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Dryland Ecosystems and Desertification Control Programme Activity Centre

MULTISECTORAL PROGRAMME OF ASSISTANCE
TO ECOWAS (RAF/88/047)
SUB - PROJECT.

Master Plan for Coordination of programmes for Combatting Desertification / Natural Resources Management in the ECOWAS Sub-Region.

CAPE VERDE, MAURITANIA, SENEGAL, GAMBIA, GUINEA BISSAU, GUINEA, MALI, BURKINA FASO, GHANA, TOGO, BENIN, NIGER, NIGERIA, SIERRA LEONE, LIBERIA, COTE D'IVORE.

DESERTIFICATION CONTROL P.A.C.
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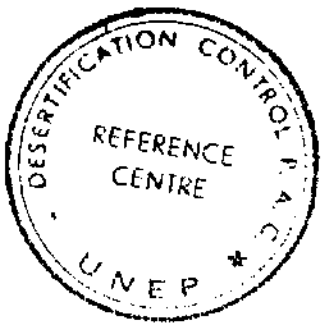
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(RAF/88/047)

SUB - PROJECT.

Master Plan for Coordination of programmes for Combatting Desertification / Natural Resources Management in the ECOWAS Sub-Region.

Report prepared by:

Dr. Michel Baumer
CONSULTANT IN AGROFORESTRY.

and

Dr. Moustapha Sar
SENIOR PROGRAMME OFFICER, UNEP/DEDC/PAC.

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List of abbreviations and acronyms used

A.B.N.	Niger Basin Authority
CIDA	Canadian International Development Association
ACP	African Caribbean and Pacific Countries
WARDA	West African Rice Development Association
AFRENA	Agroforestry Research Network in Africa
ALG	Liptako Gourma Authority
AOF	French West Africa
APDF	African Project Development Facility
ARACA	African Regional Agricultural Credit Association
ASECNA	Agency for Air Traffic Security in Africa and Madagascar
ATIBT	International Technical Tropical Wood Association
AVV	Volta Valley Development (BF)
ADB	African Development Bank
BADEA	Arab Bank for Africa's Economic Development
BECEAO	Central Bank of West African States
BDAO	West African Development Bank
BE or BEN	Benin
BF or BKF	Burkina Faso
BIARA	Inter-African Animal Resources Bank
IDB	Islamic Development Bank
IBRD	International Bank for Reconstruction and Development
CAZRI	Central Arid Zones Research Institute
CBLT	Lake Chad Basin Commission
CEC	Commission of European Communities
ITC	International Trade Centre (Geneva) Switzerland
CCPM	Permanent Maghreb Advisory Committee
ECA	Economic Commission for Africa
CEAO	West African Economic Commission
CEBV	Cattle and Meat Economic Commission
ECOWAS	Economic Community of West African States
EEC	European Economic Commission

CENAPI	National Agricultural Centre (BF)
CFN	Niger River Commission
CI	Cote d'Ivoire
CILSS	Inter-State Committee on Drought Control in the Sahel
CIPEA	International Livestock Centre in Africa
CITES	Conventions on International Trade of threatened species
CMAE	Conference of African Ministers of Environment
CMEAOC/TM	Ministerial Conference of West and Central African States on Maritime Transport
NAC	National Agroforestry Commission (Ghana)
CNRS	National Scientific Research Centre (France)
CNSF	National Forest Seeds Centre (BF)
UNCED	United Nations Conference on Environment and Development
STRC	Scientific and Technical Research Commission (OAU)
CSLRCT	International Scientific Council for Research and Control of Trypanosomiasis
CV	Cape Verde
DANIDA	Danish International Development Association
DC/PAC	Desert Control Programme Activity Centre
DESA	Department of Health and Sanitation Education
DMU	Debt Management Unit (Ghana, Ministry of Finance)
DNHE	National Hydraulic and Environment Department (Mali)
DRS	Defence and Restoration of Soils
ECA	Economic Commission for Africa
ECU	European Currency Unit
ERP	Economic Recovery Programme
FAC	Cooperation Assistance Fund (France)
FAO	Food and Agricultural Organization of the United Nations
FCFA	Franc des comptoirs francais d'Afrique

EDF	European Development Fund
FEER	Rural Water and Equipment Fund (BF)
FF	French Franc
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
UNFPA	United Nations Fund for Population Activities
FPP	Forestry Planning Project (Ghana)
FRDP	Forest Resource Development Project (Ghana)
GA	Gambia
GB	Guinea Bissau
GH or GHA	Ghana
NRM	National Resources Management
GTZ	German Cooperation Assistance
GU	Guinea
IBSRAM	International Bureau for Soil Research and Management
ICGEB	International Centre for Genetic Engineering and Biotechnology
ICRAF	International Centre for Research in Agroforestry
IDA	International Development Association
IERD	International Economic Relations Department (Ghana, Ministry of Finance)
IGAAD	Inter-Governmental Authority on Drought and Development
IIASA	International Institute for Agricultural Systems Analysis
IIRSDA	International Institute for Scientific Research on Agricultural Development, ADIOPODOUME, Cote d'Ivoire
K cal	Calory/kg.
DC	Desertification Control
LAS	League of Arab States
LI	Liberia
MA	Mauritania
ML	Mali

MOA	Ministry of Agriculture
MOFEP	Ministry of Finance and Economic Planning (Ghana)
MPTS	Multi-purpose Tree Shrubs
NE	Niger
NI	Nigeria
OBA	African Timber Organization
OCDE	Joint Economic Development Organization
OCLALAV	Joint Organization for the Control of Locust and Grain Eating Birds
ODA	Overseas Development Administration (UK)
OIBT	International Tropical Wood Organization
IGO	Inter-Governmental Organization
WHO	World Health Organization
OMVS	Organization for the Development of Senegal Valley
ONASENE	Office national des service d'entretien, de nettoyage et d'embellissement
ONEA	National Water and Sanitation Department (BF)
NGO	Non-Governmental Organization
UNIDO	United Nations Industrial Development Organization
ORSTOM	Overseas Office for Scientific and Technical Research
OSS	Sahara and Sahel Observatory
OAU	Organization of African Unity
DAP	Desertification Action Plan
APPER	Africa's Priority Programme for Economic Recovery
EAP	Environment Action Plan
TFAP	Tropical Forest Action Plan
WFP	World Food Programme
PAMSAD	Programme of Action for Mitigating the Social Cost of Adjustment
NEAP	National Environment Action Plan
UNPAD	United Nations Programme of Action for Development

UNPAAERD	United Nations Programme of Action for Africa's Economic Recovery and Development
PAPRE	Priority Programme for Africa's Economic Recovery
PAPYL	Yalle-Leo Pastoral Development Project
SAP	Structural Adjustment Programme
ESDP	Economic and Social Development Plan
PEOV	West Volta Animal Husbandry Project (BF)
PFIE	Training and Information Programme on Environment
GDP	Gross Domestic Project
PIP	Public Investment Programme (Ghana)
PNAFN	National Development Programme
GNP	Gross National Product
PNFV	National Village Forestry Plan
PNGT or PNGTV	National Land Management Programme
NDCP	National Desertification Control Plan
UNDP	United Nations Development Programme
PPD	Popular Development Programme (BF)
PQDP	Five Year Popular Development Plan (BF)
PREFEP	Canadian Training and Further Training Project (in Cote d'Ivoire)
PSAGE	Sahelian Programme of Assistance to Environment Management
PSF	Forest Sectoral Plan (CI)
PSRN	Natural Resources Monitoring Programme
RAF	(1) Agrarian and Land Reform (DF) (2) Regional Programme for Africa
SADCC	Southern Africa Development Coordination Committee
SALWA	Semi-Arid Lands in West Africa
SAU	Useful Agricultural Area
SEN or SN	Senegal
SFI	International Financial Company
SL	Sierra Leone
SODEFOR	Forest Development Company (Cote d'Ivoire)
SPONG	NGO's permanent secretariat

SRLSD	Regional Strategy for Combatting Desertification and for Development
TEDB	Timber Export Development Board
TO	Togo
UDEAC	Union of Central African States
IUCN	International Union for the Conservation of Nature
UK	United Kingdom
UNCED	United Nations Conference on Environment and Development
UNCOD	United Nations Conference on Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
UNSO	United Nations Sudano-Sahelian Office
URM	Mano River Union
US	United States of America
USAID	United States Agency for International Development
WMO	World Meteorological Organization
WRI	World Resources Institute
WWF	World Welfare Fund

PROJECT RAF/88/047 ASSISTANCE TO ECOWAS FOR STRENGTHENING OF ECONOMIC CO-OPERATION AND INTEGRATION AMONG WEST AFRICAN COUNTRIES

Output 6: Master plan for the coordination of programmes in Ecowas member states

Executive Summary

1. **The Project RAF/88/047/B/01/5,** funded by UNDP, is a multi-disciplinary programme for strengthening of economic cooperation and integration among West African States within the Economic Community of West African States (ECOWAS). It consists of sub-projects on trade, monetary and financial cooperation, transport, industry and energy, agriculture, as well as desertification control/land resources management which are carried out respectively by the following Agencies: UNCTAD, UNECA, UNIDO, FAO and UNEP.

2. **According to the Inter-Agency Agreement signed on 14 May 1991,** UNEP entered into cooperation with the United Nations Economic Commission for Africa (UNECA), designated as the Executing Agency, to assist in the preparation of a Master Plan for the Coordination of Programmes to Combat Desertification in the ECOWAS Member States.

   The activities to be carried out by UNEP were as follows:

   - compile a complete inventory on desertification control activities in the sub-region;
   - Assess the effectiveness of these activities;
   - Prepare a Master Plan support programme to combat desertification in the Sahel and Coastal countries (see detailed Terms of Reference on page 266 of the report).

   The study was carried out by Dr. Moustapha Sar, geographer/environmentalist who was hired by DEDC/PAC as a consultant and later on recruited as a Senior Programme Officer, and by DR Michel Baumer, Agroforester, consultant.

   The draft master plan was adopted firstly by an Inter-governmental Seminar which was held in Ouagadougou (Burkina Faso), from 14th to 16th March 1994 and gathered representatives from the Economic Community of West African States (ECOWAS) member countries, then by the ECOWAS Council of Ministers in June 1995 and finally by the Conference of West African Heads of States in 1995.

3. **The Preamble**

After recalling that drought and desertification - which have been prevailed for two decades in Africa, are among the two most important environmental problems in the West African sub-region - mainly by their damaging effects on the structure and functioning of national economies, the preamble emphasizes relevant measures taken to combat desertification by such entities as:

(i) the International Community (adoption of the PACD during UNCOD 1977),

(ii) the African Heads of states within the framework of the OAU (Lagos Action Plan, 1988) and of ECOWAS (decade of reafforestation, 1982, etc.),

(iii) the African Ministerial Conference on Environment (the 1985 Cairo Programme of AMCEN).

The Preamble further stresses that despite relevant measures taken to combat desertification in the sub-region. this phenomenon continues to spread now in the West African dry sub-humid regions (North of Nigeria, Benin, Togo, etc.), mainly due to deforestation activities. The Preamble points out that the fact that the Master Plan to combat desertification does not comprise any new projects and programmes, but aims at coordinating on-going programmes for combating desertification/natural resources management in the ECOWAS sub-region.

4. **The first part of the draft Master Plan analyses some issues mainly:**

A. the ECOWAS institutional, economical and environmental setting. The Master Plan looks into the capacity of institutions like ECOWAS to integrate environmental policies within the ECOWAS framework with reference to desertification and deforestation, in particular, criticizing the lack of effectiveness of this institution for example in trade liberalization, industrial harmonization (coordination of industrial development policies), among others.

It further analyses, the implication of institutional conflict of environmental policies, successes, failures and prospects of ECOWAS at regional integration and concludes finally that in concentrating on purely economic objectives, ECOWAS can be a source of disagreement between its members. To reduce tension, it is necessary to focus on other broader objectives like environmental issues, on which it might be relatively easier, to strike a balance and secure consensus.

B. the outline of strategies, plans and programmes to combat desertification/land resources management in the ECOWAS sub-region

It was noted that many Environment Protection/Natural Resources Management

Plans/Programmes strategies are being developed in West African countries, and to name a few:

(i) Environmental Action Plan (EAP) initiated by World Bank;

(ii) Tropical Forestry Action Plan (TFAP) initiated by FAO/UNDP;
(iii) National Plan of Action to Combat Desertification (NPACDs) supported by UNEP.
(iv) National Conservation Strategy (NCS) sponsored by IUCN, UNEP and WLF;
(v) Natural Resources Management Plan (NRMP) sponsored by World Bank/UNDP/USAID, etc.

It is hoped that solutions would therefore be found at national level, by coordinating and harmonizing these different Strategies, Plans and Programmes which are overlapping, in most cases, and often contradictory in their objectives or scope, secondly, by integrating them into the National Development Plans. The responsibility of donor countries, UN Agencies, and World Bank in view of the multicity of strategies and programmes is pointed out in the Master Plan. The Master Plan suggests that better coordination of the activities of such organizations and donor countries should be required.

C. Existing conditions in the Sub-region are reviewed as follows:

- agriculture, lato sensu, natural resources conservation and protection of remaining forests. It is thus suggested that a natural resources accountancy should be carried out in order to demonstrate how the impact of development activities has affected natural resources and led to a rapid degradation of the environment in the West African States;

- some economic aspects of the struggle against desertification including debts' reduction or cancellation, transfer of existing and potential technologies to combat desertification;

- some national programmes to combat desertification/natural resources management in the ECOWAS Member states, particularly in Benin, Burkina Faso, Ivory Coast, Ghana, Mali and Senegal.

Some preconditions are recalled for efficient programme implementation such as curbing or reducing population growth, promoting the consumption of local farm produce and trading activities within the West African Sub-region, a comprehensive physical planning policy and development policies for rural communities.

The ECOWAS Master Plan suggests that promoting agroforestry to combat desertification in West Africa should be one of the solutions to encourage. It further notes, in the chapter entitled "Hope in the Sahel", that despite difficulties, all is not

negative in West Africa: Some success stories in desertification control and some successful rural development experiments as well are quoted in Niger, Mali, Mauritania, Burkina Faso, Senegal.

5. The Second part of the draft Master Plan

This part of the document constitutes the draft Master Plan for Coordination of Programmes to Combat Desertification/Natural Resources Management in the ECOWAS sub-region.

A. Preparatory phase

1. **A three years preparatory phase** is proposed during which activities should be implemented at:

   (a) **The national and sub-regional levels** involving governments and ECOWAS, consisting of an indepth review, analysis and evaluation of all on-going projects, strategies, programmes to combat desertification/land resources management. It is also suggested that all of these projects, strategies and programmes be merged into one single strategic exercise in the framework of a future Sub-Regional Action Programme to Combat Desertification integrating the objectives of AG 21 and with the endorsement of UN organizations (UNEP, FAO, UNESCO, etc.), and donors, as anticipated in the new Convention under negotiation.

   (b) **the local level,** where rural populations will be responsible to undertake precise assignment in the following areas:

      (i) Water resources,
      (ii) Soils management,
      (iii) energy, and ligneous plants,
      (iv) animals husbandry

   (c) **Transnational projects** have been proposed for specialization in agronomy, sciences and agroforestry.

2. **A minimum priority development programme** in the four sectors considered below, has been adopted by the intergovernmental Seminar which met in Ouagadougou, Burkina Faso, in mid March 1994. **The minimum priority programme** will include the following activities:

   (i) integrated development of river and lake basin;
   (ii) project to protect the rivers and lagoons against floating weeds;
   (iii) creation and development of transborder reserves programmes;

(iv) monitoring of ecosystems and evaluation of the desertification phenomenon; to this end, a feasibility study for the establishment of a Desertification Control Observatory will be carried out by ECOWAS;

(v) development of meteorological infrastructures and cooperation in the area of meteorological applications;

(vi) inventory of water resources and drawing of sub-regional map of hydro-geological resources.

B. Strategy for the implementation of the Master Plan

The Master Plan proposes a **strategy** to implement projects and programmes with the following measures:

(i) political declaration of ECOWAS Heads of States introducing the concept of a Master Plan to combat desertification the ECOWAS member states to the International Community, donor countries, non-governmental organizations, etc.;

(ii) restructuring and reinforcing ECOWAS technical departments to enable them to ensure the coordination and follow-up of the implementation of the Master Plan;

(iii) reinforcing the sub-regional intergovernmental institutions and organizations with the aim of coordinating their utilization;

(iv) promoting greater awareness and consequent involvement of decision-makers in the integration of desertification control/natural resources management projects in development programmes, and national action plans/programmes;

(v) stimulating the involvement of grassroot operators and NGOs in planning and implementing desertification control/natural resources management projects/programmes.

6. Conclusion:

The Intergovernmental meeting of Experts which was held in Burkina Faso, Ouagadougou, recommended that the Master Plan to combat desertification in the West African states should be considered as an important step in the preparation of the Sub-region action programme anticipated in the draft Convention to combat desertification and as such, should constitute one of the sub-regional aspects of the Convention. The Seminar further recommended to carry out feasibility studies for the establishment of a Desertification Control Observatory at the ECOWAS level as to monitor, evaluate and analyze the natural resources situation in West Africa and projects/programmes which

will be implemented as well.

The meeting on Information and Launching of the Sub-Regional Action Programme (SRAP) preparation process which was convened in Lome (Togo) in March 1996, adopted a recommendation that the main programmes that are anticipated in the Master Plan will be integrated in the West African SRAP, under preparation.

After the adoption of the Master Plan by the ECOWAS Authorities, the Secretariat of the Economic Community of West African States has started the implementation of the **Minimum Priority development programme.**

A sub-regional seminar on floating aquatic plants was convened at the African Development Bank Headquarters in Abidjan in January 1995 for the preparation of a regional project on Aquatic Plants Control, which will be submitted to funding institutions.

PREAMBLE

I.

Drought and desertification (no matter the definition that one may adopt - indeed these definitions are many and varied, ranging from the first one given to UNCOD by UNEP, to the one provided by MAINGUET, 1991, cf GORSE, 1984, and ODINGO, 1990) - are very old phenomena. For two decades, and especially since 1973, these phenomena have gained currency in West Africa on account of their serious repercussions on a population that has more than quadrupled since the unprecedented drought which dates back to 1911 - 1914, and also because information and its media have developed considerably. The real problem does not lie in climatic changes but rather in the exponential and unctrolled population growth.

This is a serious environmental problem when viewed against the backdrop of the relative duration of the current drought season and its negative impact on the physical and living environment, humanity included, resulting in the degradation of the ecosystems, particularly with respect to the soil, the flora and the fauna. This process of ecological degradation has led among other things to erosion and loss of fertility of agricultural lands in arid and semi-arid zones, as well as in the zones of most humid lands, resulting in disastrous consequences on agricultural and pastoral economy, as well as serious food shortages.

To these unfavourable physical consequences should be added a break in the equilibrium between man and nature, due to pressures exerted on the environment by the populations and cattle, as well as poor management of the vulnerable ecosystems of arid and semi-arid zones, resulting in gradual desertification due, among other things, to unbridled deferestation for agricultural purposes, excessive and inordinate export of

unprocessed forest products, search for firewood in growing quantities.

According to available statistics, the Sudano-Sahelian part of the subregion has over the last few years suffered far more than the rest of West Africa and rather than regressing, desertification is progressing steadily from certain poles and has in recent years reached large northern parts of countries in the humid zone (Northern Benin, Northern Togo, Northern Nigeria, Northern Cote d'Ivoire, etc.) where a progressive and irreversible "sahelization" is in the offing.

The International Community has not remained indifferent in the face of these major challenges:

(i) In 1977 was adopted in Nairobi the United Nations Desertification Control Action Plan which formulated recommendations at national, subregional and international levels and charged the United Nations Environment Programme (UNEP) to monitor and ensure the implementation of the plan. Since then, considerable work has been done by UNEP which created a desertification control unit.

(ii) In 1980, the Assembly of Heads of State and Government of the Organization of African Unity (OAU) adopted the Lagos Plan of Action which included drought and desertification among the priority issues for which urgent solutions should be found.

(iii) In 1982, the ECOWAS Conference of Heads of State and Government expressed deep concern over the alarming situation of forest resources and its consequences on the socio-economic development of the populations and proclaimed 1983-1993 a "Reaforestation Decade".

(iv) In 1985, the African Ministerial Conference on Environment (AMCE) adopted the Cairo Programme on African Co-operation, whose primary objective was to put an end to the degradation of the African environment and reverse the process with a view to meeting the food and energy requirements of the African populations.

These important initiatives and many others undertaken by the Heads of State and Government as well as the international bodies all testify to the great mobilization to combat desertification at regional and subregional levels. This mobilization has led to the realization at all levels of the need to pool the efforts of the international community to combat this scourge, and to the direct involvement of the cooperation partners, culminating in the preparation of several plans, strategies and programmes for the control of desertification/management of natural resources.

It should be acknowledged, however, that notwithstanding such a mobilization aimed at alerting the international public opinion to the adverse effects of this phenomenon, desertification has continued to gain grounds and to spread in the subregion despite the large scale programmes and projects that have been implemented, especially by such agencies as CILSS and UNSO which have invested considerable sums of money in the ECOWAS region without being able to contain the situation, much less reverse the trend during the 20-year period under review.

Consequently, at the meeting preparatory to the United Nations Conference on Environment and Development (UNCED) held in Brazil in June 1992, African countries defined a common position which emphasized among other things the need to find ways and means of combatting desertification more vigourously and

to envisage the signing of an International Convention on Desertification.

In this context which does not give rise to optimism, one may wonder whether a new desertification control plan will serve any useful purpose, especially as previous plans, programmes and strategies have not produced any satisfactory results. The authors of this document are of the opinion that greater attention should be given to the human load capacity of the territories in question, commonly referred to as West Africa. However, this will not be treated as a priority issue in view of the fact that only a minority of the countries of our subregion have given due importance to the necessary link between demand and supply and between minimum vital needs and the physical possibility of satisfying these needs in a given environment.

Furthermore, these proposals for a master plan, which is not a new desertification control plan but rather a plan for the coordination of desertification control and natural resource management programmes undertaken in the ECOWAS subregion, are mere recommendations which should be submitted to the Heads of State concerned for consideration.

From that point of view, the plan has nothing new as far as programmes and projects are concerned. It simply tries to ensure co-ordination and harmonization of the relevant activities undertaken in the subregion, while emphasizing the urgent need to implement as a matter of priority "grass-root" and short term actions in the area of water, animal husbandry, energy and forestry, etc. In other words, actions which should start with the farmer and develop gradually to embrace all the farmers of an administrative unit of a country (district, sub-prefecture, etc.) and extend to the administrative region. The intensification of small actions of this nature would help resolve the problems within a reasonable time frame at the grass-

root level, while other large-scale national and subregional projects would be undertaken simultaneously.

In order to combat desertification in an effective and concerted manner, it is necessary that actions undertaken at national level by the various countries are co-ordinated and relayed at subregional level by transnational programmes aimed at supplementing them.

As a matter of fact, since by their nature, causes and consequences, the problems of desertification are not limited to national territories, it is necessary that in addition to national programmes and projects a transnational approach be adopted so as to promote a co-operation that favours exchange of experiences, knowledge and instruments for an effective control of desertification.

This approach forms part of the efforts being deployed by the United Nations system to promote international co-operation in the field of desertification control as recommended by resolution 3337(xxix) adopted by the General Assembly in 1974.

This study falls within the ECA/UNDP Multisectoral Assistance Project to ECOWAS (Project RAF/88/047).

The team charged to prepare the study included on a temporary basis Dr. Mansour Khaled, an economist and team leader, and on a permanent basis Dr. Moustapha Sar, a senior environmentalist who in the meantime became the senior programme officer of DC/PAC at UNEP, and Dr. Michel Baumer, an agro-forestry expert who worked with the team for three months. During the missions it undertook to ten ECOWAS countries the team met with officials from all the sectors concerned.

Our sincere thanks go to all these officials (cf annex 1) for the welcome extended to the team as well as to the following international agencies: ECA, ECOWAS, FAO, UNDP, UNEP. We wish to thank more particularly ECOWAS, ECA and UNEP for the material assistance provided in the drafting of the report.

PART ONE

II.

A. The institutional, economic and environmental framework

1. Consultation mission

The mission, corresponding to a 9 man/month, was undertaken within the context of the UNDP/ECA Programme of Assistance to the Economic Community of West African States (ECOWAS) (Project RAF/88/047). Its aim was to examine two sources of serious concern to the region, namely desertification and deforestation. These concerns cannot be considered in isolation, i.e., outside the major socio-economic activities in the ECOWAS countries. Unfortunately, the programme was initially conceived in a fragmented manner, the obvious reason being that it was deemed appropriate to entrust each sector of social or economic activity to the relevant agency of the United Nations System; the major environmental concerns were later added as an independent sector.

The terms of reference are found in annex 3. In order to make up for this shortcoming, the original terms of reference recommended that the two serious environmental problems facing the subregion, namely desertification and deforestation, be examined in a socio-economic context, more so as it is totally impossible to combat desertification and stop deforestation without taking into consideration the way the people manage their natural resources at local level (survival projects) and at national and subregional levels (economic development plans). Consequently, it was proposed that a sociologist be included in the mission to help identify the links between populations, resources and environment and determine the appropriate

institutional structures and programmes that would enable the rural communities to attain social stability.

That was necessary especially as the terms of reference of the environmentalist were not limited to the technical aspects of desertification such as ethnobotanical surveys or the drawing up of an ecological map, but also included socio-economic aspects such as identification of social constraints linked to access to land ownership and other resources, as well as to agrarian reform policies.

The policy Committee of the programme however decided otherwise, in view of the available meagre resources. Nevertheless, within the very limited time frame at its disposal, the mission tried to do its best to grapple with the profound social and economic causes of desertification and deforestation in ECOWAS countries without laying claim to any theories or general application models in the areas of resource management or people's participation in such management, much less making a critical appraisal of projects undertaken by CILSS, an exercise that could be carried out with the full participation of that institution.

As a matter of fact, to be able to carry out fully and effectively the exercise described in the terms of reference, the mission should have comprised more specialists including local researchers, and should have been given more time.

2. ECOWAS: Economy, development and environment

The Economic Community of West African States (ECOWAS) was established by the Lagos Treaty signed on 28 May 1975 by the Heads of State of Benin, Burkina Faso, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone and Togo. It was later ratified

by Cape Verde when the latter separated from Guinea Bissau. The primary objective of ECOWAS is economic: to promote cooperation and development in almost all areas of economic activity. Right from the start ECOWAS prepared a complex programme to achieve economic integration of the markets of member countries. However, this integration has often been hampered by the vagueness of the treaty and the unbinding nature of the decisions of the legislative organs of the community.

This report aims at examining the role of ECOWAS institutions in the integration of environment policies within the global framework of ECOWAS, with particular reference to desertification and deforestation. Environmental programmes and policies were not discussed in detail within the institutions of ECOWAS, even though the specialized technical committees of the community responsible for natural resources, energy, social and cultural affairs have recognized the importance of such programmes and policies. Though recognized in practical terms, environmental policy does not seem to have been given much attention and this is likely to remain so unless it is integrated in the economic policy, economy being the primary concern of ECOWAS. Needless to say that environment is inextricably linked to the economic production and distribution activities of the community.

ECOWAS has not been as effective as was expected at its inception. In many respects it has not satisfied the hopes and aspirations of its members. For instance no significant success has been achieved in the area of trade liberalization, that is to say in the removal of trade barriers among the member States, even though this is vital for economic integration. Industrial harmonization, i.e., the coordination of industrial policies and development, is more elusive than ever. As a result, member States' benefits remain unclear, since individual national

interests continue to take precedence over the community interests.

There are also two other factors hampering integration. The first is the imbalance in the levels of social economic and political development of the States, resulting in distrust and disenchantment between the poor member States on the one hand, and the rich States on the other. The second is the proliferation of regional organizations (cf table 1) which more or less have similar objectives, and the competitive membership of these organizations, for example membership of CEAO and ECOWAS, resulting in conflicts of interest, confused allegiance and diverse loyalties. Article 14 of the Treaty establishing CEAO limits the capacity of its member States to participate fully in ECOWAS, which is a violation of the Treaty establishing ECOWAS. Similarly, article 58 of ECOWAS stipulates that where agreements concluded by member States are incompatible with the Treaty, the said member States shall take immediate steps to resolve such incompatibilities.

TABLE 1: INVOLVEMENT OF COUNTRIES IN STATE GROUPINGS

	BN	BF	CV	CI	GA	GH	GU	GB	LI	ML	MR	NE	NI	SL	SN	TO
ABN	+	+		+			+			+		+	+			
ACP	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
WARDA	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+
ALG		+								+						
ARACA																
ASECNA	+	+		+						+	+	+			+	+
ADB																
BADEA																
BDEAO																
BIARA																
CBLT																
CCPM																
ECA																
CEBV																
CEDEA																
CILSS																
CRST																
CSIRCT																
ICGEB																
LAS																
OUMVG																
OMVS																
OAU																
URM																

To be able to make full use of the great potentialities of the community, member states should clearly identify and express ideological perceptions inherent in any grouping or regional organization. As a result of this conceptual inaptitude and lack of proper and satisfactory balance between national and regional activities, projects and programmes will continue to reduce the ability of the community to coordinate activities in the area of environmental protection and the use of common natural resources.

3. Impact of institutional conflict on environmental policy

As in all the other areas, there are inter-organization conflicts in the area of environmental policy. Tensions between ECOWAS and regional organizations dealing mainly with environmental issues have been noticed. For instance Niger is a member of the Lake Chad Basin Commission (CBLT), the Niger River Commission (CFN), CEAO and ECOWAS. Burkina Faso and Mali are members of CFN, CEAO and ECOWAS.

Also observed were contradictions inherent in dual membership, which not only affected subregional environmental policy but also undermined programmes, policies and actions which could otherwise have been successfully implemented at national level.

National organizations and some international organizations dealing with environmental issues more often than not prefer to concentrate their efforts on separate countries because of the difficulties encountered in providing assistance to "theoretical" regional projects. In the particular case of external assistance agreements outside ECOWAS between a member State and a bilateral or international aid agency for example, problems may crop up where the agreement is such as to affect the capacity of the member States to fulfil their obligations vis a vis ECOWAS, thus resulting in the cancellation of the assistance.

Few government officials know about the existence of international programmes. Those who are aware of such programmes are very high ranking officials or people who had the chance of participating in meetings where these programmes have had a positive impact. They feel that it was useful having many meetings and programmes to "drive in the nail" but complain that concentration efforts as a result are diluted, that consistent efforts are not made to resolve a given problem, that the themes in vogue are too often replaced (for instance desertification control replaced with shortage of production systems) and that the programmes are not accompanied by financial resources. The junior civil servants for their part are of the opinion that international programmes do not serve any useful purpose, that they are a mere indication of the competitiveness existing between the various agencies, programmes and institutions of the international system and that they have little or no effect on national policies and no impact on their daily work. As for the illiterate farmers, needless to wonder what they think of the confusion generated by the programmes, which they are very much aware of, though.

4. Potential to integrate policies within the framework of ECOWAS

Generally speaking, it should be realized that as a subregional organization, ECOWAS can serve as a means of integrating environment policy in the social, economic and political framework of the subregion. An integration spearheaded by ECOWAS would make it possible to align the policies in the various sectors, including environment. Rather than condemning ECOWAS, we should think of how to make it work more effectively. After all, subregional integration is the only way that leads to regional integration as envisaged in the Lagos Plan of Action and on which Africa has embarked upon.

Regional integration can reduce some of the shortcomings associated with fragmented economies. It improves international competitiveness by making use of the advantages of specialization and large economies of scale. Regional approach also provides new dimensions to step up national, unilateral and uncoordinated efforts during discussions with international agencies such as the World Bank or the IMF for example. Regional integration and cooperation also strengthen structural adjustments.

In order to strengthen ECOWAS in this regard, it would be necessary to follow the stages listed hereunder:

a. Modify the status of the other regional organizations with similar objectives and make them act as subgroupings under the authority of ECOWAS;

b. Eliminate the institutional sources of conflict by harmonizing the treaties and rationalizing the cooperation instruments in the subregion including the environmental instruments which determine the utilization framework of common natural resources such as rivers;

c. Exploit the possibilities of a large scale subregional integration that may be created by ECOWAS, considering its geographical jurisdiction and economic dimension. ECOWAS could start by helping the countries to harmonize their natural resource management legislations and by implementing training and community awareness building programmes on environmental objectives;

d. Review current economic development plans to take due account of environmental problems, especially in the areas of energy, agriculture and trade;

e. Strengthen within the ECOWAS secretariat the departments dealing with environment: regional environmental plans will be useless unless they are followed up, evaluated and coordinated by well equipped units (cf part III: Master plan implementation strategy.B).

5. ECOWAS achievements, failures and prospects in the field of regional integration

In the past, ECOWAS endeavoured to coordinate subregional activities related to desertification control and natural resource management by implementing since 1982 a number of desertification control related programmes adopted by its policy makers. These programmes include:

- The Regional Agricultural Development Strategy (A/Dec.4/5/82) adopted by the summit of Heads of State and Government in May 1982, supplemented by a series of short and medium term programmes related to the implementation of the strategy and endorsed by the meeting of Ministers of Agriculture, Water and Forests;

- The proclamation of the "Reafforestation Decade" 1983-1992 (A/Dec. 3/5/83) adopted by the summit of Heads of State in May 1982 whose objective was the attainment of 500 to 10,000 ha per annum and per country in terms of state and community reafforestation;

- Programme for the control of invasion of rivers and lagoons by floating plants adopted in December 1990 (C/Dec.6/11/87) which provides among other things for the establishment of an inter-Ministerial committee in each affected member States to take stock of the floating species and to monitor the development of plants in lagoons and other streams;

- ECOWAS integrated and global energy policy directives adopted by the summit of Heads of State in May 1982, establishing in each member country an Energy Commission as well as an Energy Resource Development Fund within the ECOWAS Fund;

- Forestry Development Assistance Programme and Village Hydraulic Programme (1989-1990) (C/Dec.2/12/92).

However, it is sad to note that none of the officials met in nine ECOWAS States made spontaneous mention of these projects.

ECOWAS achievements, failures and prospects can be evaluated by concentrating on specific activities, projects and programmes and their impact on less important and remote regional sectoral programmes. Examples of these are desertification control and deforestation plans.

