:

- Nigeria's "sweet oil" is low on sulphur so that the SO_2 concentrations due to the burning of oil is not necessary a problem in Nigeria,
- Particulate matter is definitely the main problem in Nigeria and in Lagos in special,
- There is a complete lack of adequate instrumentation for collecting air pollution samples in Nigeria,
- Whenever some instruments are available consumptions (calibration gases) and spare parts are completely missing due to adequate funding,
- General statements concerning adequate funding was made by most of the States,
- The need for training and institutional building concerning air pollution was another issued brought up by most of the participants.

6 Remarks and conclusions

From discussions and statements made by the participants as well as from what we saw on a tour to "polluted areas of Lagos", the capital of Nigeria must be one of the most polluted large urban areas in the world. Some of the sources that would give rise to huge exposures and health impacts were:

- Open air burning of all kinds,
- Four very large wastes dump areas burning with black smokes at ground level,
- An extensive use of wood for cooking outdoor in the streets,
- Thousands of small diesel aggregates for electricity production in almost every large building in Lagos,
- A very poorly maintained car park and especially terrible smoky diesel buses,

It seemed that some of the states had started some sampling of air pollution. In a statement from NILU it was pointed out that a national reference laboratory for air pollution would be needed in Nigeria as soon as possible. This would also answer

to the question that was raised concerning a pool of experts that could support the different State Environmental Protection Agencies (SEPA) in maintenance, calibrations, training and reporting. Similarly a national air quality assessment centre could be established to serve a national database for air quality data and assure harmonisation and better quality of the data collected.

Dr. Schwela briefly presented a first outline of a "National plan for Urban Air Pollution and Human Health Assessment, 2002-2010". This plan he would discuss further with the Federal Minister of Environment in Abuja on 3 March 2002.

The plan covered 5 areas of work:

1. Air pollution policies and standards
2. Air Quality Management
3. Surveillance and health impacts
4. Training, institutional building and public awareness
5. Financing

The outline may serve as a beginning of the air quality management and the development of a Clean Air Implementation Plan (CAIP) for Nigeria. The draft proposal is presented in Appendix G.

7 Recommendations

A committee was organised to prepare a list of recommendations as a result of the discussions during the Training Course. A list of 14 recommendations was finally presented at the closing ceremony of the Training Course. These recommendations are presented in Appendix F.

The recommendations included tasks such as:

1. Development of CAIP,
2. Awareness rising,
3. Inventory of institutions and actions,
4. Capacity building,
5. Networking,
6. A national database,
7. Institutional strengthening and upgrading,
8. Updated guidelines and standards,
9. Improved quality assurance,
10. More monitoring stations,
11. Attention also to indoor air pollution,
12. Development of models on GIS,
13. Federal ministry as coordinating institution,
14. Ensure funding.

8 Closing Ceremony

The Chairman, Dr. Amaya, summarised the Training Course and read the 14 recommendations.

Dr. Schwela repeated some of the elements of the proposed "National plan for Urban Air Pollution and Human Health Assessment, 2002-2010".

The Honourable Minister of State Federal Ministry of Environment of Nigeria Chief Imeh T Okopido presented the certificates to all participants and gave a closing address before closing the Training Course. In his statement he stressed that all important programmes proposed on air quality will be given the highest priority in Nigeria. The Ministry and the Government will support any initiative on air pollution. We have a lot more to do in the future to clean up our air.

Appendix A

Request for funds and the proposal and a proposed agenda of the Training Course

FEDERAL MINISTRY OF ENVIRONMENT

OFFICE OF THE HONOURABLE MINISTER OF STATE

7TH FLOOR, FEDERAL SECRETARIAT, SHEHU SHAGARI WAY
P.M.B. 468, GARKI. ABUJA NIGERIA.

Telephone/Fax **09-5234931**
E-mail **fmenv@hyperia.com**

Ref. No **FME/EA/ESM/AQMP/033/VOL. 1/24**
Date **14th September, 2001**

Mr. Bjorn Skogma
Director General
Department for Development of Cooperation and Policy
Ministry of Foreign Affairs
P.O. Box 8114 Dep.
N-O032 Oslo, Norway

Dear Mr. Skogma

NATIONAL TRAINING COURSE ON AIR QUALITY MONITORING AND MANAGEMENT IN NIGERIA

The Federal Ministry of Environment is planning to organise a training course on Air Quality Monitoring and Management in Nigeria from 29 October to 1 November 2001.

The training course will strengthen our national capacity to monitor and manage air quality in Nigeria. This programme will form part of the on-going implementation of our local Agenda 21 - the National Environmental Action Plan. It is also in line with the Decision 9/2 on Protection of the Atmosphere adopted at the 9th Session of the United Nations Commission on Sustainable Development (CSD-9) in April 2001. The training course will assist Nigeria in its efforts to develop functional and result-oriented air quality management programme that will address both indoor and outdoor air pollution problems in the country including their impacts on the human environment.

It will also provide good basis for future cooperation with the Norwegian Institute for Air Research (NILU), especially in the area of air quality monitoring and management including the use of telemetric system to monitor the levels of air pollutants in our urban and sub-urban areas.

In this regard, the Ministry of Environment would like to submit for your kind consideration request for financial assistance of twenty-five thousand US dollars ($25,000.00) from the Government of Norway to carry out the training prgramme.

The World Health Organisation (WHO) and NILU are very supportive of this programme and have indicated their willingness to collaborate with the Ministry in the implementation of the programme. The two organisations would provide lecturers and training materials. A detailed proposal on the training course is attached including a tentative agenda.

We look forward to your favourable response

Yours Sincerely.

Chief (Dr.) Imeh T. Okopido
Honurable Minister of State.

cc: The Ambassador, Norwegian Embassy, Abuja, Nigeria
Dr. Dietrich Schwela, WHO, Geneva, Switzerland
Dr. Bjarne Sivertsen, NILU, Kjeller, Norway

NATIONAL TRAINING COURSE ON

AIR QUALITY MONITORING AND MANAGEMENT

LAGOS, NIGERIA 25 - 28 FEBRUARY 2002

FEDERAL MINISTRY OF ENVIRONMENT
ABUJA, NIGERIA

WORLD HEALTH ORGANISATION (WHO)
GENEVA, SWITZERLAND

NORWEGIAN INSTITUTE FOR AIR RESEARCH (NILU)
KJELLER, NORWAY

QUEENSLAND UNIVERSITY OF TECHNOLOGY
BRISBANE , AUSTRALIA

PROPOSAL FOR A NATIONAL TRAINING COURSE ON AIR QUALITY MONITORING AND MANAGEMENT, LAGOS, NIGERIA 25 - 28 FEBRUARY 2001

1. INTRODUCTION

With increase in industrialization and urbanization, and with a population of over 120 million, Nigeria has begun to experience a myriad of air pollution problems arising from domestic and industrial sources such as indoor residential cooking and heating, bush and refuse burning, transportation, power generation, and gas flaring. These local sources make a significant contribution to regional and global atmospheric pollution problems. The potential ecological impacts of these problems are enormous. Preliminary investigations indicate that a high percentage of the population is at risk, and that ecosystems of the country are highly threatened.

With increasing urban population in Africa, particularly in Nigeria, coupled with increased rate of industrialization, there will be even larger increase in the emissions of pollutants, and increase in the public and environmental exposure to these pollutants in the years to come.

The Government of Nigeria is keen on developing a functional and result-oriented air quality management programme that will address both indoor and outdoor air pollution problems including their impacts on the human environment. The air management programme would include identification and establishment of air monitoring stations in different parts of the country; development of methodology and air monitoring network adapted to the specific needs of the country; and establishment of national air quality database which shall feed into the global air quality network. This training course will provide the boost for effective take-off of this national programme.

