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**ECONOMIC COMMISSION FOR AFRICA  
MULTIDISCIPLINARY REGIONAL ADVISORY GROUP (ECA-MRAG)**

**REPORT OF ECA-MRAG MISSION TO IDEP  
10 TO 19 APRIL 1991  
DAKAR, SENEGAL**

**by**

**REGIONAL ADVISORS ON ENERGY AND ENVIRONMENT AND DEVELOPMENT**

**September 1991**

**REPORT OF THE MRAG MISSION TO IDEP**  
**SENEGAL 10-19 APRIL 1991**

**Introduction**

At the request of the United Nations African Institute of Economic Development and Planning (IDEP) a two-man MRAG team composed of two Regional Advisers on Energy and on Environment and Development respectively undertook a mission to the institution in Dakar 10-19 April 1991.

**Mission purpose**

The objectives of the advisory mission as requested by the Institute's 1 February 1991, telex to the ECA were:

- designing a three-months specialization course on energy, environment and development in Africa;
- preparing project proposal; and
- advice on possible funding source.

The terms of reference were subsequently revised by IDEP as follows:

(a) To review the structure and content of IDEP's three-months specialization programme on energy, environment and development in Africa and to recommend changes;

(b) To assist in identifying resource person inputs for the different course modules and for the coordinator of the programme;

(c) To prepare a draft project proposal to be submitted for donor funding;

(d) To advise on relevant training materials for the programme.

## Background

IDEP is a bilingual (English and French) institute established by resolution 58 (V) of 1 March 1962 at the fourth session of the Conference of Ministers of the Economic Commission for Africa. The Institute started its operations in Dakar in November 1963 as a United Nations Special Fund Project.

The primary function of IDEP is the training of African economic planners at post-graduate level. Its mandate also includes research and provision of advisory and consultancy services on request as well as organizing conferences, seminars and workshops. Every year it brings together up to 100 African Government Officials in decision-making positions of departments, commissions and ministries responsible for national economic planning.

The umbrella training programme of the institute is composed of a cycle of programmes of two year's duration leading to an M.A. degree in Economic Development and Planning which is divided into three interrelated components, namely:

- (a) a nine-month basic programme in economic development and planning;
- (b) a choice of four independent three-month specialization programmes;
- (c) a six-month research training programme which forms the final part of the M.A. programme.

The nine-month basic programme is oriented to African conditions and experience. It gives emphasis to comprehensive multisectoral and regional planning, micro-economic policy design

and project evaluation. It also deals with macro-economics of development policies related to structural adjustment policies.

The three-month specialization programmes offer a choice of focus on four of the priority sectors of the Lagos Plan of Action namely:

- Industrial development in Africa;
- Population and human resources development in Africa;
- Energy, environment and development in Africa;
- Agriculture and rural development in Africa.

The four independent programmes which are of a more applied and empirical nature, include case studies, practical application exercises, field projects and workshops at both the comprehensive and sectoral, country and multi-country levels. Any one of these courses may also be pursued as a self-contained, short-term specialization programme.

IDEP activities, are characterised by practical orientation to problems for which solutions are sought that are implementable in the socio-economic conditions prevailing in Africa.

IDEP's simultaneous English-French interpretation and translation resources make it possible to conduct lectures and seminars in either language thereby enabling the institute to serve most countries in Africa.

The current IDEP training and research programmes are derived from its medium-term plan which is geared to serve Africa's development aspirations as set down in the Lagon Plan of Action, and the African Alternative Framework to Structural Adjustment Programmes. These lay particular emphasis on:

- sectoral changes in African economies with specific sectoral priorities, targets and rates of growth indicated;
- self-reliance at national, subregional and regional levels;
- greater economic cooperation at subregional and regional levels towards the operationalization of the African Economic Community by year 2000.