One is under the impression that ECOWAS has not done as much as it should have in the field of regional integration. Apparently, this impression does not concern ECOWAS only. Indeed, similar efforts were made in other regions of sub-Sahara Africa which did not pay off as quickly as expected. Some even failed completely, likely the East African Community.

To achieve rapid results, the calendar of future policy action should comprise an elaborate methodology for assessing ECOWAS performance. It has been observed that most of the programmes, be they economic or environmental, were not evaluated and monitored in a consistent and systematic manner, but rather on an ad hoc basis. The few evaluations that were carried out were concentrated on trade policy integration and had not contributed in determining their impact in other areas such as environment.

So far, regional organizations have to some extent benefited from international assistance as well as assistance provided by donors. There are no indications that such assistance will increase in the future. This is particularly true of the area of environment. The World Bank has received requests for specific assistance from ECOWAS to improve its absorption capacity and develop a framework that would enhance integration objectives and national adjustment efforts. Other regional organizations have done the same, such as PTA, CEAO, SADCC and UDEAC. Under the Lome IV, the Commission of European Communities also gave clear indications that it favours African regional integration. At the end of 1990, CEC indicated its interest to sponsor a study leading to the preparation of a programme of action, the implementation of which would show to what extent governments are committed to ECOWAS.

It is obvious that there is need for a new approach in order to forge ahead. The major question is as follows: What should be the main elements of this new approach? In this connection, the mission report tries to come up with a master plan for coordination of programmes for combatting desertification and deforestation in ECOWAS countries, and suggests how it could be implemented in practical terms. These elements are examined within the context of the environmental initiatives and policy of the subregion, with particular reference to the programmes drawn up to combat desertification in the region and promote reafforestation.

We are of the humble opinion that unnecessary proliferation and encroachment of regional institutions should be avoided. New initiatives should revolve around existing subregional organizations like CILSS whose activities should be coordinated with those of ECOWAS. Efforts should be made to take into account the specific interests of other countries of the subregion which could benefit from CILSS activities, while

bearing in mind that CILSS member countries are faced with specific environmental problems (see strategy proposed for the implementation of the plan).

To ensure natural integration it is important to put a structure in place. However, the modus operandi to be adopted should make it possible for each country to participate at its own pace. The temptation to accord greater importance to relatively more attainable objectives in sub-regional cooperation and brush aside objectives that are not easily attainable but which nevertheless are important should be avoided. It is these latter objectives that bring about significant changes and normally attract assistance from donors to ECOWAS because they reflect a genuine commitment to integration.

However, ECOWAS concentration on purely economic objectives can be a source of disagreement among its members. In order to reduce the tension, it is necessary that the organization concentrate on other wider objectives such as environment, on which it should be relatively easier to find an equilibrium and a consensus.

B. Presentation and brief analysis of various desertification control and natural resource management strategies, plans and programmes in the ECOWAS subregion

1. Multiplicity and diversity

Following the 1968 persistent drought which ravaged the economy of the countries of the subregion and decimated the fauna and the flora, and the subsequent appeal made by CILSS Heads of State to the International Community to support their efforts in combatting effectively and decisively drought and desertification, as well as increasing public assistance to development, we have since 1985 witnessed a burgeoning of plans,

programmes, strategies and projects for the control of desertification and management of natural resources.

Thus, between 1985 and 1991, close to 8 desertification control and natural resource management plans were drawn up or are being drawn up in the subregion, some of which are still awaiting funding. In most cases, these plans have adopted the same strategic pattern, pursue the same objectives and often have identical programmes.

The Lagos Plan of Action was adopted in 1980 by the African Heads of State. The Harare Declaration was adopted by the African leaders during the 13th FAO Regional Conference for Africa. The Addis Ababa OAU Declaration was adopted in 1985. All the 3 documents speak of the decline in agricultural production and the need to find a solution to the agricultural crisis on the continent.

Mention should also be made of the 1979 Monrovia Strategy, the Cairo Commitment arising from the Conference of African Ministers of Environment and Sustainable Development, Africa's Priority Programme for Economic Recovery (APPER) and the United Nations Programme of Action for Africa's Economic Recovery and Development (UNPAAERD).

Since 1985, CILSS Heads of State and Government have convened several meetings aimed at taking decisive measures to combat drought and finding adequate solutions which often consisted in drawing up and adopting strategies for drought and desertification control, the aim being to achieve a sustainable development of the economy of the countries of the subregion.

Between 1985 and 1989, two strategies were adopted by CILSS Heads of State and Government, namely:

(i) The Regional Strategy for Drought Control and for Development (SRLSD) adopted in Nouackchott in 1985;

(ii) The Revised Strategy for Drought Control and Development of the Sahel (SRLSD) known as the Nouackchott Strategy.

Later, the Experts Conference convened by CILSS adopted the "Segou Guidelines" whose aim was to assess, after a four-year period, the applicability and operational nature of the two previous strategies. Eight important items were considered.

The Regional Drought Control and Development Strategy (SRLSD) considered by the States as the "Mother Strategy" for the control of drought and desertification as well as for development in the subregion gave birth to national desertification control plans (NDCP) initiated since 1986 in the CILSS Sudano-Sahelian region.

Since then, four other natural resource management and planning programmes were drawn up or are being drawn up in ECOWAS member States. These plans have their own strategies and objectives and are being sponsored and sustained by cooperation partners. They include:

(i) The Environment Action Plan (EAP) sponsored by the World Bank and UNDP;

(ii) The Tropical Forest Action Plan (TFAP) supported by FAO and UNDP;

(iii) The IUCN Strategy initiated by IUCN;

(iv) Natural Resource/Soil Management Plan supported by the World Bank, UNDP and USAID.

The drawing up of these plans and strategies was funded by bilateral cooperation agencies such as FAC, German Cooperation (GTZ), Norwegian, Swedish and Japanese Cooperation Agencies, with the participation of the World Bank and UNDP.

The reasons put forward for drawing up all these plans are that development programmes implemented in the subregion over the last 25 years have fallen short of expectations; desertification has continued to spread, even to the southern part of the region. The failures recorded were attributed among other things to the ineffectiveness of the strategies adopted, because of the sectoral nature of the approach adopted, which aimed essentially at the implementation of ad hoc and uncoordinated actions for the control of bushfires, deforestation, etc., and more importantly because those actions did not follow a long term logical sequence.

All CILSS member countries have their national desertification control programmes supported by UNEP and UNDP, and based on a global, sustained, multisectoral and integrated approach. These programmes often concern provision of water and energy, protection and development of agricultural lands, forests, grazing lands and, above all, the resolution of food deficit through the implementation of the food security component.

The World Conservation Strategy prepared in 1980 by the International Union for the Conservation of Nature (IUCN) in cooperation with the World International Nature Fund and financed by UNEP with the assistance of FAO and UNESCO aims at the conservation of living resources for sustainable development, the preservation of genetic diversity and the sustainable use of species and the ecosystems. At national level, this strategy should lead to the implementation of a national conservation strategy which comprises coordinated policies, programmes and plans of action.

The Tropical Forest Action Plan (TFAP) initiated by FAO, the World Bank, the World Resource Institute (WRI) and UNDP is financed through bilateral cooperation (French-Cooperation Fund, Norwegian Aid, Swedish Aid, etc.). This constitutes another strategic framework proposed to developing countries to re-direct, intensify and harmonize their traditional forestry practices and policies with a view to evolving actions for the conservation, protection, regeneration and rational as well as sustainable management of forests. TFAP has identified the following five priority areas: forestry in land utilization, timber industries, firewood and domestic energy, conservation of forest ecosystems (national parks, fauna reserves) and forestry institutions.

The Environment Action Plan initiated by the World Bank and financed by UNDP and some bilateral cooperation agencies provides for programmes relating to rural environment and agro-sylvipastoral activities identified in the sectors of agriculture, animal husbandry, agro-forestry, fisheries, soil conservation, protection and restoration, as well as programmes pertaining to natural environment such as forest reserves, national parks, lakes, rivers, coasts, etc. Another programme provided for in the Environment Action Plan concerns the urban area, namely drainage, disposal of solid wastes, pollution control, hygiene, housing etc.

The Natural Resource/Soil Management Plan which adopted a new approach is based on the premise that classical approaches so far used have not attained their objectives and are often rejected by the people who prefer their traditional techniques which are more effective and suitable than certain modern techniques which they have not mastered. This approach which was previously used by some NGOs has been taken over by some international institutions such as the World Bank, EDF and some bilateral cooperation agencies (FAC, GTZ, etc.). The "soil" management

approach which is holistic as well as being community, integration and decentralization oriented, because it operates from the bottom upward, includes forest resource and fauna reserve management programmes, the development and management of agricultural soils, catchment areas and land development. It is consistent with the idea of involving the populations in the identification of their problems and in the search for solutions to land development problems.

The 1991 Bamako Commitment arising from the Pan-African Ministerial Conference on Environment and Sustainable Development held from 28 to 30 January 1991 as a prelude to UNCED (already described as "Conference of the last chance"). This latter commitment gives priority to:

- food security
- energy security
- sustainability of economic growth (which is virtually nil) and employment
- financial resource security and stability
- improvement and greater security with regard to quality of life and housing,

a collection of objectives which, alas, are beyond Africa's capacities.

2. Ongoing prospects

According to a joint statement released by CILSS, UNSO and IGAAD in 1991, some external factors contribute to the rapid marginalization of the African continent. One such factor is the proliferation of multilateral institutions, resulting in incoherence and lack of coordination which limit Africa's capacity and made it difficult for her to derive advantages from the plethora of decisions and programmes emanating from this host

of institutions. This has resulted in the continent's institutional and human capacities being overstretched.

Addressing the Niamey International Symposium on 14 October 1991 (CILSS, October 1991), the Executive Secretary of CILSS stated that the Sahel countries were faced with two major problems which could be extrapolated to the entire West African region:

- Multiplicity of plans and programmes resulting in overlapping, duplication and competitiveness;

- Failure to take due account of the social and environmental impact when evaluating actions (CILSS October 1991).

He further stated that neither environmental degradation nor debt burden could justify a country's acceptance of several plans which obey the same sustainable development logic. Environmental planning will be incomplete and imperfect unless it is integrated in the economic and social development process. We would agree with this if it were put the other way round, namely that social development should be integrated in sustainable environmental potentials.

This serious reservation aside, we think that the resolutions of Committee A of the Niamey Symposium (Harmonization and integration of plans and strategies in economic and social development) were reasonable. Those resolutions provided, before March 1991, for:

- concerted efforts in each Sahelian country for the adoption of a single integration framework;

- a budget programming of integrated actions in consultation with development partners.

A meeting to be organized by CILSS was scheduled at the end of this fiscal year. However, there is no doubt that such a meeting will be fruitful only if:

- participants attend in their private capacity and not as representatives of States. In this way the politicization of discussions will be avoided and environmental issues which are vital and transcend arbitrary national borders will be discussed;

- participants are imbued with a new development idea, like the one mooted by LEBRET; the aim is not to amass additional wealth but to live more happily;

- constraints arriving from multiple plans, projects and programmes, which are mainly dictated from outside, are considered in their true perspectives;

- the meeting is organized by ECA and ECOWAS for all countries of the West African region and not for countries of the Sahel alone, thereby showing clearly that it is a departure point for a new reflection that concerns the entire Africa and is not limited to West Africa. Free from the numerous pressures to which it is subjected, Africa should be able, almost single-handed, to map out a strategy that enables it to find or regain its identity, to "set in motion" and to embark on a genuine development;

- the relationship between supply and demand is constantly present in all the discussions, which necessarily leads to discussions about the relationship between resource and population, the real basis of the problems;

- there is genuine popular participation in the discussions since the decisions that will emerge thereof (like "let's get down to work", "let's tighten the belt so that our children live", let's share rationally so as to be less dependent on the outside world" etc.) concern each and all. In practical terms, this means that the meeting which should be attended by not more than a hundred specialists of very high standards, all attending in tuitu personnae, that is in their private capacity, should be followed immediately (i.e., a few days later) by a series of meetings which shall hammer and disseminate the message. If well organized, two months will be enough for the message to reach, in successive stages, the village population and the nomads. Trans-border meetings should be organized in the border region between two States;

- a few intergovernmental organizations (ECA, UNEP) could be invited to follow the discussions as observers without the right to speak; donors should not be invited to take part in the meeting at the initial stage. In this way the autonomy and relevance of the programme to be drawn up will be guaranteed. In other words, the programme will be devoid of any interference on the part of donors and funding institutions.

The programme to be drawn up should be concise and limited to the essential. It should highlight some of the basic principles that have so far been constantly rejected, such as control of population growth, adjusting demand to resources, impossibility of increasing resources indefinitely, etc. The programme should also contain very few objectives to serve as guidelines where possible, like elimination of erosion over a 3-year period on all cultivated lands and maintenance and restoration of fertility.

As can be observed, all these types of plans have adopted to a very large extent the same approaches aimed at involving the populations and making them more responsible, pursue the same objectives, namely desertification while ensuring a rational management of natural resources and promoting sustainable development. This explains why in most cases these plans overlap, often compete among themselves when it comes to presenting their programmes to donors, and at local level as far as the use of space is concerned. This is because more often than not these programmes are to be implemented in the same areas, among the same populations and by the same officers. This often creates scepticism among the populations as to the results to be expected.

The harmonization of these various plans, strategies and programmes for the control of desertification and management of natural resources is of vital importance. It would be necessary to computerize these various plans to be implemented in each country with a view to detecting possible overlapping, duplication and distortion and making the necessary corrections.

The problems of harmonization does not rest with the countries alone but also, and more importantly, with the donors because each funding institution has its own policy and strategy and is prepared to get involved financially only if it approves the strategy implemented.

It would be necessary to integrate all these strategies, plans and programmes at national level and retain only one which could serve as a framework of reference integrating all the programmes and projects for the control of desertification and management of natural resources of a country.

Furthermore, in all these plans the sub-regional dimension of desertification and natural resource management control seems to

have been overlooked. Trans-border projects often exist in regard to the protection of national parks and reserves. Other such projects should be initiated and implemented in the areas of trans-humance, common water resources, management of basins, energy, coastal erosion, etc.

As part of their preparations for an effective participation in the United Nations Conference on Environment and Development (UNCED), African countries held three meetings in Cairo, Abidjan and New York to define an African common position on Environment and Development.

All those meetings on African environment and development programme was prepared, including strategies, priority programmes of action and negotiation mechanisms. Thus, a total of twenty priority programmes were prepared and presented at the Brazil Conference, reflecting African common position and embracing the viewpoints of all the bodies concerned (Governments, NGOs, Women and children's associations, etc.).

In addition to the African common position, each Government set up National Preparatory Committees to prepare, with the financial assistance of UNDP and UNSO, a national report dealing with all environmental issues.

All the national reports intended for UNCED dealt with the following issues:

(i) description of the economic, demographic and geographical situation of the country;

(ii) inventory of natural resources and their state of degradation, as well as major ecological problems encountered;

(iii) inventory of institutions charged to prepare, implement, monitor and assess environmental problems (including desertification);

(iv) different strategic approaches adopted to control environmental degradation;

(v) environment and sustainable development: priority programmes of action and sustainable development strategy;

(vi) international, regional and subregional cooperation.

In analyzing the priority programmes prepared by the various States, one realizes that they are similar to those enshrined in the African common position, which shows that there is some degree of consistency in the definition of the priority concerns of the various African States. Furthermore, matters pertaining to bio-diversity, the ozone layer and climatic change were also not neglected. Though they do not constitute the immediate priorities of the developing countries, these matters were given wide coverage in the African national, subregional or regional reports, thus showing the importance Africa attaches to environmental problems.

Agenda 21 and the drafting of an International Convention on Desertification Control:

Chapter 21 of Agenda 21 which emphasizes the universal nature of desertification constitutes a major step forward in the international recognition of this scourge and the need for a concerted action at international level. It contains recommendations at national, regional and international levels in the following six specific and independent areas:

1. Strengthening of knowledge base and developing information and monitoring systems for regions prone to desertification and drought, including the economic and social aspects of these ecosystems;

2. Combating land degradation through intensified soil conservation and reafforestation activities;

3. Developing and strengthening integrated development programmes for the eradication of poverty and promotion of alternative livelihood systems in areas prone to desertification;

4. Developing comprehensive anti-desertification programmes and integrating them into national development plans and national environmental planning;

5. Developing drought-relief schemes for drought victims and environmental refugees;

6. Encouraging and promoting popular participation and environmental education, focusing on desertification control and management of the effects of drought.

After defining in each of the six above-mentioned areas the bases of action, the objectives to be attained, the activities to be programmed, the necessary data and information, the means of implementation (funding, evaluation costs, scientific and technical resources, human resources and training, etc.), Agenda 21 stresses in particular the need for international co-ordination and cooperation and recommends among other things the strengthening of subregional institutions such as AGRHYMET, the African Centre for Meteorological Applications (ACMAD), CILSS, etc.

Chapter 12 of Agenda 21 (paragraph 12.40) also recommends to the General Assembly to establish an intergovernmental negotiating committee for the elaboration of an international convention to combat desertification, those countries experiencing serious drought and/or desertification, particularly in Africa, with a view to finalizing such a convention by June 1994.

However, the drafting of a convention on Desertification, though an act of far reaching consequences, especially as desertification has now been recognized by the International Community as a serious scourge, is not enough to resolve this distressing and alarming problem. It is of primary importance that material and financial resources should be mobilized for the implementation of the convention.

As a matter of fact, if the Plan of Action for the Control of Desertification adopted in 1977 by the United Nations failed to produce the desired impact, it was due especially to lack of awareness of the social dimension of the problem, of political will on the part of the governments and, above all, of financial resources and, consequently, of intervention on the ground.

It is necessary therefore that the Convention on Desertification which is currently being drafted should take into account the various evaluations of the Plan of Action for the Control of Desertification carried by UNEP in 1977, 1984 and 1991 and draw the most benefits therefrom.

The draft convention on desertification should also take account of and State clearly the universal nature of desertification control.

Indeed, desertification affects almost all the continents and few countries are spared. The inhabitants of dry regions

affected by desertification are directly concerned because they have to receive regular emergency food assistance to be able to survive, while people living in prosperity outside the affected areas must contribute to this emergency food aid. The entire international community is therefore concerned. More often than not, the aid does not arrive on time or is inadequate, resulting in large migrations of people from the affected areas to other areas and contributing immensely to urbanization problems and increase in the number of refugees known as "environmental" refugees.

Desertification is also linked to both the economy of the countries of the North and that of those of the South. We can cite as an example the fierce competition between subsidized agricultural products emanating from the European Common Market and non-subsidized African agricultural products or conversely, the rapid degradation of livestock breeding zones in some African countries resulting from massive and destructive exploitation of these zones in a bid to export meat to the European Economic Community at subsidized prices.

Mention should also be made of the negative effects of desertification on biodiversity because it results in the destruction of the fauna and the flora, on international waters where the destruction of the vegetation in the area dividing the waters leads to erosion and sand-bank thus creating serious problems, and also on climatic changes which take place especially in the low atmospheric strata due to deforestation.

Thus, it is imperative to acknowledge the universal nature of desertification and the need to carry out a global action to find the solutions required. From this point of view, desertification must be treated on the same equal footing as climatic changes, biodiversity, etc., and be provided with the same funding.

4. Strategies in place

West African countries abound in experiences which nevertheless do not render them fit for the Western model. Are we finally going to acknowledge that several models can co-exist without competing with each other? The link between poverty and environmental degradation does not explain everything.

A convention on climatic changes was ready for signing in Rio. The text of the convention on biological diversity and that of the convention on forests were discussed in order to reinforce the conservation treaties under study. Lastly, an Earth Charter is being drafted, which is a declaration on the principles that should govern the relationship between people and States among themselves, and between them and the Earth, with a view to guaranteeing a common future in regard to development and environment. If adopted, what will remain will be the necessary resources for its implementation.

The big danger inherent in all these commitments, programmes and declarations is that, given their number, they will end up sapping all the energy of the countries concerned and eventually discouraging them. The West African countries do not have (and they are not the only ones) the capacity to absorb programmes that succeed each other at a tremendous rate. A new programme should be drawn up only after the results of the previous one have been achieved. In 1976, the nations gave priority to desertification control; what was the outcome? It has even become a mere verbal priority in some countries which are nevertheless directly concerned. Detailed information on the status of desertification and on the implementation of the United Nations Plan of Action for the Control of Desertification can be found in a document of the Executive Director of UNEP presented to the special session of the Governing Board of UNEP in February 1992 (UNEP, 1991).

In this rapid succession of priorities, the responsibility of international organizations, and that of the United Nations system, is enormous. More often than not, one gets the impression that each organization is acting alone, independently, and is competing with the other organizations. The number of international organizations is also overly large, and the share of running expenses in their budget often very high. Despite the assistance that it has provided, some people wonder for example whether UNSO is still serving any good purpose, competing with UNDP, or whether UNDP and UNEP should not merge.

5. Current situation in the Sahel

In the 8 West African countries which are members of CILSS, a lot of controversy surrounds the planning and definition of development strategies. Coupled with the discouragement of the populations are lack of reliable statistical data, inadequate qualified technicians, the catastrophic status of the State finances, very large dependence on the outside world and lack of information. There are however some positive encouraging signs: former nomads learning farming, villages becoming aware of the adverse effects of erosion and trying to control it, etc. However, the resources are very low. They presuppose strict and rigorous planning which should no longer be exclusively geared towards increase in the production of cash crops and the hypothetical construction of national industrial bases. Such programmes compel one to:

- depend on financial assistance
- receive a transfer of techniques
- enjoy institutional support
- receive technical aid
- have trainers and technicians

Furthermore, the data on the natural environment itself and, a fortiori, on the socio-economic environment were unreliable and could not be taken into account. Despite the recommendations made by UNCOD for an accurate and constant evaluation of desertification, it was only in 1990 that the Sahara and Sahel Observatory was created at the initiative of France.

Even though the plans drawn up soon became nothing more than a catalogue of ill-conceived and unco-ordinated ideas and project files, coupled with the fact that neither adequate steps were taken to ensure their funding and implementation, nor the results monitored and evaluated at macro-economic level, various strategies were proposed by the States. Using as basis the FAO report which we jointly prepared (BAUMER and SABRA, 1980) for Mauritania, CILSS member States prepared in Nouakchott in 1984 a desertification control strategy as well as national desertification control programmes. However, the many plans and projects that came into being reflected the wishes of donors much more than the guidelines of the plans or strategies. Structural shortcomings gave birth to a multiplicity of approaches, actions and methodologies of interventions (both from the technical and administrative view points) where no reference was made to the name or even the principles of agro-forestry so often mentioned today. Such multiplicity has resulted in a juxtapotion of initiatives (sometime competitive), disorganization, dispersal of efforts, wastage of resources, in short a panoply of development constraints.

CILSS concluded that the various plans (NPCD, TFAP, NEAP, etc.) contain the same orientations and that there was need to arrange them in their order of priority, for everything cannot be classified as priority. CILLS also noted the gap between the objectives enshrined in the plans and the realities on the ground (1991) and deemed it necessary to harmonize the various development plans and actions and ensure that they supplement

each other and remain consistent with the major orientations defined by the national economic and social development policy. A presentation and analysis of a few of the major strategies concerning the countries of the Sahel can be found in this document of CILSS (1991) which we have used extensively. Prominent among these are the following major programmes involving all the countries of the Sahel:

- SRLSD - Revised Regional Strategy for Desertification Control and Development (1984) which stipulates that it behoves each State to define its own strategy based on its peculiarities and policy;

- Strategy for the Conservation of Living Resources for Sustainable Development (1980) prepared by UICN in cooperation with UNEP, WWF, FAO and UNESCO;

- NEAP - National Environment Plans of Action initiated by the World Bank;

- NPCD - National Plans for the Control of Desertification, which emanate from the Regional Desertification Control Strategy;

- TFAP - Tropical Forests Action Plans created at the initiative of FAO, the World Bank, the World Resources Institute and UNDP;

- PANUD - United Nations Plan of Action for the Control of Desertification, which emanated from UNCOD in 1977 and is often known as the Nairobi Plan;

- OSS - Sahara and Sahel Observatory, created at the initiative of France in 1991;

- SAP - Structural Adjustment Programme created by the World Bank and the IMF;

- PFIE - Training and Information Programme on Environment, initiated by EEC, the Sahel Institute and UNSO;

- PSAGE - Sahelian Programme of Assistance to Environmental Management;

- PSRN - Renewable Natural Resources Monitoring Programme in the Sahel, supported by CILSS (Agrhymet) and CEC and which overlaps with OSS;

- DIAPER - Permanent Diagnosis Programme jointly launched by CILSS and CEC;

- RESADOC - Sahelian Documentation Network, supported by ACDI and various partners;

- The Population and Development Research Programme initiated by BAUMER in 1981 on human resources in Mauritania, supported especially by USAID.

Since the various plans and programmes prepared at national level were uncoordinated, the result is multiplicity, confusion and duplication. Thus, in Burkina Faso where the programmes are numerous and even include:

a PNGTV - National Village Soil Management Plan
a PNAFN - National Plan for the Development of Natural Formations
a PNFV - National Village Forestry Plan

which are linked to both NPCD and NEAP, one realizes that TFAP overlaps five times and seven times with the first and second plans respectively. As a matter of fact, the primariness of a plan over another is not clear, even though NEAP, the latest plan, is global and more comprehensive than the others. However, in Cape Verde and Mali it is NPCD that takes precedence over the other plans. In other countries, the other plans are often linked to the Economic and Social Development Plan (ESDP).

There are too many areas of activity which overlap. If we take NPCD, TFAP, NEAP and living resource conservation strategies for example, we notice the following common areas of activity:

- protected areas and heritage management
- management of information on environment
- research
- monitoring of ecosystems
- women development and participation
- domestic energy
- information, sensitization and training
- national development
- land laws and regulations
- strengthening of institutions

i.e., 10 identified areas out of 22. These superpositions give rise to problems of coordination between programmes having the same objectives, which more often than not are not easy to overcome. Contrary to what one would have expected, the positive results are hardly shared because people want to keep the benefit to themselves. No one cares about coherence or priority. What matters is the success of one's own programme. Some donors even go to the extent of drawing up the list of countries that they consider priority countries (in order for example to control them better politically and financially) and areas of geographical concentration. In these countries the funding of a project is

dictated by the whims and caprices of the donor and not by local priorities.

Despite the existence of CILSS which is very actively supported since its inception in 1973 by the Sahel Club, not much has been achieved in the area of subregional cooperation. It is often seen as competing with national development, whereas the two are supposed to complement each other.

Lastly, it should be noted with satisfaction that though it has been able to mobilize several hundreds of millions of dollars since its restructuring in 1983, CILSS acknowledges the fact that money is not the solution to under-development. What is lacking most are endogenous initiatives and measures.

C. Situation in the Sub-region

1. General agricultural situation

Depending on the countries, agriculture constitutes between 40 and 70% of the GNP and accounts for more than half of the foreign earnings of most of the countries in West Africa. However, budgetary allocations to the agricultural sector are very low: In Ghana it represented 3.5% of the 1990 budget, taking into account current expenditures and investments, i.e., much less than defence, education (more than one quarter of the budget) and health (over 10%).

The growth of agricultural production in the sub-saharan countries was 2% per annum during the last two years, compared to the population growth rate which was higher. In the Sudano-Sahelian region, it was 2.86% on the average between 1970 and 1980 as against 3.60% in Senegal and was projected to exceed 3% in Mauritania and Niger between 1980 and 2010, whereas the growth rate for all the regions was estimated at 2.75%. In the humid

and semi-humid region of West Africa, the average growth rate of the population was 3.28% between 1970 and 1980 and was estimated at 3.35% between 1980 and 2010. During the period under review Guinea Bissau (4.39%) and Cote d'Ivoire (4.04%) had very high growth rates compared to that of Kenya (4.03%). On the whole, with the exception of Cote d'Ivoire, Ghana and Gambia, the annual population growth rate has continued to increase since 1975, reaching 2.1% in Guinea Bissau and 4.1% in Cote d'Ivoire between 1985 and 1990 (ECA, 1991). The urban population growth rate has experienced a downward trend since 1975 but remains high and beyond the current absorption capacity of the cities. It was 3.8% and 6.7% in Benin and Niger between 1985 and 1990. Between 1980 and 2010 Nigeria and Liberia will have the highest rates, 3.52% and 3.21% respectively. Table 2 shows that in 1986 per capita energy food production in several countries was below 2000 Kcal, e.g., Ghana, Guinea, Sierra Leone and Chad which have been affected by severe social crises over the last few years.

Only Cote d'Ivoire enjoyed an appreciable per capita food production between 1970 and 1984, which nevertheless was almost 4 times less than was needed for the country's economic recovery.

The 1990 World Economic Survey shows the general deterioration of the situation in most of the West African countries affected by desertification: the food production index in those countries has improved as shown in table 2 below:

Table 2: Food production index in some ECOWAS countries

	1980	1985	1990
Benin	100	114	120
Burkina Faso	100	112	111
Cape Verde	100	--	107
Cote d'Ivoire	100	97	88
Gambia	100	93	92
Ghana	100	140	99
Guinea	100	121	88
Guinea Bissau	100	98	107
Mali	100	89	98
Mauritania	100	102	87
Niger	100	105	85
Nigeria	100	80	89
Senegal	100	92	108
Togo	100	90	100

It will be noted that the term project, plan, programme, etc.. are often used interchangeably.

Between 1978 and 1990 significant efforts were made to combat desertification and projects were prepared or implemented by the United Nations agencies. The projects for Africa include:

10 ECA projects
about 50 FAO projects
about 20 IFAD projects

12 UN/DCTTD projects
5 UNESCO projects
over 100 UNSO projects

as well as other international projects which also concern Africa (UNEP 1992).

Terms are not always very accurate. As pointed out by WEISSMAN (1990), from 1980 we have witnessed a rapid succession of terms created by donors to describe the reforms of their assistance programmes aimed at mitigating the economic crisis facing Africa: stabilization, adjustment, economic policy reform, structural adjustment, sectoral adjustment, humane adjustment, etc.. All these terms cover policies aimed at:

(i) stabilizing the economy through carefully planned adjustment of local demand to reduced level of external resources;

(ii) ensuring a long term permanent growth changes in prices in order to create a more effective and flexible economy based on the judicious utilization of resources.

Country	Population growth (in %) 1970 - 1980 1980 - 2010	Per Capita food production growth (in %) 1970 - 1984	Food energy (per capita K cal) in 1986
Benin	2.52 3.08	- 0.9	2186
Burkina Faso	1.98 2.74	0.2	2142
Cape Verde	1.72 1.10	-	2716
Côte d'Ivoire	4.04 3.11	1.4	2573
Gambia	2.22 2.23	- 4.1	2519
Ghana	2.89 3.12	- 3.8	1766
Guinea	2.11 2.53	- 1.0	1776
Guinea Bissau	4.39 2.22	-	2185
Liberia	3.20 3.21	- 0.7	2379
Mali	2.11 2.81	- 0.9	2073
Mauritania	2.72 3.06	- 0.6	-
Niger	2.51 3.10	- 0.5	2430
Nigeria	3.48 3.52	- 1.9	-
Senegal	3.60 2.88	- 3.2	2375
Sierra Leone	1.52 2.02	- 1.2	1852
Togo	2.59 3.03	- 1.5	2207

(Source; FAO, 1990)

In 1992 about 30% of French aid, 35% of American aid were devoted to structural adjustments and these percentages continue to increase. PAMSCAD or Programme of Action to Mitigate the Social Cost of the Adjustment was launched in Ghana to counterbalance the negative effects of the adjustment.

Deforestation in Africa eliminates forest areas at least 30 times more than both afforestation and agroforestry can create. Sedimentation of lakes as well as of reservoirs of dams and rivers increases one and a half times faster than the population in the catchment areas; it reaches 5% per annum in the rivers of Nigeria.

The time and efforts needed to install agroforestry systems and the interval of several years between their installation and the beginning of their direct marketable and profitable production (edible leaves, firewood, fruits, forage, etc..) are an impediment to the expansion of agroforestry techniques. However, this is not the same everywhere. If almost everywhere in West Africa there is a serious lack of awareness of the gravity of erosion, of soil losses, of firewood, forage and food shortage, there are cases where this awareness exists, for example where the scarcity of arable lands is so severe as in the Ibo land (Nigeria) or in Rwanda. In 1990, each rwandese had on the average 0.19ha to meet his needs (food, textile, firewood, forage, etc..). National parks were used for agricultural purposes with the aim of alleviating the situation for a few years, before the recurrence of the 1990 situation.

The land situation is so critical that the government of Rwanda had envisaged «exporting» between one and one and a half million of its nationals to Tanzania and Zaire. Negotiations to that effect had taken place. In other cases, the populations had experienced in their history strong pressures exerted on them by other populations and had as a result sought refuge in

inaccessible areas where they evolved very expensive techniques to carve a land for themselves. This is what the Nubas in the Republic of Sudan have done. Driven from the plains by Arab invaders, they sought refuge in the mountains of the Central part south of Kordofan where, with stones, they created terraces and carried soil on their backs from the valleys. They made water reservoirs at the tops, in the space between pebble blocks. Perched on their mountains and protected from mosquitoes and malaria, they resisted the onslaughts of arab tribes up to 1960. The Furs in Western Sudan did likewise. Inventors of a sophisticated irrigation with long aqueducts, they created a powerful sultanate around Jebel Marra who left his name to their province: Darfur. Compelled by necessity, man invents solutions and accepts to do hand work to survive. Proof of this are the numerous terraces found around many mediterranean regions. In the South-Western part of Ethiopia the Konsos who experienced a national economic self-sufficiency before the Ethiopian Revolution carved their mountains with terraces which could produce without being eroded; there they planted ligneous trees, the upper wall preventing the roots from hampering farming done on the terraces. Today, African peasants have developed the habit of looking up to others for help, so much so that more often than not they don't even take care of the anti-erosion works contracted for them by the Government. For instance, in Lesotho where 400 000ha of land (representing almost the total available lands of that small country) were developed with the view of the Defence and restoration of the soils (DRS) in the thirties, the farmers felt that it was the duty of the Government to maintain their lands and, as a result, left them to deteriorate.

The tree is no stranger to the African as is often alleged. Allah's paradise is replete with trees, so are huts. In Burkina Faso, a survey has revealed that one farmer out of two had planted at least one tree during the past three years. In the Dago land, in Mali, half of the farmers have planted at least one

tree over the last two years. More and more farmers produce seedlings themselves, which they plant in their farms.

