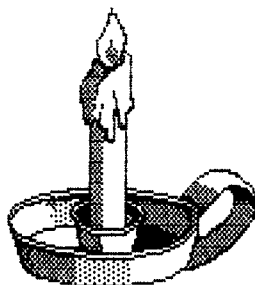


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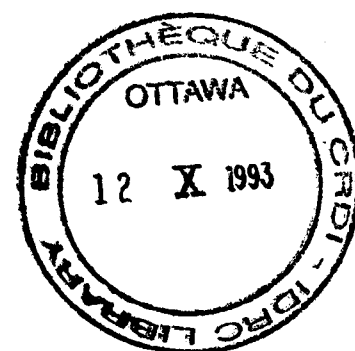
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Energy Policy Seminars in West Africa-

a consultancy report for IDRC

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1. Introduction

1.1. The object of the consultancy was to contact relevant institutions in Vienna, Senegal, Mali, Ivory Coast and Burkina Faso with the view to assess the role of those institutions as well as their receptiveness to organize energy policy training workshops and to identify important regional issues for energy policy and planning as well as energy policy research. See Annex 3 for summary of terms of reference and list of persons and institutions visited September 26 - October 16 in the above-mentioned countries.

1.2. Is there a problem?

The first question is: is energy planning and energy policy a problem worth addressing in the countries visited?

The answer is unconditionally affirmative: energy planning and energy policy formulation are very rudimentary and in many cases non-existent.

Countries may have well developed policies in one energy sector (for example Burkina Faso in the "improved stoves" programmes or regulations concerning the commercialisation of firewood) but the overall policy responsibility and an overall view of the national energy situation and its problems are missing.

1.2.1. The energy situation.

In all the countries visited, the rural and urban household consumption of fuelwood for cooking, beer making and traditional handicrafts (eg. pottery, brickmaking) amounts to between 50 % and 88% of the total energy demand. This sector is therefore of great importance in any energy policy. The environmental aspects of fuelwood use are gruesome, some parts of the countries discussed have already now a negative balance between supply and demand.

The use of alternative sources has therefore been on the development agenda in many countries, but the options seem to follow - often donor inspired - traditional technological lines of action: the

building of expensive dams for hydropower, increased off-shore and inland drilling for gas and oil, recommendations to use nuclear energy (Niger). Emphasis - also donor and NGO inspired- has also been placed on renewable energy resources, improved stoves, "new" energies etc.

Other suggestions include increased use of kerosene for urban cooking needs, or the movement of populations from forest deficit areas (World Bank agenda for Burkina Faso). It is a moot question if oil and derivatives can fill the shortfall between demand and supply. The oil bills are staggering: Burkina Faso pays more than 50% of her export earnings towards the cost of imported oil. 12% of Senegal's imports is oil.

Each country has a small laboratory or institute to test "new" energy technology. It is probably fair to say that the technological solutions are there. What is interesting and urgent at present is to know more about the trade off between alternative energy sources for different sectors, the importance and effects of pricing of technology or energy, the testing of new technology not only in the laboratory but also in the real economic and social surrounding. This is not done to any great extent and most countries have no capacity or interest to produce such background inputs in their energy policy discussions - provided such discussions take place.

The set of symptoms of the energy situation which have been described above may not reflect the real underlying cause: deforestation may be ultimate result of abject poverty, of rural poverty and desperation. This is important to keep in mind because there seems to be a mismatch between understanding of the situation and the remedies suggested. The introduction of kerosene or of new stoves may sound interesting, but may not be on the agenda of those receiving the advice, for purely economic reasons.

1.2.2. Policy coordination

The "soft state" of Gunnar Myrdal has many interesting features such as corruption, elitism, oligarchy, etc. One aspect which is especially pertinent in this connection is the inability to make decisions and the fragmentation of the bureaucracy.