Further important areas given due emphasis are:

- Comprehensive inter-sectoral approaches to development planning and programming with sectoral interdependence expressed through input-output relations not only in material production but also with regard to social, political and ecological factors;
- optimal mobilization and utilization of indigenous resources in the pursuit of the continent's goal of sustained and self-reliant economic and social development;
- building and strengthening planning and policy design capacity and machinery in African countries.

Review of the IDEP's proposed specialization programme:  
comments on the course structure proposed

The first item of the mission's terms of reference calls for "review of the structure and content of IDEP's Three Month Specialization Programme on Energy, Environment and Development in Africa and to recommend changes".

The March 1991 draft of this Specialization Programme presented to the ECA-MRAG mission on 15 April, does not contain statements of the objective of the programme or what participants would gain from it or of its relation to pressing African needs in energy, environment and development. There is also no indication of the background qualifications, experience or present employment

the prospective candidates must have in order to be eligible for the course. The programme outline lists seven modules to be covered in three months but does not indicate the time allotted to each one of the modules.

According to the titles listed, Module I is to be a review of energy, environment and development in Africa. Modules II, V and VI are on energy supply, on energy sector planning and management and on energy projects respectively. Modules III and IV are entitled "Drought, Desertification and their Social Economic and Environmental Implications", and "Industrial Technology and Environmental Management...." respectively.

From these titles therefore, it seems that energy is to be the main area of concentration while environment would constitute the subsidiary discipline. Development is presumably to be a topic covered by implication rather than by explicit treatment of salient issues. The title of Module VII "Field Work, Visits, Surveys and Experiments in Energy and Environmental Projects in Senegal" seems to support this inference.

There appears to be no intention to explicitly discuss in the programme, the triangular interaction and tight linkages among - energy - environment - development that have recently become of central concern in the international community as is evidenced by the Brundtland Report of the World Commission on Environment and Development (1987) as well as the current preparations for the 1992 UN Conference on Environment and Development (UNCED-92) to be held in Rio, Brazil in June 1992.

#### Comment on the course content proposed

Module I, entitled "Review of Energy, Environment and Development Profile in Africa is to be composed of three sections:

- 1.1 The World Energy Crisis of 1973-74, 1979-80 and 1990-91 and Africa's Place in the World Energy Situation.
- 1.2 Fuel Wood Crisis and Deforestation
- 1.3 Industrial Development and the Environment.

These sections would address only a few aspects of the present state of energy, environment and development in African countries. The sections cannot, therefore, be regarded as adequately reviewing the energy crises, the environmental crises and the development crises which gravely threaten development and survival prospects in most of the countries. Nor do the titles of sub-sections under each section hold out any promise of discussion of the profound linkages and interactions between energy, environment and development that prevail in reality.

It is not clear why the interaction of industrial development with the environment is singled out for treatment in the programme, particularly in view of the low pace and level of industrialization in Sub-Sahara Africa. Subsistence agriculture including overgrazing, large scale agricultural and forestry production for exports, large scale mining for export, land clearing for agriculture, the very rapid pace of urbanisation due to the massive exodus from impoverished rural areas, each has an impact, far more widespread and hence of much greater concern in the African environments.

Module II entitled "Energy Supply and Technology" is to have four sections:

- 2.1 Traditional Energy Resources
- 2.2 Conventional Energy Resources
- 2.3 Electrical Energy Systems
- 2.4 Non-Conventional Energy Resources

Module II is presumably intended to focus on the impacts and interactions of energy supply and technology with environment and development to judge by the subsection titles in the Module. However, it seems that even this expectation is to be met only partially. Three sections 2.1, 2.3 and 2.4 each include a subsection entitled economic and ecological costs. Section 2.2 on conventional energy sources lacks such a subsection even though hydrocarbons, hydropower and nuclear energy supplies and technologies are known to have very important impacts on environment and on development. The uses of energy supplies from these sources also have profound impacts on the environment and on development. Nonetheless, the environmental and developmental issues and concerns arising with large order of magnitude and widespread energy uses are not taken up in this or in the other modules proposed.