All agricultural products in Africa have experienced a downward trend since 1961, especially cocoa whose world production fell from 64% to 40%, coffee, cotton, vegetable oil which dropped from 65% to 15%, tobacco, sugar and even rubber. Only tea production has increased from 8.1% to 19.4%. This crop is mainly produced in East and Central Africa.

In 1989, Nigeria produced only 80 000 tons of rubber and 256000 tons of cocoa, not to mention the large quantities that were exported secretly to the neighbouring countries using the CFA Franc. Cocoa production, just like the production of groundnut, cotton and palm oil, has fallen sharply in that country since 1960 but has risen under the dual effect of the devaluation of the Naira and market liberalization. However, only cocoa and small quantities of rubber and oil palm products were still exported.

In order to feed existing agro-industries the country started importing many food products (rice, maize, wheat, sugar) in the 80s, as well as commodities which were formerly exported, such as groundnut and cotton.

2. Natural resources conservation

The role of African Governments should not be to do conservation work which is the domain of farmers and cattle breeders but rather to provide the latter with the technical support they need in order to plan and implement their own land conservation and utilization programmes.

A National consultative Committee should give opinions on:

- the detailed formulation of a strategy for the conservation of soils and other natural renewable resources;

- the implementation of the policy that may derive therefrom;

- the co-ordination of actions; and

- their follow-up.

In that Committee should be represented the various interests of the country as well as Government Departments responsible for the formulation of macro-economic and budget allocation policies. Their presence would allow for continuity as far as financing is concerned. The Standing presidential Commission on Soil Conservation and Afforestation set up in Kenya in 1981 is a good example in this respect. The Commission has proved particularly active and effective in that it created awareness among the public about the benefits of conservation. However, for want of adequate documentation and experienced specialists, it nearly drew the country into a general battle against eucalyptus trees under the pretext that they are major consumers of water.

Other actions are necessary:

(i) create or strengthen government conservation services which can be placed in various ministries, depending on the countries; most West African countries lack qualified specialists or material resources needed for such services, even the minimum to start with, as has been recommended;

(ii) encourage the NGOs while ensuring that they do not go beyond their areas of jurisdiction and prevent them from taking premature initiatives as some of them often do (cf. chapter 3).

(iii) put in place an appropriate legal instrument. If during the colonial era no draconian and very restrictive laws- with heavy penalties and prison terms- had not been enacted, more often without consulting the farmers, there probably would not have been any more trees in most West African countries. Grazing lands would be more degraded and agricultural lands even more eroded than they are now. Unaware of the consequences of their decisions, the leaders of some countries based their struggle for independence against such repressive laws and regulations, not realizing that they were creating a movement against conservation which was deemed counter-productive and was consequently abandoned. It took the elite of the newly independent countries many years to convince their people of the usefulness of soil and natural resources conservation. This has not been easy especially in countries or regions where high population density clearly shows the consequences arising from land shortage.

Many countries still lack appropriate legislation to establish institutions. legalize their mandate and ensure that they have budgetary allocations. The establishment of such legislation should begin with a thorough review of existing laws and regulations with a view to harmonizing and even formulating them anew, taking into account the concerns of each Ministry and Department and clearly spelling out the responsibility of each and every one.

(iv) Train at all levels:

- administrators who should be sensitized and made aware of their role;

- farmers by introducing conservation in the courses and seminars organized for them and ensuring that conservation is no longer considered as a separate area;

- technicians in conservation techniques as well as in techniques of involving rural communities in the conception, drawing up and implementation of their own plans.

(v) Identify research needs, especially through «D and D» (Diagnosis and Design) exercises in order to make the poorest farmers participate in the very definition of research objective.

(vi) Develop conservation programmes.

The positive effects of a good conservation of soils and natural resources include:

- reduction of migrations to towns;
- contribution to the establishment of permanent agriculture;
- increase in food security;
- reduction of inundation in the valleys;
- reduction of the rate of sendimention in dams and the extension of their duration;
- reduction of agricultural risks and increase in agricultural revenues;
- quantitative and qualitative improvement in water supply;
- improvement of land and environment resources, leading to better living conditions.

Protection of the flora and the fauna

A detailed study on the protection of the flora and the fauna can be found in a recent document prepared on the basis of the researchers conducted by BYE MASS TALL, G.A.AGBAHOUNGBA and SARAKA YAO, the major conclusions of which are reproduced below (ECOWAS, 1989 a). After recalling the priority actions undertaken in this field by the Member States of the Community (reafforestation of the catchment areas, bush fire control, control of insects harmful to forests, adaptation of research, strengthening of training, polling of efforts, assistance to National Forestry Funds, poaching and trophy control, experts meetings, etc..), the document in question also aims at identifying regional actions that could constitute a programme of action for ECOWAS.

The first chapter gives an overview of the status of the flora and fauna resources of the subregion. The document recalled that in 1975 the total share of the timber trade was estimated at US$ ie. 2.4% of the overall foreign trade of Member States. The production is given in table 4 below.

Table 4: PRODUCTION OF TIMBER AND FOREST PRODUCTS IN THE ECOWAS SUBREGION

(unit: 1000 m^3) (1985)

Country	Firewood and charcoal (m^3)	Log (m^3)	Rough timber, sawing and veneering (m^3)	Wood panels (m^3)	plywood (m^3)	wood pulp (m^3)
Benin	3,673	3,879	24	-		
Burkina Faso	8,250	6,606	5			
Cape Verde	-	-	-			
Côte d'Ivoire	6,668	12,032	4,854	122		
Gambia	881	891	5			60
Ghana	7,284	9,803	2,138	61	70	
Guinea	3,085	3,624	180	2	40	
Guinea Bissau	422	526	40		2	
Liberia	536	5,084	745	9		
Mali	29,973	30,249	10		7	
Mauritania	605	650	1			
Niger	2,817	3,034				
Nigeria	95,225	102,584	5,081	134		
Senegal	7,770	2,885	20		86	
Sierra Leone	690	7,971	41			
Togo	546	697	18			
TOTAL	168,425	154,930	13,153	328	205	60

Chapter 2 deals with national flora and fauna protection policies. It examines national legislations, programmes, constraints and the role of international co-operation.

National strategies for the implementation of actions were prepared in the form of national programmes for combatting desertification.

In Burkina Faso the National Plan for the control and protection of Nature aims at increasing the production of firewood through reafforestation, utilizing improved ovens and providing assistance to the Forestry Administration. With regard to the protection of the fauna, the authorities place emphasis on the introduction of legislations to control game.

In Côte d'Ivoire, the nature protection policy is mainly based on the management of the delineated forestry zone used for the exploitation of industrial timber, on the training of engineers and forestry technicians, on the protection of the savana zones against bushfires and lastly on the protection of national parks and reserves. Industrial reafforestation activities are largely in the field of forestry.

In Mali, emphasis was placed on the implementation of a National Nature Protection Plan by giving priority to the establishment of a «green barrier» for the protection of farming areas. This presupposes the active participation of rural populations in reafforestation activities regarding the planting of firewood trees.

Niger is one of the few countries of the Community to have adopted a national strategy for combatting desertification. It is

based on the integration of socio-economic activities in environment. Presented in the form of a national plan codenamed «the Maradi Commitment», this strategy is based on the critical appraisal of past actions and the definition of new global objectives (food security, satisfying energy needs, protection, restoration and improvement) with a view to drawing up a genuine national programme. This plan will use as its basic structures the Youth of Niger, the Armed Forces and socio-professional associations. The principles of action are based on protection and restoration through community reafforestation and regeneration of natural formations.

In Senegal, the establishment of the Ministry for the protection of nature testifies to the government's concern over these problems. The strategy mapped out revolves around drought and desertification control, to which should be added the growing needs of the populations for firewood. A forestry master plan was prepared with the help of CTFT, based on the following major guidelines:

- increased protection of plants;
- stabilization and increase in the number of ligneous and non ligneous products;
- restoration of degraded ecosystems caused by man and drought;
- extension of community reafforestation;
- encouraging people to use new forestry products.

This policy is linked to the strengthening of structures and the establishment of new institutions (CNLD). This COMIDES established since 1984 meets every two years to take stock of the progress made by the States and by international organizations.

In Ghana, the forestry policy is based on the conservation and management of the forestry zone, research and training.

A Forestry Commission was set up within the Ministry of Natural Resources to serve as an advisory and follow-up committee on forestry activities and conservation of wild life resources. This policy is based on reafforestation activities with the participation of the rural populations and Committees for the Defence of the Environment established in the regions and districts.

In Sierra Leone, the forestry policy falls within the context of PND (1974/1975 - 1978 - 1979), the main objectives of which are as follows:

- acquisition, management and protection of the forestry and industrial farming zone in order to meet the timber and firewood requirements;

- development and expansion of sawing industries;

- development of forestry research;

- training of officers;

- conservation of the fauna.

In 1986, a «Green Revolution» programme was launched with the aim of attaining food self-sufficiency: forestry contribution was focused on the conservation and development of forests for soil protection and on increase in forestry production. Special emphasis was placed on the priority of the forestry sector and the improvement of forestry legislations for a better exploitation, as well as on the participation of the rural communities.

In Togo, there is also a political desire to protect the flora and the fauna. The Ministry of Environment was created and various measures taken such as the establishment of Tree Day. In 1990, the policy had yet to be supported by a master plan. Nevertheless, Togo adhered to the Tropical Forestry Action Plan (TFAP). Programmes of action were carried out in the area of industrial reafforestation including community reafforestation, for the protection of forests and national parks.

In November 1987, during the first meeting of forestry experts on the Decade of reafforestation held in Lagos, the ECOWAS Executive Secretariat briefed the meeting on progress made by Member States in the implementation of the Decade. It was noted that new measures had been taken by most States in the following areas:

- sensitization of the populations;

- national strategies for the protection of the environment;

- establishment of eco-development projects.

National Tree Days were established. All this shows a real political will and the usefulness of pooling efforts to preserve

and restore the environment. A review of the legislation in force and their shortcomings was carried out, leading to a recommendation to harmonize national legislations.

In the countries of the North, the programmes or projects implemented are in consonance with the search for food self-sufficiency and the objectives set are based on:

- food security;

- meeting firewood requirements;

- protection, restoration and development of the environment.

In the countries of the South, the programmes or projects are focused on:

- meeting the industrial wood requirements of the foreign market;

- meeting firewood requirements;

- protection, restoration and development of the environment.

With regard to the fauna, the activities undertaken are based on:

- delimitation of parks and reserves;

- construction of access roads;

- establishment of tourist infrastructures;

- conservation of parks and reserves;

- development of domestication and game production projects as is the case in Benin, Côte d'Ivoire, Ghana and Togo. Despite the diversity in national policies for the protection of the environment, ECOWAS (1989 a) noted the following common elements:

  (1) Inadequate knowledge on the real potentialities of forest and wild life resources and paucity of the studies and inventories made;

  (2) Inadequacy of policies and strategies implemented for a sustainable development;

  (3) Absence of national development planning;

  (4) Non-integration of development and environment restoration problems into the other sectors of the economy;

  (5) Inadequacy of financial resources for the implementation of environmental protection projects,

  (6) Inadequacy of human resources for the management and promotion of forestry and fauna development projects;

  (7) Weakness of research and forestry development structures;

  (8) Over-dependence on external funding sources;

  (9) Lack of harmonization of national legislations;

(10) Inadequate motivation and popular participation.

In conclusion, it has been recommended (ECOWAS, 1989 a) that member States:

- prepare a Regional Forestry and Wild life Action Plan which, in our opinion, should rather be prepared by FAO and introduced after TFAP;

- harmonize their national legislations;

- monitor the ecosystems in a consistent manner at regional level. We feel that this is possible only if there are structures to implement whatever lessons are derived from permanent surveillance;

- strengthen inter-state co-operation in the area of wild life protection.

3. State groupings and disparities between North and South

The 1986 African Agriculture Atlas shows that the countries of the subregion are involved in many State groupings (Table 1). Eight groupings can each boast of the membership of all West African States.

The North and South of West Africa are very dissimilar as shown in Table 5 below.

Table 5. Disparities between North and South

NORTH		SOUTH	
In 2010 only 1/3 of the population will be urban		In 2010 2/3 of the population will be urban. The Southern part comprises the most populated State in Africa-Nigeria with a population of 80 million inhabitants way back in 1980.	
The population of Cape Verde will increase by only 1.10% between 1980 and 2010.		Nigeria is expected to have the highest population growth rate between 1980 and 2010 : 3.52%.	
Life expectancy at birth 1980 - 1985		Life expectancy at birth 1980 - 1985	
Cape Verde	57.0	Ghana	52.0
Mauritania	44.0	Togo	48.7
Senegal	43.3	Nigeria	48.5
Chad	43.0	Côte d'Ivoire	47.0
Niger	42.5	Guinea Bissau	43.0
Burkina Faso	42.0	Benin	42.5
Mali	42.0	Guinea	40.2
Sierra Leone	34.0	Gambia	35.0

Infant mortality was generally lower between 1980 and 1985 with the exception of Guinea (159 for a thousand), Mali (149) and Burkina Faso (149). It was 77 in Cape Verde and 98 in Ghana	Infant mortality was very high between 1980 and 1985. 200 for a thousand in Sierra Leone. 193 for a thousand in Gambia. 154 for a thousand in Guinea.
G.N.P. between 1973 and 1982 in Senegal.	G.N.P. declined between 1973 and 1982 in Guinea Bissau, Sierra Leone, Liberia, Ghana and Nigeria.
Food production in Cape Verde, Mauritania, Niger and Chad fell between 1980 and 1984. It increased by 1% in Gambia and Senegal.	Food production slightly declined in Togo between 1980 and 1984. It increased considerably in Guinea Bissau (8.55%).
	30 to 35% of Côte d'Ivoire exports were devoted to debt servicing.
In 1983, Cape Verde had a total debt of US$ 67 million.	In 1983 Nigeria had a huge debt amounting to close to 12 billion dollars.
The animal population was very high in 1983, with several thousand heads of cattle.	The animal population exceeded the capacity way back in 1983 with several thousand heads of cattle.

	BF	CV	CD	GA	ML	MA	NE	SN
Cows	2850	13	3600	300	6500	1200	3521	2329
Pigs	195	22	6	12	47	-	33	187
Sheep	2000	1	2300	185	6300	4000	3448	2100
Goats	2600	75	2100	194	6000	3000	7478	1050
Horses	270	10	405	4	856	158	784	410
Dromedaries	6	-	421	-	400	770	410	6

	BE	CI	GN	GU	GB	LI	NI	SL	TO
Cows	849	780	800	1900	225	42	1231	351	260
Pigs	500	400	375	44	130	115	300	42	380
Sheep	1032	1380	2000	450	65	232	1300	320	840
Goats	988	1380	2000	440	145	233	1285	168	760
Horses	7	2	29	4	1	-	2600	-	2
Dromedaries	-	-	-	-	-	-	950	-	-

Milk production does not meet the total needs in 1979. Senegal imported more than it produced. All the countries were importing milk or dairy products	Milk production was very low compared to imports between 1979 and 1981. All the countries except Guinea, without financial resources imported more than they produced (Côte d'Ivoire imported 187,100 tons against a total production of 9300 tons.
The countries of the North export 1/3 of their meat production. They produce at least 15kg of meat per head per annum.	Côte d'Ivoire imports more meat than it produces. All the countries import and produce less than 10kg of meat per head and some countries (Ghana, Sierra Leone, Liberia produce less than 5kg)
Fish production exceeds 20kg per head per annum in Gambia and Senegal. It is 16kg in Mauritania and between 1 to 5kg in other countries.	On the whole production 15kg per annum except in Guinea and Burkina Faso which produce only 5 to 6kg.

Food imports represent a high percentage of the total imports of Cape Verde, Mauritania and Senegal between 1982 and 1984	The same holds true for the South. 31.8% in Guinea Bissau, 30.4% in Sierra Leone, 20.7% in Togo, 15% in Ghana
The period of growth varies between 0 and 210 days	The period of growth varies between 200 and 335 days.
Rainfall varies more than 25%.	Rainfall varies between 15 and 25%.
Between 1982 and 1983 Senegal spent 11% of its budget on agriculture, compared to Niger (9%) and Mali (4%)? It however spent more than double that percentage on Defence.	Between 1982 and 1983 Sierra Leone spent 10% of its budget on agriculture compared to Côte d'Ivoire (also 10%), Ghana (5%), Nigeria (4%).
In the Northern zone, in 2010, Mauritania, Mali and Cape Verde would no longer be able to produce or import their food requirements.	In the Southern zone in 2010, Guinea, Gambia and Nigeria would no longer be able to meet their food requirements and should have enough money to import them.

Status of forests in the subregion is given in the table below.

Table 6. Total area covered by forests in ECOWAS States (in 10.6ha)

	Total surface area	Total forest area
Burkina Faso	217.0	4.0
Benin	11.3	6.7
Côte d'Ivoire	32.0	18.0
Cape Verde	0.4	N/A
Gambia	1.1	0.1
Ghana	24.0	12.0
Guinea Bissau	3.6	1.0
Guinea	24.0	15.0
Liberia	11.0	3.5
Mali	124.0	4.5
Mauritania	102.0	15.5

4. Forest protection

The status of forests in the subregion is given in table 6. The figures only show the sizes and differ slightly from those provided by LANLY which were prepared under better conditions and with more scientific methods. They also differ from those given elsewhere in the same document (ECOWAS, 1989 a). For example the forest area of Burkina Faso is estimated at 2,159 000ha or 3,870ha! Furthermore, out of 136,106ha of forests, the same document (ECOWAS, 1989 a) estimated the forest reserve at 20,17.106ha, of which 8.106ha goes to Côte d'Ivoire, 4,4.106ha to Nigeria, 2,5.106ha to Liberia and 2,0.106ha to Ghana.

Forest statistics of ECOWAS countries are therefore very inaccurate for most of them. However, it is much more important to take measures to protect the forest and to widen its area rather than to think of making inventories using photo-interpretation devices or other methods which, under the present circumstances, would not serve any purpose as far as protection is concerned.

In 1988, timber was the 4th export commodity in Ghana, representing a very insignificant percentage of exports. Côte d'Ivoire was the biggest exporter, with timber and ligneous products accounting for 2.6% of its exports in 1987 (ECA, 1991).

The International Tropical Wood Organization (ITWO) which replaced the International Technical Tropical Wood Association (ITTWO) has a total membership of 36 producer countries and 73 consumer countries, accounting for about 90% of the world timber trade. It aims at encouraging the development of national policies geared towards constant utilization and conservation of tropical

forests and their genetic resources, as well as ensuring ecological balance in the regions concerned. The Friends of the Earth even wrote that it is the only organization that deals solely with tropical humid forests and international timber trade. This is too categoric an assertion because the FAO Tropical Forests Commission has similar objectives and also defends the interests of the nations concerned, i.e. consumers, producers and middlemen.

It would have been fairer to say that ITWO tries as much as possible to preserve forest resources rather than exploiting them. However, the position of many producer countries is ambiguous, and they are against the preparation of a code of conduct regarding proper use of forests which they consider as an attempt by the rich consumer countries to consolidate their hold on national forestry practices. The position of ITWO would no doubt be better if this code concerns all the forests in the world and not only tropical forests. The position of the members of the Organization is not clear, neither among the importing countries nor among the exporting countries.

For instance, even though the former President of the United States of America, Mr. Bush, announced that he would be the «President of Environment», his country is not up to date in the payment of its contributions to ITWO.

Regarding the exporting countries, a concrete proof of this ambiguity is the case of the Philippines. In 1981 that country is on record as having exported 365,441 cubic metres of timber to Japan, whereas the latter's imports showed a different figure - 1,400,000 cubic metres.

This means that about one million cubic metres were exported by pirates, dishonest and corrupt people. Is it possible, under these circumstances, to talk of sustainable exploitation? What are we protecting? Is it the primary forest, its fauna or flora? Or is it a secondary forest which, at most, becomes a tree plantation for industrial purposes, such as oil palms in Malaysia, which have largely replaced the primary forest? It was suggested that the importation of tropical wood should be prohibited.

This prohibition should begin with a ban on the importation of rough timber to enable the producer countries do the processing themselves and make profits therefrom.

However, prohibiting the rich countries to import would add to the impoverishment of the poor countries, unless a series of parallel measures were taken such as banning the importation of wood furniture into these poor countries and compelling the latter to replant and promote reafforestation under conditions suitable to every species exploited.

The aim of the timber companies is not to reduce their operations but rather to work 24 hours and make quick profits by making use as rapidly as possible to what remains of the trees of high value in the tropical forests. Now, according to estimations, at the current rate of exploitation, the forests of some States will be productive for only a few years - 7 to 8 years for Sarawak and Borneo, and 3 years for Sabah, Borneo (JAGELS, 1990). Under these circumstances, what guarantee can there be for tropical forests? The best chance that remains perhaps is to underscore the great economic value of products and services usually considered as secondary. In some of the forests of Poland, more than half of the revenues come from brooms made with small branches and from the harvesting of

mulberries, bilberries and mushrooms, and even from tourism created as a result of the presence of bisons.

In Nigeria, out of over 7400 industrial establishment identified in 1988 (FOS, 1988), 1622 were engaged in the processing of wood and its derivatives. Out of this number, 1474 were owned by private individuals, 66 were limited liability companies and 65 were joint ventures; 8 others were parastatals and 4 were co-operatives. Regarding the number of employees:
1079 had between 5 and 9 employees
368 had between 10 and 19 employees
125 had between 20 and 49 employees
27 had between 50 and 90 employees
11 had between 100 and 199 employees
6 had between 200 and 499 employees
4 had between 500 and 999 employees
2 had over 1000 employees.

The total number of salaried workers was 25,426, i.e. an average of 16 workers per establishment, and the lowest figure of employees per manufacturing establishment. However, in terms of total number of employees, the wood industries ranks third after the textile industry (60,361 workers) and the food industries (50,988 workers). In terms of total cost of inputs, the wood industries were last compared to all the manufacturing industries. They also came last in terms of turnover per salaried worker, far behind the metal industries which come first (40 times the turnover of wood industries).

In 1990 the sawmills were operating at only 36% of their full capacity. However, between 1988 and 1989, timber production

increased by 3.3% as against 2.5% for sawing, which represented only 1% of the total volume of timber (CBN, 1990).

It would be appropriate to concentrate first and foremost on wood processing activities, sawing in particular, even if this means embarking on a retrenchment exercise. The production capacity of what remains of forests does not allow for an increase in forest industries. In the same vein, reafforestation activities should be intensified:

- to guarantee the environmental advantages deriving from forests (water flow, biological multiplicity, etc..);

- to ensure in ten years time the resumption of the exploitation of precious species, many of which are on the verge of disappearing, or have almost disappeared (this presupposes that the precious species should be replanted, which implies a better knowledge of their biology and management);

- to make it possible to provide for a population which will double in 20 years time even if rigorous population control measures were applied; and

- to ensure that it has the quantity of firewood and charcoal it needs.

According to an FAO document (1980) quoted by ECOWAS, as far as firewood is concerned, the demand of countries of the North which is higher than the 1980 demand would still be higher in 2010. For countries of the South, the situation varies; for instance Nigeria which had a very positive result in 1980 would experience a deficit of nearly 90 million m^3 in 2010, compared to Guinea whose demand of

$17,8.10^6$ m^3 in 2010 would be lower than supply estimated at $29,6.10^6$ m^3. Positive balance sheets of ECOWAS countries for the 2010 could be established as follows:

Guinea	29,6
Côte d'Ivoire	14,4
Ghana	13,8
Togo	13,5
Benin	8,9
Liberia	1,9
Guinea Bissau	1,1

In Senegal, the management by the village communities of forests formerly classified and manages by the Forestry Commission has made it possible to produce, instead of mere cubic metres per ha per annum as revenue, a whole gamut of products including timber, firewood, charcoal, fodder, honey, insects consumed as larvae or adults, fibres, medicinal products, dyeing, fruits, edible leaves, etc.. Studies have revealed that in Peru one hectare of forest had a net value of over US$ 6000 whereas the wood that can be derived therefrom only costs US$ 1000 (JAGELS, 1990). The protection of the rest of the tropical forests is in any case a difficult and complex problem. The following principles laid down by Mc NEELY (1990) could be applied:

1. Translate environmental advantages and inconveniences in monetary terms, into a relatively stable unit like the ECU or the US dollars;

2. Identify the compatible uses, for example the protection of the catchment areas with fishing, game, tourism and scientific research;

3. To be open minded and objective in dealing with conflicts that may exist between various activities, and relate the facts, however, painful they are, in order to lay new bases for a new consensus;

4. Admit that our institutions are not developing as rapidly as the problems are identified, and that new institutions may prove necessary in planning and implementing integrated development plans;

5. Ensure that the responsibilities are clearly defined and that those responsible for development are also responsible for conservation;

6. Recognize that the best of motivations is often personal interest that is clearly understood.

As natural resources, soil, water, vegetation and fauna constitute the major development potential in the northern part of the regions that we are concerned with. The economy of the region is essentially rural. Development process there is highly influenced by climatic conditions: low and very variable precipitations, more scarce in the North, but with a drought that has been encroaching on the South for a few years now. There have been droughts in the past but the consequences were less severe, even though there were relatively more deaths. Little was known and said about them. Other droughts occurred, equally or more severe than those of the 70s and 80s but with less havoc, eg. around 1880 or thereabouts, 1910 - 1915, 1940 - 1942. The strong human pressure has rendered obsolete systems which in the past made it possible to maintain an equilibrium:

- shifting cultivation which is very adapted to the conservation of natural resources so long as the human pressure is not much, no longer allows for the reconstitution of the fertility of the soils, nor the rotation systems deriving therefrom, like the famous gum tree gardens of Kordofan in the Sudan;

- the buffer zone which formerly existed between nomads and settlers disappeared with the state of peace; however, with extension of farming to the North, conflicts between the two social groups are rearing their ugly heads again, especially as the settlers are more supported by the new administrations which hardly have nomads within their ranks.

Even though nomadism, which minimizes risks instead of maximizing production, is a way of life in dry areas, its survival is threatened and future projections for nomads vary between their disappearance or replacement by sedentary farmers (who are great polluters) as in Kazakstan or Ouzbekistan, or by total medium term desertification of the vast areas they have created (as «Ekistics» theses announced 30 years ago).

The undeniable close relationship between development and environment is acknowledged in the African common position adopted at the Second Regional Ministerial Conference preparatory to UNCED (ECA, 1991), in the same way as was recognized the fact that the management and protection of the environment strengthen development efforts. However, development is generally conceived as a quantitative increase in living standards measured in terms of gross national product, revenues, leisure, number of telephones, cars or teleprinters, without consideration for the qualitative aspects. We prefer the definition of LEBRET and his colleagues (1961) which reads thus: «Development is, for a population and its

sub-populations, the series of transitions at the fastest rate and at the least cost, from a less humane mode of life to a more humane one».

It is no easy task evaluating Tropical Forestry Action Plans (TFAP) because most of them are still being discussed, drawn up or implemented. However, the TFAP Bulletin published by FAO regularly gives a definite account on ongoing negotiations or the progress made regarding the implementation of the Plans. Five major themes to be developed are common to all TFAP Plans:

- role of trees in agriculture (and therefore of agroforestry, among others);

- forest industries which some countries like Senegal have replaced by the qualitative improvement of forest products by incorporating therein fishing and piscultural products;

- dendro-energy;

- conservation of natural resources;

- forestry institutions, to which Burkina Faso has added tourism.

The variety of these themes shows that TFAp is applicable to all the countries of the subregion from North to South. However, the themes assume relative importance which differs from one country to another and depends on the national policy of each country.

Researches also constitute a means for the future development of medical science, biotechnologies and conservation of genes. The

need to increase the number of researches has been recognized but this is hampered by the exigencies of an ill-conceived development. Everybody wants everything, immediately and at a cheap price, and deludes himself with the thought that he will thus find fortune. What should be aimed at is a better share of resources and a general reduction of the speed at which goods and services are produced.

However, no one is ready to make sacrifices.

To African countries, poverty, debt servicing and the draconian conditions of the international trade are a ploy designed to prevent them from preserving their forests. This explains the blackmail directed at the rich countries: «Cancel our debt, provide us with greater financial resources, buy our commodities at better prices and we shall be able to contribute to the protection of forests and natural resources».

The Bamako Commitment makes mention of the non-realization of food security, resulting in famine and malnutrition, as one of the major priorities of Africa. It also mentions the absence of energy security. Also of serious concern are the precariousness of the resources and the extreme fragility of tropical soils, especially in the arid zones.

Demographic pressure, inadequacy of analysis mechanisms and of environment and economic development institutions, as well as the unjudicious management of tropical forest resources, grassy zones and water resources are frequently cited among the major factors responsible for the degradation of the African environment and economies.

The map of possible reduction of human load capacity in Africa jointly published in 1984 by FAO, UNFPA and IIASA shows that by the year 2000 a number of African countries will not be able to satisfy the needs of their populations from their own resources, unless they apply as a matter of urgency a very rigorous birth control policy, adopt a very advanced agricultural technology, and appropriate crop mixture and embark on vast soil/fertility conservation and erosion control projects. Faced with such a serious and clear threat, the virtual lack of reaction on the part of the countries concerned will result in nothing but collective suicide, unless the prospectors are mistaken.

The poor performance of the agricultural sector which remains the determining factor for the growth of most African economies (ECA, 1991) is seen as the major impediment to the efforts of African countries.

Among the major obstacles of Africa's economic development are often mentioned:

1. the fall in agricultural production;

2. inappropriateness of the production techniques in the sectors of agriculture and animal husbandry;

3. inappropriateness of policies and measures adopted to deal with the crisis;

4. the activities of transnational companies;

5. the massive flows of Africa's net resources to the outside world;

6. the impact of the dynamics of human populations and demographic pressure on natural resources.

It was proposed at the Abidjan Conference that debt recycling through the establishment of national funds geared towards the implementation and realization of programmes for the protection of the environment, improvement of the quality of life, social promotion and sustainable development could constitute an effective means or mechanism for alleviating the debt burden and facilitating the commitment of (our) countries to sustainable development and environmental protection.

5. Inventory of natural resources

There is need for an inventory of natural resources. This would no doubt show the impact of development activities on environmental degradation and on natural resources. The method of evaluation of the impact of development on trees proposed to the FAO by MERCIER (1991) and rejected by the former could serve as basis for carrying out this inventory.

As was acknowledged in Abidjan, ecological aspects must be taken into account when formulating and implementing national, subregional and regional economic policies and strategies. Table 7 below was prepared by MERCIER (1991) in trying to find a correlation between GNP and the forest cover.

Table 7. Relationship between GNP and the forest cover in West Africa

	GNP/Capita	Forest/Area
Chad	100	9.6%
Guinea Bissau	103	57.3%
Niger	137	7.2%
Sierra Leone	144	27.3%
Mali	about 145	5.4%
Nigeria	193	9.5%
Ghana	200	31.9%
Guinea	about 200	38.0%
Gambia	202	1W6.3%
Liberia	237	12.2%
Togo	254	26.4%
Burkina Faso	259	12.9%
Benin	262	25.3%
Mauritania	319	0.3%
Senegal	390	52.5%
Côte d'Ivoire	553	6.8%

(according to MERCIER, 1991)

These data do not show a clear correlation between GNP and the forest cover, contrary to what MERCIER has written (1991). However, the statistical analysis of data on 29 African countries, excluding Zaire which has a misleading figure, shows the following correlation: $P = 12.64F + 6.1$ where P is by the year 2000 the per

capita GNP in constant US$ (1987) and F the percentage of forests occupying the soils. In other words, when the forest areas increase by 1%, the per capita GNP statistically increases by US$ 12 per inhabitant per annum. The map prepared by this author based on the «global development status» by the World Bank and the «World Resource Report» by the World Resources Institute shows that by the year 2000 poverty (evaluated here only in terms of per capita GNP) will be extremely high in Guinea and Mali with GNPs close to 0, very high in Gambia, Ghana, Guinea Bissau, Liberia, Niger, Nigeria, Sierra Leone and Chad, with GNPs below Us$ 250 per inhabitant, high in Benin, Burkina Faso, Mauritania, Senegal and Togo, with GNPs ranging between US$ 250 and 500 per inhabitant, quite high in Côte d'Ivoire with a GNP above US$ 500 per inhabitant.

By adopting the system of evaluation used by MERCIER (1991:41), table 6 of which sums up the indicators, the following West African countries in 1982 were among «those which have started off» very badly: Benin, Burkina Faso, Mali, Mauritania, Niger, Nigeria, Togo, i.e. 7 countries out of about 150 studied and with 14 countries in that category for the whole of Africa.

NO.	Indicator	What the indicator represents	Arbitrarily used threshold
1.	per capita GNP	Financial possibilities	US$ 1000 per inhabitant
2.	Rate of illiteracy	Level of education	50%
3.	Forests/total area	Resultant of ecological protection	20%
4.	Forest area per inhabitant in 1990	Availability of tree products	0.4ha
5.	Population/area	Possibility to feed the population on available agricultural lands	1

Out of 5 indicators, Senegal and Sierra Leone had four which were unfavourable. The fifth one could not be calculated for want of statistical information but was most likely deemed unfavourable. Furthermore, among the 10 countries out of 150 with four unfavourable indicators were:

Ghana (expect for the fifth report)
Guinea (expect for the fifth report).

It was also realized that between 1980 and 1987, the 13 countries that «started off» most badly have na average per capita GDP growth rate of 0.83% per annum and a life expectancy of 50 years in 1987, while countries with four unfavourable indicators, and the fifth one also most likely unfavourable, have a negative per capita GDP growth of - 0.6.% and a life expectancy of only 47 years in 1987. Among the countries with four unfavourable indicators, the average per capita GDP growth rate for 1980-1987 was 1.16% and a life expectancy of 54 years in 1987. Countries with intermediate revenues had a life expectancy of 64 years and an annual per capita GDP of 2.20%.

In 1991, MERCIER used the same method by taking five new indicators (Table 9).

Table 9: 1991 new indicators of the evaluation system used by MERCIER

NO.	Indicators	Code	Scale
1.	per capita GDP in the year 2000	GNP	100
2.	current rate of illiteracy	ALF	100
3.	Forests/total area in the year 2000	F/S	100
4.	per capita forest area in the year 2000	F/C	100
5.	FAO indicator on relationship between available areas and population	DEN	100

(MERCIER, 1991)

MERCIER was able to draw the following list of countries at risks, beginning with the most vulnerable, viz Niger*, Mauritania*, Burkina Faso*, Burundi, Somalia, Gambia*, Rwanda, Nigeria*, Chad, Malawi; those with an asterisk belong to West Africa, i.e. five out of the ten most vulnerable States. Approximate values obtained for these six countries are given in Table 10 below.