2. ORGANISATION OF THE TRAINING COURSE

This is the first National Training Course on air quality management to be organised in Nigeria. The course will be hosted by the Government of Nigeria, through its Federal Ministry of Environment, in collaboration with the Norwegian Institute of

Air Research, Kjeller, Norway; the World Health Organisation (WHO), Geneva, Switzerland; and the Environmental Aerosol Laboratory of the Queensland University of Technology, Brisbane, Australia.

3. OBJECTIVES OF THE TRAINING COURSE

The training course is primarily designed to promote air quality monitoring and management in Africa, particularly in Nigeria. The specific objectives of the programme include:-

- Raising awareness of the need for effective air quality Monitoring and management among participating State Environmental Protection Agencies (SEPAs);
- Fostering of national cooperation and collaboration through a forum of discussions and exchange of experiences;
- Strengthening of national air quality monitoring and assessment capabilities;
- Identification of problems relating to air quality monitoring in Nigeria and proffering possible solutions;
- Training the trainers to promote/propagate the programme;
- Training participants to, in turn, train other people in their own States; and
- Initiating of plans of action for improvement of air quality monitoring and management in all the States of the Federation.

The agenda of the training course is presented in Annex 1.

4. COURSE PROGRAMME AND DESIGN

Course content:

The course content of the training programme will include:

- Objectives, scope and purpose of training course
- Health effects of air pollution
- Environmental effects of air pollution

- Quantitative understanding of the magnitude and links between emission, air quality and exposure
- Global aspects of air pollution
- WHO air quality guidelines and their role in setting air quality standards
- Introduction to ambient air quality monitoring – Objectives, Principles, General methodologies, Quality assurance
- Monitoring networks
- Instrumentation
- Siting of monitors
- Data objectives, data management, and data validation (QA/QC)
- Data evaluation and use
- Costs and procurement
- Meteorological data
- Dispersion and meteorology
- Meteorology and air quality monitoring in Nigeria
- Assessment of health impacts
- Air Management Information System (AMIS)
- Special monitoring problems
- Air quality legislation in other countries
- Country reports and discussion

Teaching methods and Course Duration:

Lectures will be supported by workshops and field visits. The course will be conducted in English. The Duration of the course will be 4 - 5 days including field visits.

Course venue:

The venue of the training course will be equipped with computers and audiovisual facilities so that participants will benefit fully from the training course.

Training Course Lecturers

The course will be delivered by lecturers provided by WHO and NILU at their expense as their contribution to the course.

Training Course Participants:

The course will be free. Participation will be drawn from Federal and State Government Ministries and Agencies responsible for air quality monitoring and management, as well as from other organisations with related responsibilities. Participants should be academically qualified with adequate professional experience in an appropriate field such as environmental science, environmental management, engineering, meteorology, atmospheric physics or related field.

About 35 participants are expected to participate at the training course. Nigeria has 36 states. Participants will be drawn from the State Environmental Protection Agencies (SEPAs), based on the six geopolitical zones of the country. Some participants will also be nominated at the Federal level.

5. FINANCIAL BREAKDOWN

	Item	**Cost US $**
i)	Travel costs for 35 participants from different parts of the country	= $7,000.00
ii)	Per diem for 35 participants for 5 days	= $12,000.00
iii)	Organisational and secretarial support, including printing and distribution of reports on the training course and training material and follow-up activities	= $ 6,000.00
iv)	Course lecturers provided by WHO and NILU	
	Total	= $25,000.00

PROPOSAL FOR NATIONAL TRAINING COURSE ON

AIR QUALITY MONITORING AND MANAGEMENT

LAGOS, NIGERIA 25 - 28 FEBRUARY 2002

TENTATIVE PROGRAMME

DAY 1: **Monday, 25 February 2002**

OPENING CEREMONY:

08.00	Arrival and registration of participants
09.00	Arrival of other invited guests
09.30	Arrival of the Permanent Secretary and Honourable Ministers
90.40	Opening Remarks by Honourable Minister of State for Environment
	Goodwill message by the Resident Representative of World Health Organisation (WHO)
	Goodwill message by the Director of Meteorological Department, Federal Ministry of Aviation;
	Goodwill message by the Chief Commandant, National Road Safety Corps;
	Opening Remarks by Dr. R. Helmer, Director, Dept. of Protection of the Human Environment, World Health Organisation, Geneva, Switzerland
10.30	Keynote Address by the Honourable Minister of Environment
11.00	Vote of thanks by the Permanent Secretary, Federal Ministry of Environment
11.10	**Tea/Coffee Break**

TECHNICAL SESSION

11:40-12:10	Objectives, scope and purpose of the training course; **ESM-FME, Nigeria**
12:10-13.10	Health effects of air pollution; **WHO (DS)**
13:10-13:40	Environmental effects of air pollution; **WHO (DS)**
13:40-14:40	Lunch break
14:40-15:20	Exposure and risk to exposed populations; **WHO (LM)**
15.20-16.20	WHO Guidelines for Air Quality; **WHO (DS)**
16:20-17:00	Exposure reduction through lifestyle modification; **WHO (LM)**
17:00-17.30	Discussion
18:00-	Cocktail Party

DAY 2 **Tuesday, 26 February 2002**

09:00-10:00	Introduction to air quality management; **WHO (DS)**
10:00-10:40	Quantitative understanding of the magnitude and links between emission, air quality and exposure; **WHO (LM)**
10:40-11:10	Towards the development of air quality management in Nigeria; **ESM-FME**
11:10-11:30	Tea/Coffee break
11:30-12:30	Air pollution sources; **NILU (BS)**
12:30-13:30	Dispersion and meteorology; **WHO(LM)**
13.30-14:30	Lunch break
14.30-15.30	Monitoring program design; **NILU (BS)**
15:30-16:10	Discussion
16.10-17:10	Global aspects of air pollution; **WHO (DS)**
17.10-17:30	Discussion

DAY 3 **Wednesday, 27 February 2002**

09:00-10:00	Instrumentation; **WHO (LM)**
10:00-10:30	Meteorological data; **NILU (BS)**
10:30-11:00	QA/QC; **WHO (LM)**
11:00-12.00	Meteorology and air quality monitoring in Nigeria; **DM-FMA**
12:00-12:20	Tea/Coffee Break
12:20-13:20	Dispersion models; **NILU (BS)**
13:20-13.50	Data evaluation and use **WHO (LM)**
13:50-14:20	Air quality legislation in other countries; **NILU (BS)**
14:20-15:20	Lunch break
15:20-16.20	Assessment of air quality data**; WHO (LM)**
16.20-17:00	Presenting air quality data; **NILU (BS)**
17:00-17.30	AMIS; **WHO (DS)**
17.30-18:00	Discussion

DAY 4 **Thursday, 28 February 2002**

9.00	Country/State Reports Presentations
11.00	**Tea/Coffee break**
11.20	Discussion
13.10	Recommendation
14.30	**Group Lunch**

CLOSING SESSION

15.30	Presentation of summaries of proceedings
15.50	Closing Remarks
16.05	Vote of Thanks
16.10	Close of Meeting

Appendix B

The Honourable Minister of State Federal Ministry of Environment Chief Imeh T. Okopido Opening address

KEYNOTE ADDRESS BY OTU-EKONG (Dr.) IMEH T. OKOPIDO, THE HONOURABLE MINISTER OF ENVIRONMENT (STATE) AT THE NATIONAL TRAINING COURSE ON AIR QUALITY MONITORING AND MANAGEMENT IN NIGERIA LAGOS 25 – 28 FEBRUARY 2002

PROTOCOL

I am pleased to be here today at the official opening ceremony of the National Training Course on Air Quality Monitoring and Management in Nigeria. I am also very pleased to see in our midst participants from different parts of the country, as well as representatives of international organsations. Let me first of all express my appreciation to all of you for honouring our invitation. I would also like to acknowledge the support we received from the Government of Norway and the World Health Organisation in the preparation for this training course. I thank them for their assistance.