Such fragmentation and the constant moving of ministers from one ministry to another may be essential parts of a president's policy. It often leads to "dirigisme", a situation where every decision has to go to the top. Decisions in such situations are usually taken on the basis of political considerations or sloganism ("we shall centre our efforts in the rural environment" etc), but often without enough consultation, preparation or afterthought.

The first alternative among several, presented by different external groups such as donors or NGOs or by ministers or men of power with vested interests is picked and carried out. Such decisions cannot be carried out without contradictions or even catastrophic results. If at all - often nothing at all happens in spite of presidential decrees.

This is very evident in the energy sector in the countries under discussion. The importance of a Houphouët-Boigny, "le bœuf de Yamoussoukro" or a Captain Sankara in making fast decisions is undisputable, and probably necessary. But the former has a very powerful group of representatives of vested interests around him, the latter has an inexperienced bureaucracy to help prepare the planning and execution of development projects.

In the one case therefore, it seems to be absolutely impossible to discuss the trade off between the risks of hydropower (the US\$ 500 x 10⁶ Soubre dam and river has enough water only two years of three) and the risks of oil and gas exploration (What will the Phillips new drilling in the Espoir field give?). In the other case prestige projects (the Kompienga US\$ 100 x 10⁶ dam, the Tambao railroad) are brought to the top of the list.

Some energy planning is usually done in ministries of planning, with donor or World Bank support. But such ministries of planning are usually - especially if they are divorced from the ministry of finance - without much political power. Their "academic" activities, basically carried out to satisfy donor interests are not taken seriously by local politicians and leaders. The national energy committees which exist in several of the countries under discussion have the same problem.

2. What can IDRC do?

IDRC has supported a variety of research efforts in various sections of the energy sector. Some of the results are not very well known but deserve to be. One reason for this state of affairs is the fragmentation of the energy policy situation and the difficulty in getting new research results across to decisionmakers - a situation which is not exclusively African.

One way of getting closer to this is to have meetings in some form between researchers and decisionmakers.

IRDC is probably right in believing that such a "confrontation" would lead to a better understanding of the energy situation and of the need for energy policy coordination and energy planning.

The organisation is, however a small (but important) player in this field and would have to limit its interventions to some kind of training or exchange- of- information initiatives, national, regional or global.

Several questions will, however, have to be answered:

researcher
generally The major one is: what does IDRC want to get out of such a seminar or workshop? New policies? New information? Ideas about researchable topics or topics which have not been treated or covered? Some lasting effects such as a functioning energy commission at some level in government? Maybe all of the above?

Other questions are:

-- do researchers really have anything to show that would interest decisionmakers? If so, in which areas?

For example : Are there one or two really good cookers or improved stoves than can be pushed hard? Have they been tested in the field? How about the other renewable technologies? How long do solar panels last in the Sahel? What level of technical sophistication does one need to install or operate and maintain a solar pump? Are the biogas experiments valid? Do the installations work? In real life, in Africa?

Equally important: if we believe we have the technical answers how about the economic, social and cultural problems? What are the linkages between underdevelopment in general, poverty and deforestation and fuelwood demand? What kind of resistance is there

to the introduction of "new","improved" technology? Costs? Traditional values? Perceived risks by the receivers? What other reasons are there for deforestation than the cutting of fuelwood such as increased need for agricultural land, cattle raising, increase in small stock?

We are discussing French-speaking West Africa. The Sciences Sociales in the French system do not include Economics which is a faculty of its own and therefore by choice, often far away from economic realities. There seems to be very little interest among researchers in the region in the economics of energy or to discuss trade off and opportunity costs of new interventions or energy substitution.

Policy questions also tend to fall out of the strict pattern of disciplines. Is it Economics or Political Science? If there is no clear answer to that question - and how could there be? - then there is no interest, as the academic reward system in West Africa as well as elsewhere works against crossing disciplinary borders.

Sociology is interested in other topics and anthropology is usually so cultural specific - and should indeed be so - that it is useless for any type of national generalisations.