Table 10: GNP, illiteracy, percentage of forests, forests per inhabitant, FAO indicator for 5 West African countries

	GNP	ALF	F/S	F/C	DEN	Synthetic index (out of 100)
Niger	4	12	2	2	1	5.3
Mauritania	12	21	21	2	3	7.8
Burkina Faso	10	12	13	3	4	10.2
Gambia	7	30	22	2	10	14.4
Nigeria	6	51	13	1	3	15.1

As far as West Africa is concerned, Ghana has the highest synthetic index: 25.5. In this catastrophic situation which is the lot of «a whole continent in bankruptcy and in social, cultural, financial and ecological degradation», an expression reechoed by Lloyd TIMBERLAKE (1985) in his book «Africa in crisis» - only a few African countries, but outside the subregion that we are concerned with, still have large forest area, low population densities and low rates of deforestation, like Cameroon, Gabon and Zaire. On the whole, however, as Rene DUMONT observed over a quarter of a century ago (DUMONT, 1962), «Black Africa has started off badly» and simplistic solutions will not be enough be it reafforestation at all cost, ban on forest exploitation, or electricity supply to the rural areas.

6. Some economic aspects

West Africa's economic and social situation is deplorable. One finds in the region several countries of the world classified as the least developed. Production is low and income very low. Despite three decades of development and hundreds of millions of dollars spent each year, living standard remains low, per capita production falls every year and, above all, people are poor and miserable, living under constant pressure to meet their basic needs and in uncertainty about what tomorrow has in store for them.

We personally do not believe that the current orientations towards a single world scale development model is likely to bring stability and prosperity to these people. Neither do we think that the major problem is greater access to commodities.

We believe that the development formula proposed by LEBRET and his colleagues way back in 1961, and which we have referred to

earlier, is most likely to give West Africa, and the third world in general, the possibility to chart its own course. A few observations regarding this definition are in order:

- development is a dynamics, a movement;

- it concerns simultaneously all the strata of the population, nomads and sedentary people, those living in both urban and rural areas, men, women, etc;

- it is based on the notion of mankind, which is a clear notion; when confronted with a problem man has several solutions before him but he knows naturally which one is the most humane.

Such development concept leads to reduction of inequalities within a given community - in our case West Africa - and to a more equitable share of resources among the members of that community. It recognizes the equal value of different cultures and does not try to favour one culture at the expense of the others.

In the present state of affairs, the West African nations are torn between a large number of plans and programmes which are believed to be all inspired by the desire of the donors to help these nations. No country in West Africa has adequate financial resources to dare refuse to co-operate with whatever programme that may be proposed to it. Besides, it has high hopes to find through such co-operation a new source of funding, however modest it may be. However, these plans and programmes are conceived by putting the cart before the horse. They decide what should be done and then look for money for the purpose, which always leads to great disappointments.

A concrete proof of this is the Plan of Action to combat Desertification. This Plan gives the details of what should be done; however, it is far from attaining the desired objective due to lack of necessary funds for its implementation.

Furthermore, even though most of the plans and programmes say more or less the same things with regard to natural resources, and thus are repetitive:

- need to preserve the vegetation;
- role of the forest;
- need to maintain and increase soil fertility;
- need for better conservation and utilization of water;
- need to combat erosion;

they give different priorities, each of them replacing priorities that have paristakingly been accepted by governments with a new set of priorities. The «plethora of decisions and programmes» (CILSS/UNSO/IGADD/1991) impose on these governments, their men and their institutions a very heavy workload and leads to decisions to subordinate a programme to another which vary from one country to another and leave room for doubts as to the real value of these programmes. If, in a country, a programme takes precedence over the other, it is not always because it is the best but rather because the organization which has presented it is stronger locally than the others. The result is a confused and deplorable situation.

Besides, each plan and programme give a list of activities to be carried out, which is so long and so exhaustive that no priority emerges and the recommendations made are never implemented. At times, the recommendations are too many.

In Côte d'Ivoire where EDF and France contribute each over 25% to aid, followed by the World Bank (21.59%) and ADB (13.19%), the seven or eight major bilateral donor organizations meet from time to time to co-ordinate their actions. They have also planned to meet from time to time with representatives of Ministries, especially the Ministries of Economy and Finance, of Agriculture and Animal Resources, of Mines and of Energy. These meetings could be held to discuss items agreed on in advance, thus enabling the Government to better put its wishes and needs across and the donors to better co-ordinate their assistance. This would probably result not only in sound management of economies but also in a better adequacy of projects and assistance in general to the needs expressed. For purposes of efficiency, some donors (ACDI, FAC, etc..) have expressed the desire to bring their administrative procedures (including their forms and documents) closer as much as possible to those of the Ivorian administration. This is not enough. Nevertheless it is a decision in the right direction. In its 1989 report (UNDP, 1991), the UNDP Office in Abidjan made a good analysis of development programmes. However, it made no mention of any of the major programmes referred to in this report.

The size of their markets is one of the elements that slow down the development of African countries, particularly in the subregion that we are concerned with. These countries have never succeeded (except perhaps paradoxically during the era of the French West Africa - AOF) in creating viable and effective economic communities that would enable them to have adequate market sizes and to have

international negotiating power that might carry some weight. Furthermore, the West African countries have not succeeded in catching the industrialization train, partly because of a freeze on external assistance to that end, except in some areas like oil industries; even then the major industries are largely controlled by decision-making centres outside the region. Per capita GNP has increased by over 1% per annum since 1965 only in Burkina Faso and Mali, out of 14 countries. Except in Mali where it increased by 2.2% per annum during the same period, per capita private consumption decreased almost everywhere. The share of agriculture in the GNP was in general decline, due to the fall in prices. Table 9 gives the average changes in terms of annual percentage of economic and social conditions.

The economy is out of balance, with a primary sector very important but unproductive, and depending largely on the outside world for most of its inputs. The tertiary sector is important and too many people depend on it, either in odd jobs (cigarette retailers, car window cleaners, shoeshine boys, menders of all kinds, etc..) or in businesses with low output (late arrival at workplace, unjustified absenteeism or even unauthorized leave, low output sometimes due to inadequate vocational training). The secondary sector is virtually non-existent. Table 9 shows social development indicators in 1991-1992.

Trade between the countries of the subregion has made some progress. For instance under the impulse of CILSS and the Sahel Club, cereal trading between the countries of the Sahel on the one hand and, on the other, between those in the most humid part of the subregion and the Sahelian countries has made some progress. This makes it possible to fill the empty granaries of the subregion with cereals coming from part of the subregion which have them in

abundance, before importing them from outside, especially from America and Europe. However, sales outside the subregion are largely made up of unprocessed agricultural products, such as timber, cocoa and coffee whose prices are experiencing a downward trend in the long term. Some of these products like cocoa butter are already being manufactured through tissues farming in European laboratories and are reported to be already used on industrial scale in France and Switzerland under satisfactory financial conditions. The same might be true of coffee grains in a few years to come.

Trade problems can have an impact on the aspects of desertification control. Taking the timber trade for instance, which most countries of the humid coast encourage, there is contradiction between increasing sales and preserving the environment. Apart from few examples of seriously protected forest regions, precious species have become more and more scarce and practically nothing is done to maintain them. This is serious, especially as these species take a long time to grow.

Efforts have been made, especially in Senegal, to use local flours (millet, sorghum, banana, etc..) in the baking of bread, the consummation of which is growing. Nevertheless, these efforts are inadequate and have not attained their objective. Large quantities of wheat are still being imported and demand for local cereals has increased.

Table 11. Average changes in annual percentage, since 1965, of economic and social conditions of 14 West African countries

	POPULATION	PER CAPITA CNP	PER CAPITA PRIVATE CONSUMPTION	SHARE OF AGRI. IN GNP	INFANT MORTALITY	PER CAPITA CALORIES	REGISTRATION IN PRIMARY SCHOOL	% OF ILLITERATES OF OVER 15 YEARS IN 1990
BE	2.9	-0.1	-0.4	-0.8	-1.7	0.3	4.5	77
BF	2.3	1.3	0.8	-0.3	-1.4	0.7	6.3	82
CI	3.9	0.6	0.7	-0.4	-1.9	0.6	2.5	46
GH	2.5	-1.4	-1.2	0.7	-1.2	0.0	0.8	40
GU	1.8	?	?	?	-1.3	0.1	0.8	76
GB	3.1	-0.9	-1.1	0.0	-1.2	0.9	1.6	64
LI	3.1	?	-1.1	2.3	-1.2	0.5	?	61
ML	2.3	-1.7	2.2	-1.2	-1.0	0.5	0.1	68
MU	2.4	-0.6	0.0	0.3	-1.5	1.3	8.1	66
NE	3.0	-2.4	-2.1	-3.1	-1.3	0.8	4.0	72
NI	2.7	0.1	1.3	-1.4	-1.8	0.3	?	49
SL	2.2	0.0	?	1.0	-1.4	-0.5	4.6	79
SN	2.9	-0.6	-0.3	-1.1	-2.7	-0.1	2.6	62
TO	3.0	-0.1	0.4	-1.0	-2.1	-0.5	1.2	57

(W.B.,199

Table 12. Social development indicators, 1991-1992. The evolution trend is indicated by + for increase and - for decrease.

	SURFACE IN 1000KM²	AGRICULTURAL LANDS (%)	POPULATION DENSITY IN AGRICULTURAL LANDS	TIMBER AND FORESTS IN 1000KM²	RATE OF ANNUAL DEFORESTATION IN %	ACCESS TO DRINKING WATER (%) BY URBAN DWELLERS	ACCESS TO DRINKING WATER (%) BY RURAL DWELLERS
BE	113	20.4+	200	35-	-1.4-	80	34
BF	274	49.5+	65	67-	-0.9+	43	69
CV	4.03	15.9-	564	0,01=	0.0=	83	50
CI	322	51.7+	69	76-	-3.2+	?	?
GA	11.3	23.7+	317+	1,62-	-3.6+	100	50
GH	239	32.4-	187	81-	-0.9+	93	39
GU	246	28.0+	81	146-	-0.4=	41	12
GB	36	39.2+	698	11=	0.0=	?	22
LI	111	54.5+	41+	18-	-1.1+	?	23
ML	1240	25.9+	26+	70-	-0.4=	46	10
MU	1026	38.5=	5+	49+	-0.2=	73	?
NC	1267	10.2+	58+	21-	-2.8+	35	49
NI	924	77.2+	157+	122-	-2.4+	100	20
SN	197	55.5+	66+	59-	0.0-	79	38
SL	72	55.8+	101+	21=	0.0=	68	7
TD	57	56.9+	108+	16	-0.6	100	41

A better economic co-operation among the countries would be beneficial. Let's take Ghana as an example. Since 1976 the share of parallel economy has increased from 1% of the GNP to over 35%, smuggled cocoa constitutes the largest share and represents 10 to 30% of the national production which itself is in decline (400,000 to 500,000 tons in the 60s, between 265,000 to 454, 000 tons in the 70s and less than 300,000 in the 80s). This has seriously affected the country's budget. If the neighbouring countries of Ghana (Côte d'Ivoire and Togo, but also Burkina Faso through which the smuggled cocoa passes) were more strict, the smuggling would decrease and the Ghanaian economy would be better off.

Furthermore, there is need for consistency in the appointment of people charged to prepare natural resources conservation activities and ensure their implementation. In many countries, especially in West Africa, the change of a minister is generally accompanied by other changes at various levels in the Ministry, even in the organizations that come under that Ministry such as national boards. With the exception of the French Ambassador in Côte d'Ivoire who has served in that country for 18 years, the tour of office of a diplomat tends to be reduced to 3 years. The same applies to technical assistants. Now, three years is so short a period for someone to have an idea of the general conditions prevailing in a country and many officials from West African countries would like to see the duration extended, at least for those sent within the framework of co-operation assistance, as well as experts in the field of agriculture in the widest sense, or in the field of rural development.

The adoption of national and subregional plans for combating desertification did not produce all the results expected:

- because, as is unfortunately generally the case, these plans were prepared long after UNCOD, which had actually drawn world attention to desertification;

- because, as was expected, the countries concerned themselves did not pay the same attention to desertification as soon as rainfall started to become normal again;

- also because of the overly large number of recommendations which concerned very diverse areas instead of focusing on a small number of areas commensurate with the capabilities of the most affected and poorest countries;

- lastly because of the uninterrupted succession of decisions, meetings, commitments and plans, one following the other at a rapid and difficult rate to follow, and more often than not leading the new declarations rather than actions on the ground to combat desertification.

There were some national initiatives in the area of desertification control which were crowned with success. However, most of the successes we have noted are at the level of villages or villagers, within the context of small rural development projects. Regarding the Sahel, a list of these successes is given in paragraph V entitled «Hopes in the Sahel». This does not mean that there were no positive results at the level of governments. There have been, except that they weren't many. A concrete proof of this is the action undertaken by the Burkinabe government with regard to water supply to the citizens through the construction of small mud dams.

One can say that almost all the short and medium term measures taken to combat desertification are aimed at ensuring a sound environmental protection in so far as natural or subregional development strategies make it possible to have a clear idea about the objectives to be attained. However, as we have stated earlier, the authors are of the view that greater consideration should be given to the undeniable relationship between resources and demand: there are already parts of the region under consideration where the known resources are tapped beyond their potential, as shown in the map presented by FAO during the United Nations Conference on Population, and where it is unwise to continue to confuse «development» in the sense that we favour, i.e. the one defined by LEBRET (1961), with increase in human activities. This increase can only lead to less humane mode of life rather than a more humane life, while destroying natural resources, more often without possibility of recovery.

We have not observed too much inconsistency in the attitude of donors, United Nations agencies included, at least in regard to national projects. However, we have done so between projects of several countries, like the example of simultaneous support of the same agency for a project for the promotion of meat export from a sahelian country to a guinean country and for a project in the same guinean country to reduce the importation of meat. The same inconsistency is also observed at the subregional level. The rationale behind certain projects can sometimes be misleading. What does one think of projects which tend to push Fulanies, milk users, towards the production of meat for the city dwellers? How does one react to proposals for the installation of timber industries in countries where efforts are being made by the government to preserve the rest of the forest cover? What should be the wise reaction when faced with the double objective of avoiding that

crops are cultivated in more and more marginal zones, or too close to the Sahara, and selecting at great costs plants that are more resistant to drought?

All the countries concerned do not seem to have a common and homogeneous code of conduct. Where attempt is bming made to establish one, there is no reason why it should be limited to only the 16 ECOWAS countries. So long as countries do not share common ideas on certain essential issues, like birth control, the rationale behind nomadism, the danger of letting herds wander about, which causes serious problems to agriculture in sedentary zones, and many other issues, it is impossible to have a genuine master plan. So long as there are contradictions, risks of opposition resulting into conflicts will persist. If all or at least the majority of West African countries had common positions on major issues, it would be easier to have a common development strategy and, simultaneously, a common desertification control policy. However, we are far from that situation. At international conferences the countries of the Sahel are in favour of right of asylum but they do not react the same way when the Kel Tamacheks ask them that asylum!

The modest place environment and desertification control generally occupy in national budgets, even in the most threatened countries, is a proof of the contradictions spoken of earlier on.

(a) Effects of debt on NPCD

In its resolution 44/174 on the implementation of the Desertification Control Action Plan, the United Nations General Assembly recommended that studies be conducted with a view to among other things finding new methods of funding desertification control

programmes, including evaluation of additional resources required to attain minimum objectives within the context of desertification control.

The possibility of mitigating the impact of desertification by carrying out reafforestation activities through the cancellation or reduction of the external debt of countries suffering from drought and desertification has been studied. Indeed, the external debt of these counties constitutes for them a crushing burden, the repayment of which negates their development efforts by sucking a large part of their financial resources which could otherwise have been used to combat desertification, among others. For most of these countries, particularly those in the Sahelian regions, the debt servicing burden is not only unbearable but also unrealistic, and the repayment of the principal and interest is not without risks. The consequence of this situation is a very high demand on the natural resources of these countries indebted and suffering from desertification, as well as the productive sustainability of their lands, and there is a danger that this might lead in the future of two serious ecological imbalances in these countries, and even at the planetary level, more so as tropical forests play an important role in the balance of the planet. Some experts see a close link between debt servicing burden in countries suffering from drought and desertification, and tropical deforestation.

However, the crisis arising from debt repayment in the countries in question is a plausible reason for the protection of the environment based on principles of debt exchange against environmental protection. Thus, since these countries cannot allocate their scarce financial resources to combat desertification, the degradation of the lands will continue inexorably, thus adding to the poverty of these countries.

It is interesting to study the debt structure of the countries of the subregion suffering from drought and desertification. One realizes, first and foremost, that these debts are largely official debts, concerning mainly Governments and multilateral institutions, and very few private organizations (cf.table 13).

The international debt strategy suggests:

(i) the cancellation by the creditor countries of official debts (bilateral or multilateral) of countries with low revenues, including most of ECOWAS countries, as their contribution of the implementation of the Desertification Control Plan;

(ii) the establishment of a new institution, preferably affiliated to the World Bank, to manage the debt programme of these countries;

(iii) the application by the International Monetary Fund of special allocations provided for in the articles of its convention in order to grant indebted countries suffering from drought and desertification longer repayment schedules of their loans, as well as repayment of interests in local currency;

(iv) a review, in this connection, of the question of allocation of special withdrawal rights; on resumption of these allocations, developed countries should study the possibility of giving up their share (or part of it) in favour of countries with low revenues which are heavily indebted and suffering from desertification;

(v) the study by the creditor countries of the possibility of providing in their banking legislations financial endowments deriving from taxation, in favour of countries heavily indebted and affected by drought and desertification, as their contribution to the implementation of the desertification control action plan;

(vi) the special programme in favour of indebted Subsaharan African countries placed under IDA, which was launched in 1987 for a three-year period and recently extended for the same period, starting from 1991; this special programme constitutes a general framework for the mobilization and coordination of official funding (bilateral and multilateral) in favour of countries committed to the structural adjustment programme. As far as this programme is concerned, funding is granted to pluri-annual structural adjustment programmes through different sources;

Table 13: Composition of long term debt of a few ECOWAS countries (in %)

	BILATERAL	MULTILATERAL	PRIVATE
GHANA	27	65	8
LIBERIA	44	39	17
NIGER	31	43	26
NIGERIA	38	10	52
SENEGAL	60	34	6

(vii) provisions aimed at transferring, on the basis of certain modalities, the principal of the debt of a borrowing country from the debit column of the credit column; exchange of debts for anti-desertification programmes or substitution of land resources through the United Nations (exchange of debt against environmental protection).

Over the last few years, a very special and constant attention has been given to this debt mechanism. An experiment was conducted in a number of Latin American countries under the aegis of the World Bank/IDA. It would be necessary for some ECOWAS countries that this mechanism be experimented with the help of the World Bank. Some countries of the European Economic Community, the main source of bilateral assistance, have declared their attention to consider with greater attention and sympathy the reduction or cancellation of debts, where such debts are linked to the conservation of natural resources.

(b) Research and Development of new technologies in the fight against desertification and their transfer to the countries of the subregion:

1. In 1977, the United Nations Plan of Action for combating desertification drew attention to the importance of research relating to new technologies in the fight against desertification, by stressing the modification of technologies in order to adapt them to local conditions, taking into account socio-cultural and economic factors and ensuring an effective combination between local and imported technologies.

PACD noted that accessibility to adequate technology was the major impediment to the implementation of desertification control

programmes, as well as lack of financial resources for their implementation.

There is also lack of application or poor application of the vast range of new technologies now available, and of time-tested local technologies on certain projects and programmes. It should be noted that the poor application of available technologies stems from the fact that these technologies are transferred to some countries without taking into account the human and social aspects and their adaptability. Besides, these technologies are often applied by technicians who do not take local realities into account.

Priority should be given to the selection and use of technologies adapted to local conditions. Organizations like FAO, UNDP, UNSO and UNIDO have made invaluable contribution through the accumulation of experiences on the ground, the knowledge of local conditions and the definition off criteria for adapting new technologies. Among these criteria, mention could be made of:

(i) the proven effectiveness of the technologies to be transferred;

(ii) their suitability to the various local environmental and socio-economic conditions;

(iii) their patronage by potential users.

These criteria should be taken into account in any research programme concerning the choice of technologies to adopt, the aim being to ensure applicability and accessibility of all technologies to the populations that would have to apply them.

A search programme should be developed in an area that would provide, among other things, for:

- ways and means of seeking funding;

- effective cooperation with the industrial area in the search for and introduction of techniques suitable for desertification control;

- research on the economic and social consequences of soil degradation, the factors put in place in a transition towards agricultural practices and approaches that help maintain the load capacity of lands, etc...

Several technologies currently available can have a promising future as far as desertification control is concerned, in such areas as agroforestry, water and soil conservation, improvement of soil fertility, renewable energy, etc..

However, the major obstacles to the use of available technologies remain:

- lack of information on the existence of these technologies;

- lack of qualified technicians;

- the sometimes specific nature of certain desertification control methods (eg. some trees are suitable for certain sites and are not for others, etc..);

- preference given to high imported technology and rejection of known simple techniques.

ECOWAS countries should be helped to among other things:

- develop the training of specialists in Science and technology, the dissemination of adequate technologies for combating desertification, development of lands in dry regions and of sources of renewable energy;

- establish and develop an institution capable of helping the countries of the subregion to deal with technical and management issues relating to transfer of technology, and taking decisions regarding the choice of adequate technologies.

7. Analysis of some national desertification control and resources management programmes in Burkina Faso

The programmes of Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Senegal have been the subject of in-depth analysis. Annex 2 examines the programmes sponsored by ADB.

(a) Analysis of desertification control and resources management programmes in Benin:

As Moustapha SAR has emphasized in his mission report of 15 December 1991, Benin is considering ways and means of integrating its environment action programme in the Economic and Social Development Plan. Benin «has a large number of natural resources management and desertification control plans, programmes and projects. However, it is faced with the problem of harmonization and adequacy of these various plans which it wants to make more coherent and have integrated in the Economic and Social Development Plan.»

In Benin, the programmes drawn up place emphasis on activities pertaining to firewood plantation, industrial plantations, village reafforestation, forest development, development and management of teak plantations, constant surveillance of the forest cover and multi-purpose tree plantations.

In the field of wild life protection, emphasis is placed on the development of national parks and the promotion of game domestication projects.

Regarding village reafforestation projects, activities are concentrated on the participation of the rural populations, provision of plants, training and establishment of village nurseries.

The firewood plantation projects in Southern Benin are aimed at developing:

- 2,500ha of taungya plantations;

- 1,000ha of simple plantations;

- 2,4000ha of village plantations.

The industrial plantations related to the development of 4,210ha, including 3,800ha of timber. A constant surveillance project was initiated with the assistance of FAO and UNEP.

Regarding multi-purpose tree plantations, 2,000ha has been developed.

The Ministry of Rural Development estimates that 100 000ha are untimbered per annum, whereas the areas covered by re-afforestation are only 2000 to 3000ha per annum.

Table 14 below which was obtained thanks to MR. PAOLO COPPINI, UNDP Resident Representative, gives the lists of natural resources conservation projects.

Table 14: Natural resources conservation projects in Benin

NUMBER	PROJECT TITLE	TAKE-OFF DATE	DURATION	GLOBAL AMOUNT IN US$	STATUS	EXECUTIVE AGENCY	FUNDING INSTITUTION	OBSERVATION
UNSO/BEN82/X01	Multi-purpose Tree Plantations	Jan.1984	5 years 10 months	1,551,579	completed	Govt.	UNSO	-2530 000 plants distributed. -survival rate: 63% -Reafforested area: 3516ha
UNSO/BEN/90/X02	Environment Action Plan	1 April 1991	21 months	906 432	ongoing	Govt.	UNSO/BM/France/GTZ	Aims at providing a framework of reference for the integration of environmental aspects in economic development.
UNSO/BEN/91/X02	Natural Resources Management Atacora and Borgou sub-prefectures	July 1992 (approx.)	4 years	3 119 137	Pipeline	Govt.	UNSO	Aims at improving production systems in 9 sub prefectures of Atacora and Borgou through agri-sylvi-pastoral and forest development activities.
	Natural Resources Projects	May 1992 (approx.)	5 years	24 400 000	Pipeline	Govt.	IDA/RFA/COCE/UNDP	Planned pilot development operations relating to classified forests of a total surface area of 234 500ha
BEN/91/005	Assistance to the development of an action programme for the forestry sub sector	June 1992 (approx.)	12 months	699 200	Pipeline	FAO	UNDP	Aims at laying the bases for a development programme of the forestry sub-sector in order to strengthen the new environment and agricultural policy of the country. Feasibility study on the development of Kouffe Mountain. Forest reserve: 163 200ha.

(b) Analysis of desertification control and natural resources management in Burkina Faso:

Burkinabe structures:

«The inventory of FAO controlled projects in Burkina Faso as at 30 June 191» published in Ouagadougou in August 1991 showed that 29 projects represented a total package of over 61 million dollars and that the 1991 budget amounted to US$ 4,611,490 of which US$ 3,844,651 was for the national programme and US$ 166,839 for regional projects.

The list o projects related to natural resources conservation projects included:

BKF/86/014/H /01/12	Assistance to the DEP. of Ministry of Environment and Tourism.	12/08/87 4 years US$ 988,859. Budgetary difficulties for interim phase. Unrenewed CTP contract.
BKF/87/002/1 /01/12	Technical assistance to FEER.	Phase 2 considered.
BKF/87/016/M /01/12	Pilot project of the Oursi pond for the development of natural ponds in the Burkinabe Sahal.	Completed.
BKF/87/016/M /01/12	Development of agriculture into farming communities to organize CENAPI.	22/02/88 3 years US$992995 2nd phase.
BKF/89/011/D /01/12	Development of natural forests for the preservation of the environment and timber production.	07/06/90 3 years US$2111123.
GCP/BKF/036/ SWE	Development of the Toumousseni Forest reserves.	13/12/86 3 years US$514240.

TCP/BKF/0054	Project formulations: Development preparations.	22/11/90 3 years US$17000
BKF/85/011/K /01/12	Development and exploitation of forests for the supply of firewood to Ouagadougou.	
RAF/87/096	Development of forests and dry zones and protection against sank-bank in Sub-Saharan Africa.	US$ 2765000
III.BKF33	Re-updating of forestry legislation.	Underway.

What is happening in Burkina Faso in the areas of sanitation is an example which shows the need for improvement by governments of their co-ordination activities. Even though this area falls within the purview of the Ministry of Environment and Tourism which lays down the directives to follow, these directives are carried out not only by the Department for the Prevention of Pollution and Harmful Effects, but also by three bodies outside the Ministry, namely DESA, i.e. the Health and Sanitation Education Department which is under the Ministry of Public Health, ONASENE and the National Water and Sanitation Department which do not keep the Ministry of Environment and Tourism informed of their activities.

Programmes in Burkina Faso

In Burkina Faso, some national development programmes concern natural resources and have an impact on pluri-statal programmes. These include:

- the three struggles (fire, inordinate felling of trees, straying of cattle) announced on 22 April 1985;

- the popular Development Programme (PPD) which was implemented from October 1984 to December 1985;

- the 1982 World Conservation strategy;

- the 1989 National Environment Action Plan (NEAP);

- the 1989 Tropical Forestry Action Plan (TFAP);

- the National Plan for combating Desertification (NPCD) prepared in 1986;

- the Agrarian and Land Reform Programme (RAF) promulgated by decree on 4 August 1985;

- the National Soil Managementt Programme (PNGT) launched in 1986 of the implementation of RAF.

As can be seen, the number of programmes is very large. All are co-ordinated by NEAP which was drawn up very recently, and which provided for a large number of actions:

- agrarian and land reform;

- promulgation of adequate legislations;

- implementation of the national development programme;

- development of research, training and education to ensure better desertification control;

- conservation, protection and diversification of the vegetation;

- development of new and renewable energy resources, etc..

During the period 1979-1988 and despite years of low or negative growth rates like 1980, 1983 and 1984, the GDP (B.F.,1991) increased in real terms at an annual average rate of 4.9%, a rate which is clearly higher than that of the population growth during the same period, which was 2.68%.

The agricultural sub-sector which contributes a little over 30% to the GDP made it possible to meet the cereal needs from 1985 to 1989. Its average growth rate of the value added from 1982 to 1987 was higher by 7%. The positive results achieved were mainly due to the extension of cultivated lands and especially the spontaneous colonization of quite fertile lands in the South and South-Western parts, which were recently freed from onchocerciasis, as well as to technological progress in the cotton industry. However, such positive results were not accompanied by an increase in per capita output. They were achieved at the expense of the conservation of natural resources and without taking anti-erosion measures or measures likely to maintain soil fertility. They did not have any linkages in the sectors of trade, transport and other services.

The animal husbandry sub-sector represents only 6.3% of the population, whereas over 90% of the population derive the bulk of their revenues and employment from agriculture. It is less and less competitive at the subregional level.

The timber, forest, fauna and fishing sub-sector accounts for 4.7% of the GDP. In 1984, shea almond represented close to 11.5% of

the country's exports, i.e. CFA 4.5 billion; we are referring to the raw commodity. Soil erosion and environmental degradation are among the major obstacles impeding agricultural development (BF,1991).

Only 3 million hectares or one third of the Useful Agricultural Area (SAU) are cultivated. However, 84% of the national territory or 22 900km² are devoted to agriculture, animal husbandry and forestry. As a result of diversity in soil fertility and of population distribution, certain zones are facing a critical situation as they are over exploited with farming intensity ratios exceeding 50%. Consequently, in order to protect the natural resources and ensure an effective exploitation of the lands, the government of Burkina Faso in 1984 and 1985 promulgated an ordinance and a decree relating to Agrarian and Land Reform (RAF). The ordinance and decree contain the legal, institutional and technical bases for a proper management of natural and environmental resources, while the State is responsible for land ownership.

Natural forests which provide 349347m^3 of timber (as against 152 852 000 m^3 for unploughed lands and crops) still occupied over 50% of the territory in 1993. Among them 25% are classified as forest reserve, i.e. 2 545 000ha in 13 wild life reserves, 880 000ha in 48 forest reserves proper, which produce 32 500m^3 of timber, 390 500ha in 2 national parks: Pô and W (BF, 1991).

In Burkina Faso, the programmes aim at increasing dendro-energy production thanks to industrial and village reafforestation. According to a study conducted in 1984, 3000 hectares were developed into rural and family plantations. For industrial reafforestation an area of about 13,500 hectares were realized.

Considerable efforts were deployed in the implementation of «improved oven» programmes aimed at developing a technology suitable for the reduction of firewood consumption through the installation of furnaces made from clay materials or the use of butane that urban consumers can afford. Other energy substitution projects were also experienced such as solar energy and biogas. In the field of wild life protection, activities carried out relate to the development of national parks.

On the average, annual felling of threes is $0.56m^3$ per ha per annum at national level (PARKAN, 1986). The development of wild life conservation areas is at an embryonic stage. The boundaries of the areas are poorly or not delimited. Tourist infrastructures and equipment are very few and of very inferior quality compared to what obtains in East Africa. Hunting is poorly organized and unproductive. Poaching is very intense, encroachments by farmers and cattle breeders are constant. In the South, the Nazinga ranch is devoted to game breeding. It is still at a pilot stage but constitutes a promising experiment.

The firewood balance sheet is negative at national level and very negative in 23 provinces where feeling is done to the detriment of the reserve which is highly degraded. The W park is adjacent to the reserves in Benin and Niger, and the Partial Reserve of the Sahel (which nomads have walked through extensively) is the border with Mali and Niger.

With regard to drinking water, the supply ratio rose from 21% to 69% between 1981 and 1989, taking into account only water holes fitted with man-powered pumps less than 500 metres from the dwellings. The ratio rose to 80% in 1992! This remarkable progress

is due to Water Holes Committees set up within the framework of the Five Year Popular Development Plan (PQDP).

Almost 800 dams have about $5.10^9 m^3$ of water. However, more than 2/3 of that quantity has evaporated. A total of 15 785ha were irrigated in 1990, 14176ha of which are fully under control. In this formal and controlled irrigation, rice occupied 8810ha, sugar cane 3900ha, other cereals 570ha, market gardening 440ha and other fruit crops 130ha. Informal irrigation, downstream from small dams, covered about 1624ha in 1986.

Natural fodder resources represent 91% of the total available fodder (BREMAN and al., 1986).

Regarding atmospheric pollution, the following sources of pollution which could be better controlled are cited by the «Sustainable Development Foundations:

- bushfires which constitute one of the three areas to be combatted, as decided by the National Revolution Council. The other two areas are excessive felling of trees and straying of animals;

- abusive use of phytosanitary products in agriculture, particularly in areas where cotton farming is intensive;

- motor vehicles (more than half of which are concentrated in Ouagadougou) and motocycles (more than 1/3 in Ouagadougou) whose emission of gas is not controlled;

- use of ligneous fuel in home not designed for gas reduction;

- use of gas that destroys the ozone layer in the refrigeration systems.

Mention should also be made of the large quantities of methane emitted by animal faeces and domestic sceptic tanks whose dirty waters overflow or are thrown into the streets.

Furthermore, the surface waters are polluted by faeces and development without any treatment of the used waters of industries, as well as by car washing. As a result of this double pollution, biological and chemical, surface waters are affected 100%, traditional wells 70%, broeholes and modern wells 15%. About 80% of the diseases noted are water borne: malaria, onchocercocis, dracotiatis, typhoid, cholera, yellow fever, intestinal parasitosis, etc..

The management of water is shared between 7 structures without any effective co-ordination which makes it possible to know the status of the resources at any given time. The Health and Sanitation Education Development (DESA) of the Ministry of Health together with Social Action Department control the quality of water while the Department for the prevention of Pollution and Harmful Effects of the Ministry of Environment and Tourism is responsible for the prevention of water pollution by industrial and toxic wastes.