Air is an environmental resource. It is a fundamental necessity for almost all forms of terrestrial life. It is also an economic resource. It is essential to a number of vital economic processes, including agricultural production, forestry production, industrial production, fuel combustion, heating, cooling and so on. Likewise, poor air quality affects a number of these processes.

Poor air quality can be described as the presence in the outdoor or indoor atmosphere of one or more gaseous or particulate contaminants in quantities, characteristics, and of duration such as to be injurious to human, plant or animal life or to property. These contaminants can interfere with the comfortable enjoyment of life and property. Poor air quality can reduce human production potential as well as agricultural productivity. This implies that poor air quality can lead to poverty.

Humans occupy a very important ecological niche in the earth ecosystem and play very pivotal role in shaping the fate of the ecosystem .Most atmospheric pollutants pose a serious risk to human health. Any negative impact of poor air quality on humans will directly or indirectly affect other components of the earth ecosystem, including water, soil, vegetation and man-made structures. These impacts can create serious dysfunction and dislocation of the ecological processes.

Emissions of some air pollutants can undergo atmospheric oxidation and hydrolysis to form acidic deposition, otherwise called the "acid rain". The deposition of certain air pollutants, most notably synthetic organics and trace metals, play an important role in the pollution of the marine environment. Such acidic precipitation can lead to loss of aquatic resources, including fish and other components of freshwater biota. This impact will be even more severe on natural lakes, ponds, rivers and stream. Acidic deposition can also cause corrosion and tarnishing of metals, soiling of surface stone, brick and concrete,

and discolouration and peeling of paint. In addition, many historic buildings/structures and relics can be damaged by exposure to atmospheric pollutants

Distinguished Participants, Invited Guests, Ladies and Gentlemen, with the growing awareness and concern for the need for good air quality, the basic question now is "How can we monitor and manage our air quality?" .

The new air quality monitoring and management programme initiated by the Ministry is to ensure adequate monitoring of the nation's air quality in order to protect the health of the citizens and to preserve the integrity of our various ecological systems. The initiative is part of the implementation of the programmes enunciated in our National Agenda 21, and in the Global Agenda 21. It is also in line with Decision 9/2 on protection of the atmosphere adopted at the 9th Session of the United Nations Commission on Sustainable Development (CSD-9) in April 200l.

Furthermore, as part of this new initiative the Ministry has prepared a project proposal on National Air Quality Assessment. The primary goal of the project is to develop a functional and result-oriented mechanism for monitoring and managing air quality in Nigeria. The project recognises that air quality must be maintained at levels that protect human health, and must also provide protection to animals, plants (crops, forests and natural vegetation), ecosystems, materials and aesthetics. Among he objective of the National Air Quality Assessment project are to:

- Identify sources and threats of air pollution to humans, the built-environment, and the natural ecological systems;
- Assess the current level of air quality status in Nigeria, including.its conformity with relevant international air quality standards;
- Identify and determine the level of implication of various land-usesand land-use practices to air quality status in Nigeria;
- Develop a comprehensive database on air quality in Nigcria to serve as baseline, for measuring air quality trends in our various ecological zones over time;
- Develop and validate management tools such as models and Geographical Information Systems (GIS) to be employed in air quality monitoring and management programmes in Nigeria;
- Develop human resources capable of monitoring and managing air quality in Nigeria;
- Quantify trends and identify future problems or progress in achieving control targets;
- Determine ecosystems exposure and mechanisms for impact assessment;
- Assess socio-economic and health impacts of air quality status in Nigeria;
- Provide objective input to air quality management towards policies

on transport, health, energy and land-use planning activities;

- Develop policies and set priorities for management action;
- Coordinate workshops and training for all agencies and organisations in Nigeria participating in air quality monitoring programmes;
- Inform the public periodically about the country's state of air quality and establish alert systems when necessary; and
- Establish functional air monitoring stations and network in the six geopolitical zones of the country.

This project has been submitted for funding through the Ecological Fund Office (EFO) because of the vital ecological linkages and implications of air quality for land, water and vegetation, and other ecological systems and processes. It was also submitted to the EFO because or the magnitude of the project and the cost implications which cannot be accommodated by the statutory budgetary allocation of the Ministry of Environment. The Ministry shall also seek international cooperation in the implementation of this project.

Distinguished Ladies and Gentlemen, although a lot has been achieved over the last two decades in terms of the scientific understanding of the air we breath, there are still gaps in knowledge, especially with the increasing number of new chemicals produced and marketed every year. Some of these new products lead to emission of new pollutants. More scientific inputs are needed in the following areas to provide better understanding on how to assess the overall environmental, economic and social impact of poor air quality:

- Improved monitoring of traditional and trace pollutant emissions and concentrations;
- Improved understanding of the formation and transport of pollutants;
- The actual exposure of the population to various levels of different pollutants during their daily activities;
- The extent of human health effects from traditional pollutants and the associated economic damage;
- The kind and extent of human health effects from trace pollutants and their economic assessment;
- Some screening tools in order to provide early warnings concerning unconventional pollutants;
- The kind and extent of' ecological effects from all pollutants and associated economic losses, in particular additional data on the impact of acid rain and photochemical oxidants on forests and crops; and
- The global issues of climate change and ozone layer depletion, and the associated economic and social impacts.

At the international level, an awareness of the ecological and economic interdependence of nations has high-lighted the need for improved international

management of air as a natural resource. It is now a statement of fact that poor air quality can have an impact on areas far away from the emission sources; it can be transported across national frontiers and may exert effects on other environmental media. Some typical examples include:

- The acid precipitation issue which I mentioned earlier;
- The long-range transport of photochemical oxidants and their possible impact on remote forests and other ecosystems; .
- .The carbon dioxide (CO_2 issue and the possible far-reaching economic and social consequences of global temperature changes; and
- The possible destruction of the protective stratospheric ozone layer by CFC releases.

These issues point to the fact that we are all part of a global community. They also remind us of the: need for all countries to work together for the protection and conservation of the global environment.

Nigeria is very conscious of this fact. We recognise the importance of joint responsibility and partnership at local, national and international levels. A good example of this is the mutually agreed dateline by all stakeholders to stop gas flaring in Nigeria by 2004. We shall continue to play own part in the protection of the global environment. We shall also continue to honour our obligations and commitments to all the environmental and environment-related conventions and treaties which we have signed. Such conventions and treaties include the United Nations Convention on Climate Change (UNFCC); the Convention on Biological Diversity; the Vienna Convention and the Montreal Protocol on the protection of the ozone layer.

We believe in the philosophy of the *Precautionary Principle* as clearly stated in the Rio Declaration. Let me explain this concept in relation to the issue of climate change. It implies that all nations need to act now to guard against possible threat posed by global warming as a result of climate change, especially when many scientific investigations have concluded that there is a serious threat to the survival of humanity on earth if the present trend of lifestyle, production and consumption patterns continues unchecked. Beyond economic and commercial considerations, other factors need to be considered by all countries before certain policies are made, especially those policies whose implications could extend beyond national frontiers. We live in a world of global inter-dependence. What Country A enjoys today as benefit may be a problem to Country B. But in the near future the: problem of Country B may become/or create a new problem for Country A. This is why it is absolutely necessary for all countries to work together to protect the global environment. On our part, we shall continue to identify with genuine and noble global efforts and programmes aimed at enhancing the quality of life on earth.

The Ministry shall carry out studies on new products and their impacts on the environment. Co-ordinated continuous monitoring of carbon dioxide (CO_2), oxides of nitrogen (NO_x), oxides of sulphur (SO_x), and ozone (O_3), as well as particles is high priority by the Ministry.

I hope the training course will be successful and wish you all good luck.

Thank you for your attention.