The conclusion is that there is very little social science research to show, at least of the R & D or applied type.

Seminar organisers would have to decide the precise nature of a seminar or workshop against the background discussed above. If information, which information? if training, at what level?. If thematic, what theme? And if level is important, the size of the seminar is probably inversely related to the "importance" of the participants. (If ministers, half a day, and so on).

There are several alternatives to be considered:

2.1. The 0 alternative.

The alternative to do nothing at all in this sector has some merit.

The reasons for staying out would be:

(a) the market is saturated. There is a large variety of educational and training initiatives in energy planning that have taken place and will take place globally, regionally in West Africa (ENDA, CRUT) and also nationally. Here are some examples of recent initiatives - and there is no reason to believe that these activities will cease -:

"L'Energie et Le Développement en Afrique," ENDA/IDEP, Dakar March 4 - June 7, 1985.

- a very ambitious course, aimed at the middle level, bilingual, although the English-speakers dropped out early- divided into 17 sessions: Introduction, energy balances, simulation in economics, electricity, solar energy, wind energy, biogas, hydrocarbons, pricing, planning, project preparation and various case studies and excursions totally 116 hours of teaching, 14 class related documents and papers, and examination at the end of the course. 22 participants from 12 countries - mainly from planning ministries or planning organisations, all with university degrees and various diplomas.

ENDA plans to run this course every year for 25 participants.

" Conception et mise-en-oeuvre des plans nationaux d'énergie",

Dakar May 28 - June 2, 1984, organised by Ministère de Développement Industriel et de l'Artisanat, with the assistance of CIDA.

- This seminar was organised within the framework of the Cooperation pour le Développement (CDA) and in a series, " Seminars

sur les économies de l'énergie". (CDA is a consortium of countries Belgium, Canada, France, FRG, Italy the UK, and the US. Energy is one of the seven committees of their effort. Canada /CIDA is responsible for the coordination of the energy committee.) The seminar was prepared for CIDA by Lavallin of Montreal. A similar seminar for English-speaking Africa was held in Nairobi 6 - 18 May 1984.

- "Energies pour le Développement Rural",

Ecole Inter-Etats d'Ingenieurs de l' Equipement Rural, (EIER) Ouagadougou, November 1st every year. An nine month "Cycle de formation post universitaire", participants from most Francophone African countries, all with appropriate engineering degrees and at least two years experience. Objectives:

- " la connaissance des besoins énergétiques du milieu rural et de leurs implications sur son développement,
- la connaissance theorique et pratique des differentes techniques envisageables, tant pour fournir l'énergie que pour l' utiliser de façon optimale,
- la capacité de concevoir et de mener a bien des projets liés a la maîtrise des énergies pour le développement rural.
- la capacité d' apprécier économiquement et socialement la valeur de ces projets."

Colloque du Deuxieme Salon sur les Energies Nouvelles et Renouvelables en Afrique

was held in Dakar, 7 - 8 October, 1985, and was organised by Ministère de la Recherche Scientifique et Technique in connection with the Salon. Participants from most Senegalese research organisations, private enterprises and private researchers.

Various seminars organised by Le Comité Interetats de la Lutte contre le Secheresse en Sahel (CILSS) or national organisations or bureaucracies on improved stoves. Burkina Faso has developed an interesting type of seminars with real cooking classes, first for 12 00 women in the city. These women thereafter organize classes in their quartiers . Each division of the capital then has adopted a region or a district on the countryside, and the women from the town seminar then go out to that district and hold new classes for rural women.