About 100 000ha of forest lands are destroyed every year as a result of inordinate grubbing which mostly takes place in thick and thin forests which were much wider at the beginning of the century as reported by BINGER (1982), MARC (1909) and TAUXIER (1917) mentioned in the NDCP (1986). The lands are tilled without manure nor fertilizers. «Thus, after a few years and with the population

growth, fallow lands are put back into activity before they are well-wooded. After several cycles of ploughing and laying fallow, some lands end up becoming sterile lateritic cuirasses». (BF., 1991). However, the dangers of inordinate deforestation are well identified. On the mossi plateau especially where 44% of the population live, the worsening energy crisis, compled with a deterioration of the economic situation, will dangerously affect the agricultural potential and the protection against desertification. Farmers are not encouraged by RAF to plant trees, which is the legal authority in which is vested land ownership.

If this body does not encourage farmers to plant trees, who will do so voluntarily under these circumstances? It is necessary that the law acknowledge the farmer's ownership right to the tree he has planted and his right to use the land on which he has planted.

To these inconveniences should be added the problems arising from uncontrolled grazing resulting in the gradual elimination of the most important species, the hardening of the soil due to trampling by cattle, the quantitative reduction of available fodder in overgrazed areas and the worsening of erosion for want of sufficient water infiltration and vegetation. Programmes relating to cattle did not produce satisfactory results. The West Volta Livestock Breeding Project (PEOV) funded by IDA was a failure. 75 cattles breeders with 10,000 cows in respect of each one of whom CFA 140,000 was spent, were settled on 10,000ha. No improvement was done regarding the grazing ground.

The Yalle-Leo Pastoral Development Project (PAPYL) sponsored by the Netherlands in the form of rich pasture land «was transformed into a breeders farm covering an area of 20,000ha of classified forests divided into 5 zones by fire lanes and equipped with 9

boreholes. The settlers do not pay any tax; they can grub and farm where they like; new settlers are welcome provided they have their animals vaccinated and can build their dwellings 300m away from the boreholes.. A co-operative has just been formed. There would be over 10,500 cows, 3000 small ruminants, which is already too much for the available grazing grounds. No co-operation or consultation has been established with the forest services» (BF., 1986).

The East Sondre/AVV Cattle Breeding Project (Development of the Volta Valleys) also sponsored by the Netherlands, covers an area of 1700ha. It was geared towards sectoral studies. However, it was not deemed necessary to pursue those studies, even though the production system was neither studied nor changed. The project was developed in isolation without consultation with the cattle breeding service nor the extension services. It was re-oriented in 1985.

Even though there is no exhaustive inventory, scientifically speaking, of threatened species, be they plants or animals, nor a dynamic and evolutionary map showing settlements and species threatened with extinction, the seriousness of genetic erosion has been recognized. It would certainly be necessary to increase the number of the following species (most of which are not threatened with extinction:

- in Sahelian zone: Acacia raddiana, Bauhinia rufescent, Grewia tenax, Hardwickia binnata, Maerua crassifolia, all types of fodders but also Capparis decidue to be used for fencing purposes;

- in sub-sahelian zone: A. Balanites aegyptiaca, Caesalpinia ferrea, Combretum glutinosum, C. micranthum, C. nigricans var.

Elliotti, Commiphora africana, Moringa oleifera and especially Pterocarpus erinaceus, P. Lucens;

- in the Sudanese zone: Adansonia digitata, Anogeissus Leiocarpus, Burkea africana, Butyrospernum parkii, Faidherbia albida, Khaya senegalensis, Lannea microparta, Naucleu a latifolia, Prosopis africana, Securidaca longipedunculata, Tamarindus indica, Zizyph mauritiana;

- in South Sudanese zone: Acacia sieberiana, Daniellia oliveri, Flemingia congesta, Gliricidia Sepiom, Isoberlinia Doka, Sesbania Sesban.

Mention should also be made of an on-going FAO sponsored natural forests project managed by villagers. The project succeeded in entrusting to villagers the development and management of natural forest settlements to produce in a consistent manner firewood which is supplied to Ouagadougou.

The villagers have derived considerable revenues from the project. It would be good that the results achieved are widely publicised both within and outside Burkina Faso.

Under these circumstances, it is obvious that the traditional systems of production should be replaced by new systems which will make it possible to maintain the productivity of the various types of environment, provided that a break is put to population growth. The Burkinabe authorities have acknowledged that in some regions «the soil occupation ratio exceeds the possibilities that traditional farm lands can offer. Letting natural lands unploughed for a long period has become illogical; whenever, possible, they should be replaced immediately by fast growing and nitrogen-fixing

ligneous plants such as Gliricidia sepium, romain Calliandra calothyrsus, Leuceana leucocephala and L.diversifolia, Tephrosa vogelii, etc... The new systems should as much and as quickly as possible be agroforestry in outlook, i.e. blending ligneous and agricultural and livestock productions, with sustainable ecological and/or economic benefit to the farmer.

For want of adequate experimentation, errors will be committed. The most important thing however is that they should be corrected gradually. Even though the International Centre for Research in Agroforestry (ICRAF):

- does not deal directly with extension services but with research and training;

- is very careful in the large-scale application of the findings it has accumulated, for fear, and justifiably so, that massive errors will be detrimental to agroforestry development,

we believe that it should be able to give to all the West African regions a series of easily applicable technical recommendations.If the Centre joined its efforts to those of the FAO, and provided that the forest seeds centres of the subregion - like the National Forest Seed Centre (CNSF) of Burkina Faso - could provide the necessary seeds (with a great and voluntary participation of the farmers and with the international twining of towns and villages), a great step forward could be made in the years to come, the first results of which could be expected in 1996.

The NGOs should be involved in the activities to be carried out. Thirteen Burkinabe NGOs are already recognized by the government and 63 others are working in the country. They have the advantage

of being in close contact with the people and have already achieved a lot in the areas of natural resources conservation and restoration, village water supply, agroforestry and land development. They have a permanent Secretariat, SPONG.

Lastly, it should be recalled that before 1980 Burkina Faso adhered to seven international conventions on natural resources. They are:

- 1946 International Convention on the Regulation of Whaling;

- 1950 International Convention on the protection of Birds;

- 1968 Algiers Convention on the Conservation of Nature and Natural Resources in Africa;

- 1971 Ramsar Convention on Humid Zones of International Importance, particularly as Habitats for Water Birds;

- CITES, 1973, on the International Trade of Fauna and Flora species Threatened with Extinction;

- 1979 Bonn Convention on the Conservation of Migratory species belonging to Wild Life;

- 1979 Bern Convention on the Conservation of European Wild Fauna and Flora and their Natural Habitats, and its Extension to African Countries.

C. Analysis of national desertification control and natural resources management in Côte d'Ivoire

In the 1991 edition of the Abidjan telephone directory, mention was made of the following international organizations: WARDA, ADB, BCEAO, IBRD (with special mention of SFI and APDF), ECC Delegation, CMEAOC, TM, Entente Council, UNDP, UNFPA, IBSRAM, WFP, ILO, FAO, WHO, UNICEF, IMF, UNIDO, International Coffee Organization, ORSTOM.

In Côte d'Ivoire, activities undertaken related to the formation of permanent national forests, the strengthening of national services, bushfire control, industrial reafforestation, village reafforestation, improved ovens, establishment of national parks and other protected areas for wild life conservation.

Regarding the formation of permanent national forests, 16,000ha have already been definitely classified, i.e. 34% of the objective set.

The Ivorian authorities have deployed tremendous efforts in the training sector with the creation of professional establishments: Bouaflé forestry school, the Bouake forestry school, the Banco forestry school and the Bouake Agricultural Institute.

Regarding bushfire control, efforts were made to sensitize and educate the people.

Village self-defence and rapid intervention brigade committees were formed to co-ordinate and strengthen the control activities. About 20 brigades and 500 committees were equipped for the 1984/85 campaign.

Considerable efforts were made by Côte d'Ivoire in the realisation of industrial plantations. Before 1966, 20,932ha were planted in the North and Central regions. At the moment, a significant percentage of this area has ben abandoned and others were destroyed by bushfire. Only 10,150ha remain and are entrusted to SODEFOR to manage.

In 1966 and 1975, 22,900 hectares were realized by SODEFOR. On the whole, between 1966 and 1982, plantations for the production of timber covered 44,200ha, of which 44% for teak and cedrela. 779ha of Eucalyptus plantations for the production of paper were established at San Pedro.

Regarding village reafforestation, an operation concerning 1,000 forests and 100 villages was launched. The aim is to create village nurseries.

Improved ovens were also developed with the participation of the Association of Ivorian Women.

To preserve the fauna, 3 cynegetic zones were developed, covering about 524,500ha with a total annual production of 238.2 tons of meat. Annual game consumption is estimated at 20,000 tons.

In Côte d'Ivoire where grubbing on burnt-baited lands was responsible for the disappearance of 300,000ha of forests per annum, three projects were considered by the UNDP Bureau for the conservation of natural resources.

They are:

(i) Project aimed at strengthening remote sensing activities for the promotion of agricultural activities, the implementation of which was entrusted to FAO which carried out three pilot studies:

(a) fire surveillance in the Comoe National Park;

(b) development of vegetation in the village o Baoule;

(c) cartography of fallow lands suitable for the cultivation of hevea.

(ii) Project study on the productiveness of savanas, scientific bases for their management, the implementation of which was entrusted to UNESCO. The project was prepared at the Abidjan institute of tropical ecology. The aim is to increase productivity in savana zones without disrupting the ecosystems. The project studies the soils but also takes into account the role of the fauna.

(iii) Reafforestation prop-up project implemented by FAO. It is a small project designed to prop-up another WFP project for the development of forest plantations.

Other projects can have or have had an impact on the conservation of natural resources:

- a completed pisciculture project in the rural areas;

- a project for strengthening the Meteorological Service;

- a project for reducing post harvest losses;

- a cereal project;

- a project on the cultivation of onions;

- a project on the restructuring of co-operatives.

Even though France intends to reduce considerably its assistance to Côte d'Ivoire, particularly by cutting down the number of its technical assistants and by withdrawing from Adiopodoume to give way to IIRSDA, its influence is very much felt and it is difficult to envisage a balanced co-ordination of donors among themselves, and between them and Côte d'Ivoire. A step forward in that direction would be made if the member countries of the European Community decided to have a single and sole representation which would speak with one voice to the Ivorian Government. However, to ensure that such co-ordination does not lead to a domination by donors, it would be necessary that the negotiating powers of Côte d'Ivoire should be strengthened considerably.

A positive note: between 1980 and 1985, the industrial timber processing rate increased from 36.8 to 56.8% of the total timber production (RCI, 1988). The wood industries are divided into 1st, 2nd and 3rd processing stages. The first stage relates to sawing (747,000m^3 in 1986), peeling (130,000m^3) and slicing. The second stage takes very diverse forms: plywood, beading, moulding, hoop-wood, etc.. The third stage relates to joinery, furniture and toys.

«The depletion of Ivorian forests is bound to reduce the first processing to local market needs (half of possible sawing) and the second processing (the other half)» (RCI, 1988). Table 15 gives a few indications regarding these three stages of processing.

Table 15: Statistical indicators of the timber sector (in CFA 10^9)

1st & 2nd Processing			3rd Processing	
1981	1985		1981	1985
11	15.2	Gross value added	1.4	0.3
27.8	51.2	Turnover including exports	3.2	1
62.6	71.9%	Purchase of raw materials including imports	0.6%	-
7.2	14.8			

Recommendations have been made, and rightly so, regarding:

- the liquidation or restructuring of 11 companies with very deteriorating financial situations;

- the abolition of quotas which only encourage poor management;

- the ban on the export of timber of indispensable species for the implementation of the programme envisaged, like ilomba (peeling), koto-aniegre (slicing), samba, silk-cotton tree, bete and framire;

- the development of the local market to promote the use of timber in building and to speed up the standardisation of ligneous products.

Possibilities for creating new factories were evaluated (RCI, 1988) at 2 or 3 wood-peeling units, 1 slicing unit and 20 to 25 units for 2nd processing apart from plywood. We believe this is too much given the already high rate of deforestation. Regarding the 3rd processing, it is estimated that at lease 10 furniture manufacturing units, especially framire furniture and ready for mounting furniture, could be created.

(d) Analysis of national desertification control/natural resources management programmes in Ghana

Soil and water conservation:

In the forest region of Ghana, farmers show little interest in agroforestry techniques except perhaps in keeping some trees standing for purposes of shifting cultivation. The taungya system

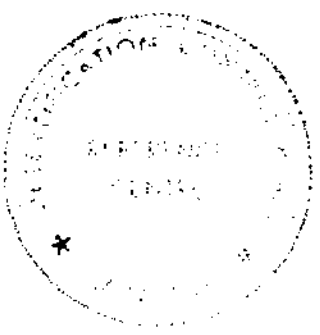
is not used because it would encourage illegal settlements of people in the forest.

Even though they are sometimes forbidden to plant trees for various reasons, women are more interested than men in the adoption of techniques such as corridor farming, especially when they know they can collect firewood and take care of a few ruminants. However, it is a tradition, almost everywhere in Ghana, that men decide of the use of lands. And since most of them are not prepared to alleviate the burden of women, this risks showing down the expansion of agroforestry.

In the agro-ecological zone of the sudanese savana, fifteen soil and water conservation improvement techniques have been tested. Only two of those techniques were agroforestry, namely corridor forming which was rejected because of competition for water between ligneous plants and other crops, and improved ligneous fallow lands, as is the case between Yagha and Lawra, which were retained. While mention was made of contour mounds covered with vetiver, noting was said about grass contour mounds sowed with shrubs which produced good results, as in Cameroon and Kenya.

In the guinean zone, three additional techniques were mentioned. What was forgotten, it would appear, was the ecological and economic improvement of farm lands and grazing lands with isolated nitrogen-fixing ligneous plantations. The same technique could also apply in the transition zone between savana and forest, where the following techniques were retained and analyzed with maize cultivation:

- corridor farming;



- improved ligneous fallow lands;

- production of living stakes for yam, among nine others.

In the forest zone, these three same techniques could be adopted but with a combined maize and cassava farming. Four other techniques were rejected.

In the coastal savana zone, the seeding or planting of pulse crops on the tendrils of erosion along the roads can contribute significantly to agroforestry and was retained among the five improving techniques.

In Nigeria, out of 7400 industrial establishments counted in 1988 (F.O.S., 1988), 1622 are related to wood processing and its derivatives. Of this number, 1474 were owned by single individuals, 66 were limited liability companies and 65 were partnership ventures; 8 others parastatal companies and 4 were co-operatives. Regarding the number of employees, 1079 had between 5 and 9 employees,

368 between 10 and 49 employees
125 between 20 and 49 employees
27 between 50 and 99 employees
11 between 100 and 199 employees
6 between 200 and 499 employees
4 between 500 and 999 employees
2 over 1000 employees.

The total number of salaried workers was 25426, i.e. on the average 16 workers per establishment, i.e. the lowest figure of employees per manufacturing establishment. However, in terms of

total number of employees, the wood industries rank third after the textile industry (6036 workers) and the food industries (50988 workers). In terms of total cost of inputs, the wood industries were last compared to all the manufacturing industries. They also came last in terms of «turnover» per salaried worker, far behind the metal industries which come first (40 times).

In 1990, the sawmills were operating at only 36% of their full capacity. However, between 1988 and 1989, timber production increased by 3.3% as against 2.5% for sawing, which represented only 1% of the total volume of timber (CBN, 1990).

By law, the following species cannot be exported in the form of logs from Ghana (those marked with asterisks are very heavy:

utile piangon
odum losipo
emeri* African noyer
sapele avodare
afrormosiateak
asanfona*mansonia
mahoganyedinam
danta* hyedua
mahore ofram*

Ghana was one of the first tropical countries to ask for a review of its forestry sector within the context of the Tropical Forest Action Plan (TFAP). Led by the World Bank and made up of forest experts from ODA, ICDA and FAO, a mission prepared a «Forest Resource Management Project for Ghana» for 1989-1995. The project was sponsored by ODA, IDA and DANIDA. Six sectors of activity were identified, namely strategic studies, development, strengthening of

institutions, education and training, rural forestry and research, reflecting TFAP priorities as far as land uses, ecological conservation, hydro-energy, development of industries and institutions are concerned. This Project is a proof of Ghana's desire to reserve and develop forest resources in order to ensure sustainable production of timber and forest products and slow down environmental degradation.

Ghana's timber export in 1988 is given in Table 16.

Table 16 - Ghana's timber export in 1988

	m^3	10^{10} £	£ per m^3
Logs	340 151	26 051	76.6
Sawn timber	169 640	25 643	151.2
Veneering	20 991	4 985	237.5
Plywood	1057	166	157.0
Timber	4464	1842	412.6
Total	563 213	58 687	109.5

(STATISTICAL SERVICE, 1991)

Tables 17, 18 and 19 show respectively, in respect of Ghana, the recapitulation of the rates of financial revenues, the economic rates and the necessary indications for the adoption of promising techniques with a 2/1 project/cost ratio.

The National Agricultural Research Plan would support research programmes aimed at increasing on a consistent basis agricultural production in each agro-ecological zone. The application of

appropriate natural resources management techniques would thus be an essential input for designing all programmes. Where necessary, research into simple techniques for land and water conservation as well as maintenance of soil fertility, improvement of traditional systems of mixed production or production by rotation, and of systems integrating forestry, animal production and farming would all aim at protecting the environment. Furthermore, research on varieties resistant to diseases and insects, linked to integrated management systems of predators would lead to a reduction in the consumption of agricultural chemical products.

An interesting and successful experiment carried out in Ghana and reported by LUKEFAHR and al (1991) is worth mentioning: the introduction and development of rabbit breeding through a national project, which made it possible for Ghana to produce 200g of rabbit meat per inhabitant per annum. That is much higher than what is produced in China (60g), in the United States of America (70g) but far less than what obtained in the major producing countries: Malta (4300g), Hungary (4000g), France (3600g) or Spain (3600g). The breeding produces on the average and per annum 4 periods of gestation of 5 rabbits which are sold when they are 5 months old and weigh 1.7kg.

Table 17: Recapitulation of rates of financial revenues in Ghana

Technique	Savanna Zone (%)	Transitio n zone (%)	Forest Zone (%)	Coastal Savanna Zone (%)
Fertility improvement technique				
1. Corridor farming	--	-1.5	18.8	--
2. Wooded fallow lands	32.0	29.0	28.8	--
3. Staking living on taro	--	26.5	--	--
4. Animal draught (bedding	23.7	--	--	--
cultivation only)	26.2	--	--	--
5.Animal draught (bedding cultivation				
and farming)	8.3	--	--	--
6. Fodder bank				
Water & soil conservation techniques	46.9	100.0	100.0	--
7. Matting	6.8	8.6	79.9	72.0
8. Bedding cultivation	2.6	--	--	--
9. Laying out stones	-18.5	8.5	100.0	65.8
10. Groundnut strip farming	-5.9	--	--	--
11. Pigeon peak strip farming	16.1	14.4	8.6	1.5
12. Vetiver on terraces				
Biomass improvement techniques	10.6	--	10.6	9.6
13. Private timber plantation	7.1	--	12.7	9.8
14. Communal timber plantation	18.4	--	--	--
15. Forestry				

Table 18: Recapitulation of rates of financial revenues in Ghana

Technique	Savanna Zone (%)	Transition zone (%)	Forest Zone (%)	Coastal Savanna Zone (%)
Fertility improvement technique				
1. Corridor farming	--	-1.8	18.7	--
2. Wooded fallow lands	44.5	41.6	39.3	--
3. Staking living on taro	--	26.2	--	--
4. Animal draught (bedding cultivation only)	25.3	--	--	--
5. Animal draught (bedding cultivation and farming)	26.2	--	--	--
6. Fodder bank	16.5	--	--	--
Water & soil conservation techniques				
7. Matting				
8. Bedding cultivation	72.7	100.0	100.0	--
9. Laying out stones	17.0	16.8	85.5	81.2
10. Groundnut strip farming	28.9	--	--	--
11. Pigeon peak strip farming	-12.6	12.0	100.0	69.4
12. Vetiver on terraces	-1.1	--	--	--
Biomass improvement techniques	29.8	-1.4	20.2	14.7
13. Private timber plantation				
14. Communal timber plantation	12.5	--	15.7	16.4
15. Forestry	14.5	--	18.3	18.5
	18.4	--	--	--

Table 19: Indications necessary for the adoption of promising techniques with a 2/1 profit/cost ratio (in t per ha)

Technique	Savanna zone	Transition zone	Forest zone	Coastal savanna zone
Fertility improvement technique				
1. Corridor farming	--	--	39,387	--
2. Wooded fallow lands	7,428	13,540	16,711	--
3. Staking living on taro	--	35,165	--	--
4. Animal draught (bedding cultivation only)	16,564	--	--	--
5. Animal draught (bedding cultivation and farming)	16,365	--	--	--
6. Fodder bank				
Water & soil conservation techniques	41,404	--	--	--
7. Matting				
8. Bedding cultivation	12,371	3,724	--	--
9. Laying out stones	11,036	10,050	5,645	10,836
10. Groundnut strip farming	22,549	--	--	--
11. Pigeon peak strip farming	--	2,287	--	195
12. Vetiver on terraces	--	--	--	--
Biomass improvement techniques	7,714	--	60,594	61,524
13. Private timber plantation				
14. Communal timber plantation	153,489	--	253,613	198,307
15. Forestry	143,006	--	202,375	170,638
	9,061	--	--	--

Co-ordination of assistance to Ghana

Co-ordination of external assistance has been reasonably strong among the donors on the one hand, and between them and the Government on the other. The International Economic Relations Department (IERD) of the Ministry of Finance and Economic Planning (MOFEP) monitors the commitments and expenses while the Debt Monitoring Unit (DMU) keeps record of external aid and debt. IERD has been strengthened to improve its capacity to arrange the data relating to assistance, up-date them, analyze them and make report on debt at regular intervals.

Regarding the relations between the Government and donors, every external assistance must continue to be channelled through the Ministry of Finance and Economic Planning. The role of the Ministry should therefore be strengthened to cope with the problems of monitoring and co-ordination. In order to reduce the effects of programmes that overlap and eliminate possible errors of interpretation, the Government has proposed, in consultation with the major donors, to designate from time to time a major donor for a given programme to help it ensure the co-ordination.

In the forests and the savannas, 200km^2 and 1000 km^2 of land respectively are lost every year to agriculture and grazing. However, in 1991, forest reserves represented 11% of the land area, wild forest 5%, unreserved forests 2%, wooded savannas 30%, tree cultivation 7%, annual farming 5%, unimproved grazing lands 15% and other uses including scrub 25% (PPEMD, 1991). Soil erosion is severe and losses of 63.5 t/ha/annum were measured by BONSU (1986) on bare fallow lands in the semi-decrepit forest zone with a 29% rain wash: these losses can be reduced to less than one ton/ha/annum and to less than 3% on these same lands on which maize is cultivated (2,1 to 3.9 t/ha) with natural fertilizers, particularly cow droppings (according to BONSU, 1986 and reported by ASAMDA, 1991, but without reference). In semi-decrepit forest

zone, BONSU and OBENG (1979) also demonstrated the very beneficial effect of certain anti-erosion agricultural practices, as shown in table 17 regarding maize cultivation at Kwadaso with a 7.5% slope.

Table 20: Effects of anti-erosion agricultural practices

	Land loses (t/ha)		
	1974	1975	1976
Bare fallow land	100.10	187.10	313.0
No labour	7.75	1.80	1.96
Matting	0.53	0.38	0.42
Slope	5.73	2.36	2.72
Minimum labour	3.75	1.06	4.90
Mixed crops	2.33	20.36	33.59

With sorghum in Guinean savanna zone, BONSU (1986) has demonstrated that with a 2% slope, land losses diminished while sorghum production increased with a large quantity of straw compared to a bare land (table 21).

Table 21: Land Losses, water wash and agricultural production based on treatment

	Land losses (t/ha)	Wash (mm)	Grain production (t/ha)
Bare fallow land	5.18	21.87	--
2 t/ha - dung	1.39	8.16	0.84
4 t/ha dung	1.04	5.26	1.37
5 t/ha dung + 4 t/ha covered with straw	.06	2.04	1.59

Source: BONSU, 1988.

The strategy for combating soil degradation includes:

- improvement in the use of lands;
- encouraging the population to participate in soil conservation and restoration;
- Strengthening national institutions to help in the implementation of programmes and projects aimed at stopping land degradation.

Except in Accra, women in the North and Upper North account for more than half of agricultural employment.

Before the 1983 Economic Recovery Programme (ERP), the decline was very sharp. For instance only 62% of the country's protein needs could be met. The food production index dropped from 100 in 1974 to 62 in 1983. Despite the efforts deployed, it is estimated that there will be a deficit of 750,000 tons in the year 2000. Hence the problem of the link between research and farmers.

There have been no quarterly statistics on timber since 1986 (Statistical Service, 1991).

Between 1970 and 1982, per capita agricultural production dropped by 28%. Given that the population was only 6.7 million in 1960 with a growth rate of 2.9%, then moved to 12.2 million in 1984 with a growth rate of 3.1%, there is reason to be worried about what is going to happen in the year 2000, when the population is expected to reach 23 million.

Table 22 shows projects that formed part of FAO natural resources conservation related activities in Ghana in 1991.

Table 22: FAO natural resources conservation related activities in Ghana in 1991

UTF/GHA/025	Forest resources development	2 years	US$401,214
G-1654	Firewood and use of bean plantations in the North and Upper North regions	3 years	US$1,250,786
GHA/87/007	Assistance to National Agroforestry Programme	4 years	US$804,906
GHA/88/001	Assistance to forestry planning	3 years	US$907,619
Loan	Forest Resources Management, to be repaid in June 1995		US$64,600,000
Loan	Crops diversification		US$22,400,000
FAO/WB (Co-operation Programme)	Lands Resources Management		

The aim of the Environment Action Plan is to lay down a set of appropriate policy and investment actions and to strengthen institutional activities to enable Ghana have a development strategy that takes due account of environmental protection. Losses due to environmental degradation were estimated for 1988 at close to ¢42 billion, i.e. 4% of the Gross National Product, and incentives to the users of the Ghanaian environment encouraged them

to exploit, degrade and destroy that environment. The proposed national environment policy aims at:

- preserving the ecosystems and the ecological processes necessary for the functioning of the biosphere;
- managing natural resources soundly and judiciously;
- protecting living beings and their habitats;
- indicating the environmental practices to follow in the development effort;
- integrating at all levels environmental considerations in sectoral and socio-economic planning;
- getting closer to the regional and global environmental objectives.

The judicious utilization of lands is the focal point of the new policy. It immediately raises the serious problem of land and tree tenure system. The forest is in constant regression. It is exploited, burnt, motheaten and destroyed without any control. A sad illustration of this are the sharp cultivated slopes which abound between Kpong and Huhunya, east of Kor.

Agroforestry demonstrations through UNDP/FAO/MOA Project in Ghana

Due to time constraints, we were able to visit only three demonstration farms at peduase, Kpong and Huhunya, as well as the Aburi botanical garden. A whole day, Saturday, February, was devoted to those visits.

The peduase demonstration farm

It was established in September 1990 in the Aburi district, on top of a rocky mountain, well situated along a very busy road, just below a presidential residence built by the late President N'krumah. On a half hectare are planted pineapples on more or less two contours alternating with cashew nut trees at 5 to 6 metres interval. Natural vegetation is a Panicum sp type of savanna with a few trees. It is mostly used for pineapple and banana plantations, either wholly or following the contour of the biggest slope. There are a few palm trees not far from the houses.

Observations

1. The cashew nut tree was chosen "because the Government wanted it", without consulting the farmers;

2. The contour lines are neither very horizontal nor parallel;

3. Rocks can be seen here and there close to the cashew nut trees and it is not certain the trees will live long;

4. Should some die, the rest will be at a good distance from each other, which is recommended to ensure good yield;

5. It would have been better if grass-grown mounds were used to ensure better protection against erosion and provide fodder or mulch, and sowed with nitrogen fixing shrubs (two species alternating step by step (for example Pithecellobium dulce and Leucaena leucocephala);

6. After the cashew nut trees have grown ... if they ever grow ... the system will no longer be agroforestry, and there is no proof that the production of cashew nut trees

will be more profitable to the farmer than that of pineapples which he sells by the road side.

The Kpong demonstration farm

The Kpong demonstration farm is situated in the Manga Krobe district, a short distance from the road. It was established in July 1990. Its focal point is corridor farming with leucaena leucocephala in parallel fences 5.5 m distant from each other. Each year there is a mixed cultivation of maize and pigeon pea.

Huhunya demonstration farm

Located near a forest station, this farm is established on a sloppy land. The shrubs are not planted on contour lines, which is unfortunate because the potential impact of agroforestry against erosion, which is one of its major advantages, cannot be highlighted. The objectives of Leucaena leucocephala plantation were not properly defined. The plant grows well, of course, but it is not possible to measure the effects of shrubs on soil fertility. Besides, management is poor. People did not seem to know why the shrubs were planted. Were the objective clear (production of firewood for example) the trees would have been cut long since, more so as that is a good source of fodder production.

e) Analysis of national desertification control/natural resources management programme in Mali

In Mali, 52 priority projects and programmes concerned natural resources management, according to the Analytical Balance sheet published under the aegis of OEDC, CILLS and the Sahel Club (SY, 1990). 36 less important projects were also underway or in the pipeline. All those projects were evaluated in keeping with the SEGOU Declaration but they were poorly co-ordinated and streamlined. As a matter of fact, they sometimes appeared as a

disguised means of achieving objectives that were not among those set for the project. For instance the project for the harnessing and management of underground water (sponsored by UNDP, UNICEF, ADB and IDB) aims at reassessing Mali's geological structure, prepare a new water development master plan and strengthen the National Water Resources and Environment Department (DNHE). Rather than providing more water to the population, it would have been wiser if the people were taught how to manage the water they have: reduction of wastage, water savings, maintenance of existing water holes, etc.

On the whole, the proposed "developmental" actions should meet the needs of the population but no project was planned to adjust demand to possibilities. Women's participation was somewhat timid. The same can also be said of the populations concerned in general. Taking for example Forest Project II which aims among other things at providing the city of Bamako with more firewood, it was noted that the populations living along the forest reserves were not made to participate fully and responsibly in the implementation of that project. The Burkina Faso experiment seems to have been forgotten.

Other programmes like South Mali Project II aim essentially at increasing agricultural production but did not take into account the human load capacity of the lands. Besides, many projects have very close or similar objectives and could be merged into a single operation which will be cheaper and easier to manage.

Mention should be made of a particularly interesting small project initiated by Italy and being implemented by FAO in the region North of Kaye. The project with little financial resources and only one expert is devoted to the development of livestock breeding. However, since animal husbandry still remains the major activity of the region, it is in fact almost an integrated development project. This project could be a success, especially from the point of view of quality/cost ratio, but also by its

social effects and linkages; it operates at the "grassroots level" and has already secured a real participation of the majority of the village communities in the region, which is a success. Its main guiding principles are as follows:

- the problems to be resolved are defined by the populations concerned themselves at village or village community meetings;

- nothing should be tried without the participation of the villagers and everything should be done to ensure that their organizations quickly take charge of the implementation of any projects that may be agreed upon;

- embark on simple and less costly projects which can be realized by the villagers with their own resources;

- most of the activities to be carried out should require few or no imported inputs;

- favour loans and advances compared to gifts and grants, especially in regard to the constitution of the working capital (purchase of veterinary medicines, pumps, feeds, arrangements for fattening of animals to be exported, etc.);

- give half of the responsibilities to the women;

- train locally and on the basis of the requirements of "bare foot" land developers;

- entrust responsibilities to the villagers, especially in regard to land tenure (which means excluding nomad cattle breeders and improving parts of the lands to be leased to breeders), straying of animals (which means constructing

fences around the farms and keeping the animals therein), fodder stocks (through haymaking and silage making);

- encourage the wealthiest to invest profitably (in for example: ostrich farming, fattening of livestock for the Tabaski, sale of fodder to the breeders of kayes, rearing of various animals, agriculture etc.).

If this project attains its objectives - and to do so it will be necessary to extend it for a few more years - it will stand out as a remarkable achievement within the context of DC/NRM projects.

f) Analysis of national desertification control/natural resources conservation in Senegal

In Senegal, according to information received from Mr. P. Coeur-Bizot, UNDP Acting Resident Representative in his letter of 25 February 1992, reafforestation activities covered a total of 175,836 ha between 1961 and 1981, 23,140 ha in 1985 (5,740 ha of which were managed by the State and 17,400 by the communities) and stabilized around 20,000 ha/annum between 1985 and 1990. The community plantations started only in 1977, reaching 5,100 ha in 1983, 19,400 ha in 1985 and since then over 17,000 ha each year, with a ceiling of 19,722 ha in 1989. The following projects concern natural resources conservation:

SEN/89/X06/B/64/31 -	Integrated village afforestation
SEN/83/X02/HI/64/31 -	Basic cartography for the rehabilitation of salinated lands
SEN/89/X01/B/64/31 -	Fixing of dunes and protection of market-gardening basins

UNSO/SEN/90/X01/A/64/31 -	Assistance to the ecological monitoring centre
SEN/89/X08/A/64/99 -	Integrated village afforestation
SEN/91/002/B/01/99 -	Assistance to the National Preparatory Committee
SEN/84/X05/I/64/31 -	COMIDES I and II
SEN/87/027/I/01/12 -	Integrated agro-sylvo-pastoral Development
SEN/86/009/J/01/16 -	AGRHYMET III
SEN/87/007/F/01/12 -	Strengthening of the educational office

The natural resource conservation projects are divided into two groups:

A. <u>Forests presentation and reconstitution of the vegetation</u>

Even though the implementation of projects of the component "Forest presentation and reconstitution of vegetation" was delayed mainly because of bureaucratic procedure regarding the approval or putting in place of international expertise, there is no denying the fact that most of them have achieved encouraging results: SEN/90/X01 "Assistance to National Ecological Monitoring Centre" which took off in 1991 was a follow-up to project SEN/84/X09. The Centre constitutes an invaluable tool in the planning and management of natural resources. Proof of this is the documents and information it provides to the technical tools and decision-making departments. These include reports on pastoral ecosystems, methodologies for improving agricultural statistics, agricultural

production monitoring maps, vegetation, bush fires, cattle distribution and population and annual land occupation maps. The Centre also produces monthly maps on rainfall in Senegal as well as summary maps per season. A second phase will make it possible to complete the institutionalization process of the Centre as a national autonomous entity.