Appendix C

Dr. A. Moudi
Goodwill address to the Training Course

GOOD WILL MESSAGE BY DR A. MOUDI. WHO REPRESENTATIVE FOR NIGERIA AT THE NATONAL TRAINING COURSE ON AIR QUALITY MONITORING AND MANAGEMENT, LAGOS. 25 - 28 FEBRUARY 2002.

It gives me great pleasure to bring to this gathering, greetings from Dr Ebraim Samba, the Regional Director of the African Regional Office of the World Health Organization. I would also seize this opportunity to commend the government of the Federal Republic of Nigeria for the wisdom in establishing the Ministry of Environment that gives us the Institutional base to discuss issues on the environment and translate strategies to action.

The existence of various environmental pollutants particularly in all our major cities is no longer a secret, considering the resultant air pollution from persistent uncontrolled refuse and bush burning, vehicular and power generating sets emissions as well as indoor cooking using wood and other fossil fuels. The heavy noise pollution from indiscriminate blaring of horns, power generating sets, loud speakers and music centers as well as underground water pollution from
leachings from refuse and petroleum products dumps.

The realization that the ultimate recipient of the impact of most environmental insults be it air, water or noise pollution is the health of the population. Notable health implications being pulmonary & blood disorders, diarrhoeal diseases, hearing impairment, stress and irritability to name just a few. Knowing fully well that the most important resource of any country is her human capital, for Nigeria to begin to take her position among the committee of nations particularly within the African region, the health of her people has to take the center stage in her developmental efforts. It therefore becomes highly imperative for the government of Nigeria to formulate and adopt for immediate implementation a comprehensive **National Environmental Health Policy** that brings together the views of all relevant stakeholders.

The filth that often characterizes many of the cities is a grave Public Health concern which calls for the re-introduction of the **House-to-House Sanitary Inspection, the review & enforcement of the Public Health Laws** as well as **massive awareness raising** on the strong linkage between the environment and the health of the people among the policy makers, opinion leaders as well as the public at large.

The maintenance of a safe environment for a healthier world is a concern of the World Health Organization hence the interest of WHO in promoting healthy living and work environments among its 185 member states principally through the Ministries of Health. This fact is also taken into consideration in the recently concluded WHO Nigeria Country Cooperation Strategy (CCS). The WHO Country Cooperation Strategy is an adaptable country specific strategy that provides the framework of cooperation between WHO and Nigeria from 2002 -2007. It reflects the values, principles and corporate directions of the World Health Organization as one organization with three levels - Country Office, Regional Office and Headquarters. The immense technical support being offered at this National Training Course on Air Quality Monitoring and Management by WHO and her partners is another clear testimony of our commitment towards a safe environment.

In closing, I will like to reiterate Honorable Minister that the World Health Organization will always be there to work with the Government of Nigeria through its relevant Ministries and Agencies to promote healthy living and working environment. It is my expectation that this will be the beginning of a very fruitful relationship.

I thank you all for listening.

Appendix D

Final Programme for Technical Presentations

Revised tentative programme for the proposed national training course on Air quality Monitoring and management, Lagos, Nigeria, 25 – 28 February 2002

Day 1: Monday, 25 February 2002

OPENING CEREMONY

TECHNICAL SESSION

11:40-12:10	Objectives, scope and purpose of the training course; **ESM-FME, Nigeria**
12:10-13.10	Health effects of air pollution; **WHO (DS 1)**
13:10-13:40	Environmental effects of air pollution; **WHO (DS 2)**
13:40-14:40	Lunch break
14:40-15:20	Exposure and risk to exposed populations; **WHO (LM |1)**
15:20-16:00	Exposure reduction through lifestyle modification; **WHO (LM 2)**
16.00-17.00	WHO Guidelines for Air Quality; **WHO (DS 3)**
17:00-17.30	Discussion
18:00-	Cocktail Party

DAY 2 Tuesday, 26 February 2002

09:00-10:00	Introduction to air quality management; **WHO (DS 4)**
10:00-10:40	Dispersion and meteorology; **WHO (LM 3)**
10:40-11:10	Towards the development of air quality management in Nigeria; **ESM-FME**
11:10-11:30	Tea/Coffee break
11:30-12:30	Air pollution sources; **NILU (BS 1)**
12:30-13:30	Quantitative understanding of the magnitude and links between emission, air quality and exposure; **WHO (LM 4)**
13.30-14:30	Lunch break
14.30-15.30	Monitoring program design; **NILU (BS 2)**
15:30-16:10	Discussion
16.10-17:10	Global aspects of air pollution; **WHO (DS 5)**
17.10-17:30	Discussion

DAY 3 Wednesday, 27 February 2002

09:00-10:00	Instrumentation; **WHO (LM 5)**
10:00-10:30	Meteorological data; **NILU (BS 3)**
10:30-11:00	QA/QC; **WHO (LM 6)**
11:00-12.00	Meteorology and air quality monitoring in Nigeria; **DM-FMA**
12:00-12:20	Tea/Coffee Break
12:20-13:20	Dispersion models; **NILU (BS 4)**
13:20-13.50	Data evaluation and use **WHO (LM 7)**
13:50-14:20	Air quality legislation in other countries; **NILU (BS 5)**
14:20-15:20	Lunch break
15:20-16.20	Assessment of air quality data**; WHO (LM 8)**
16.20-17:00	Presenting air quality data; **NILU (BS 6)**
17:00-17.30	AMIS; **WHO (DS)**
17.30-18:00	Discussion

Appendix E

Ambient Air Quality Standards for Nigeria

TABLE 3.4

NIGERIAN AMBIENT AIR QUALITY STANDARD

Pollutants	*Time of Average*	*Limit*
Particulates	Daily average of daily values 1 hour.	250 ug/m^3 *600 ug/m^3
Sulphur oxides (Sulphur dioxide)	Daily average of hourly values 1 hour.	0.01 ppm (26 ug/m^3) 0.1 ppm (260 ug/m^3)
Non-methane Hydrocarbon	Daily average of 3-hourly values	160 ug/m^3
Carbon monoxide	Daily average of hourly values 8-hourly average	10 ppm (11.4 ug/m^3) 20 ppm (22.8 ug/m^3)
Nitrogen oxides (Nitrogen dioxide)	Daily average of hourly values (range)	0.04 ppm-0.06 ppm (75.0 ug/m^3-113 ug/m^3)
Photochemical oxidant	Hourly values	0.06 ppm

TABLE 3.5

TOLERANCE LIMITS FOR AMBIENT AIR POLLUTANTS

Pollutants	*Long-Term Limits*		*Short-Term Limits*	
	mg/m^3	*+(hours)*	*mg/m^3*	*+(min.)*
Acetic acid	0.06	24	0.2	30
Acetone	0.35	24	0.35	30
Ammonia	0.20	24	0.2	30
Aniline	0.03	24	0.05	30
Benzene	0.8	24	1.5	30
Cadmium	0.003	24	0.01	30
Chromium	0.001	24	0.0015	30
Dichloromethane	1.0	24	3.0	30
Diethylamine	0.05	24	0.08	30
Diethylether	65.00	12	155.0	30
Dimethylamine	0.005	24	0.005	30
Dimethyl disulphide	0.2	24	0.7	30
Carbon monoxide	1.0	24	5.0	30
Carbon tetrachloride	2.0	24	4.0	30

Note :

*Concentration not to be exceeded for more than once a year.