Ordinary university or post-degree courses in a variety of energy related subjects are held by the Universities (Dakar, Abidjan, Ecole Supérieure Inter africaine de l'Électricité in Abidjan, Ouagadougou (Institut Universitaire de Technologie), as well as ad hoc courses or seminars at for example Institut Burkinabé de l'Energie (IBE), Centre des Etudes sur les Energies Renouvelables (CERER), Dakar, Laboratoire de l'Energie Solaire in Bamako. Centre Régional d'Energie Solaire (CRES) and CILSS also have a variety of seminars on energy related problems, the latest at CRES, Bamako are

"Journées de Reflexion sur l'Introduction des Energies Renouvelables dans les Programmes d'Enseignement " May 1984, and in October 1985 the latest in a series of conferences on how to support the solar and renewable energy R & D in member states.

The African Regional Centre for Technology (ARCT-CRAT) although like CRES more oriented towards the development of new technologies has had a series of meetings or seminars, some of which have resulted in interesting publications, (see annex) and has as one of its constitutional aims to organize training seminars and workshops on various aspects and problems in the field of technology. Such a seminar was held jointly with the World Bank " Choix et gestion de technologie " with 15 participants from Niger, Mali, Senegal, Guinea and Togo. Energy questions were an important part of the meeting. Energy in Planning is another seminar planned together with NUFFIK(?)

CIDA has been involved in energy planning and training in many African countries, for example Ghana, Senegal, Mali and Niger in connection with major hydropower projects.

There is not a lack activity. The problem would be to find the appropriate niche.

(b) The differences that exist between countries, eg. between the "oil" countries on the one hand and the "firewood countries" on the other would make any coherent seminar almost impossible. To this

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 may be added the problems of data differences (see below 2.3.). This may look like a spurious distinction - the Ivory Coast has perhaps more problems with its forest cover than the Sahelian countries, but the size of the money involved and the presumed revenue to individuals from being connected in some way with oil exploration and operation in the petroleum sector is much bigger.

(c) Although there is agreement that training is necessary and that seminars would serve some such purpose one can ask (with Dr Thomas of the African Regional Centre for Technology) what happens to "trainees"? Ministers change, so do top politicians, - if this is a group involved in a seminar. The civil service dispositions in many African countries are very ad hoc: officers trained for one purpose most often end up doing something else. The futility of specialized training is obvious.

(d) More important is the political dimension. One should not underestimate the intense political heat that can be generated in this sector and where IDRC -if unprepared- would stand the risk of being drawn into something it has no way of controlling and which may jeopardize other IDRC activities.

One important impression of the (in this case surprised) consultant is the enormous variety of vested interests that exist both in terms of money and power. " Territories" are also well defined and fiercely defended: thermal power, hydropower, petroleum exploration, renewable energies, etc.

This is an area where outsiders will have to tread very carefully. It is probably unavoidable that mistakes will be made and much time will be spent in damage limitation and control.

2.2. International/ regional seminar

Such a seminar would bring together individuals from several countries for two purposes: training or " exchange of information".

Even if it is one of the aims of IDRC to disseminate knowledge generated by researchers IDRC has financed it is the view of the consultant that one should aim for something else than an

information exchange between randomly chosen individuals from the research community and the bureaucracies.

-- The idea has been put forward that a regional seminar should aim at the ministerial - secretary of- state-level.

However, training seminars or workshops usually do not attract the top-level persons one would like to see. Time constraints play an important role and the attraction of places like Bamako or Ouagadougou is limited. If seminars are held in Dakar or Abidjan (some persons interviewed suggested Paris, or as a second choice Ottawa) there is always the risk seminars turning into social events or shopping trips for participants.

-- In a regional seminar there cannot be very many participants from each country. IDRC will have little to say about the selection process or the selection of the individuals.

-- There may also be a limited attraction in hearing about other countries' experience, for political or for intellectual reasons.

-- Even if there is a select audience, a select teaching staff and a well defined training purpose, the impact is thus questionable. Some few individuals come back to their country with some new ideas which may be very difficult for them to implement.

There are of course more narrow topics which have a regional importance, - exploitation of forests, - pricing and subventions of various types of energy and the impact in national economies- which could be appropriate themes for such regional seminars. But is that for IDRC?

It is the opinion of the consultant that funds should not be used for international or regional seminars.