Module III entitled "Drought, desertification and their social, economic and environmental implication" consists of three sections:

- 3.1 Overgrazing, fuelwood and deforestation
- 3.2 Drought control and water resources management
- 3.3 River and lake basin development

The module is probably intended to deal with the protection of land resources. It does not, however, deal with soil erosion and many other pertinent topics. As it stands now, it is inadequate. Furthermore, certain elements of sections 3.1 and 3.2 appear repetitious in that they have already appeared in section 1.2 (Fuelwood crisis and deforestation).

Module IV entitled "Industrial Technology and Environmental Management of Wastes, Pollution and Water Supply." consists of three sections:



- 4.1. Environmental sanitation, air and water pollution, congestion and noise;
- 4.2 Environmental management of urban solid wastes;
- 4.3 Appropriate technology for rural and urban water supply.

This is the classical treatment of the topics on environmental pollution and water supply. It is not clear from the information provided whether the new and emerging environmental issues such as climate change arising from an increase in the CO<sub>2</sub> concentration in the atmosphere will be addressed.

Module V entitled "Energy Sector Planning and Management" has three sections:

- 5.1 Energy balance sheets
- 5.2 Energy demand management
- 5.3 Analytical simulation techniques

As only energy supply and technology issues have been addressed in the preceding modules it is not clear why energy demand (i.e. "energy use") management should be taken up in Module V. It has recently become imperative to integrate environmental and developmental impact assessments of energy supply and of energy utilization in energy planning and management. But the inclusion of "social welfare" under pricing objectives and "socio-political, legal and environmental constraints" in two sub-sections of 5.2 can hardly be considered adequate coverage of the far reaching roles that environmental and developmental impact considerations have come to play in present day energy sector planning and management. The entire structure and content of Module V reflect past concepts and practices of energy planning and management that have been drastically overhauled due to prominent environmental and developmental concerns.

Module VI on Energy Sector Projects in Africa has two sections:

6.1 "Cross-country studies of UNDP/IBRD energy sector projects and their management in Africa"

6.2 "Cost-benefit evaluation of energy sector projects."

It is not certain whether there are any published cross country studies of UNDP/IBRD energy sector projects and their management in Africa.

The joint UNDP and World Bank Energy Sector Assessment Programme (ESAP) has compiled a report entitled "Issues and Options in the Energy Sector" of many developing countries. The first such report for the energy sector of an African country was for Mauritius published in December 1981. By 1990 reports had been issued for 42 African countries. Each report compiled by a team of expatriate experts, aimed to apply orthodox structural adjustment programme concepts and tenets to energy sector problems in the particular country. The reports invariably included a list of prioritized projects that the team would propose towards solving the sector problems identified in the country.

An in depth follow-up evaluation of individual projects would be undertaken by the Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMASP) at the specific request of the country. But ESMASP project reports are classified and not generally published. It would, therefore, be difficult to access ESMAP material if it is the intention to conduct cross-country studies on ESMAP projects as part of the specialization programme.

Section 6.2 on Cost-Benefit Evaluation of Energy Sector Projects does not include a subsection on environmental impact assessment (EIA) even though major donors are making this mandatory.

For Module VII entitled "Field Work, Visits, Surveys and Experiments in Energy and Environmental Projects in Senegal," no section titles are proposed. It would be interesting to have an indicative listing of samples of the field work, surveys and experiments envisaged.

An alternative course structure and contents which the mission suggests for the IDEP Three-Month Specialization Programme on Energy, Environment and Development is set out in the following section.

### Suggested structure and contents

#### Introduction

Energy is extracted or harnessed from primary energy resources to be found in the environment. The resources may be renewable e.g. hydro, geothermal, solar, wind or non renewable e.g. coal, petroleum, nuclear. Primary energy resources may be converted into energy carriers such as electricity, heat, light, liquid or gaseous fuels for ease of transport, distribution and/or for use. Such conversions take place in the environment. The extraction, harnessing, conversion, transport and distribution of energy each directly and/or indirectly affects or exerts impacts on local environments. Often, remote environments may also be impacted.