Pollutants	*Long-Term*	*Limits*	*Short-Term*	*Limits*
	mg/m³	*+(hours)*	*mg/m³*	*+(min.)*
Chlorine	0.03	24	0.1	30
Chloroform	10.0	12	50.0	30
Dimethyl sulphide	0.05	24	0.08	30
Ethanol	5.0	24	5.0	30
Ethylene	5.0	24	5.0	30
Ethlene oxide	0.5	24	0.8	30
Fluorides (as F^-)	0.005	24	0.02	30
Fluorides	0.01	24	0.08	30
Formaldehyde	0.012	24	0.055	30
Furfural	0.05	24	0.08	30
Hexachoronhexane	0.01	24	0.08	30
Hydrochloric acid	0.006	24	0.006	30
Hydrocarbons (total)	2.0	24	5.0	30
Hydrogen cyanide	0.01	24	—	—
Hydrogen sulphide	0.008	24	0.008	30
Lead	0.005	24	0.002	30
Lead sulphide	0.001	24	—	—
Malathion	—	0.015 ppm		30
Intrathion	0.001	24	0.001	30
Manganese	0.01	24	0.03	30
Mercury	0.0003	24	—	—
Methanol	0.5	24	1.0	30
Methyl acetate	0.07	24	0.07	30
Methyl acrylate	0.01	24	0.08	30
Methyl methacrylate	0.1	24	0.1	30
Methyl parathion	—	—	0.008	30
Methylene chloride	20.0	12	55.0	30
Mono methylamine	0.01	24	0.01	30
Naphtalene	0.008	24	0.008	30
Nitric acid	0.006	24	0.006	30
Nitrobenzene	0.008	24	0.008	30
Nitrogen dioxide	0.085	24	0.085	30
Nitrogen monoxide	0.4	12	0.8	30
Nitrogen oxides	0.004	24	0.1	30
Oxidants	0.08	24	0.1	30
Ozone	0.1	24	0.2	30
Pentane	25.1	24	100.0	30
Phenol	0.1	24	0.8	30
Phosphoric acid	0.1	24	0.8	30

Pollutants	*Long-Term*	*Limits*	*Short-Term*	*Limits*
	mg/m³	*+(hours)*	*mg/m³*	*+(min.)*
TABLE 3.5—*Contd.*				
Phosphorus Pentoxide	0.5	24	0.15	30
Propanol	0.5	24	1.00	30
Propylene	5.0	24	5.0	30
Pyridine	0.08	24	0.08	30
Silica	0.02	24	5.0	30
Soot	0.05	24	0.1	30
Styrene	0.08	24	0.008	30
Sulphur Dioxide	0.05	24	0.5	30
Sulphuric Acid	0.1	24	0.5	30
Suspended Particulates	0.15	24	0.5	30
Tetrahydrofuran	0.2	24	0.2	30
Tetrachloromethane	—	—	4.0	30
Thiophene	—	—	0.6	30
Toluene	0.6	24	0.6	30
Toluene Dissocyanate	0.02	24	0.05	30
Trichloroethylene	1.0	24	0.14	30
Triethylamine	0.14	24	0.14	30
Turpentine	25.0	12	75	30
Vanadium Pentoxide	0.002	24	—	—
Vinyl Acetate	0.15	24	0.15	30
Xylene	0.2	24	0.2	30

TABLE 3.6

COMMONLY MEASURED AIR POLLUTANTS AND METHODS USED

Pullutant	*Methods*
Grit and dust fall	bucket, jar, British standard deposit gauge (monthly)
Suspended particulates	USA high volume filter (gravimetric ; 8 hourly)
— Total	British Standard Smoke Filter
— Smoke	(Soil Index ; Daily)
	Tape—Filter (Soiling Index ; hourly)

Pollutants	*Long-Term Limits*		*Short-Term Limits*	
	mg/m³	*+(hours)*	*mg/m³*	*+(min.)*
Sulphur Dioxide	West-Gaeke (specific for SO_2 ; daily) H_2O_2 followed by analysis for sulphate (specific for SO_2 ; daily H_2O_2 followed by titration or determination of conductivity (not gaseous acidity ; daily or continuous) coulometric (specific for SO_2 ; continuous) Statmann silical gel (8-hourly)			
Sulphuric Acid Mist	Double Filtration (Daily)			
Carbon Monoxide	Non-Dispersive infra-red (continuous)			
Ozone	Chemiluminescence			
Oxidants	Neutral KI (daily)			
Methane	Flame Ionization (continuous)			
Higher Hydrocarbons	Flame Ionization (continuous)			
Nitric Oxide	Chemiluminescence—reaction with O_3 (continuous)			
Nitrogen Dioxide	Chemiluminescence—reduction to NO then reaction with O_3 (continuous)			

Continous methods are those operating automatically

Appendix F

Recommendations

NATIONAL TRAINING COURSE ON AIR QUALITY MONITORING AND MANAGEMENT IN NIGERIA. LAGOS. 25 -28 FEBRUARY

INTRODUCTION

The National Air Quality Training course was held in Lagos from 25 –28 February 2002. The training was organised by the Federal Ministry of Environment (FMENV) in collaboration with

- the World Health Organisation (WHO) Geneva, Switzerland;
- the Norwegian Institute for Air Research (NILU), and
- the Queensland University of Technology (QUT), Brisbane, Australia.

The WHO observed that the sources of air pollution in Nigeria include vehicles, gas flaring, bush burning, industries and indoor cooking/heating.

The aim of the training was to promote air monitoring and management in Africa, particularly Nigeria.

Participants were drawn from the Federal, State, Non Governmental Organizations and relevant institutions.

OPENING

The training was declared open by the Honourable Minister of Environment (State) Otu-Ekong Dr. Ime T. Okopido, who presented the keynote address.

Goodwill messages were delivered by

- the representative of the World Health Organisation;
- the Chief Commandant of the Federal Road Safety Corps (FRSCs);
- representative of the WHO, Geneva, Switzerland, and
- the Norwegian Ambassador to Nigeria.

The training course covered important major aspects of Air Quality Monitoring and Management and came up with the following recommendations;

1. There is need for Clean Air Implementation Plan. (CAIP) to be developed for Nigeria to support the national policies on Health and Environment.
2. Awareness should be created on the importance of effective air quality management programme in Nigeria.
3. Inventorization and stocktaking of various actions including institutions and agencies handling issues which relate to air quality in Nigeria should be carried out.
4. Capacity building and human resources development on air quality management should be improved.
5. More enabling environment for effective local and international networking, and sharing of information and experience in air quality management should be created.
6. A national air quality data base which would eventually be fed into the regional and global air quality data base such as AFRINET and the Air Management Information System (AMIS) should be developed.
7. Institutional strengthening including upgrading and rehabilitation of laboratory and other facilities, appropriate for Nigeria, to assist the generation, storage and retrieval of air quality data should be carried out.
8. There is need to improve the current baseline information on air quality to support development of air quality guidelines and standards.
9. A national quality assurance and quality control programme to ensure credibility of data, and to be part of global programmes and initiatives should be developed.
10. In view of the size of the country, there is need for establishing more monitoring station in both rural and urban areas and also upgrade and rehabilitate the existing monitoring stations.
11. Besides the outdoor air quality , there is an increasing need for more attention to be paid to indoor air quality monitoring and management. In this regard, there is an urgent need for baseline information on indoor air quality in Nigeria.
12. Air quality modelling including utilisation of Geographic Information System (GIS) should be developed.
13. The Federal Ministry of Environment as the coordinating institution for

air quality should strengthen collaboration with relevant agencies and organisations including the Meteorological services, Ministry of Health Universities and NGOs.

14. The govemment should en sure funding of environmental issues in Nigeria.

CLOSING

Certificates were issued to participants at the end of the training programme. Closing remarks were delivered by the Commissioner of Environment Lagos State, Dr. (Mrs.) T. S. .Anibaba. The training was declared closed by the Honourable Minister of State for Environment.