2.3. National seminars

The result of a national seminar on energy policy could probably be more easily defined. For example, the setting up or rather reactivating a national energy committee at the presidential level with a small secretariat to advise the president on energy matters, and the trade-off and substitution problems in the energy sector.

There are several other reasons for concentrating on the national level:

-- the data situation is very different in the various countries (for example total lack of any meaningful data in Mali, another situation in Senegal etc). Thus problems of energy balance calculations, and basic data surveys must be attacked in different ways.

-- the policy situation is also different. Burkina Faso has a working policy and a programme of sale and vulgarization of improved stoves (at present 30 000 in Ouagadougou only - if figures are right). Mali has no such programme, nor has Niger.

--the organization of national seminars are probably easier, and such a seminar would make it possible to bring together interested individuals from different parts of the sector, not only researchers and bureaucrats, but also engineers and managers of powerstations, and the NGOs.

-- there have been similar attempts earlier and there is usually some kind of national experience to build on.

--a series of national seminars would probably cost as much (or even be cheaper) than a big international/regional seminar in Dakar.

If IDRC wants to pursue the idea of organizing workshops or seminars, it is the opinion of the consultant that the national seminar is the most appropriate way of proceeding.

2.4. Organizational questions

For the success of such seminars:

- an extended time of preparation is necessary
- it is necessary to hire both local and international expertise and be prepared to pay for their contributions
- seminars will have to be organized or sponsored by the government and

- a certain amount of political preparation is necessary
- IDRC may want to seek other co-organisers ,like CILSS,CRUT, ENDA -
(but this is probably not necessary),
- if the seminars are arranged as a series, for example in Bamako,Ouagadougou and Niamey, the same resource persons,moderators etc could be used to give some continuity to the exercise.

2.5.Suggestion for a national seminar

There may be some virtue in starting in one country and we would like to suggest Burkina Faso for the following reasons:

-- the country has some interesting policies in place concerning the major problem: firewood.Burkina Faso has recently introduced a severe and far embracing legislation to control the commerce in firewood by licencing and controlling dealers, severe punishments for offenders. The system of an all embracing network of Comites pour la Defence de la Revolution (CDR) makes control very easy.

-- the country has recently embarked on a very costly dam project at Kompienga (US\$ 100 million plus) and it has been subjected to a recent (July 1985, September 1985) energy assessment by the World Bank,

-- more important, the country organised in 1982 a major colloquium on energy needs and supply in all sectors of the economy (Colloque Nationale sur l'Energie , published in various sections in stencilled form. A printed Document de Synthese exists. Ouagadougou 1982). The major papers were written by two consultants, one local, one international on the basis of information given by the various ministeries. The seminar was therefore not only the product of donors/external experts but had a substantisal input both of facts, analysis and - very important- interest from the bureacracy.

One result of the seminar was the creation of l'Institut Burkinabé de l'Energie. The recently introduced firewood legislation would not have been in place unless that seminar had

prepared the ground by creating interest and stressing the urgency of the problem.

The material for the seminar still exists and could be updated and added to. Additions will certainly be necessary as there have been major government changes since 1982 in the country. The resource persons from 1982 are probably still available(see annex).

3. Researchable topics

Some mention has been made earlier about research needs in the field of energy policy and planning. There are three sectors which need further attention:

(a) data collection and the production of energy balances, both national and detailed balances for different sectors. This is a work which has to be done but which is rather difficult as we know very little (still!) about the energy needs of the rural population. The problem also involves the assessment of human or animal energy, which is another major part of the energy consumption in such areas. The importance and the drawbacks of modelling in these situations will also have to be looked into.

(b) the connection between development, energy and environment both in general terms and in specified sectors needs to be attacked,

(c) the whole area of energy-related social and economic problems need to be attacked on a wide front. The whole question of the effects of energy pricing, the spin-off of energy subsidies in agriculture and fisheries and the questions of the impact of an over all agricultural price policy on the energy choices of rural people are just not known.