SEN/86/008 "Permanent Retraining Centre for the Promotion of Forestry Programmes". This project which made it possible to improve considerably the conceptual standard of forestry officers has already trained 408 officers out of the 800 envisaged and 167 female student instructors and teachers of technical education out of 300 envisaged. The training of relief personnel is also going smoothly. However, there are delays in the implementation of activities that will help institutionalize the Centre (training of instructors, statutes of the Centre, construction of the Centre's administration block).

SEN/87/008 "Rural Forestry Development" has, through the preparation of a rural forestry development and a rural forestry manual, contributed to the harmonization of approaches developed in the field of rural forestry. The project activities continue within the framework of a 42-month second phase funded by the Netherlands.

SEN/87/027 "Integrated Agro-Sylvo-Pastoral Development". Activities already carried out under the project have made it possible to organize the village communities of four villages and to realize three micro-projects relating to fish processing, poultry farm and cattle fattening. Actions for the protection of the environment were also undertaken by the project but the central question remains the definition of an effective and vigorous methodology regarding the preparation of the development plans envisaged.

SEN/87/028 "Dabo Forest Reserve Development Plan". This project aims at the drawing up of a plan for the development of Dabo forest and the implementation of the short and medium term sylvo-pastoral management of the forest. Activities already undertaken under the project relate to the collection and analysis of existing basic data, conduct of studies, delineation of forest reserves, the establishment of eight co-operatives instead of two already envisaged and the installation of the central nursery.

SEN/89/X01 "Fixing of Dunes" which is a follow-up to a first phase begun in 1985 has produced satisfactory results in the reconstitution of the vegetation. As well as the consolidation of the achievements of phase I, the project made it possible to stabilize 900 ha of maritime dunes, 450 ha of inland dunes, to realize 150 ha of community tree plantations, 150 ha of protection reafforestation, 105 km of shelter belt and to protect road infrastructure from sand invasion by planting trees along 30 km of road.

SEN/89/X08 "Integrated Village Afforestation", phase II of project SEN/89/X06 prepared and disseminated viable agrarian models and land development techniques in the targeted rural areas in the Louga, Bakel and M'Backe districts. The project also made it possible, among other things, to develop 900 ha in the Bakel district and popularize 5,000 improved ovens.

B. Ligneous fuel saving and development of substitution energy - preservation and rational management of water resources

For these components the results are not yet tangible because activities under this project were launched only during the second semester of 1991 or have yet to be implemented, especially in the field of energy.

SEN/87/006 "Water Resources Planning". Activities under this project were delayed considerably because of bureaucratic procedure regarding the selection and deployment of a Senior Technical Adviser and, above all, availability of premises. The basic studies are underway.

SEN/88/002 "Harnessing of Underground Waters". The component "village hydraulic" finally took off in 1991 with the drilling of the first wells in the Louga District, followed by the piezometric and hydrochemical work connected with the water tables. The component "Rehabilitation of water tables" was deleted from the project for want of financial mobilization from Japan.

UNDP intervention concerned acceptability tests on briquettes produced by the pilot factory whose establishment constitutes a pre-requisite for the implementation of the UNDP project. However, the Government has yet to mobilize funding for the factory. In a report on participation in a "macro D and D" exercise in Senegal (15 July - 2 August 1989) submitted to ICRAF, we explained why the industrial exploitation of this peat could constitute a serious danger for the future of agriculture in the "niayes" region.

In addition to these projects, others which came into being as a result of new orientations or requirements of the Government in the field of natural resources made it possible to conduct specific studies or lend institutional support to government structures within the framework of the preparation of international conferences.

8. Programme pre-requisites

A few pre-requisites are necessary for the effective implementation of the following proposals, if accepted:

1. Slow down the population growth quickly and effectively. To those who think that many West African territories cannot be developed because they do not have adequate population we wish to remind them that major resources are already lacking in West Africa, like water which we do not know how to multiply, that some most populated zones in Africa (Rwanda, the Luo land, Eastern Kivu, etc) are among the poorest, and that survival there will soon be possible only by exporting people. The argument "Development will be possible when the population increases" appears to as a wishful thinking and a refusal to acknowledge that resources cannot be multiplied indefinitely. Admittedly, there are countries where small agricultural farms have 40 ha, like in Uruguay or in Argentina. However, agricultural farms are much smaller in Africa: in Rwanda each inhabitant has only 0.19 ha to produce his food and all that comes from the soil.

Indeed, the slowing down of the population growth has already been mentioned by several countries as a necessity. Thus, for Burkina Faso, "to keep the population growth in check" (GNT, 1991) is the first pre-requisite to the realization of a sustainable growth and harmonious development, followed by:

- self sufficiency or food security,
- mastery of the equilibrium of the ecosystems,
- consistent human resources improvement.

2. With regard to agricultural products in the widest sense of the word, patronize local consumer goods and their trading within West Africa, if need be at the expense of export commodities, whose security is unstable or threatened. Already palm oil is no longer produced by Africa but rather by South-East Asia; groundnut oil is threatened by colza oil like maize oil, cacao butter has already been produced through tissues farming in European establishments at prices close to those of cacao butter derived from African farms, and in ten years time, the same will apply to coffee grain. West

Africa should first meet its current and forseable food and nutritional requirements, for, at best, these requirements will continue to increase with the population at least for a few more years, probably about 20 years, by which time the population will have doubled.

No doubt, such a strategy will lead to painful reviews. There would be less cars and less imported luxury goods but more locally manufactured bicycles, and the beginning of a greater autonomy. However, is it possible that all the governments of the subregion will accept this strategy when in some capitals the reception halls of big hotels are refurbished so that pretty women ... and especially rich women, can bring in their furs?

We are not in any way suggesting that the economic and social salvation of West Africa lie in either socialism or capitalism. We believe that the subregion must chart its own course, based on solidarity, eternal wisdom and patience, and drawing its inspiration from the village notion in African tradition, for in the villages lie the true forces of Africa and it is the villages which suffer most from desertification - including the desertification of hearts - caused by the cities!

3. The ultimate objective of the activities envisaged should be viewed within a development context. Such a development should include an inventory of resources, an assessment of possibilities and a choice of rotation (BAUMER and al. 1974). This exercise should be carried out gradually and be up dated, more so as the inventory of resources is not yet complete (in terms of available water for example) and the resources themselves are changing. It is possible to conceive a first provisional development based on existing data, which should be translated into a common language so that comparisons can easily be done from country to country. This first development would be based on the data of a subregional resources atlas prepared and funded largely by the universities of

the subregion which more often than not devote their meagre resources to less useful works. FAO and UNDP assistance could be useful.

The subregional preparation and development should be entrusted to a small multinational group of West African universities, using, if possible, the services of experienced consultants who know the region and have the authority to draw from the human resources and information from all the universities and research organizations working in the subregion. Decisions regarding the acceptance of development would be taken by the Heads of State.

The details should be up-dated and analyzed further in a gradual and consistent manner.

Development methods used by the "Louis Emberger" Centre of the Montpellier-based CNRS in France, which researchers from several countries of the subregion are conversant with, should be used.

4. All means should be used so that country life also becomes as attractive as city life. The growing urbanization exceeds the absorption capacity of West Africa. At the present rate, two thirds of the population will be urbanized in the year 2010 and a large part of the urban population will be without job.

One of the possible ways of showing down rural exodus is to decentralize the administration and give civil servants remoteness allowance proportional to the distance from the major urban centres.

Tremendous effort should be deployed to stem the expansion of the major cities and favour the development of small rural towns. Polluting industries should be decentralized. As first step, the establishment of industries in the major cities should be forbidden

and polluting industries should as much as possible be located far from inhabited zones and be equipped with all known anti-pollution devices.

D. AGROFORESTRY VERSUS DESERTIFICATION: POTENTIALS AND OBSTACLES

A book on the above subject exists (BAUMER, 1987), the sub-title of which reads: "Possible role of agroforestry in the fight against desertification and environmental degradation". It is worth referring to it.

The United Nations Conference on Desertification held in Nairobi in 1977 invented and disseminated a definition of desertification which is commonly used especially in the press and on the radio: Desertification is the diminution or destruction of the biological potential of the land, which finally leads to the appearance of desert conditions. It is one of the aspects of general degradation of the ecosystems under the combined pressure of adverse and capricious climatic conditions and excessive exploitation. This overutilization has reduced or destroyed the biological potential, i.e. the plant and animal production destined for multiple uses at the time when increase in production was necessary to satisfy the needs of growing populations aspiring to development. This definition is essentially based on the premise that desertification cannot be divorced from development and, as such, is linked to demographic expansion. However, there are many other definitions, as indicated by ODINGO (1990), among others.

The above definition is at variance with the scientific use of the word "desertification", where "fi" in French comes from Latin "fieri" meaning "to do" and shows that the action is caused by Man. IN our strict sense, desertification is the passage from an arid facies to a hyper-arid facies (i.e. desert), and desertification is desertisation caused by Man. In a peculiar sense, French-speaking

rural geographers for a long time used the word "desertification" to characterize the diminution of the population density in rural areas on the verge of dereliction.

The distribution of arid regions in West African countries is given in table 23, based on UNESCO classification (1979).

Table 23: Distribution of arid regions in West Africa

	Hyper-arid		Arid				Semi-arid		Semi-humid		
	A 2b	2b	B1a	B1b	B2a	B 2 b	C1a	C1b 1B	D1a	D1b	D2b
Benin							+		+		+
Burkina Faso			+			+	+		+		+
Cape Verde										+	
Côte d'Ivoire									+		+
Gambia									+	+	+
Ghana										+	
Guinea										+	
Guinea Bissau	+								+		
Mali	+						+				
uritania	+	+	+			+	+				
Niger			+	+		+	+				
Nigeria								+	+		+
Senegal			+			+			+		
Togo			+	+							

Source: UNESCO, 1979.

According to MAINGUET (1982) the causes of desertification include:

- the natural environment and its parameters of vulnerability;
- climate and its variations; and
- among the mechanisms: man and its way of life.

It is quite clear that we can combat desertification by trying to off-set the effects of climatic changes (as recommended by LANDSBERG, 1974), improving our life styles (environmental development, agricultural practices, non-renewable energy saving, etc.) and techniques (irrigation, desalination of sea water, reduction of toxic wastes, etc.). In many cases, agroforestry can help develop these new attitudes.

Let's examine briefly the obstacle to the development of agroforestry in West Africa.

Incapacity of administrative institutions, i.e. their non-adaptability and ineffectiveness of certain policies are often cited as some of the impediments to agroforestry development. Linking agroforestry activities to a ministry often poses problems: one hesitates between the Agricultural Department and Forestry Department, and even the Livestock Department or Planning Department. As a matter of fact, given the multidisciplinary and sectoral nature of agroforestry activities, such activities should not be confined within a system of vertical divisions but should cut across horizontally all the sectoral activities they encompass: agriculture, land and water conservation, forestry, animal husbandry (including pisculture, agriculture, etc.) and others. In practical terms, the interdisciplinary nature of agroforestry can be taken care of partly by a National Inter-Ministerial Commission which meets at least once a year to analyze the various problems, researches and possible solutions, and should be the national

contact point with international organizations in the field of agroforestry. However, in practical terms also, agroforestry is more often than not linked to Forestry Department, which is easily conceivable in French speaking countries where one has to be an agronomist first before becoming a hydraulic and forest engineer.

A serious impediment is ignorance about agroforestry techniques. This could be overcome by providing advisory services to peasants, farmers and cattle breeders. But first, it would be necessary to train the instructors, and to be able to train them, one must have solutions ready for dissemination.

This is where ONGs play a very questionable and dangerous role for the future and success of agroforestry in that they disseminate too quickly and too early techniques which are not time-tested or which they have not assimilated thoroughly. The invasion of grazing grounds and crops by Leucaena leucocephala on the southern coast of Mombassa (Kenya) is an example of the first case. The first ineffective windbreaks of the Maggia valley in Niger is an example of the second. Such errors are serious because they are likely to discourage the farmers who may say to themselves: "we have been cheated once again".

It is, therefore, important that the packages of agroforestry techniques to be popularized should be based on research findings. Now, there is hardly any agroforestry research centre in West Africa apart from the AFRENA sub network (Agroforestry Research Network in Africa) known as SALWA (Semi-arid Lands in West Africa). It concerns the following 4 sahelian countries proper: Burkina Faso, Mali, Niger and Senegal. Unfortunately, SALWA has two defects:

- some national teams are not versatile enough;

- the joint research theme has not received all the attention it deserves, while too much attention was paid to national themes, so much so that this sub-network is not as effective as one would have wanted, even though it is the last of the four AFRENA sub-networks that have been created and that the period of joint researches has just begun. The first set of practical recommendations should be available at the beginning of 1994.

Other countries like Côte d'Ivoire, Ghana and Nigeria should be linked in the near future to the HULWA sub-network (Humid Lands of West Africa) which will benefit from the experiments started several years ago in Cameroon under the aegis of ICRAF. An AFRENA sub-network for the sub-humid zones concerning Benin, Burkina Faso, Côte d'Ivoire, Guinea, Nigeria and Togo was scheduled for 1993 but at the end of 1992 funding could still not be found and it is probable that the usual donors of ICRAF will prefer to fund activities in Latin America and South-East Asia.

Another major obstacle to the popularization of agroforestry is the uncertainty of the farmers about the ownership of the trees they have planted. It is necessary, in the general interest and in the interest of agroforestry, that the legislations in force in the various countries be modified within the context of the "Green Sahel" campaign (ARGOULLON and al .. 1981) to ensure that those who plant trees benefit from the products thereof.

Should we make a little sacrifice as far as principles are concerned and admit that careful applications could be made of what we already know in agroforestry without any serous danger, it would be possible to apply such knowledge very quickly and without much cost. Admittedly, agroforestry techniques cannot replace all the products and services that forest can provide. Nevertheless, they could be an acceptable substitute. Table 8 makes a comparison between some qualities of the forest and those of agroforestry

techniques. Shrubs used in agroforestry systems can play a major part of the role played by the forest, but with much less intensity on account of the fact that they are less numerous per area unit than in a forest. Roughly, the products and services per hectare of forest can be provided by 6 to 10 ha of agroforestry systems.

The major agroforestry techniques that it would be advisable to popularize in West Africa include:

A) In arid zones

i) Firewood and fodder producing shelter belt fences in cultivated and irrigated oases. The recommended species include: proposis juliffora, P. Chilensis, P.Tamarugo in crust soil or salt soil; coupled with a low storey of Atripex nummularia, A. Halimus, and even Cassia Sturtii.

B) In semi-arid zones

ii) On fields, only as an initial step and in most favourable conditions:

- shelter belts on one or several rows and on several storeys, combining firewood and fodder production with protection; these shelter belts should be protected for some time from animal teeth, through surveillance by the users of grazing grounds; the recommended species include: Balanites aegyptiaca (with a low storey mixed with Capparis decidua, Boscia Senegalensis, Azadirachita indica with a sub-storey, Casuarina equiseti folia with a sub-storey);

- isolated or cluster of fodder trees protected by the users themselves and constituting fodder stocks for the dry season; depending on the soil, fodder capparidaceae, indigenous or exotic acacias, prosopis sp.pl, including P. africana can be used.

iii) where these zones are cultivated:

- firewood producing windbreaks
- food producing trees (Moringa Oleifera, pithecelobium dulce, Adansonia digitate etc.) or fodder producing trees (Prosopis Africana, various acacias, pierocarpus sp.pl, etc.)

iv) In Park zones

- Butyrospernum Parkii, Parkia biglobosa, Faidherbia albida, always accompanied by small anti-erosion works, easy to do, less costly, and with great output.

C) In semi-humid zones

v) Ligneous fallow lands with Leucaena Leucocephala, L. deversifolia and even Calliandra Calothyrsus or Sesbonia, to improve the fertility of the soil, produce firewood and a little fodder;

vi) On slopes, above 2%, it is imperative to establish grass-grown strip contours (production of fodder), well spaced out, and with shrubs planted at regular intervals to fight against erosion and constitute

terraces naturally and progressively. These shrubs should, depending on the cases, produce:

- food (avocado trees, Aurantiaceae, pithecelobium dulce, guava trees, Faidherbia albida etc.);

- firewood or timber;

- fodder (Capanus Cajan, Calliandra Calothyrsus, Gloricidia Sepioum, Leucaena sp.pl). The species will be selected on the basis of ICRAF data bank now available on cassettes (about US$200). They should be nitrogen-fixing as much as possible in order to contribute to the reconstitution of soil fertility.

vii) On weak slopes and flat soils, strip contour farming with ligneous species selected on the basis of ICRAF data bank and depending on the soil, wind, rainfall and its distribution, as well as the products and services one wants to obtain. Leucaena is a well known species, particularly in this sort of use. However, care should be taken not to overuse it for fear of an invasion of psyllidae or other parasites. Generally speaking, to avoid possible inconveniences of any mono-farming and contagion in particular, the same species should not be used on two neighbouring parcels and preferably use at least two species instead of one on the same parcel.

viii) On slopes over 30% any farming without farming practices (terraces, contour farming, water infiltration trenches, putting land under grass and

ligneous plantations on the outside edge of terraces, farming regulation etc.) should be banned. Existing farms should be gradually submitted to such regulation.

D. In humid zones

ix) Ligneous fallow land practice should be imposed wherever possible, with Acacia Barteri, Calliandra calothyrsus, Inga sp.pl, Leucaena leucaephala etc.

x) Corridor farming should be made compulsory, with mixtures of appropriate ligneous species meeting the needs of the populations. In industrial coffee, cocoa, rubber tree and oil palm plantations etc., an intensification of production should be achieved by associating appropriate shrubs with the major crop. Measures should be taken to ensure that only species likely to satisfy the local needs of the populations are introduced and not species whose products are meant for expert. For instance in young hevea plantations, fodder shrubs (such as Calliandra calothyrsus, Gliricidia Sepioum, leucaena leucocephala, Tephrosia vogelii) or fruit-bearing trees (such as grape trees or Bartholenia excelsa or Bractis gassipaes). Cocoa or coffee trees whose products are threatened by <u>in vitro</u> farming should be avoided. The recommended species include Theobroma grandiflora.

Table 24: Comparing qualities of forest and those of agroforestry techniqu

FOREST	AGROFORESTRY TECHNIQUES
Timber production	It is conceivable in certain cases to plant separately some feet of precious species in agroforestry systems, sometimes even at a density higher than found in natural forests. That is why the regeneration of ebon trees of Madagascar, which have almost disappeared, ha been proposed.
Production of firewood	Common in agroforestry, with for example stems of Cajanus Cajan or in corridor farming. In Nairobi for instance large production of firewood has been obtaine with Leucaena leucocephala. In the regularly renewed windbreaks at La Maggia (Niger) a large quantity of firewood has been obtained.
roduction of service timber	Poles are easy to produce, for example on the edge of farms or grazing grounds, as is done in Rwanda with Gmelima arborea. Stakes are also easy to produce.
Impact on the climate	Windbreaks have an important role to play; so do isolated trees which create, in the proper sense, micro-climates that favour in many cases the growing o grass due to the reduction of evaporation.
impact on hydrology	Every isolated tree acts on the slowing down of rainfall, on increase in water infiltration and on soi water consumption.
Creation of nests for the fauna	Isolated trees can play this role but only for birds, bees, silkworms. They cannot create a safe place conducive to the existence of game.
Production of shade	An isolated tree also produces shade but a limited shade especially as it is situated near the equator.
Slowing down of rosion	If well planted and properly distributed, isolated shrubs can slow down considerably erosion and even eliminate it completely, as was demonstrated at ICRAF station in Machakos (Kenya). The slowing down of erosion is one of the major objectives of agro-forestry.
Maintenance of fertility	If well arranged and properly selected, shrubs, particularly nitrogen-fixing shrubs, can play a very important role in maintaining or reconstituting soil fertility.

E. HOPES IN THE SAHEL

There is a book (ROCHETTE 1989) which recounts successful rural development experiments conducted in the northern regions of Sahelian countries. It is no longer possible to still believe in the touch of the wand of some distant fairies to save the countries of the Sahel. However, local achievements have proven that there exist appropriate technical solutions to combat desertification. We wish to mention them here, all taken from ROCHETTE which describes them in detail. The table summarizes the characteristics.

All is not negative, however, in the West African table. Awareness is building, but too slowly; small scale less costly but effective actions are being undertaken in some village communities, which help in the conservation of natural resources and should be generalized. For instance, account should be taken of the movement that is being developed in several zones, particularly in the Sahel zones, to slow down, and even stop environmental degradation and improve soil fertility by applying simple methods (bunds or laying of stones in the fields, use of green fertilizer, etc). These methods which are described in detail in a book recently published by GTZ for the Sahel Club (ROCHETTE, 1990) are often a rediscovery of old methods. Like some agroforestry techniques (windbreak, planting of fodder shrubs on grassy contours, fences to prevent animals from straying, corridor farming etc), they could be massively popularized in few years, once the researches conducted in that regard have made it possible to determine their advantages, inconveniences and cost, and as soon as the new national legislations on land tenure and on tenure relating to shrubs are available. There is no doubt that they would have a tremendous impact. However, there is also no doubt that these improvements will serve no purpose unless a break is put to the rapid population growth.

At in Gall in Niger, the protection of the banks of a "Kori" or non-permanent river is done with stone or gabions bricks which allow for the rehabilitation of old gardens under date palm groves. Sixteen such bricks were constructed with external assistance, followed by 29 others without external assistance after the gardeners who help each other in the construction of the bricks have done some self-training. The bricks stabilize the land and increase water infiltration. They were quickly adopted by gardeners who do the construction without external assistance because the land and the water acquired are highly and quickly upgraded by the date palm and by irrigated farming.

The half-moons methods which are well known and extensively used in Israel, and to a lesser degree in Tunisia, were successfully applied at Ourihamiza/Tahoua in Niger. It consists in digging a half circle perpendicular to the slope and surrounded downstream by a 50 to 60 cm hillock called "lunette" parallel to the half-circle and extended by wings. The half circle absorbs the neater trapped by the "lunette" which infiltrates slowly; it is generally used for the cultivation of sorghum or millet. The radius of the half-moons is about 2 metres, and its depth 20 to 30 cm. They are located on contours 4m long. A hectare has 313 half moons. A shovel, a pickaxe, a rope and a compass are needed for the construction of a half-moon network. The half-moon should be worked at in order to avoid the compaction of its depth; otherwise the infiltration diminishes from year to year.

On the same site, the construction of gabion micro-dams by the population made it possible to make a few subsidence gardens and fields. At the same time, experience has shown that there was a limit to human load capacity in the Oasis and that the capacity has been attained or about to be attained.

In Mali, at In Tademy in the Gao region populated by cattle breeders compelled to live a sedimentary life, the construction of

mud bunds, stone spillways and gabion dams enabled the population to embark on the reconstitution of its environment. A slight increase in the water resources also made it possible to undertake many and very diverse activities like the construction of improved ovens, improvement of gardens, the creation of a mini-nursery, protection of young plants and evacuation through brick turrets, quickset hedges in proposis juliflora etc. That is a good example of developing development.

In Mauritania, in the Chelket Arkham, Achram Diouk hydrographic unit in the Tagant, subsidence farming upstream the improved dykes for retaining running water was stepped up. Admittedly, improved dykes require heavy equipment but the rehabilitation and modernization of dykes have immediate effects that reassure the population. Furthermore, the techniques are applied within the very framework of local land and socio-economic system (the djemaa) which facilitates the mobilization and initiatives of the people.

At Kamo, 80 km east of Timbuktu, we find an experiment which is not unique, namely the construction of a village irrigated perimeter with submersion control mechanism and seed-bearer granary, at low financial costs and with effective village participation and management, which yielded positive results within the context of a global development approach.

Namari Goungon in the Tillabery district, 125 km north of Niamey is a good example of massive introduction of trees in and around irrigated perimeters without causing any harm to the farms (rice); what is more important is that these trees have not attracted birds.

Better global results would probably have been obtained (especially low water consumption) by using Casuarina equisetifolia instead of eucalyptus. On the other hand, the use of Faidherbia

albida, Borassus flabellifer and Khaya senegalensis is excellent; that of Acacia holosericea and Prosopis juliflora is acceptable. One could have tried Prosopis africana, which however requires more humidity than its counterpart.

The Hondo Bomo Kaina Project experiment south of Timbuktu, with Sonhrai farmers and Tamacheq Telle Emedess cattle breeders is significant for all the plains liable to inundation by lakes, big ponds and swamps of the Sahel: the tall and fat "bourgoutières" can be regenerated at low prices and with a great profit for the shepherds and agro-breeders themselves. The example is particularly instructive because a success of the regeneration of "bourgou" (red, Echinochloa stagmina, or white, E, longijubatum) by the concerned people themselves is a vindication of the failure of the Hondo irrigated perimeter because its technology is beyond the scope of the community.

Established, developed and managed by the local co-operative of cattle breeders, the Safara cattle market south west of Mopti, in Mali, is fast becoming a real income and employment generating enterprise. The simplification of administrative bureaucracy, the Co-operative Surveillance Committee set up to act as police (which made it possible to eliminate the stealing and sale of stolen animals), the sanitary protection provided by the breeders themselves, the guarantee for the sellers to fund buyers and get satisfactory prices are all factors that guarantee the security of the market.

Guided by the achievements made around 1950 in Kenya by D.T. Pratt and 1960 in Kordofan (Republic of the Sudan) by one of us, young woodlands were planted by the populations themselves at Djibo and Se Ganoua in Burkina Faso. These were followed by timely works which made it possible to test light techniques aimed at facilitating the regeneration of grazing grounds: half-moons, stony cordons, scarification of the soil, planting of hedges,

regeneration of Balanites aegyptiaca according to size, dual use (fences and seed nests) of cut branches, caretaking, protocols of agreement with the administration.

In the Gandiolais, a coastal zone North of Dakar in Senegal, Windbreaks protect the niaye and roads against silting. Women groups have successfully established forest demonstration farms and initiated medicinal agroforestry action which consisted in identifying the most scarce and coveted species such as Fagara Xantoxylaï des, Gardenia ternifolia, Securidaca longipedunculuta, Stereospernum knunthianum, and Strychnos spinosa.

The comparison of the windbreak networks established at La Maggia and Maïquizaoua in the Tahoua District in Mger has revealed that neem windbreaks increases the velocity of the wind at their height and that it was necessary to establish windbreaks on two storeys (and generally too rows). The major obstacle preventing the farmers from embarking on such operations is their uncertainty regarding the tenure of the trees and shrubs they plant. The problem of partial occupation of a field by a row of windbreaks is generally resolved without much difficulty.

At Ranawa, in the Burkinabe Yatanga, the success of long stone bunds and the reactivation of the "Zai" or water pockets 10 to 20 cm in diameter, 5 to 15 cm deep and 0.5 to 1 m long, prepared in dry season, made it possible to embark on other actions: dung pits, cereal stock, millet mill, afforestation, banco protection walls for planted trees. However, the agroforesty techniques are hampered by the straying of animals.

The Rissiam experiment, west of Kongoussi in Burkina Faso shows that filtration dykes have proved their mettle technically and socially. Adapted and mastered by a population trying to be self-reliant, the experiment was highly successful in that it met the major need of the population i.e. to be able to eat one's fill.

The collection and distribution of flood and running waters has been successful at NO and Rounou in the Bam, in Burkina Faso. They allow for complementary irrigation at the end of the rainy season. At NO, the successful experiment has proved that the village was highly determined to regain its lands and power to produce, despite the lure of gold mining and of Côte d'Ivoire nearby. The village is united and organized despite its diversity and the discontinuity of external operations. It is sustained by the determination of its women.

At Noogo in the Yatenga of Burkina Faso, mud and stone anti-erosion bunds have proven that technical development, when carried out by a community, is of a lesser quality compared to the one carried out by an individual. The technique was quickly mastered and is spreading easily.

In Niger, the development of the Laba plateau, 25 km east of Keita is based on the following three (3) complementary techniques:

a) anti-erosion bunds outside farm lands;

b) planting of local acacia and prosopis on upstream pocket;

c) sylvipastoral development using bunds and half-moons, on bulging parts and on degraded skeletal soils.

At Guidan sourout, 15 km east of Keita, steps have made it possible to plant prosopis juliflora, Acacia Seyal, A. nilotica, A. raddiana on degraded sloppy soils and the development of one hectare requires 840 man/day; its cultivation requires 70 man/day in addition. This method aims among other things at reassuring the farmers and encouraging them to request that conservation works be done on the cultivated lands with greater output. At the moment, they do not want to treat their cultivated lands for fear that they might lose their right over them after they have been developed.

Furthermore, the results obtained prove the dependence of the population on a project but do not guarantee its future.

A Saye, 5 km south of Ouahigouya in Burkina Faso, the construction of anti-erosion bunds and dung pits helped in identifying a few basic constraints impeding a rapid and massive generalization of the techniques put in place: problems of water and food supply, promotion of women.

Mud and stone bunds and barriers constructed by a certain A.O. at Birgui in the Kana region in Burkina Faso were accompanied by the voluntary and spontaneous protection of natural buddings by thorns, especially with respect to the mere and the baobab. However, many other species deemed indispensable became numerically inadequate: shea tree, kapok tree, bastard mahogamy, jujube tree, acacia, grape tree, plum tree, Faidherbia albida, tamarind tree, Balanites aegyptiaca. A.O. was able to expose his wives and boys to all sorts of techniques such as use of water level, wheelbarrow or miner's bar, and mobilize all his family. The women teach their daughters. A.O. has played the role of instructor and brought 35 people into the village co-operative.

At Ziga, 25 km south east of Ouahigouya, the anti-erosion fight and land development included: stone bunds, grass-grown bunds with spillways, euphorbia hedges along the roads, young woodlands, scarification of indurated soils, half-moons, dung pits, individual reafforestation, harvesting of Andropogon gayanus and Pennisetum sp.pl grains and some action concerning improved ovens (the ovens were however not repaired and were consequently abandoned). Another land development at Kanibo, a big cotton village with Sudanese climate 15 km south east of Koutiala in Mali, is under study.

The existence of a well structured village association made it possible to work out a standard land development plan for the zone,

identify the problems and deal with them gradually and according to the needs and priorities expressed by the farmers, and to put in place techniques that they could master collectively and individually. The plan began with the harnessing of running water: stop strips filled with stones, filtration bunds, fixing of an outlet; it then introduced quickset hedges on the limits of the farms and on the limits of the parcels, improved agricultural practices (dry raking and partitioned ridging, organic manure, reafforestation, improved ovens etc. with variable successes which show that global approach to "land development" is delicate.

ROCHETTE and his collaborators end their analysis with the example of "Vive the paysan" Association at Sapone, 36 km south of Ouagadougou. The example is an illustration of the formation and operation of intervillage association.

ROCHETTE (1989: 572) concluded thus: "The wind of development does not come from east nor west, north nor south; it comes from the Sahel and from those who have shown solidarity with the Sahelian people".

As far as we know, no similar book exists for the northern part of our subregion and the time frame allocated to us did not make it possible to collect therefrom examples of successful development ventures carried out by the people concerned, which are protective of the environment and natural resources.

PART TWO

I. Master Plan for Co-ordination of Programmes for Combating Desertification/Natural Resources Management in the ECOWAS Subregion

A. Towards a Master Plan

This project aims at the preparation of a subregional-oriented master plan for combating desertification and co-ordinating programmes existing in ECOWAS member countries. In this connection, the major concerns and priorities defined in these countries were first identified. Leading ideas relating to priority programmes were proposed in the most sensitive sectors which in one way or another are affected by desertification.

The solution envisaged to resolve the problems posed by desertification should not only be sought at national level, but also recommended at subregional level. The programmes identified must be implemented by the countries and their national institutions, and co-ordinated by subregional organizations.

Even though from the ecological point of view there is a distinction between countries of arid and semi-arid zones on the one hand, and countries of sub-humid zones on the other, the programmes identified are the same in the two cases because the priority problems therein are almost identical even if they do not show the same acuteness in the two zones. This explains why the programmes proposed are the same for the two cases.

All the proposed short, medium- and long-term actions, be they at national or subregional level, are conceived in a way as to ensure their incorporation in a master plan. It is important to bear in mind that:

- an iterative method must be the rule in the conduct of development; in other words, every action must be constantly reviewed; it is necessary to go back from time to time to the point of departure and ask the same question to see if the answer is still the same. For instance, within UNEP, the definition of desertification has evolved since UNCOD. Furthermore, knowledge on the evolution of climatology has become clearer, ideas on sedentarization of nomads are changing. The periods of interrogation, of "putting the counter back to zero" are increasingly long as the basic data are becoming more accurate, according to a given plan (RAINTREE, 1983);

- there must be some logic in the order of activities, as well as in development (BAUMER and REY, 1974). Inventory precedes calculation of possibility, which in turn precedes choice of rotation. Similarly, it is logical, before increasing the number of water holes, to know whether it is possible to do so on the basis of overall reserves and estimates, and to have carried out an economic and environmental study on the possible consequences of opening any water hole;

- "the logical order of things" should not however be a major obstacle to the implementation of any anticipated activity if the circumstances permit. In this regard, it is necessary to be flexible when interpreting the terms "short or medium" or "in the long term" in the following activities. Nevertheless, it can be said that generally speaking, these expressions correspond more or less to 2 to 5 year duration for the short-term, 4 to 10 years for the medium-term and over 10 years for the long-term.

B. Preparatory phase

As stated in the preamble, the time allocated to the consultants was too short to prepare a real master plan that allows for the improvement of on-going actions. Nevertheless, sufficient materials have been collected to be able to propose major orientations of a preparatory phase or phase I lasting 3 years of a real master plan. During this phase, actions are proposed at two levels:

i) at national and subregional level, domain of governments,

ii) at grassroots level, domain of citizens.

i) National and subregional level

Two actions are proposed, one indispensable, the other highly recommended and supplementing the other, and a subregional co-ordination action.

The indispensable action would consist, for each government concerned and with possible help of ECOWAS personnel (some few high level bilingual independent consultants: English and French) in analysing all the strategies, programmes and on-going projects dealing with desertification, comparing the objectives, merits and demerits, and merging them into a single National Strategy Project within the framework of the future subregional master plan. Of course the governments concerned on the one hand, and ECOWAS on the other, are expected to inform their usual multilateral, bilateral and non-governmental donors of their intention and obtain their approval and, if deemed necessary, the support of some of them.

This work done, the results of which should have been obtained in eighteen to twenty four months, it would be desirable that an action be undertaken in each of the 16 countries concerned and with

the help of ECOWAS: prepare a single desertification control and natural resources conservations strategy. This work should fall within the context of chapter 12 of Agenda 21 and should be done in close co-operation with the agencies of the United Nations System concerned by environment: UNEP of course, but others as well such as FAO and UNESCO.