ACKNOWLEDGEMENTS

The Federal Ministry of Environment will like to acknowledge:

a. The Norwegian government through the Norwegian Institute for Air Research (NILU) Kjeller, Norway, for financial and technical support for this programme;
b. The WHO Geneva, Switzerland for technical support and facilitation of the entire process;
c. The Queensland University of Technology (QUT) Brisbane, Australia, for technical support;
d. The Centre for Energy Research, Obafemi Awolowo University , Ile-Ife, Nigeria, for technical support.

Appendix G

Draft proposal
National Plan on urban air quality and health
2002-2010
Dietrich Schwela

National Plan on urban air quality and health 2002-2010

INTRODUCTION

Air pollution threatens the health of human beings and the environment in an acute, accumulative, and chronic way. Concern focuses not only on the air quality outdoors but also indoors. In fact, the highest air pollution exposure occurs in the indoor environment in developing countries. Exposure to air pollution may cause or aggravate respiratory and heart diseases and other health problems. Air pollution can be particularly harmful to people with chronic lung or heart ailments, pregnant women, the elderly, children, and infants. In addition, air pollution is probably more harmful to the poor working primarily in the streets and living in precarious conditions. The level, extent, and duration of the exposure, age, individual susceptibility, and other factors determine whether someone will experience pollution-related health problems.

To minimize the risks that air pollution poses to populations, Nigeria is trying to develop its institutional and technical abilities to improve surveillance, control, and preventive actions. An effective way for he States of Nigeria to develop a feasible action plan is to be part of a National Plan to improve air quality. This National Plan will facilitate local, national and international agencies the setting of air quality priorities, better coordination and cooperation regarding air quality problems in the States, and more possibilities to acquire funding and other resources to support air quality activities.

The National Plan follows the recommendations of Chapter 6 (Protecting and promoting human health) and chapter 9 (Protection of the atmosphere) of Agenda 21, derived from the 1992 United Nations Conferences on the environment and Development (UNCED) and the commitments made at the ….

This document describes the activities that should be implemented at national and State levels in the next eight years to create conditions leading to lessen health threats from air pollutant exposure. It has been prepared with contributions from the First National Training Course on Air Quality Monitoring and Management, held in Lagos, Nigeria, from February 25-28, 2002.

BACKGROUND

Neither air pollution nor efforts to control it are recent phenomena. An early example of pollution control ordinance can be trace to thirteenth-century England, when King Edward I banned the burning of highly polluting coals in London.

Closer to Nigeria and nearer in time, air pollution concern in Nigeria began in the 1970s when universities and ministries of health carried out the first air pollution measurements.

The Global Environmental Monitoring System GEMS/AIR of UNEP and WHO began its operations in 1976. In sub-Saharan Africa, GEMS/AIR began with 1 station in Accra, Ghana, and Nairobi, Kenya, respectively. In 1980 GEMS/AIR operated globally around 2709 stations in 45 countries. In 1996, GEMS/AIR discontinued its activities, and became part of the Air Management Information System AMIS, set up by WHO.

AMIS provides the comprehensive information required for effective air quality management. It includes air quality monitoring, the development of instruments for conducting emission inventories and dispersion modelling, the estimation of the global and national burden of disease due to air pollution, and the proposal of detailed air quality action plans. Participation in AMIS automatically links countries to a support network of resources and expertise, the Global Air quality Partnership.

During the last year, WHO/HQ in conjunction with the efforts of other multilateral organizations has supported activities to air quality improvement in the Sub-Saharan Region, such as the removal of lead in gasoline.

The current global environmental problems such as climate change, stratospheric ozone depletion and transboundary pollution also affect the air quality of Nigeria. One of the main mechanisms to solve these problems has been the international cooperation through ther implementation of international agreements such as the Montreal Protocol and the Kyoto Protocol.

CURRENT SITUATION

Goals, policies, strategies

Legislation

Federal and State responsibilities

National Air Quality Assessment project

Institutions

Cities

Topographies

Meteorological conditions

Potentially important emissions

Initial emissions inventories

Incidental air pollutant concentration measurements

Knowledge on human health effects (potentially caused by air pollution)

Knowledge on environmental effects (potentially caused by air pollution)

Interaction with Nigeria´s neighbour countries

APPROACH AND GUIDING PRINCIPLES OF THE NATIONAL PLAN FOR NIGERIA

Through the National Plan on Air Quality and Health for Nigeria, WHO/HQ in collaboration with NILU and ICAQH/QUT, promotes a comprehensive approach to strengthen the capabilities of the States of Nigeria. It aims at accelerating air quality management action and human health protection. The Plan describes the activities that should be developed and executed at the national, State and local levels in the next eight years to create conditions leading to lessen health threats from air pollutant exposure.

Plan is multi sectorial and interdisciplinary, WHO/HQ invites national and state technical agencies to discuss on the following five strategic axes: policies; standards and regulations; air quality management; surveillance of air pollution impact on health; education, training and public awareness; and programme financing. A concerted strategy would then be obtained and formulated.

The Plan recognizes the creation of national and local leadership (from the government and society) as the core issue to fight against air pollution in order to reinstall and maintain air quality to such a degree that human health is neither impaired nor endangered and yet economic development is encouraged. The Plan addresses national action on the one hand, and State implementation on the other.

The Plan is based on the following guiding principles:

Universality	Greater coverage of air quality and health programmes.
Equity	Air quality and health improvement regardless of ethnicity, sex, age, etc.
Participation	Active participation of the population in the development and implementation of the plans to minimize air pollution and prevent the deterioration of environmental quality.
Concerted effort	Discussion and cooperation among all stakeholders.
Integrity	Development of integrated programmes on air quality and health (prevention, surveillance, intervention, control, and education).
Coherence	Orientation of the efforts of all stakeholders towards a common objective.
Opportunity	Sound solutions at the suitable moment.
Sustainability	Development of economically self-sustainable programmes.

Decentralization	Implementation of decentralized programmes with national and local components.
Compatibility	Development of air quality and health programmes compatible with national and local needs.

GOAL AND OBJECTIVES OF THE NATIONAL PLAN

The goal of the National Plan on Air Quality and health is:

To contribute to the improvement of indoor and outdoor air quality and prevention of its deterioration in the States of Nigeria within the sustainable human development framework, protection human health with equity, and protecting the environment.

The general objective of the Plan is:

To contribute to the strengthening of the technical and institutional capabilities of the States and of the mechanisms for cooperation among the states for the implementation of plans and programmes to improve air quality and prevent indoor and outdoor air pollution, based on standards and regulations that protect human health, within the sustainable development framework.

The specific objectives of the Plan are:

- To include or strengthen the concept of air quality and health in the national laws, regulations, plans and strategies of the States of Nigeria.
- To establish or strengthen national and local air quality management programmes.
- To establish or strengthen surveillance programmes of air pollution impact on health and to implement operative research on this issue.
- To inform, educate, train, and strengthen public participation in all aspects related to air quality and health, including air polluton reduction and prevention.
- To establish self-sustainable mechanisms in national and local air quality and health programmes.

Programmatic areas

Based on the objectives described above, the National Plan has been structured into the following five interrelated programmatic areas:

1. Policies, standards and regulations
2. Air quality management
3. Surveillance of air pollution impact on health
4. Education, training, and public awareness
5. Financing.

Areas 1, 2, and 3 are the bases of the Plan, while areas 4 and 5 support the other three. Each area has a specific objective, a set of expected results and a group of activities to be developed and executed in the next eight years. Each expected result includes supranational activities to be promoted by WHO on one side, and national and local activities to be carried out by the authorities and civil society on the other. WHO activities will be coordinated with those of other agencies and programmes of the United Nations, development banks and institutions, the private sector and non-government organizations with whom WHO will pursue the establishment of partnerships. The States of Nigeria should prepare Clean Air Implementation Plans (CAIPs) and air quality and health trend reports periodically to monitor the progress and impact of their programmes.

Due to the heterogeneity of the situation (human and economic resources, air pollution problems, etc.), the activities described below must be implemented according to national and local possibilities and needs.