Humans use energy for survival and also for development activities. Development and survival activities take place in the environment with the use of energy e.g. clearing land to produce food, build houses, streets and, to extract minerals.

These "development" activities themselves can inflict considerable damages on the local environment wherever they take place. In addition the residues and waste substances resulting from the activities and from the energy used to effect the

activities have impacts on the local and often induce adverse impacts on remote and even on the global environment.

Energy systems and uses are, therefore, intimately linked to and interact with development and with the environment. Adverse impacts were in the past regarded as subsidiary and peripheral factors in the design and economic and social appraisal of energy systems and development programmes. Recently growing alarm over the irreversible adverse impacts arising from the interactions of energy, environment and development, has made these interactions factors of central concern internationally. This is the result of the high levels of threats to the survival into the future of present life forms, posed by global warming, ozone layer depletion, rapid erosion of bio-diversity, deforestation and degradation of land resources, pollution of fresh water resources, sea water contamination, etc. resulting from the predominant patterns of development and uses of energy.

On the relationship between environment and development, it is now acknowledged that environmental conservation and development which were previously perceived to be in conflict are, in fact, complementary and mutually reinforcing. Therefore, environmental conservation is no longer adequate without utilizing the resources (land, water, forests etc.) sustainably for development. The Brundtland Report (1987) states, "Humanity has the ability to make development sustainable - to ensure that it meets the needs of the present without compromising the ability of the future generations to meet their own".

It has also been argued that development cannot subsist upon a deteriorating, environmental resource base, and that environmental concerns must be incorporated into existing and future economic and sectoral policies to ensure that they protect and improve the environment and the resource base. In other words, environmental objectives must be built into investment programmes

and technology choices as well as all components of development policies.

### Objectives of the course

The objective of the course is to assist and help enhance African planning and management capabilities in energy, environment and development with respect to:

- acquisition and processing of relevant data and information on technologies and the developmental and environmental impacts of the application and use of technology in a holistic perspective;
- the analysis of the triangular inter-relationships and linkages among energy, environment and development;
- the promotion of an integrated planning to sustainable national and subregional development encompassing energy and environmental dimensions.

### Target group of course participants

- Decision makers and management staff in energy, environment and development planning agencies and parastatals;
- Policy makers in government organisations involved in energy, environment and development matters;
- Researchers and lecturers in the three fields.

The course assumes a basic understanding of ecological, economic and/or engineering principles.

### Course programme

The course programme consists of lectures, case studies, exercises, group discussions and field visits with respect to the subject matter of the various modules.

Module I Review of energy, environment and development profile in Africa.

Module II Energy uses, supplies and resources in Africa

Module III Environment in Africa

Module VI Energy-environment linkages

Module V Environment-development linkages

Module VI Development-energy linkages

Module VII Integrated planning of energy, environment and development

Module VIII Case studies and field visits of energy, environment and of development projects.

### Course duration

The course will last three months (approx. 13 weeks). Modules I through VII will be covered in one and half weeks each. Modules VIII will be covered in two and half weeks.

### Suggested detailed programme outline

#### Module I: Introductory review of energy, environment and development profile in Africa

##### 1.1 Definitions

##### 1.2 The African triple crisis in energy, environment and development in the context of the world crises in the these spheres.

### 1.3 The inter-linkages

- 1.3.1 energy - environment
- 1.3.2 environment - development
- 1.3.3 development - energy

### 1.4 The urgent need for orderly transitions to sustainable energy, environment and development patterns in Africa.

## **Module II: Energy uses, supplies and resources in Africa**

### 2.1 Energy uses for essential needs

### 2.2 Energy uses for economic and social development

### 2.3 Energy supplies, production and delivery

- 2.3.1 biomass
- 2.3.2 electricity
- 2.3.3 petroleum products
- 2.3.4 heat

### 2.4 Energy resources

- 2.4.1 renewable: animate, biomass, geothermal, hydro, solar, wind, others
- 2.4.2 depleting: coal, petroleum and natural gas
- 2.4.3 nuclear