Under the auspices of ECOWAS and its Natural Resources Division which will have been strengthened (more by high level experienced consultants, possibly Africans, than by new officers), a 6 month work will then be done to harmonize the National Strategies, try to unify them and propose a new document to all ECOWAS countries.

i) Grassroots level

During the same period of 30 to 36 months devoted to the above work, ECOWAS countries will do everything possible to mobilize their populations and encourage them to seriously work, with less external inputs possible, towards attaining specific objectives in only four but priority areas:

a) Water: ensure that water is available throughout the year near each village, by embarking on small constructive works, mostly done manually, such as mud dams, surface reservoirs, digging of living baobab trees, or, wells in the southern zone;

b) Soil: eliminate the adverse effects of hydrous erosion in agricultural lands through small constructive works mostly done by hand (half-moons, fish scale systems, bunds, stone walls, terraces, half terraces, filtration dams, elaborate

contours covered with grass or otherwise, etc.);

c) Lingeous plans and energy: for the recovery of the dendro-energy situation, ensure that each person plants and maintains at least forty firewood producing trees or shrubs (and if possible multi-purpose ligneous plants) in the first year, and at least sixty in the second year; these plantations should be done as a matter of priority in village forests and in agro-forestry systems (upper storey of hedges on the boundaries of fields or property etc.) especially if these trees are nitrogen-fixing trees;

d) Animals: in two years, the generalization of tedding and ensilage practice, coupled with the absolute stoppage of straying of animals (except nomads) and with a prudent stabilization of the minimum number of animals at the current level, obtained mostly through effective price policy (higher for young mature animals, lower for aged animals) should make it possible to move towards a more rational animal production (greater resort to wild fauna, pastoral development and reduction of over-grazing).

All these actions are simple, easy to implement and less costly. They would allow for reconcentration of efforts (as Burkina Faso has done in the area of water) and would easily fit

into a longer and more comprehensive strategy than the one described below (IC). What is important is to break up the programmes into activities that are connected with each other. With regard to water for instance, massive effort should first be made to ensure that it is within the reach of every village. Secondly, steps should be taken to render it more drinkable, using very simple methods:

- use of African plants to clear the water (El-Azhari ...);
- breeding of some water snails to destroy bilharziosis agents;
- rearing of fishes to destroy mosquitos larvae and other insects;
- exposing thin layer to sun in order to purify it;
- thrashing "with fork" for oxygen etc.

Thirdly, effort should be directed towards ensuring the most economic use of water: drinking water generally comes first. However, it will not be out of place to conduct studies to know whether it is better to supply animals with drink (the whole year or almost) or to irrigate farms (not necessarily the whole year) or to use the environment to produce (fish, ducks etc.) or to improve composts; water saving, including evaporation control - the cost should be examined at this stage (particularly saving in terms of irrigation). Farmers will be introduced to water saving on each occasion: with much less water it is possible to produce more money with a few well managed hives than with a goat flock. Under these circumstances, will it not be better to have a few more hives and a few goats less?

The actions proposed will be based on the widest dissemination possible through the press, on the radio and television, by instructors, by religious authorities as much as possible, and through short and simple information cards on achievements made. We were told that UNEP has started preparing these cards on an experimental basis.

Furthermore, each achievement will be accompanied by adequate information which should be as general as possible.

Transnational project ideas for the subregion

Irrespective of the actions presented further down, at national and subregional level, there are project ideas concerning several countries of the subregion which could be developed or co-ordinated by ECOWAS.

A programme for combating the invasion of rivers and lagoons by floating plants has already been prepared by ECOWAS and funding was found. This very delicate programme should take into account.

- the possibility of feeding sea-cows with water hyacinths which these protected aquatic mammals are very fond of;

- the possibility of making ensilage with water hyacinth, even though they contain very little dry substance, as was successfully done by one of us in the Sudan around 1960;

- the biological control of water hyacinth, Eichornia crassipes, for example with Neochetina eichlorniae, as was successfully practised for many years in the Sudan, and is currently being done in Benin since 1991 with the help of GTZ and under the scientific control of IITA (IITA, 1992).

Programmes for the development of catchment areas can fall within this category, be it a water tower serving many countries like the Fonta Djallon Highlands project in Guinea or a region astriding several countries (average valley and low valley of Senegal for example).

Would also be considered under this heading:

- transhumance projects and management of grazing grounds; for example between Mali and Mauritania, by establishing an equitable system of evaluating the fodder available to cattle (better quality after the rains in Mauritania for Malian transhumants, inferior quality in dry season in Mali for Mauritanian transhumants);

- transnational parks and reserves projects for a better conservation of landscapes and threatened animals; for example the Senegalese park of Niokolo Koba would be more effective if the adjacent parts of the Guinean and Mauritanian territories were also protected;

- coastal anti-erosion projects in the Gulf of Benin; for example, consequences of the development of the Lome harbour or the Rufisque coast in Senegal;

- studies on the consequences of the major dams on environment;

- in the area of energy, a project aimed at co-ordinating national research activities and avoiding duplication, particularly with regard to improved wooden ovens and solar energy would be most useful;

- Regarding information, a project aimed at keeping nations informed of experiences successfully carried out in other

continents in the field of aridification and desertification control is recommended.

Subregional training programmes

As well as the training programmes inherent in each of the actions proposed, some very important training courses should be organized by ECOWAS at subregional level. For instance, and by order of importance:

i) Training of specialists in the farming of plant tissues

It is recommended that ECOWAS:

request UNESCO assistance in the training of about forty (40) specialists in tissues farming which West Africa needs urgently if it is not to lag behind in this speciality (laboratories in Europe and Israel already know how to produce through tissue cultivation and in an economic way cocoa butter and are currently working on coffee grain. They are willing to receive and train African trainees); efforts should be geared towards the cultivation of grain tissues (maize, sorghum, millet, niebe), as well as yam, cassava, banana and plantain, etc .

The training should aim at:

i) cultivating on barren lands explants of plant tissues (meristems, embryoes, somatic tissues etc.) of callus, of cells suspensions or protoplastic cells taken from their compartments;

ii) transforming cells through the introduction of foreign DNA in some farming cells, by cell fusion, co-infection

controlled by Agrobacterium, bombardment of DNA particles or electroporation;

iii) regenerating cultivated cells in plants, hoping that some of them will have been transformed and will bear new characteristics borne by DNA (IITA, 1992).

ii) Training of specialists in scientific careers

The aim is to bring member countries to slow down considerably the brain drain they are facing, especially in the scientific field, not by preventing students from studying abroad but by providing the graduates with attractive working conditions, career prospects and giving them due consideration. To this end, it is recommended to train, not at the level of each country but at subregional level, a small team of specialists with the status of researchers who can propose solutions to the current brain drain (promotion, career prospects, research and teaching professions, sabbatical leave etc.) and advise the governments on how to bring back to their countries thousands of West African graduates who have settled down outside Africa.

iii) Training of agroforestry officers

As stated in paragraph IV of the first part of the report, agroforestry is one of the methods whereby shrubs are planted in association with animal husbandry or with crops or with both, in order to benefit immensely from the advantages provided by the forest. Indeed, agroforestry can contribute to:

- producing firewood, fodder, food, tanning barks, gums and resins;

- providing shelter against the wind, stopping sand in saltation, fixing carbon, enclosing animals, etc.

New examples of the role of agroforestry in combating desertification and preserving natural resources can be found in a book published by one of us (BAUMER, 1988).

In West Africa, however, there exist very few facilities for training agroforestry officers; and these facilities only provide training in English (University of Ghana for instance). It is therefore strongly recommended that ECOWAS support ICRAF project for assistance to the University of Niamey (for the dry zones) and the University of Yamoussokro (for the humid zones), both of which have begun dispensing courses in French, in order to help them enrich their courses and field work, constitute references among the farmers and internationalize their recruitment.

C. Actions to be undertaken

Below is a more exhaustive list of actions to be undertaken. In most of the countries of our subregion, what is more required is putting ongoing programmes in order than embarking on new activities. The major actions are in bold letters. As a matter of fact, the question is drawing up at national level lists of projects that are underway, the whole set of which constitutes a minimum development programme. If ECOWAS could have a sort of development status on each of the ideas in every country, that would greatly facilitate its permanent evaluation of the status of natural resources and enable it to constantly improve the subregional master plan.

Conventionally, we have reduced to four the areas of action.

Regarding water, no country nor supranational authority has a qualitative and quantitative inventory and a dynamic cartography of available waters, water needs, and discovery probabilities; no country has a mathematical model of its water resources. We think it is urgent - indeed UNESCO and the United Nations have been

repeating this in vain for the past forty years - to have such an inventory.

The soils of ECOWAS states are generally poor and the fertility very vulnerable. Since fertilizers are expensive, agroforestry is one of the most promising methods whereby the fertility can be maintained and improved. Table 25 gives an idea on the needs and availability of arable lands.

Table 25: Needs and availability of arable lands (in 10^6 ha)

Area	Sudano-Sahelian Africa	Humid West Africa
Total	828.2	206.6
Fit	53.4	49.1
Marginally fit	65.0	102.8
Currently cultivated	53.1	55.4
Existing reserves	+65.3	+43.4
Needs in 2010	60.5	69.6
Balance sheet	+4.8	-26.2

Source: FAO, 1986.

The area of energy and ligneous plants is illustrated by the requirements and availability of firewood, timber and industrial wood which are given in table 26.

Table 26: Wood requirements and availability (in 10^6 M^3)

	Sudano-sahelian Africa	Humid West Africa
Total area (10^6 ha)	828.2	206.6
Forest resources (10^6 ha)	111.4	49.4
Firewood:		
Supply	74	332
Supply in 2010	73	268
Current needs	63	104
Needs in 2010	140	276
Current balance sheet	+16	+218
Balance sheet in 2010	-67	-8
Timber and industrial wood		
Supply	10	45
Supply in 2010	5	7
Current needs	4	8
Needs in 2010	7	25
Current balance sheet	+6	+37
Balance sheet 2010	-2	-18

Source: FAO, 1986b.

It emerges from this table that the dendro-energy situation will become very catastrophic in the next 15 years and that the subregion which is an exporter of timber and industrial wood, will become an importer of these commodities by the year 2010. The fast disappearance of the forest cover is very much likely to seriously jeopardize man's existence. Advice has been given here and there to consume local, to set community institutions afloat, to create a Timber Producers Association, to increase knowledge about forest

and its resources, to develop training, particularly through ATO (African Timber Organization). However, nothing will replace a very high rate and massive reafforestation, using not only rapid growth species but all the indigenous species, to maintain and recreate a "forest environment".

The following are the major leading ideas in the fourth area which is that of animals:

- maintain nomadism and transhumance everywhere they are the form of animal husbandry best adapted to the difficult environmental conditions, but help in their organization (transhumance corridor equipment, fodder stocks, tedding and ensilage (opening and closure of water holes, markets, etc.) in order to bring about a veritable development of grazing grounds;

- in sedentary zones, promote agricultural/animal husbandry association, by eliminating the straying of animals and encouraging stalling and composting;

- diversify the animals used and give greater importance to the breeding of the fauna, for example ostrich and varan in the dry zones, elands in semi-humid zones, grass cutters in humid zones, crocodiles in marshy zones; this fauna already serves greatly for human food (20% of animal protein consumed in Nigeria);

- more effectively protect and help threatened wild animals to reproduce (elephant, giraffe, antelopes, gazelles, duckers, water bucks etc.) by associating tourism development with this protection.

The following were presented in three groups: in the short-, medium- and long-terms. However this distinctions are flexible and

arbitrary and only given to fix ideas; besides they vary from one country to another.

Many other ideas could have been retained, like land tenure or participative management of forests, which could be added if deemed necessary.

C.1 SHORT-TERM PRIORITY ACTIONS

Short-term priority actions were selected among those which present great urgency and were deliberately reduced to a limited number; they were selected among simple actions, requiring few inputs but a lot of work and full participation of the beneficiary populations. They were also selected as "developing development" activities, that is to say that their implementation automatically leads to actions in other areas, such as research, information or training, which are sometimes classified as distinct sectors. In concrete terms, they can be implemented right from the first year of the take-off of the master plan at national and subregional levels and completed over a maximum period of two to five years.

The short-term priority actions belong to four areas only: water, soil, energy and ligneous plants, and animals. The activities were differentiated at national and subregional levels.

I. AT NATIONAL LEVEL

The area of water which is a priority area for the subregion affected by drought and desertification has already received special attention both by international organizations and governments. However, the problems to be resolved in this sector still remain topical. Indeed, if the area is considered as priority area it is because it is very delicate. It is true that there is no life without water. However, one should not conclude from this that water must be found or brought everywhere and at any

price. The area is indeed a priority area because despite new discoveries, there are more and more zones where the total water resources available are either already used or there is no hope of increasing the reserves. It is important for the countries of the region to:

- provide drinking water to everyone;
- reduce hydrous erosion;
- water a number of tropical cattle compatible with fodder resources;
- raise the phreatic water tables in the valleys, steams and rivers with small dams;
- increase water infiltration in the soil;
- if possible embark on irrigation farming and create a diversion of temporary waters to improve the grazing grounds.

a) multiply small hydraulic works generally done by hand by the populations concerned, as some countries of the subregion have started to do (filtration dykes, stony cordons, etc.) in keeping with the main objectives;

b) intensify the inventory and development of national water resources, (drinking water, surface water, underground water and others) and draw up water management programmes;

c) start putting in place institutional, scientific, technological and human resources in order to strengthen

research/development programmes in this sector. This action will continue beyond the short-term.

Account should be taken of the impact of these works on the environment and care should be taken not to lower the phreatic water table either locally or below the works.

2. **In the area of soil**

Combat soil erosion by implementing the following measures which, if governments succeed in convincing their citizens, would help eliminate in five years any abnormal hydrous erosion of all cultivated lands. In this connection, it would be necessary to:

- ban any farming beyond a 30% slope without prior special authorization from the National Soil Department, which would lead to the application of the same measures that apply to slopes at over 2%;

- on soils with over 2% slope, make appropriate anti-erosion farming practices compulsory. This could include:

  - contour farming,
  - stone contour lines,
  - anti-erosive contour mounds,
  - continuous or alternate terraces edged with a row of fodder graminaceae and, whenever possible, with multi-purpose ligneous plants.

- ban any farming along big slopes.

The maintenance or even increase of soil fertility must be obtained rapidly through the compulsory but accepted use of appropriate agroforestry practices, using nitrogen fixing plants:

- ligneous follow lands in humid and sub-humid zones,
- contour corridor farming,
- trees and hedges on the boundaries of fields,
- shelter belts with several storeys,
- isolated fruit and fodder trees in the fields and in the grazing grounds,
- fencing of grazing grounds and animal corridors through hedges, preferably with several storeys, etc.

Other practices should be generalized, such as

- ban on or control of bushfire,
- green fertilizer,
- tedding and ensilage with simple methods, accompanied by differed grazing ground,
- fire break networks in pastoral zones,
- solar drying for the conservation of agricultural products (fish, fruits, vegetables, meat) etc.

3. <u>In the area of energy and ligneous plants</u>

Ligneous plants comprise trees, shrubs and sub-shrubs.

The largest part of primary energy consumed in the subregion comes from wood which constitutes with its derivatives (charcoal) the major domestic energy.

Meeting the demand therefore becomes more and more difficult on account of the regression of settlements and also because some countries of the subregion consume almost 6 times more than the growth of their forests. Energy demand for all uses remains one of the major sources of environmental degradation in the subregion.

a) if it is acknowledged that the per capita annual consumption of firewood is about $1m^3$ and the average

production is 0.5m^3 ha/annum with big variations from North (0.1m^3) to south (10m^3), theoretically and schematically, each citizen must plant on the average 200 trees per annum for 5 years for his own consumption. We know farmers who plant more than that, for example the late "black farmer" in Southern Mali, and we are convinced that a large number of people would be prepared to do so if they had the assurance to find the plants and if they were sure that the planted trees belonged to them. Intensive reafforestation is the best solution to resolve the energy problem and one of us (BAUMER, 1987) presented the modified and reviewed results which GORSE (1984) had published. Each village, each town should establish in a few years and at reasonable interval (in order to cut down on the transportation cost of wood) a reserved plantation primarily to meet its own firewood and charcoal requirements. For the initial phase which may come to a close at the end of December 1994, one can set as objective the plantation of twenty (20) trees per inhabitant during the first year, then double this number in the second year, and continue to increase it;

b) The planting of ligneous trees by farmers should be stepped up. Steps should be taken to ensure that the number of trees and shrubs exceeds each year the number of trees cut down, and then reaches at least double that number.

The seeds needed for the plantations can be collected on the spot by farmers and especially by school children. All one has to do is to prepare the teachers for it. The seeds can also be provided, just like small material (small bags, strings, watering cans, labels, pick axes, spades, shovels) as part of a vast town or village twinning operation between West Africa and Western Europe.

Later, high quality seeds from known sources can be used as soon as they are available from recognized centres (like the one established by ICRAF for agroforestry seeds).

The techniques to be applied would be those of agroforestry referred to earlier, but also others like village tree planting for the production of firewood and/or browse, in which could be introduced some late-growth precious species which will constitute a great investment in the future.

c) Another way of increasing available domestic energy without diminishing natural resources is to combat the straying of animals as does Burkina Faso as part of the implementation of its three commitments namely fight against the straying of animals, bushfire control and control of inordinate cutting down of trees, which brings about a stabilization of animals and easy fabrication of manure which, formed in an easy construction digester, can produce gas and compost. Of course, there is a psychological difficulty in convincing people to use this biogas for cooking food but there is no harm in trying, as has been demonstrated in China and India.

d) The national campaigns for the dissemination, utilization and repair of improved ovens should be strengthened. In the Sahel alone, the general use of improved ovens should make it possible to economize fuel (BAUMER, 1987; GORSE, 1984). The NGOs can play an important role in this regard.

e) The combined approach, viz large scale reafforestation for purposes of getting enough firewood and intensive use of improved ovens is more promising than any other approach. This does not however preclude the use of other sources of energy:

- though difficult to popularize and subjected to price variations which sometimes render exorbitant the subsidies that governments must provide, the popularization of gas stoves and small gas cylinders has been tried in some countries (Côte d'Ivoire, Nigeria, etc.) but without great success;

- solar energy whose development is hampered by poor research organization and control of oil companies could be used on a larger scale; cookers manufactured at the Central Arid Zones Research Institute (CAZRI) at Jodhpur in India could be adapted in certain cases;

- the use of peat and lignite,in so far as it does not lead to adverse ecological consequences, is sometimes possible;

f) Medicinal flora resources should not be neglected. The research works carried out at the "Institut African et malagache de plantes médicinales et pharmaceutiques" in Abidjan and in Nouakchott should be encouraged. The example of what has been done in Madagascar should be pursued, where significant budgetary savings were made through the manufacture of basic medicines with a small number of indigenous plants.

g) Mobilize the population gradually and at national level in the fight against bushfire.

h) Develop national networks of protected areas, national parks and reserves;

i) Whenever possible, entrust to the local populations, under the supervision of the Forestry Service, the

management of their forests, by involving them first and foremost in the preparation and review of development plans;

j) Reexamine critically and from the point of view of economic profitability reafforestation plans, particularly with regard to treated areas and the species used.

4. **In the area of animals**

Under the effect of the recent exceptional droughts which made available fodder scarce, and of the rise in sedentarization due to the progression of agriculture towards arid zones, domestic animals are going through a change: after having been decimated in the 70s and, above all, after a large number of them have passed from the hands of nomads to those of civil servants and some rich sedentary people, the animals themselves have become more sedentary. The gradual disappearance of nomadism is regrettable, especially if this goes, as in some cases, as far as the establishment of compulsory ranches like the Group Ranches in Kenya. Nomadism is indeed the most rational means of deriving profit from vast arid lands. Some advantages can be derived from sedentarization:

a) The first is an easier control of animals which should make it possible in a few years to adapt the cattle units better to the resources and adopt a flexible and time-serving breeding as advocated by SANDFORD;

b) Sedentarization also makes it possible to eliminate the straying of animals, which is at variance with modern agriculture, ensure a better collection of the faeces and to make manure therefrom, and even biogas and compost. The major impediment to a better organized animal husbandry everywhere is the shortage of fodder during the

dry months. Many recommendations were made, especially regarding a better utilization of agricultural by-products, and a multiplication of fodder ligneous plants on grazing grounds, because they are the source of fodder and above all of protein, the most important and sometimes only source during the dry season. Errors like those committed in 1973 by some Sahelian countries which continued to export oil cakes to Europe while their animals were dying of hunger should be avoided at all cost. However, the multiplication of fodder ligneous plants presupposes their protection and maintenance for several years, which is often not easy;

c) This is why we recommend, as a first phase of activity, an operation which is easier to control, namely tedding and above all ensilage, using simple methods within the reach of all farmers.

Tedding was tried in the 30s at Bambey (Senegal), then at Sotuba in Mali and at Fort-Lamy (now N'Djamena) around 1950. One of us rediscovered it an introduced it with lasting success in the Sudan way back in 1957, by simplifying the methods so as to make them accessible to all. Three types of silos were successfully made: the simple hole ("pit solo"), trench-silo and, in soils likely to be humid, the two parallel walls made up of dry mud bricks. The cutting is done manually. The best instrument is the scythe which one should learn to make locally (which is not easy, though) and to handle. The grass is cut with cutlass or scythe and loaded into the silos. With the trench-silo, it is sometimes possible to use a truck which enters the trench by one end, discharge the grass and come out by the other end, by compressing the ensilage. Big handfuls of earth salt are added each time a 50 cm layer of grass is loaded. After the ensilage is well compressed, it is covered with mats which is

in turn covered with earth. This ensilage can be conserved without much losses for two years. One should not lose sight of the fact that in order to make a good and simple ensilage, great care must be taken, more so as the zone is humid. One should also not lose sight of the fact it will take some time before the animals get used to the ensilage.

d) The development of agriculture should be undertaken with all the necessary care as that will enable African countries to meet their sugar requirements and gradually secure a share of the international market which is bigger than theirs. More importantly, care should be taken not to let the species of domestic bee be contaminated by virulent wild races. The conditions necessary for agriculture include:

- availability of water throughout the year,

- availability of food (which a few well selected trees per hive can satisfy or increase considerably the possible duration of foddering: that is what is called apisylviculture),

- minimum knowledge and practice.

2. AT SUBREGIONAL LEVEL

A. <u>In the area of water</u>

It is recommended that governments of member States undertake the following actions:

a) study, adopt and impose at subregional level effective methods for recycling water, for combating the pollution of surface waters, underground waters, rain waters,

salination, evaporation and for slowing down the propagation of hydrous diseases. It would be desirable that directives should be given to the effect that:

- motor vehicles should never be washed in streams or their proximity;

- river beds should never be used as a dumping grounds;

- toilets have at least a cesspool and a cover, and

- should never be located near water holes.

Mention should also be made here of the standards that should as quickly as possible be set for the processing of household refuse, by-products and organic wastes (such as offal). Different sophisticated techniques exist, which make it possible, not only to avoid the inconveniences caused by refuse (sight, smell, human and animal health, etc.) but also to use them to productive ends; composting is one such technique, which requires little water; the processing of refuse by worms is another, one of the recent techniques, which make it possible to have an excellent compost. The manufacture of biogas is now a well developed method which presents only psychological difficulties, especially as to the acceptance or rejection of the use of refuse gas (including human excrements) to cook food.

b) Promote the establishment at subregional level of standards and regulations relating to the processing of waters, as well as the use of chemical products in agriculture, particularly pesticides, herbicides and chemical fertilizers resulting in water pollution.

Among these standards, those concerning the purification of water using very simple methods should be given top priority; to the traditional methods of clarification (EL AZHARI) can be added to those used in Viet Nam during the independence war; exposition of thin layers to the sun, water thrashing etc.

2. In the area of soil

It is recommended that the following actions be undertaken at subregional level:

- Organize periodically at subregional level trade fairs and agricultural competitions during which prizes will be awarded, using as criterion the degree of agri-sylvi-pastoral integration of farms or villages and successful concrete measures taken to effectively combat desertification;

- Attain food self-sufficiency and security by improving agricultural and pastoral productivity, especially through water control, land security and distribution of production inputs (fertilizers, fungicide, selected and improved seeds), as well as diversifying production, promoting local consumption and intensifying rain farming, particularly through the improvement of farming techniques, including the introduction of agroforestry.

3. In the area of energy and ligneous plants

National policies in the energy sector aim at limiting the consumption of charcoal and its replacement by new and renewable sources of energy, in order to strengthen the protection of the environment and reduce the danger hanging over tropical forests.

The following actions are recommended:

a) Help member countries to formulate and implement national energy policies aimed among other things at creating conditions for a diversification of energy sources, replacing as much as possible imported sources of energy by local sources (peat, hydro-electricity, lignite etc.) when that can be done with no damage to the environment, and limiting energy consumption produced from biomas, while developing new and renewable sources of energy;

(b) Map out a subregional energy strategy based among other things on national energy policies and programmes;

(c) Make a better use at sub regional level of the energy network of the Conference of African Ministers of Environment;

(d) Take in co-operation with the States of the subregion measures to regulate the use of fires and initiate subregional actions to combat bushfires;

(e) Researches on the enrichment of natural forests with precious species, especially in the humid zone, should be developed and the findings applied; otherwise most of the precious psecies which make or have made the wealth of coastal countries will completely disappear from the market in a few years. Even if a massive effort of reconstitution is done now, it will take several decades before it can bear fruit. Each country should draw on the recommendations of the International Tropical Wood Organization (ITWO) to prepare immediately the list of the precious pecies it wants to save and begin to replant these species and maintain them;

(f) Seriously protect the species appearing on the list of protected species;

(g) Populations living near National Parks and Reserves of any kind should be immediately associated and involved financially in their operation.

4. In the area of animals

At the subregional level, the most urgent questions to be resolved concern transhumance and the formulatin of transnational projects. The following actions are recommended:

(a) Consolidate reginal cooperatin with regard to the organization and regulation of transhumance in member countries and endeavour to have a greater mastery over transborder transhumance through the organization, development and equipment of crossing or reception zones, within the framework of conventions aand agreements to be negotiated among the ECOWAS countries concerned with this phenomenon;

(b) Encourage the establishment and development at subregional level of protected area networks, transborder national parks and reserves, and place special emphasis on the protection of animals in relation to tourism development (eco-tourism).

In the case of Reserves (fauna and flora) or National Parks established along a border, effort should be made to arrive at an agreement with the transborder country so that it applies a consistent if not similar regulation.

Furthermore, these Reserves or Parks situated at the borders are established because they are far from the capital and from any control, and often in less populated or active regions. There is therefore no need to press for their establishment.

C.2. MEDIUM TERM ACTIONS

The medium term actions are those actions which it will take about five years to execute.

The implementation of some of them can begin at the same time as those programmed for the short term and continue over a longer period. We are here referring more particularly to actions pertaining to census, inventory, planning etc. At the end of the medium term period, evaluation studies should be conducted both at national and subregional levels, with a view to ascertaining the degree of implementation of the Master Plan and the results achieved.

The actions to be implemented in the medium term are as follows:

1. AT NATIONAL LEVEL

(a) Formulate a long-term coherent water policy to deal with the consequences of drought on the nutrition of man, cattle and on agricultural production, thus ensuring total control over water, by working particularly towards the reconstitution of the water tables;

(b) Find ways and means of retaining and storing part of the running waters, river and underground waters, by using surface reservoirs and underground hydrographic basins;

(c) Ensure an equitable distribution and a better use of water resources for agricultural purposes, animal husbandry and domestic use, with a view to avoiding wastage and arriving at a rational management of water resources;

(d) In the dry zones, "hafirs" or water collection basins could be multiplied to collect and conserve rain water. In some cases, these reservoirs could be fitted with devices to reduce evaporation, like cellular walls similar to the "amphoras" of the roman tank of Carthage. In order to avoid their rapid degradation, the "hafirs" will be a watering-trough located outside the fence.

(e) On water tables, reduce evaporation through methods that do not preclude pisciculture; in Burkina Faso (BF, 1991) it is estimated that 2/3 of the waters retained by dams would evaporate.

2. Soils

The ultimate objective of the Master Plan for combating desertification in the agricultural sector is to increase, within reasonable ecological limits, land productivity in order to improve the quality of like fo the populations, their living standards, as well as enabling them to meet their basic needs. The medium term actions recommended at national level are as follows:

(a) Make an inventory of degraded zones, by determining the causes, the degree of urgency and the cost of the necessary inventories;

(b) Encourage various forms of village co-operatives; entrust them with responsibilities and support any actions they have initiated within the framework of rural development;

(c) Facilitate agriculture/animal husbandry integration and incorporate systematically forestry component in agricultural projects (agri-sylviculture), in breeding projects (sylvi-pastoralism) and in combined projects (agri-sylvi-pastoralism) by using among other things nitrogen fixing species.

3. **Energy and ligneous plants**

Actions recommended in the short term with the aim of limiting the consumption of energy produced from biomas, while diversifying the sources of energy, should be pursued in the medium term at national level and should aim at:

(a) developing and promoting energy saving programmes and the use of alternative sources of energy and popularizing them on a large scale through publicity campagns among urban and rural populations;

(b) popularizing improved ovens and intensifying their manufacture in order to reduce the consumption of firewood, while stepping up afforestatin efforts.

in order to prevent forest degradation and the loss of their genetic diversity, as well as promoting an integrated development of other forest resources, it is recommended to:

(c) ensure the conservation of the ecosystems and genetic resources by maintaining the protected zones within a wider context of a land utilization plan and by involving the populations;

(d) integrate forestry in national development, strengthen the national institutions responsible for the

implementation of forest policies and management of forestry programmes.

4. Animals

The degradation of the pastoral environment is due among other things to overgrazing, soil compaction by cattle, particularly around water holes, excessive use by breeders of shrubby species for varius ends, bushfires, land clearing, excessive lopping and the current mode of managing herds. It is recommended that governments undertake the following medium term actions:

(a) stamp out the straying of animals;

(b) improve the methods and techniques of utilizatin of grazing grounds and management of herds;

(c) promote the use of agro-industrial by-products in animal feed, improve watering conditions by increasing the number of water holes, protect grazing grounds against bushfires;

(d) maintain the animal population at a level compatible with available pastoral resources and undertake actions towards the regeneration of degraded ranges.

2. AT SUBREGIONAL LEVEL

1. Water

At the subregional level, it is necessary to give particular attention to the management of common hydraulic resources, ensure the co-ordinatin and harmonization of hyudraulic studies and envisage the formulation of a regional water planning strategy. It is recommended to the governments to:

(a) Compile a subregional quantitative and qualitative inventory of water resources of the subregion, underground as well as surface, and the possibilities of their use (Salinity, PH, renewal speed) so as to know the resource, monitor its evolution and take account thereof in national development determine the evolution of the underground water tables (which fall by 0.5 m per annum in Burkina Faso, resulting in the drying of rivers); charge an existing subregional institution to conduct these studies; ECOWAS programme provides for the establishment of a water resource map;

(b) ensure a good use and joint rational management of common hydraulic resources, including the river and lake basins that transcend national boudaries, by paying special attention to areas where water supply is threatened from the point of view of quality, quantity and availability, and, if necessary, by establishing inter-State agreements; revitalize, under the auspices of ECOWAS, inter-state groupings of the subregion dealing with catchment areas, like the OMVS or "the Association pour le bassin du fleuve Niger" and implement the recommendations within their framework; encourage contacts betwen inter-state groupings;

(c) Map out a subregional water resources planning utilizatin and management strategy leading to the preparation of a Subregional Water Master Plan.

2. Soils

In the medium term, governments of member States should take measures at subregional level to improve the storing of grains, develop the meteorological infrastructure and regulate the use of dangerous chemical products in agriculture.

The following actions should be implemented:

(a) increase food self-sufficiency at national and subregional level by improving among other things the storage facilities and the distribution of grains;

(b) develop jointly the meteorological infrastructure particularly by regionalizing and strengthening the agro-meteorological centres (the Niamey-based Agrhymet Centre should be strengthened and developed to serve the needs of all the countries of the subregion).

(c) formulate an inter-state regulation concerning the management of dangerous chemical products destined for agricultural purposes, their importation, their movement and their use in member States.

3. <u>Energy and ligneous plants</u>

Governments should constantly attach importance to the activities of research/development institutes existing in the subregion and ensure a judicious utilization of energy products in the subregion.

It is recommended to:

(a) conclude special agreements relating to the establishment of networks for the manufacture, exchange and joint use of energy products in the subregion and among States;

(b) make an inventory of energy research/development institutes existing in the subregion and establish a division of labour among these institutes;

(c) strengthen the resources of research institutions located in the subregion and introduce a system of division of labour in order to make a better use of them, and establish ties of co-operation with other research institutions outside the subregion;

(d) harmonize forestry legislations at subregional level and develop a more active participation of the populations concerned.

4. Animals

It is recommended to adopt a subreginal approach, according to ecological zone, in order to resolve problems relating to animal husbandry development.

The following action is proposed:

- promote and arouse the participation of breeders in the establishment and management of water holes, while ensuring the preservation of ecological balance and creation of sanitary facilities, based on a subreginal approach and according to ecological zone.

C.3 LONG TERM ACTIONS

The resolution of desertification problems is a long term initiative, with the implementation of transnational programme. Indeed, it is a phenomenon that transcends the political boundaries of States and continues to spread to the countries of the subregion.

It is therefore necessary, within the context of the solutions to be envisaged, to adopt pluri-annual planning methods which take due account of long-term programmes, policies and strategies.

The following actions are proposed:

1. AT NATIONAL LEVEL

1. Water

(a) Pursue the hydrological and hydrogeological studies for a better knowledge of the resources and, in this regard, complete the inventory of water resources, know their potentialities and constitute a bank data;

(b) Implement integrated projects for the development of catachment areas (anti-erosive actions, reafforestation, dams).

2. Soils

(a) Prepare a national development master plan spelling out the various actions to be carried out to develop the potentialities of the different national regions, based on joint land management, education, training, sensitization, participation and research programmes.

(b) Ensure agri-sylvi-pastroal balance in the formulatin and impelementation of rural development programmes and take measures to stop the degradation of agricultural lands.

(c) Intensify research/development, particularly with regard to drought-resistant and high yield species.