1. Policies, standards and regulations

Objective

To include or strengthen the concept of air quality and health in the laws, regulations, plans and strategies of Nigeria and its States.

Expected results and activities

National laws and regulations on air quality

For achieving these results, WHO will help to promote the development and implementation of national laws and regulations on air quality and provide technical support to Nigerian and State authorities through publication, distribution and interpretation of the WHO Guidelines for Air Quality, provide technical support in preparation of a compendium of the existing legislation in Nigeria and its neighbour countries, participation in technical missions, and exchange of experience and knowledge between countries (e.g. via the AMIS).

Nigeria and its States should:

1. Establish multi-institutional and interdisciplinary technical committees to support the revision of policies, standards and regulations.
2. Establish programmes for the preparation and revision of standards, regulations and contingency plans.
3. Revise ambient air quality and emission standards and design mechanisms for their harmonisation with those of its neighbour countries.
4. Develop or revise policies and regulations to promote the development of programmes that will improve air quality and prevent its deterioration.
5. Design mechanisms to implement policies and regulations.
6. Promote the use of ISO 14000 standards.

National and local institutions with capability to enforce air quality laws and regulations

To achieve this result, WHO will promote the establishment and strengthening of national and State institutions with capability to enforce air quality laws and regulations and provide technical support to Nigeria through human resource education, participation in technical missions, and exchange of experience and knowledge among Nigeria, its neighbour countries, and other countries.

Nigeria and its State Governments should:

1. Establish or strengthen national and local institutions with capability to enforce air quality laws and regulations.
2. Strengthen technical and institutional capabilities to design and implement action plans at the national and local levels.
3. Establish multi-institutional and interdisciplinary technical committees to provide permanent support, follow-up, and monitoring of the activities.

Air quality incorporated into regional, sub-regional, national and local plans and policies

To achieve this result, WHO will promote the incorporation of air quality issues in regional and sub-regional development plans and policies. Nigeria, its neighbour countries, and other countries of the Sub-Saharan region should incorporate the air quality component into their national and local development and land use plans and should comply with international agreements.

2. Air quality management

Objective

To establish or strengthen national and local outdoor and indoor air quality programmes.

Expected results and activities

National and local outdoor and indoor air quality management programmes. These programmes should contain four specific areas: air quality surveillance; emission controls; air pollution prevention; and information, training, and public communication

To achieve this result, WHO will promote the exchange of experiences and knowledge among countries and the promotion of control and preventive actions in the countries and will provide technical support through the dissemination of conceptual and methodological instruments and participation in technical missions. Toward this end, WHO will help to identify, organize, and implement a network of collaborating centres working in this area. The main function of WHO, in coordination with this network, will be:

- To help prepare plans for QA/QC of air quality sampling and analysis, laboratory accreditation, and standardization of air quality data management.
- To prepare guidelines for the development of air quality management programmes.
- To prepare protocols for multi-centre studies and research guidelines.
- To provide technical support to Sub-Saharan countries in the preparation and execution of action plans.
- To train specialized human resources in Sub-Saharan countries.
- To establish a regional air quality management information centre. This centre will work closely with the WHO AMIS programme.
- To prepare information, training, and public awareness material on prevention and reduction of outdoor and indoor air pollution.

Nigeria should:

1. Perform outdoor and indoor air quality diagnostic studies in the largest urban areas and rural areas with industrial, mining or biomass burning problems.
2. Design national and local surveillance, control, and prevention action plans (Clean air implementation plans, CAIPs) technically and economically viable.
3. Establish national and local air quality surveillance systems based on action plans. These surveillance systems should have networks and protocols for meteorological and air quality sampling, emission inventories updated regularly, inventories of indoor exposure sources, and air quality forecast systems based on standardized meteorological information and forecast models.

4. Prepare a national programme for QA and QC of air quality sampling and analysis and establish a national reference laboratory.
5. Create national and local programmes for control of stationary and mobile emission sources based on command and control strategies and market based incentives identified in the action plan (CAIP).
6. Implement national and local air pollution prevention programmes based on action plans (CAIPs). These programmes should include strategies for efficient use of energy, use of renewable energy sources, protection of clean air sources such as parks and forests, sustainable urban development and behavioural changes.
7. Request environmental impact assessments to large development projects that may impact air quality significantly.
8. Organize national and local information centres for air quality management.
9. Train specialised human resources.
10. Prepare a national standardised air quality data management programme.
11. Establish certified laboratories for air quality sampling and analysis following WHO/PAHO guidelines of the regional laboratory accreditation plan.

3. Surveillance of air pollution impact on health

Objective

To establish and strengthen programmes for the surveillance of air pollution impact on health and the environment and to carry out operative research programmes on this issue.

Expected results and activities

National and local programmes for the surveillance of air pollution effects on health. These programmes should have a permanent recording system of morbidity and mortality cases associated with air pollution, risk assessment, effective information systems, ad standardized calculations of the social costs of air pollution on health

To achieve this result, WHO will promote the exchange of experiences and knowledge among Sub-Saharan countries and the implementation of action in these countries and will provide technical support to the countries through the preparation and dissemination of conceptual and methodological tools and participation in technical missions. Toward this end, WHO will help to identify, organize, and implement a network of collaborating centres working in this area. The main function of WHO, in coordination with this network, will be:

- To prepare guidelines for epidemiological surveillance and risk assessment, including the formulation of environmental health indicators. To prepare guidelines for the development of air quality management programmes.
- To prepare protocols for multi-centre studies and operative research projects.
- To provide technical support to Sub-Saharan countries.
- To train specialized human resources in Sub-Saharan countries.

- To establish a regional plan for the standardization of data management related to health.
- To create a regional information centre of air pollution effects on health.

Nigeria should:

1. Establish or strengthen national and local epidemiological programmes that record morbidity and mortality cases associated with air pollution on a regular basis and use environment and health indicators according to WHO guidelines.
2. Create or support national and local risk assessment programmes and request risk assessments to large development projects that may impact air quality significantly.
3. Establish national and local information and training centres focused on air pollution effects on health.
4. Train specialised human resources and to incorporate the topic of air pollution effects on health in the general education of health professionals.
5. Estimate the economic impact of air pollution on health.

4. Education, training, and public awareness

Objective

To inform, educate, train and strengthen public participation in all aspects related to air quality and health, prevention, and reduction of air pollution.

Expected results and activities

A concerted awareness system directed to decision-makers, political leaders, entrepreneurs, and general public on the importance of outdoor and indoor air pollution prevention and reduction

To achieve this result, WHO will support the training of human resources and will design the required tools; will prepare material for information and public awareness on prevention and reduction of indoor and outdoor air pollution; and will promote the implementation of CAIPs in Nigeria and its 36 States.

Nigeria should.

1. Develop national and local strategies to work with the mass media and to strengthen their participation.
2. To train specialized human resources achieving a multiplying effect (training the trainers).
3. Design mechanisms to communicate risks and disseminate policies, standards and regulations.
4. Establish alert systems, including air quality indices to inform the population to permit it to take necessary measures.

5. Air quality and health issues incorporated in different levels of education

To achieve this result, WHO will support the education of specialised groups and the provision of corresponding training materials, will prepare distance learning courses, which will help to promote the implementation of actions in the States.

Nigeria and its States should:

1. Incorporate the topic of air quality and health in the elementary and high school level science curricula.
2. Develop university programmes on air quality and health.
3. Develop and promote training programmes for the institutions responsible for managing air quality programmes and surveillance of air quality impact on health.
4. Train specialised human resources.
5. Include the topic of air quality and health in the research priorities.

6. Financing

Objective

To establish mechanisms for sustainability in national and local air quality and health programmes.