### 2.5 Efficiency in energy systems from production to end-use:

- 2.5.1 energy efficiency
- 2.5.2 economic efficiency

## **Module III: The African Environment**

### 3.1 Internal requirements for economic recovery

- 3.1.1 Soil conservation
  - Cultural techniques for soil conservation: intercropping, alley cropping, crop rotation, cover cropping, mulching, fallowing, bench

terracing, contour ploughing, gully damming, grassing water ways, drainage diversion, rotational grazing

- Agro-forestry practices
- Sand dune stabilization: mechanical and biological, selection of plant species for fixing shifting sands

### 3.1.2 Drought and desertification control

#### (a) Management of water resources

- Water resources assessment
- Water harvesting techniques
- Mobilization of water resources through conservation projects as well as non-conventional sources
- Water shade management
- Impact of climate change on water resources
- Irrigation and soil salinisation; management of salinised and water-logged soils
- Control of water-borne diseases associated with irrigation (eg. Bilharzia)

#### (b) Management of rangelands (seasonal fires, rehabilitation of degraded rangelands, forage production, reseeding)

- Monitoring and mapping desert encroachment
- Promotion of research on drought tolerant crop, tree and grass species
- Reducing evaporation, evapotranspiration, transpiration



- Selecting crops that use water more efficiently
- Pastoralism
- Creation of public awareness and participation in anti-desertification programmes (e.g. sand dune stabilization).
- Training and institutional development
- Establishment of Early Warning Systems for drought

#### 3.1.3 Afforestation and reafforestation

- Establishment of woodfuel plantations (use of tree species adapted to arid and semi-arid conditions)
- Use of tissue culture techniques in proliferation of plant materials
- Shelter belt establishment
- Establishment of forests on farmers' lands
- Techniques for seedling multiplication

### 3.2 External constraints: their effect on the African environment and economies.

- 3.2.1 External debt
- 3.2.2 International trade
- 3.2.3 Technological constraint

## **Module IV: Energy - environment linkages**

### 4.1 Impacts of extracting energy from the environment

- 4.1.1 Extraction of nuclear resources
- 4.1.2 Extraction of renewable resources
- 4.1.3 Extraction of depleting resources

- 4.2 Environmental impact of producing and using energy supplies
  - 4.2.1 Renewable (including animate energy) supplies
  - 4.2.2 Depleting supplies
  - 4.2.3 Nuclear energy supplies
- 4.3 Assessing the impact of energy systems environment: Internalizing the costs of environmental impacts of energy systems.

## Module V

- 5.0 Linkages between environment and development
- 5.1 Concepts of sustainable development
- 5.2 Socio-economic development
  - 5.2.1 Sustainable development and demography
  - 5.2.2 The urban challenges
  - 5.2.3 Poverty and underdevelopment
  - 5.2.4 Democratization of development processes
  - 5.2.5 Training, education and institutional development
- 5.3 Agricultural production and environment
  - 5.3.1 land uses and land management
    - conservation of biological diversity
    - impoverishment of land - over-grazing, soil erosion, deforestation
  - 5.3.2 agricultural in-puts and investments
    - fertilizers, insecticides, technology, biotechnology
    - irrigation and salinisation
    - agricultural processing and agro-industries
    - livestock development-pastoralism
  - 5.3.3 Sustainable agricultural transformation
- 5.4 Transport, industrial growth and the environment
  - 5.4.1 Industrial production and air pollution

- location and spatial structure of industries
  - industrial pollution- sulphur dioxide, nitrogen oxides, sulphates (acid rain) and hydrogen sulphide: their effect on ecosystems.
  - carbon dioxide and impending climate change
  - causes of climate change
  - possible effects of climate change on development programmes in Africa
  - depletion of ozone layer
  - policy options.
- 5.4.2 Industrial production and water pollution
- water pollution arising from solid wastes, toxic chemicals (including oil spillage) and hazardous chemicals
- 5.4.3 Transboundary pollution
- Air, river or lake water pollution
  - Transboundary transport and dumping of hazardous and toxic wastes.
- 5.4.4 Transport and the environment
- local vehicular pollution and global warming
  - soil erosion arising from poor road drainage
  - noise pollution
  - roads to no where (development)