3. Energy and ligneous plans

- Help member countries to put in place national programmes for the production of firewood and dendro-energy,

reafforestation of forest and agro-forestry parcels, by using fast growing and nitrogen fixing forest species, and securing the participation of the population, especially women and the youth;

- Launch national programmes aimed at promoting substitution energy sources such as solar energy, oil energy, geothermal energy, biogas, etc;

- Pursue the identification, delimitation and classification of national parks and reserves and natural zones having a great scientific, cultural and tourist importance;

- Natural forestry planning by developing planning and sylvicultural systems and bring the populations to gradually take control of all the planning mechanisms;

- Regenerate degraded forests and plant drought-resistant forest species.

4. <u>Animals</u>

(a) Help the breeders by improving their living conditions and encouraging diversification of their activities through the development of handicrafts, tourism etc., in order to increase their revenues;

(b) Prepare a dynamic cartography of natural ranges for the future drawing up of pastoral development plans.

2. AT SUBREGIONAL LEVEL

1. Water

(a) Ensure a better utilization and rational management of the water resources of the subregion in order to statisfy human, agricultural and catle needs, within the context of the socio-economic development of the countries of the subregion;

(b) For all the lakes and rivers flowing across several countries, establish among these countries a convention on the common use of the waters; it is possible to draw on the international convention on the sharing of the Nile waters;

(c) For the multinational catchment areas or of subregional importance, stimulate and co-ordinate joint development actions.

2. Soils

(a) Ensure the follow-up and evaluation of the desertification situation through constant monitoring of pastroal agricultural ecosystems, at national and subregional levels;

(b) Help to integrate desertification cxontrol programmes, plans and strategies in environment action plans as well as in national economic and social development plans.

3. Energy and ligneous plants

Update the inventory of energy research/developoment institutes existing in the sburegion, conduct researches on fuel

saving, the use of substitution energy and ensure the energy transition while promoting subregional and international co-operation. Study the possibility of harmonizing the national green belts with a view to an inter-State integration of these networks which would be linked up to constitute a subregional green belt.

4. **Animals**

(a) Ensure agriculture/animal husbandry integration while industrializing production conditions, through the creation of fattening ranches and sedentirization of the cattle;

(b) Cause research centres, institutes and universities of the subregion to study the varieties of precocious fodder plants, drought-resistant and high yield plants, and ensure their popularization in the countries of the subregion.

II. STRATEGY FOR THE IMPELEMENTATION OF THE MASTER PLAN FOR COMBATING DESERTIFICATION

The proposed Master Plan for Combating Desertification which envisages the co-ordination of priority programmes planned in the States of the subregion and in the major sectors identified requires, if it is to properly implemented, a strategy including six major measures which should be adopted by both ECOWAS authorities and governments of member States. These measures are as follows:

1. **Political declaration**

Within the context of the Charter of the Organization of African Unity (OAU) which advocates integration, co-operation and independence of African countries, and also within the framework of

treaties establishing subregional African econmic groupings, particularly the Treaty establishing the African Economic Community which was signed in Abuja (Nigeria) in June 1991, there is need for a high level political decision (at the level of Heads of State) to inform the International Community, the donors, the populations and the countries of NGOs of the adoption by ECOWAS member countries of a subregional Master Plan for Combating Desertification.

This declaration, which should be followed by an information campaign at international, regional, subregional and national levels, would make it possible to inform the International Community about the existence of the Master Plan and at the same time popularize its objectives, programmes, projects and strategy.

On the international and regional plane, the campaign should include at least:

- a declaration at the United Nations General Assembly;
- a declaration at the Governing Councils or Executive Boards of UNDP, UNEP, UN ESCO and FAO;

- a declaration of the ECA Conference of Ministers;
- a declaration for the attention of National or International Donors.

At national level, the campaign should include at least:

- a declaration by the Head of State;
- a paper to be presented to the National Assembly or its equivalent;
- a press, radio and television campaign, comprising at least:

  . a statement on the Master Plan
  . a statement on each of the priority areas retained

- a statement on each of the following areas: research, information, training, agro-industries.

2. Restructuring of ECOWAS

In order to have the necessary technical resources to implement the Master Plan, it is of primary importance that ECOWAS should be reorganized and restructured. The Natural Resources Division should be strengthened in terms of senior officers (mainly consultants) and logistic resources and should focus its activities on desertification control and management of natural resources. This Division once strengthened, restructured and endowed with additional resources, should be able to:

(i) co-ordinate the various actions relating to the implementation of the Master Plan;

(ii) ensure the follow-up of the implementation of the Plan in Member States;

(iii) make a periodic evaluation of the implementation of the Plan in Member States.

It should be relayed at the level of the Sudano-Sahelian Zone by the Inter-State Committee on Drought Control in the Sahel (CILSS) whose role could be, among other things, to monitor the effective implementation of the Master Plan in CILSS member States.

In the coastal countries of the humid zone, there is no relay structure comparable to CILSS to ensure the monitoring of the implementation of the Master Plan in this part of the subregion.

The Executive Secretariat of ECOWAS as a body responsible for the economic integration of the subregion must play a catalytic role in the effective implementation of the proposed Master Plan in

co-operation with the Member States, the intergovernmental and non-governmental organizations of the subregion, donors, co-operation agencies as well as the organizations of the United Nations System.

In order to play this role with the desired efficiency, the establishment of a high level subregional advisory body could be proposed, with the task of reconciling the various view points and defining the possible ways and means of:

- co-ordinating the various actions and harmonizing the existing plans and stratebgies both at the level of the States and of international organizations;

- organizing annual meetings to ensure the monitoring of the implementation of the proposed Master Plan in Member States (as well as periodic evaluation of its implementation).

Where possible, an ECOWAS Council of Ministers in charge of Environment, Conservation of Nature, planning and co-operation can be convened each year to review the implementation of the Master Plan and take the necessary measures and decisions to ensure an effective implementation of the Master Plan.

3. Strengthening of subregional institutions

In order to ensure an effective transnational co-operation, there is an imperative need to strengthen subregional integration institutions, as well as introducing a logical and realistic division of labour among these institutions. The role, objective and functions of subregional institutions should be reviewed within the context of integration, inter-agency co-operation and a division of labour among these agencies.

It would be necessary to make an inventory of all study, research and training institutions existing in ECOWAS Member States with the aim of ensuring an effective co-ordination and utilization, avoiding under-utilization, duplication or anarchy, and strengthening those whose role would be deemed vital. For example it would be too costly and irrational for each member State to envisage the establishment of a permanent natural resources control and monitoring system, or remote sensing and satellite receiving centres. It would be more realistic and advisable to make use of the existing centres in the subregion and introduce a division of labour among these centres.

Regarding transnational co-operation in the area of subregional programmes, it would be necessary to draw up a list of priority programmes in all the sectors defined in the Master Plan. Mention could be made of the few following areas in which subregional projects should be defined : trans-humance and management of grazing grounds, national parks and transnational reserves, fight against coastal erosion in the countries of the Gulf of Benin, protection of coastal ecosystems against pollution and harmful effects (for example: invasion of subregional hydraulic plans by water hyacinth etc.), protection of sea-cows which are very fond of water hyacinth in coastal lagoons.

4. Increase the involvement of decision-makers

As part of the implementation of the Master Plan, there is need for greater awareness building and an effective involvement of decison-makers in the integration of anti-erosion desertification measures in the social and economic development plans and programmes. The decision-makers in question comprise all persons invested with decision power within the Administrations dealing with desertification control and management of natural resources, namely the Minister and Directors of Departments responsible for Environment, Rural Development, Natural Resources, Planning, etc.

In order to involve thse high-ranking officials, it is necessary to organize sensitizatin seminars for them, during which papers will be presented on themes relating to the importance of desertification control and rational management of natural resources. After they have become very much aware of the negative effects of poor management of natural resources and the adverse consequences of desertification in countries with vulnerable ecosystems, they will be more inclined to measure the importance of these issues and therefore more motivated to integrate them in social and economic development plans and programmes. It would be most desirable that in all training, education, sensitization and participation in projects funded by external assistance, particularly the "Programme d'appui à la communication et à l'informatin pour l'environnement" (PACIPE) financed by the Commission of European Communities (CEC), a chapter be reserved for the target group made up of decision-makers (Heads of ministerial departments and high ranking officials).

5. Strategy for greater involvement of NGOs

It was observed that there are on the average about one hundred NGOs in each of the countries of the subregions, some of which have sometimes one thousand members. In order to restore the credibility of the NGOs and give them a new impetus, governments of Member States should take the following measures:

(i) Embark on a reorganization and restructuring of the NGOs aimed at eliminating those with no tangible results and which do not show adequate efficiency and dyanmism in their operations. The number of NGOs per country should be reduced sgnificantly and only those which are effective and produce good results should be retained;

(ii) In the same vein, the terms and conditins for establishing NGO, should be reviewed and made more

restrictive, thereby avoiding the creation of ineffective NGOs. Serious applicatins should be required from applicants and the Committee charged to vet these applications should be very strict in its selection;

(iii) In order to induce the NGOs to embark on the reorganization and restructuring exercise, the State should recognize, and above all reward those that have attained concrete results, worked out or evolved original techniques to combat desertification. The positive results achieved by some NGOs should not go unoticed or be marginalized. They should be recognized, disseminated, valued and rewarded by the Administrative Authorities. Indeed, in some countries of the subregion, some Governments organize functions to reward the best agricultural, breeders or crafts co-operatives. In that same vein, the State should reward NGOs which have attained tangible results or evolved a new technology that helps to combat desertification and ensure the management of natural resources. In so doing, the NGOs would bemore motivated and would get more involved in desertification control and natural resources management activities. Besides, their creativity would be further endhanced;

(iv) Generally, the activities of the NGOs do not seem to be well co-ordinated with those of administrative technical services, nor integrated in a global programme. Though jealous of their independence, the NGOs themselves should try and get more involved in the activities provided for in the various plans prepared by the Central Administration. Thus, in each desertification control and natural resources management plan (National Plan for Combating Desertification (NPCD), Tropical Forest Action Plan (TFAP), National Environment Action Plan (NEAP)

etc., a chapter defining the activities to be entrusted to NGOs should be provided for. The NGOs for their part should accept to get integrated in the programmes drawn up by the State instead of going it alone and acting according to their own agenda. A partnership contract should be negotiated and signed with the Administrative Authorities. In order to ensure better integration, it would be desirable to appoint within the Central Administration (at the level of the Ministry responsible for Environment Matters for example) a co-ordinator of NGOs engaged in desertification control activities, who would serve as a link between the Administration and the NGOs.

(v) For purposes of exchange of experiences, results and know-how, as well as popularization of technological innovations in the subregion, it would be desirable that NGOs engaged in desertification control activities in ECOWAS States meet from time to time. In this connection, a Subregional Federation of NGOs working in ECOWAS Member States could be encouraged to organize annual consultative, information and co-ordination meetings to be attended by representatives of National Federations;

(vi) Particular atention should be given to International NGOs established in some ECOWAS countries. Indeed, experience has shown that some of the NGOs, outside their declared intention to help African developing countries, engage in activities that have nothing to do with their official mission.

It is therefore important to control the international NGOs and ensure, whenever possible, that their activities are in cnformity with the mandate and status granted them.

Before authorizing these NGOs to operate in the countries, serious preliminary enquiries should be conducted in order to have all the necessary information about them.

6. Increase the involvement of basic operators

The participation of the populations in the preparation and implementatin of desertification control and natural resources management plans is vital for almost all the plans drawn up in the subregion by the technical departments of the Ministries concerned, even if the specific modalities of such participation are not always clearly defined.

Indeed, since the emergence of some degree of awareness of the importance of environment among a growing portion of the urban and rural population, the general public, women and youth associations which were sensitized by the activities of the media, the NGOs and the Governments, there is a growing need for an effective participation of these groups. Such participation is however inadequate and theoritical.

The participation should begin with the elimination of programmes of activity which the population does not consider as likely to help it resolve its own problems as it sees them (and not as seen by the administrators or technicians). Unfortunately, the degree of information and sensitization of the populations is still inadequate and uneven: for example in some countries, there is only a minority of farmers who understands that soil erosion is a serious probhlem. Consequently, it will be necessary that some areas of activity should in the meantime be imposed on or at least "whispered" to the populations concerned.

The implementatin of a strategy for a greater involvement and particpation of basic operators in desertification control projects and programmes requires first and foremost the definition of the

concept of basic operators. Depending on the circumstances, this category of citizens can be constituted by the associations of women, rural youth, workers, farmers, cattle breeders, craftsmen, or by village co-operatives, rural communities, scout associations, youth clubs, etc., or simply by individuals recognzied as family heads, eminent persons, religious leaders, griots, school teachers etc. Once identified, these operators should constitute target groups to be reached with well defined popularization themes.

The strategy for greater involvement and active participation of basic operators identified according to target groups in desertification control projects and programmes can be done in three stages according to the following modalities:

1st stage : training of trainers

This training can be done, depending on the themes, through seminars, courses, information sessions, chatty lectures concerning target groups made up of various working groups in the field, namely zone leaders, basic administrative agents, teachers, instructors, group leaders, extension officers and "basic operators". For each training or subject, efforts should be made to:

- avoid that more than half of the trainers are made up of Government officials;

- ensure that the largest number possible of the categories of "basic operators" participate in the training course;

- seize these opportunities to encourage or even organize several contacts between the categories on the one hand, and between them and Government officials, on the other.

The major themes of these training programmes may relate to types of concerns reflecting the project activities in the field:

(i) simple technical themes (e.g. nurseries production thechniques, anti-erosive dyke or banquette construction techniques, etc.);

(ii) sensitization and animation methods and techniques.

2nd stage : training of selected basic operators

Once trained, the trainers will have to impart the knowledge they have acquired to larger target groups of farmers, cattle breeders, forest growers or craftsmen selected from within their environment and open to innovations.

3rd stage : training of basic operators

Sensitization and animation sessions could be oroganized for other operators participating in the implementation of desertification control projects and programmes. These sessions should involve directly the populations concerned by for example making them observe and describe the degradation of their own environment, find the causes of the degradation and formulate specific solutions to be applied to resolve the problem, in conjunction with instructors, technical services or project leaders.

One of the most delicate responsibilities of the selected "basic operators" and officers who have participated in the first and second stages will be to bring the populations to select and apply, from among the solutions they themselves have proposed, those that tally with the activities provided for in the Master Plan. This should be possible by adopting the D and D method (diagnosis and design method) worked out by ICRAF to make farmers

participate in the preparation and implementation of agrofrestry research programmes, or the GRAAF method. Drawing on this method, it should be possible in each small agricultural region or "land" to draw up a list of environmental problems facing the populations, prepare a list of possible theoretical solutions for each problem in each community and, based on feasibility and profitability criteria, select from among these solutions, those already put forward in the proposed Master Plan.

The three phases, viz description of the degradation, search for the causes and suggestion of solutins should each be accompanied by an audio-visual support made up of photographs, slides or films showing clearly the phenomena described. Thus, specific themes could be projected regarding for instance bushfires, improved ovens, planting of trees, bunds for retaining water etc. The advantage of this participative method lies in the fact that it will ensure the direct involvement of basic operators and help avoid the monologues of technicians who often practise a "one track" communication.

In other words, the participative method described above establishes permanent dialogue with the operators. Such dialogue, as well as the recourse to traditional techniques will increase considerably. The method enables the operators to be responsible in the choice of technical solutions to be applied, to participate actively in the search for solutions, to discuss by exchanging views and to feel personally concerned.

Thus, there is need to incorporate in each desertification control project or programme a "training/sensitization component using participative animation techniques, in order to ensure greater involvement and participation of operators.

Since dialogue between trainers and operators is done in local languages, there will be need for a functional teaching of these languages.

IV. CONCLUSION

Desertification is a complex and alarming phenomeneon, no matter the definition one may accept. Chapter 12 of Agenda 21 (UNCED, 1992) relates all the activities recommended by UNCED to combat desertification. The consultants endorse these recommendations. They nevertheless fear that the International Convention on Desertification Control scheduled for June 1994 may be a mere reproduction of UNCOD recommendations and risks not having any effect because it is very wide in scope, covering a vast area and not having a priori enough resources. In this report, the consultants have tried to express their views on the major points submitted to them:

- they could visit only 9 of 16 countries concerned and were able to acquaint themselves with only a small portion of the projects underway, implemented or envisaged. Consequently, they were only able to prepare a proposed Master Plan which should be submitted to the States for approval;

- they do not think - at least under the present circumstances - that a Master Plan can render more effective the existing large number of strategies, programmes and plans;

- Nevertheless, they feel that the Master Plan could take off, and they recommend to the populations concerned a small number of simple actions, and to the governments concerned a review of the present strategies, plans and programmes with the help of ECOWAS; the implementation of

the proposed activities within a time frame of two (2) to four (4) years would be a test for the countries concerned as well as their regional and subregional organizations as to their ability to master the Master Plan.

A 1st phase is proposed, which will comprise:

- at the level of governments: a reappraisal of all current strategies, policies, plans and programmes;

- at the level of citizens: simple and less costly objectives in the area of water, hydrous erosion control, dendro-energy and animals.

This report has tried to assess the strategies, policies, plans and programmes being prepared or implemented in the States of the ECOWAS subregion. It is neither exhaustive nor final.

It could not be exhaustive in so far as the number of months - 8 man/month allocated to the three consultants (on the average 3 months 10 days per consultant) was not enough to undertake missions to the sixteen ECOWAS countries, go through the voluminous documentation available and draft a comprehensive report.

However, this report has gone beyond the simple indentification of the concerns and priorities of each country. It tries to supplement these national concerns and priorities by proposing complementary short and medium term actions in the sectors considered as priority sectors at national and subregional levels, which would constitute a beginning of the Master Plan.

It is not final because it is a project meant to be discussed, possibly amended, approved and later adopted on the basis of procedures to be agreed upon.

Part one of the proposed Master Plan tried to present a brief analysis of plans, strategies, policies and programmes for combating desertification/natural resources management, without evaluating them.

Indeed, in almost all the ECOWAS States we visited, we observed that even though there is a plethora of plans, strategies and programmes, few are those which are really being implemented in the field. Most of the countries are only at the conception or implementation stage of these plans, strategies and programmes, and are looking forward to a round table of donors, programmed in almost all these countries for 1992. An assessment of the results achieved in the field was therefore not possible at this stage.

Furthermore, it was noted that there is great similarity in, and in some cases, duplication of these various types of plans and strategies exiting in the countries. There is need for harmonization, or even the need to adopt a type of strategy or plan that encompasses all the programmes envisaged.

Part two of the report devoted to the Master Plan proposes a strategy for the implementation of the project, which could include among other things the strengthening of ECOWAS, which will make the latter well-equipped to oversee the implementation of the Master Plan and ensure the co-ordination of the various activities.

The work of the consultant has been made easier, particularly by the personnel of UNEP (D.C/PAC), ECA, ECOWAS, FAO, and of other organizations of the United Nations system.

Once more, we say a big thank you to all of them.

"ANNEXES"

ANNEX 1

List of persons met.

ECA

Adebayo Adedeji, Former Executive Secretary
L. Sangare, Chief, Economic Cooperation Office
L. Tandap, Chief, Environment Unit
Lynne Wallis
Pierre Adama Traore, Chief, Mineral Resources Unit
N.D. Blayo, Economist
Matemu Wa Mundangu, Economic Cooperation Office
Mbaye Diouf, Economic Cooperation Office

ECOWAS

K. Ouedraogo, Deputy Executive Secretary
Amadou Mangane, Head of Natural Resources Divison
Omar S. Thiaw, Coordinator of UNDP/ECOWAS project
Modibo Traore, Chief, Water and Forest Section
Robin Sawadogo, Chief, Animal Resources Section
A. Diop

UNDP

Solomon Akpata, Resident Representative in Ghana
C. Metcalf, Resident Representative in Burkina FAso
Fre-Hiwet, Resident Representative in Niger
Sylvestre Ouedraogo, Programme Officer, Burkina Faso
Andrew Francis, Chief Economist in Ghana
Bene Mpoko, Senior Programme Officer, Côte d'Ivoire
REne da Silva, Programme Officer, Benin
Kossigan K. Duho, Senior Programme Officer, Togo

Miss Cisse Aissatou, Programme Officer, Côte d'Ivoire
Tano Aka, Programme Officer, Côte d'Ivoire
B. M'Poko, Regional Assistance, Côte d'Ivoire
Bernard Lhost, Programme Officer, Côte d'Ivoire
Mme Rose-Marie Camara, UNSO Programme Officer, Guinea
Mawuena Kokouvi Oni, UNSO Programme Officer, Togo
Augustin Mandeng, UNSO Programme Officer, Burkina Faso
Diagana Moussa, UNSO Programme Officer, Mauritania
Issa Beye, UNSO Programme Officer, Senegal

FAO

Phillipe J. Mahler, Assistant Director General, Rome
Robert N'Daw, Assistant Director General, Accra
A.T. Ibrahim, Representative in Burkina Faso
M. Dia, Representative in Côte d'Ivoire
Montalembert (de), Marc Rene, FON Director
Lanly Jean Paul, FOR Director
Muthoo M.K., Fodo Director
Mathew Okai, Assistant to the Regional Representative in Accra
J.J. Meijer, Representative in Ghana
Jean Djigui Keita, Regional Forest Expert
R. Santana, Regional Soil Expert
Tadesse, Programme Officer Côte d'Ivoire
Tana Aka, Programme Officer, Côte d'Ivoire
Madhi Bamba, Programme Officer, Burkina Faso
Traore, Programme Officer, Burkina Faso
Raymaeckers, Chief, Natural Forest Development Project, Burkina Faso
Adolphe de Medeiros, Principal Assistant, Togo
Erone A.K. Wilson, Principal Assistant, Togo
Sonia Grmela, Wild Life Office, Accra

BENIN

MINISTRY OF ENVIRONMENT, HOUSING AND TOWN PLANNING

Eustache Sarre, Minister
Attoyo D. Pascal, Director of Cabinet
Henri Doutetien, Technical Adviser

ENVIRONMENT ACTION PLAN

Ogouma Assogba, Chief, EAP Unit
Gregory Minnick, UNSO Chief Technical Adviser
Dr. Maral A. Baglo, Technical Co-ordinator
Dr. Valker Jansen, Sociologist

MINISTRY OF ECONOMIC PLANNING AND RESTRUCTURING

Gomez, Director, Natural Development

MINISTRY OF RURAL DEVELOPMENT

Barthelemy Otchoum, Director, Forests and Natural Resources Department
Gamanyo, Director, Analysis and Forecast Department

WORLD BANK

Brizzi, Programme Officer

BURKINA FASO

MINISTRY OF ENVIRONMENT AND TOURISM

L.A. Mihyemba, Minister
Montoro Martin, Director General, Water and Forests Department
Boubie Y. Bazie, Director, Prevention, Pollution and Harmful Effects Department
Jean Lingani, TFAP Co-ordinator
Adama Sanogho, National Co-ordinator of NPCD/EAP
Jean Baptiste Kambou, Secretary-General
Denis Depommier, Head, CTFT Mission

MINISTRY OF PLANNING

Dabire Christophe, Director General of Co-operation

Samou Momini, Socio-Economist, Director, Land Development

MINISTRY OF RURAL DEVELOPMENT

Yili Thomas, Chief, Development Office

CILSS

Mounkaila Goumandakoye, Chief, Ecology and Environment Office

PLANNING AND DEVELOPMENT INSTITUTE

Malick Fall, Director

NGO

Florent Ouedraogo, President, "Development Volunteers"

COTE D'IVOIRE

MINISTRY OF ENVIRONMENT, CULTURE AND HOUSING

Mme Anikpo, Director of Environment, EAP Co-ordinator

Jean Nat, Deputy Director in charge of sensitization and education

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCE

Balle Pity, CTFT Director

Didier Bagnou, Director General, WAter Forests Department

Cisse Habout Dramane, Environment Protection Department

Koumane Amani Denis, Deputy Director, National Parks and Reserves

AFRICAN DEVELOPMENT BANK

Opasal, Deputy Director, Social and Environmental Policies

Tibaldeshi, Environmentalist

Oumar Aw, Forest Expert

Mme Angelique Sow, Legal Department

Bhoojedhur, Senior Environmentalist

WORLD BANK

Amos Ben Mayor, Environmentalist

John Heath, Programme Officer

EUROPEAN ECONOMIC COMMUNITY

Ralph Smith

CANADIAN AID

Michel Laverdière, Head of Mission

NGO

FAnny Inza, President "Afrique environmentaliste"

GHANA

MINISTRY OF ENVIRONMENT

J.M. François, Chief Forest Conservator

Henry H. Stennet, Agroforestry Expert

Richard Twumasi-Ankrah, Agroforestry Expert

G. Klufio, Environmental Protection Council

Roland Akyea, Forest Expert at Peduase

Afriyie Osei-Wusu, Forest Expert at Peduase

Joseph Owusu Nipah, Forest Expert at Peduase

MINISTRY OF AGRICULTURE

O.K. Gyarteng, PNDC Secretary for agriculture

E.S. Otinkorang, Deputy Director, Crops Department

P. Ouasso, Senior Technical Adviser of FAO/Italy project on mechanization

WORLD BANK

C.G. Ranade, Economist

UNIVERSITY

Dr. Attah-Omarshie, Agroforestry Expert

GUINEA

MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT

L. Coumbassa, National Director of Environment Department
Djiba Kane, Deputy National Director of Environment Department
Mohamed L. Doumbouya, Chief, Environment Department
Mme Idiatou Kamara, Chief, Environment and Information Section

MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES

Sagna Satenin, Chief, National Forests Department
Dr. A. Cherif Bah, Chief, Forestry Division
Thiero O. Diallo, Chief, Forest Development Division

MINISTRY OF PLANNING AND CO-OPERATION

Diallo M. Salou, Assistant to the National Environment Council Co-ordinator

MALI

MINISTRY OF AGRICULTURE, ANIMAL HUSBANDRY AND ENVIRONMENT

Moulage Diallo, Technical Adviser
Salif Kanoute, Deputy Director
Abou Berthe, Chief of projects and programmes
Ousmane Sangare, Game and Environmental Protection Division
Heinrich, Special Adviser to the Director General
Dr. Bouare, Chief, NPCD Section

MAURITANIA

MINISTRY OF RURAL DEVELOPMENT

Achour Ould Samba, Secretary-General
Ibrahima Thiaw, Chief, "Improved Ovens" project
Mohamed Abdallah, Chief, "Dune Fixing" project
Sall Ibrahim, Chief, Studies and Programmes Division

NGO

Mme Aissa Kane, Director, Environmental Protection Association

SENEGAL

MINISTRY OF RURAL DEVELOPMENT

Bocar Sall, Diriector, Water and Forest Department
Mme Madeleine Cisse, National CILLS Commission
Abdoulaye Kane, Chief, TFAP Section
Baba Dioum, Technical Adviser
N'Diawar Dieng, Technical Adviser
L. WAde, Technical Adviser

MINISTRY OF TOURISM AND ENVIRONMENT

Bakary Kante, Director, Environment Department
Fathe Balde, Chief, Co-ordination Division
Mme Toure FAtima Dia, Director, Agrisylvipastoral Development Project

SIERRA LEONE

N'Diaye, Director, Housing and Environment Department

TOGO

MINISTRY OF ENVIRONMENT AND TOURISM

Emoe Komla, Technical Adviser
Tengue Kodjo, TFAP Co-ordinator
O. Nadjombe, Chief, EAP Section
Akpe Lawson, Survey Dept

Annex 2

ADB funded programmes

ADB funded projects in the area of natural resources conservation are few. In West Africa, these projects include:

- in Côte d'Ivoire:

A forestry project in the savana region at SODEFOR which is reportedly being implemented neither in collaboration with the UNSO project on the study of productivity in the savanas nor with the FAO project for strengthening remote sensing activities in order to promote the development of agricultural activities, a bushfire control project;

- in Nigeria:

A forestry project; project on the use of soils with the intensification of agroclimatology; discussion of assistance to TFAP is underway;

- in Senegal:

A firebush control project;

- in Benin:

An important firebush project;

Under study are:

- in Nigeria:

Studies on forestry research and utilization of timber.

Among the indicative loans for 1993, none concerns the West African countries. There is however one that concerns Côte d'Ivoire for 1994 - the development of floating vegetation. It appears the major objective was not co-ordinated with the consevation of sea cow which is a big consumer of water hyacinth.

Annex 3

Terms of Reference

ECA/UNDP MULTISECTORAL ASSISTANCE TO ECOWAS
PROJECT RAF/88/047

Sub-title Preparation of a Master Plan for Co-ordination of Programmes for Combating Desertification/Natural Resources Management in the ECOWAS sub-region.

Objectives

1. Desertification and deforestation are the major environmental problems of the ECOWAS subregion which have seriously affected the economic viability and consequently the integration capability of the Community. The Heads of States and Governments at the ECOWAS subregion, concerned about the alarming state of the forest resources, and its consequences on the economic and social development of the people proclaimed at their conference in June 1982 "A Decade of the Afforestation: 1983-1993". In 1983, the ECOWAS Council of Ministers defined priorities concerning actions to be undertaken at the national and community levels for the implementation during that Decade. In order to alleviate the situation and to assist in enhancing the improvement of carrying

and production capacity of the ecosystems of the subregion, UNEP is in the context of the above Project RAF/88/047, under a sub-contract with ECA, undertaking a consultancy to prepare a subregional Master Plan for co-ordinating programmes for combating desertification/sustainable natural resources management. Activities envisaged to be carried out under this consultancy will include the following:

(i) up-dating natural resources status in the subregion and the assessment of its impacts in the socio-economic activities (and arif forest degradation);

(ii) establishing an inventory of, and analysing existing national and sub-regional plans and programmes for natural resources management and/or land degradation (desertification) control in the subregion;

(iii) preparing a Master Plan for co-ordinating national programmes towards achieving the ECOWAS goals for natural resources management and/or for combating desertification;

(iv) proposing strategies for implementing the above Master Plan. More specifically this undertaking will aim to assess the anti-desertification and anti-deforestation programmes implemented through various institutions in the ECOWAS countries and suggest measures to:

(a) improve and enhance transnational coopérative actions in the subregion;

(b) develop greater awareness and consequent involvement of decision-makers in the integration of desertification control/natural resources management in development programmes and national development plans;

(c) increase the involvement of grassroot operators and NGOs in the planning and implementation of desertification control/natural resources management programmes.

TERMS OF REFERENCE FOR THE CONSULTANTS TEAM

2. Within the context of the above objectives of the project and taking into account the results of preparatory governmental/intergovernmental actions of the subregion towards UNCED 1991, the members of the consultant team will carry out the following tasks:

I. **Development Economist - Team Leader**

3. Within the context of the project objectives, co-ordinate data collection and the elaboration of the draft ECOWAS Master Plan for combating desertification and deforestation in the subregion. This will involve:

(i) on the basis of selected countries, establish an inventory and analyse the impact of on-going national and subregional plans and programmes to combat desertification and deforestation;

(ii) propose modalities for strengthening the institutional capacity for combating desertification and deforestation in the subregion, including research and development (R&D);

(iii) propose alternative livelihood systems that will reduce the pressure on environment and natural resources, thereby contributing to the control of desertification and deforestation;

(iv) be responsible for preparing the consultancy report and the Draft Final and Final Master Plan.

II. Senior Expert: Environmentalist

4. The Senior Expert will as a first phase of his assignment orientate himself at UNEP headquarters in Nairobi, ECA headquarters in Addis Ababa and ECOWAS headquarters in Lagos and thereafter, attend the Project RAF/88/047 Steering Committee Meeting in Lagos from 9th to 10th October, 1991; there, in collaboration with the other parties: UNDP/UNSO, ECA, ECOWAS (and CILLS):

(i) clarify the objectives of the consultancy;

(ii) modify and prepare detailed terms of reference for the consultant team and its members as necessary;

(iii) participate in preparing the work-plan for the consultancy implementation.

5. During the second phase, the Senior Environment Expert would first undertake, in line with the Terms of Reference, a field mission to selected countries and to consult with the concerned governmental authorities, non-governmental organizations and subregional agencies concerned; review the past, present and planned strategies and related documentation on environmental protection/desertification control; in particular the governmental/intergovernmental preparatory actions of the subregion towards UNCED 1992. Thereafter, he would present a mission report and participate in preparing the draft final Master Plan for comments by agencies and for discussion by a meeting of participants from governments and agencies in the ECOWAS subregion.

6. After these discussions, the Senior Environment Expert, will, with other consultants prepare the Final Master Plan for submission through UNEP and ECA to ECOWAS.

III. **Agroforestry ecologist**

7. The Agro-forestry/ecologist, in close collaboration with the Senior Environmental Expert (Desertification Control), and under the supervision of the Team Leader will:

(i) up-date data on the Forest resources status in the subregion and its effects on socio-economic activities;

(ii) prepare an inventory of past on-going and planned forest conservation/natural resources management programmes including Tropical Forestry Section Plans of the subregion and analyse the main constraints to sustainable agro-forestry practices in combating desertification in the subregion;

(iii) review and analyse the various natural resources management strategies and programmes: e.g. plans of action to combat desertification; and Tropical Forestry Action Plans (TFAP), National Conservation Strategies, Environment Action Plans, etc. of the ECOWAS Member States, with a view to clear common features, strengths and weaknesses;

(iv) assess the intervention of the intergovernmental organizations (IGO) in the subregion, as well as those of the main financing institutions in the field of forest resources management, and to propose an appropriate institutional consultation and co-ordination framework for the various regional projects;

(v) on the basis of the above (i), (ii), (iii), and other earlier studies and assessments carried out by FAO and the Executive Secretariat of ECOWAS, he will further

identify and develop a forest resources management strategy and programme appropriate to ECOWAS.

During the consultancy the AGro-forestry ecologist will undertake field missions, as necessary, to selected countries to consult with governments and intergovernmental authorities, non-governmental organizations and subregional agencies concerned and review the past, present and planned desertification control and related agro-forestry activities. With the other members of consultant team, he will participate in preparing the Draft Final and Final Master Plans.

Observations by the Agroforestry Ecologist

The terms of reference given to the Agroforestry Ecologist in his contract were strictly different. They were the subject of observations in a previous report (BAUMER, 1992) from which we take the following:

"Terms of reference (1992 report, page 10)"
Many observations follow, then:
To sum up

VI. BIBLIOGRAPHY

1. GENERAL BIBLIOGRAPHY PREPARED BY THE TEAM LEADER

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