Expected results and activities

Operational short, medium, and long term programmes to promote self-sustainability of the national and local programmes on air quality and health

To achieve this result, WHO will help to promote the development and implementation of operational financing programmes; will prepare an inventory of potential financing institutions at the international levels; will facilitate the dialogue among national and local institutions and potential international financing institutions; and will provide technical support to national and local institutions in the formulation of funding proposals for the programmes.

Nigeria should:

1. Prepare economic, financial, and cost-benefit analyses for air quality and health programmes.
2. Define short-, medium-, and long-term investment programmes to comply with air quality and health programmes.
3. Raise awareness among decision-makers on the need for financing air quality management programmes and the surveillance of air pollution impact on health.
4. Create economic incentive mechanisms for emission reduction.

7. Key agents and actors

Air quality is a global issue. We are all actors and agents, we are part of the problem, the solution, or both of them. Therefore, responsible groups are represented by:

- National and local governments, responsible for the setting and enforcement of policies, laws, and regulations; air quality surveillance and control; emission control; surveillance of air pollution impact on health; and education, training and awareness of the population.

- Transport, energy and industry organizations, responsible for making the improvement of air quality and air pollution prevention a strategic goal in their daily actions.

- Society and non-governmental organizations, responsible for the education, training, and awareness of the population.

- Academic and scientific institutions, responsible for research on technological, economic, and social problems concerning air quality and health.

- International organizations, responsible for providing technical, financial, and human support.

Appendix H

A newspaper presentation of the Training Course presented 2 weeks before the course started

Tuesday, February 12, 2002

HOMES & Real Estate

FG Plans Air Quality Management Programme

ENVIRONMENT

By Bennett Oghifo

Worried by growing cases of air pollution related problems among Nigerians, the Federal Government has plans to develop a functional and result-oriented air quality programme.

The programme is expected to address both indoor and outdoor air pollution problems as well as their impact on the human environment.

It is believed that there would be even larger increase in the emission of pollutants, and increase in the public and environmental exposure to these pollutants in the years ahead considering the increasing urban population in Nigeria and Africa coupled with increased rate of industrialisation.

The training course is designed to strengthen the nation's capacity to monitor and manage air quality, and it would form part of the ongoing implementation of Nigeria's local Agenda 21-the National Environmental Action Plan. It is also inline with the Decision 9/2 on Protection of the Atmosphere adopted at the 9th Session of the United Nations Commission on Sustainable Development (CSD-9) in April 2001.

Consequently, the Royal Norwegian Government has given a grant of NOK 240,000 to the Norwegian Institute of Air Quality Management to enable it assist in the training expected to take place from February 25 to 28 in Lagos. It is seen as "good basis for future cooperation with the Norwegian Institute for Air Research (NILU), especially in the area of air quality monitoring and management including the use of telemetric system to monitor the levels of air pollutants in our urban and sub-urban areas", said Dr. Imeh Okopido, Minister of Environment (State).

The air management programme would include identification and establishment of air monitoring network adapted to the specific needs of the country, and establishment of national air quality database, which would feed into the global air quality network.

The national training course is expected to perfect the Air Management Programme. According to Dr. Okopido "will provide the boost for effective take-off of this national programme". It would strengthen national capacity to monitor and manage air quality in Nigeria.

The training course, which would be the first of its kind in the country is being hosted by the Ministry of Environment in collaboration with the Norwegian Institute of Air Research, Kjeller, the World Health Organisation (WHO), Geneva Switzerland, and the Environmental Aerosol Laboratory of the Queensland University of Technology (QUT), Brisbane, Australia.

The specific objectives of the programme is to raise awareness of the need for effective air quality monitoring and management among participating State Environmental Protection Agencies (SEPAs). It is to foster national cooperation and collaboration through a forum of discussions and exchange of experiences, and strengthen national air quality monitoring and assessment capabilities.

Other objectives are identification of problems relating to air quality monitoring in Nigeria and proffering possible solutions, training the trainers to promote/propagate the programme, training participants to, in turn, train other people in their own states, and initiate plans of action for improvement of air quality monitoring and management in all states of the Federation.

The course will be free. Participation will be drawn from Federal and State

Co-Operation Between Public and Private Sectors in Protecting African Environment

Being text of address delivered at the James Callaghan Lecture, 2001in the House of Parliament, London

ENVIRONMENT

By Imeh T. Okopido

The environment is a global legacy and eco-residence

I to the natural habitats that provide the basic resources for human growth as well as technological and industrial development. Today, the environment faces numerous threats from both natural and human-induced stresses. The symptoms portend growing danger to global health and security.

The key issue is to sustain and protect our common heritage through novel and effective intervention mechanisms.

While focusing on the realm of collective responsibility for the protection of the environment as a common heritage, this lecture also addresses the salient aspects of stakeholder environmental management and intervention routes, that can provide a "win- win" situation by developing new relationships between the public sector, business community, environmental ,non- governmental and community-based organisations, and the general public.

Through the noble cause of ACOPS, and the instrumentality of Lord James Callaghan's vision, this Lecture is a tribute to the environment as a global legacy that requires our collective protection.

Introduction

Tribute to ACOPS

About 50 years ago, when Lord Callaghan set up the Advisory Committee on the Protection of the Sea (ACOPS), there were no international conventions and treaties governing environmental protection. Thus, its formation then conceived as a broad ranging non- governmental organisation (NGO), created a forum to pool together all shades of political and corporate opinions from various stake-holders in the environment.

Today, those who cause pollution and those at the receiving end of pollution, and also environmental legislators, work together. Through ACOPS, and under the spirit of tolerance and willingness, they work together towards the realisation of the same goal regardless of political and corporate differences.

The ACOPS initiative is a glaring demonstration of how the awareness of a responsibly oriented NGO community can enrich the contribution of civil society, and also make a positive contribution to the formulation of effective public policies as well as those of the private sector.

This lecture definitely assumes contemporary prominence in terms of the present setting of the public/private sector relationship in my country. In Nigeria today, the dawn of democracy has its reflections on the environment.

While cherishing the envi-

Planners Seek Rev

HOUSING

By Abimbola Akosile

The Town Planners in Lagos State have called for an upward review of the existing scale of fees for their professional services, in oreder to streamline the procedure with modern scales and methods.

According to a release from the Secretariat of the Nigerian Institute of Town Planners (Lagos State Chapter), the planners are bothered by the seeming inappropriate remunerations for their services over the years.

To achieve this, a day- long forum has been scheduled for Thursday February, 21st, 2002 at the CAP Plc Training Centre, Ikeja, Lagos, where the town planning practitioners would seek to devise a fresh scale of fees for their services.

The settlement development experts have frowned at the provisions of the government scale of fees, saying that the realities on ground had made the document to become unacceptable. Besides, the underlying phi-

losophy orbasis for fixing the fees, they argue, has continued to be defective, the release stated.

Mr Ore Oluwadare, chairman of the Conference Organising Committee (COC), said that the one- day workshop would address such inherent anomalies by "undertaking an extensive review of the existing scale of fees, as well as discuss and adopt a realistic scale of fees for Town Planning Consultancy Services in Lagos."

Recommendations, Oluwadare stated, shall be made to the national body of the Nigerian Institute of Town Planners (NITP), for examination and appropriate action. Resource persons expected at the forum include Dr Femi Olomola, Alhaji Waheed Kadiri, and Dr. J. B. Falade.

Papers by Olomola

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ABSTRACT
The World Health Organisation (WHO) has initiated a programme for raising awareness of air pollution problems in Central Africa. Norwegian institute for Air Research (NILU) was requested to take a lead role. Funds were made available from the Norwegian Ministry of Foreign Affairs, and a first seminar was launched at the end of February 2002 in Lagos Nigeria

NORWEGIAN TITLE

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ABSTRACT (in Norwegian)

** Classification*
A Unclassified (can be ordered from NILU)
B Restricted distribution
C Classified (not to be distributed)