#### **Module VI: Development - energy linkages**

- 6.1 Development and energy uses
- 6.2 The end-use approach to energy systems
- 6.3 Centralized energy supplies
- 6.4 Decentralized energy supplies
- 6.5 Self-reliance in energy supply and use systems technological resources
- 6.6 Subregional and regional cooperation in energy systems development and operation.

**Module VII: Integrated planning of energy, environment and development towards sustainable patterns**

**7.0 Integrated planning**

- 7.1 Review of energy - environment - development linkages
- 7.2 Impacts of energy conversion on environment and human health
- 7.3 Development and implementation of legal instruments for energy supply in relation to environmental conservation
- 7.4 Environmental Impact Assessment (EIA)
- 7.5 Environmental economics and environmental assessments
  - Economic cost of resource degradation
  - Projecting supply and demand for resources
- 7.6 Continuous monitoring and assessments.

**Module VIII: Case studies and field visits of energy, environment, development projects.**

**RELEVANCE OF PROPOSED COURSE STRUCTURE TO SIMILAR CAUSES  
BEING OFFERED BY OTHER INSTITUTIONS**

The Environment Development Action in the Third World (ENDA.TM) with its headquarters in Dakar has over the years mounted a course on energy for the French-speaking African countries. In 1985, ENDA and IDEP jointly hosted a training course on energy planning for both English- and French-speaking African participants. Subsequently, ENDA decided, for a variety of reasons, to go it alone. After the break-up, IDEP decided to incorporate environmental component in its course. However, this programme was subsequently stalled due to lack of financial resources. ENDA's course structure has, however, remained for all practical purposes an energy course, lasting for a period of two months.

ENDA's guiding philosophy has been to mount a down-to-earth course programme that addresses the needs of the people at the grassroots level. Although ENDA claims that its courses contain a substantial environmental component, we were unable to detect this assertion. Moreover, some of ENDA officials indicated clearly that they were not yet ready to mount a course on both energy and environment although, as the name suggests, ENDA is an environment NGO. In May-June 1991, ENDA offered its seventh course on energy. A scrutiny of the course outline showed clearly that the course was basically an energy one. In addition to the training course, ENDA undertakes field projects on energy and environment. This NGO has a project on environmental education which entails the incorporation of environmental education at all levels of training as well as the promotion of public awareness on the rational utilization of natural resources and environmental management.

In more recent years, ENDA has made an attempt to identify an institute (or organization) in an English-speaking country to conduct a similar course for the Anglophobe countries. To this end, several organizations (institutes) have been approached in Kenya, Zimbabwe, Botswana but with little success.

ENDA's lecturers have been recruited mainly from Africa. The participants have ranged from technical staff to directors of energy. One participant had held the position of energy advisor to a President. The participants have come from various Government ministries including planning, energy, environment and natural resources. In general, young and promising Africans holding bachelors' degrees in physical sciences or economics have been selected for the course.

An attempt to assess current activities of past participants has been carried out with minimal success. No information is available on the stabilization ratio although an attempt has been

made to obtain this information by questionnaires and the ENDA's magazine to previous trainees.

ENDA is keen to embark on the formulation of a course on environment similar to the one being offered on energy. It is hoped that this exercise would commence after the ENDA's staff have participated in a course on environment in South East Asia to be hosted by the Third World Network. On the question of cooperation with IDEP on a course on energy and environment in development, ENDA stated that they would wish to study the draft course outline before committing themselves.

ENDA's other activity has involved the assemblage of energy data on African countries. The data have been claimed to be quite unique in that they have not appeared in any other publication including World Bank. ENDA's intention is to have the data published hopefully before the end of the year. In addition, ENDA is interested in assessing the energy needs of the subregional IGOs (e.g. ECOWAS, CILSS etc.) in order to promote and strengthen their activities in the energy sector.

The African Regional Centre for Technology (ARCT) is also based in Dakar, and has a viable programme on the renewable sources of energy. The centre has concentrated on biogas technology-design and construction as well as selection and costs of various digesters. With the support of UNDP, ARCT has assisted in the construction of biogas plants in member States.

ARCT has also been involved in training Africans in biogas technology. In general, a member State is required to select two trainees, one of whom ARCT pays for while the other one is paid for by the respective member State. Fourteen participants were expected at ARCT in mid-April 1991 to participate in the construction of biogas plants.

ARCT also organizes about six regional training courses annually. In selecting participants for the training course, ARCT has favoured the inclusion of young engineers, scientists as well as the economists. Most of the participants have come from the Ministry of Energy and Planning. For the fifth UNDP Cycle, ARCT has suggested the expansion of their programme to include: (i) construction of mini-hydroelectric plant; (ii) photovoltaic cells. On the question of energy supply to rural populations, ARCT is looking into ways of tackling the problem. A critical issue for discussion is the role of energy in development and the apportionment of expenses incurred on energy supplied to rural areas.

#### **A DRAFT PROJECT PROPOSAL**

##### **IDEP TRAINING COURSE ON SUSTAINABLE DEVELOPMENT FOR AFRICAN PLANNERS**

###### **A. Development objectives**

The long-term objective of the training course is to assist African countries in developing their manpower capability and technical competence in analyzing data on energy and related technologies as well as gaining an understanding of the subtle linkages between energy, environment and development.

###### **B. Immediate objective**

The course aims at enabling African participants to seek information, technologies, methodologies and experiences on energy and environment as well as the rational use of energy in development process so as not to cause environmental damage. The course will also give the participants an opportunity to learn from each others experience as well as facilitating the exchange data of and information.

### C. Background and justification

Since the energy crisis of the early 1970's African countries have formulated and initiated national energy programmes aimed at improving energy self-sufficiency, particularly in the area of energy efficient stoves as well the establishment of fuelwood plantations. However, owing to the recurrent droughts and other adverse climatic factors, the slow growth of the planted seedlings has become the bottleneck. Consequently, forests and woodlands are being decimated at rates far greater than afforestation activities.

The trees being harvested constitute a product of many years and, as indicated above, are being replaced at a snail's pace. In order to allow sufficient time for the growth of the newly planted trees and the regeneration of natural vegetation, peasants as well urban dwellers require alternative sources of energy to fuelwood. Afforestation per se is unlikely to solve the energy crises in most African countries. The promotion of energy production should transcend aims of tree growing campaigns which seek the establishment of village woodlots.

The question of alternative forms of energy to fuelwood particularly solar, wind power, geothermal has hardly been addressed in many of the African countries. In the 1970, renewable energy forms were seen as a panacea for the sub-Sahara Africa's deteriorating energy situation. The development of these non-conventional forms of energy was expected to result in relatively low cost facility and, therefore, more appropriate for use by the poor in the rural and urban centres. The question to ask now is whether African countries have put in place energy planning instruments and sound policies for research in renewable energy technologies.

Over 75 per cent of Africans live in rural areas. With the possible exception of four North African oil producing countries,



the vast majority of Africa's rural and urban populations depend overwhelmingly on biomass for energy. The farmer in the rural village cuts trees because he needs the poles for building his dwelling and firewood for cooking his food. The common man is driven by poverty and underdevelopment to over-exploit the natural resources available to him resulting in the destruction of his environment. In urban centres, charcoal consumption is a major cause of deforestation. It is probable that these adverse effects on the environment, have prompted the African Governments to pay attention to domestic energy demand, including the design and manufacture efficient charcoal stoves.

Energy requirements are not only for cooking. Rural industrialization requires energy. The latter is a prerequisite to halting of current mass exodus of young people from rural to urban centres. Agricultural production requires energy in-put in form of fertilizers, which end up polluting river and ground water. Industrial production in urban centres also requires energy in put, particularly the fossil form. The pollution of the atmosphere results from combustion of fossil fuels. This consists of gaseous pollution notably sulphur dioxide, nitrogen oxides, hydrogen sulphide, sulphates and carbon dioxide. Climate change arising from the warming of the earth as a result of an increase in CO<sub>2</sub> emissions into the atmosphere is the direct consequence of fossil fuel combustion. Acidification of the environment results from sulphur dioxide emissions from industries.

Petroleum is the main commercial energy source in the 51 African States, which used 81 million tons in 1987. The ten African oil producers used 64 million tons while the balance (17 million tons) were imported by the remaining 41 States. In addition, the 51 member States also used 9.75 millions of coal, 11000 tons of lignite and peat and 1.16 teracaloric of natural gas. Therefore, in terms of contribution to global warming, Africa contributes only a small percentage of carbon dioxide to the

atmosphere. However, climatic change will be global and will result in a rise in temperature of 1.5 to 4.5<sup>0</sup>C. It is further predicted that the dry areas, including the Sudano-Sahelian region, will become drier.

The Report of the World Commission on Environment and Development (WCED) recommends that both developed and developing countries should change their energy paths including the development of alternative sources of energy. The Report further urges that efforts should be made to develop the potential for the renewable form of energy, which should constitute the foundation of the global energy structure for the 21 century.

A pertinent question to pose is whether African countries possess endogenous technological capacity to undertake massive development and utilization of renewable energy sources.

The objectives of this project are related to the mandates of United Nations African Institute of Economic Development and Planning (IDEP) particularly in the area of training of African economic planners as well as undertaking research. It is now abundantly clear that there is an overlap between environment and development, and moreover for development to take place energy must be injected. It is expected that this course will produce a new breed of planners/environmentalists fully equipped with new tools such EIA as well as social-cost benefit analysis. Such tools will enable them to integrate environmental dimensions in the socio-economic planning as well as making the right management and economic decisions.

The course lectures/tutorials as well as the planned field case studies are related to IDEP's policy objectives which are derived from the Lagos Plan of Action and the AAF/SAP as indicated below:

### Inter-sectoral linkages

Comprehensive inter-sectoral approaches to development planning and programming with sectoral interdependence expressed through input-output relations.

### Use of indigenous resources

Optimal mobilization and utilization of indigenous resources in the pursuit of the continents' goal of sustained and self-reliant economic and social development.

### Strengthening of planning capacity

Building and strengthening planning and policy design capacity and machinery in African countries.

#### D. Intended outputs

1. Training of researchers, policy makers and planners in the fields of environment, energy and development.
2. Report of the training course incorporating individual experiences of the participants and also highlighting difficulties and usefulness of such an integrated course as well as the lecture notes to be published and circulated to African member States and their intergovernmental organizations.
3. The trained new breed of planners with a wealth of knowledge on the relationship between environment, energy and development would serve as a nucleus of resource specialists in Africa for use at the national, subregional and regional levels.
4. Various publications, pamphlets, audio-visuals, slides and other teaching materials produced and made available to the

participants by the institutions visited in the host country to promote the exchange of information and expertise in the field of integrated planning for sustainable management of resources.

Sections E, F, G and the project budget to be completed in consultation with IDEP.

E. Activities and Work Plan

F. Inputs

G. Institutional arrangement

4. Monitoring, evaluation and reporting

### Evaluation

The participants in the training course will be invited to complete an evaluation questionnaire prior to their departure from Dakar on the success and failure of the project. They will make comments on the benefit they will have derived from the training course and how they propose to use, on a continuous basis, the outputs of the project.

### Progress and terminal report

A progress report will be made to UNDP by IDEP six months after signing the agreement. A final report will be submitted to UNDP at the end of the project.