We know very little about the reasons for acceptance and non-acceptance in rural areas of "new" technologies and of local perceptions and risk taking in these matters. Nor do we know about differences between rural groups and their energy needs and requirements.

Decision-making in energy matters is also interesting especially in connection with pricing of energy and in a series of administrative problems from security stockage to fuel transport requirements.

(d) Other questions which are not resolved are for example the economics of the solar heaters: will they ever be cost/effective? There is also a need for off-laboratory testing of a variety of new inventions and prototypes to see if they really will work over time.

4. Documents

--In 1982 IDRC published with Pergamon Press a volume , Rural Energy and the Third World . In that volume there is an article by Andrew Barnett " Rural Energy Needs and the Assessment of Technical Solutions" which is excellent and which summarizes the arguments from economics and the social sciences. This type of document does not exist in French and is not likely to be produced . IDRC should seriously think about translating the document, maybe after some revisions by the author.

The World Bank has produced a series of energy assessments: Ivory Coast April 1985, Niger 1984, Burkina Faso 1985 (still in " Green Cover"). These documents contain a wealth of base material and data. Some of the suggestions and recommendation for further action are questionable. Their assessments of the conventional energy problems are as usual best, the assessments of the rural situation is not always as precise as one would like. They are available at the CIDA library.

There are also a variety of more modest publications:

GRAT,Bamako has produced a small series (available at ERG) of studies on the energy situation in Mali, on fuelwood and decisionmaking.

The publications of the 1982 Colloque in Ouagadougou contain some very good material which could be used as a pareadigm for similar work in other countries.

The literature on improved stoves is wide,wide-spread and very uneven. The best is probably De Lepeliere, E.T.Ferguson and M Steverlynck," Projet CILSS Foyers Ameliores: Elements d'un evaluation,suggestions," s.l., 1985.

ENDA productions include a fine study on charcoal: Thiam, A.," Etude de cas: Filiere et charbon de bois au Senegal" , ENDA, Dakar March 1984 (in ERG); as well as a study on women and energy: Traore,K ,L Bobo and D.Ireland " Femme-energie-alimentation en Afrique de l'Ouest," ENDA,Dakar May 1985 (my copy which I would like to give to the IDRC library is at present with the documentalist M.Drame at the IDRC office in Dakar).

Some titles of other recent material(available in the ERG) are appended. (Appendix 4).

5. Review of institutions and persons

5.1 UNIDO

The United Nations Industrial Development Organization (UNIDO) is mainly concerned with development of industry at various levels and on various scales, but they are also interested in technology transfer, applied science and technology and energy problems.

A project is now being developed by Dr H. Laue, Special Assistant to the Executive Director, called The Present and future Energy Situation in Africa and its Implication for Industrial Development. The project has as its aim to develop background information for a UNIDO long term energy programme related to its industrial development activities. The background for such a project is found in various statements during recent international meetings such as the Expert Group on Energy and Industrialization (Oslo, September 1983), the meeting of African Energy Ministers in Addis Ababa (March 1984) and of course in the Lagos plan of Action.

The project will:

- review and compile available information on energy and also on the socio-economic situation in the Sub-Saharan countries,
- make projections of the energy demand and supply situation to the year 2000
- identify present constraints on energy balances especially in the industrial sector
- identify the parameters for long term development policies in the energy sectors:
 - improved utilization of indigenous energy resources
 - diversification of energy supply
 - optimization of electricity supply systems subdivided for urban and rural areas
 - inter-connection of national and regional grids
- assessment of possible energy technologies appropriate to local conditions and available domestic energy resources

- make impact studies of the relation between industrial development and energy availability
- identify actions and cost-benefit optimization for improved energy intensivity of the different industrial sectors
- identify priority areas and a programme of concrete investment actions to be coordinated by UNIDO for developing the energy inputs to the programme of IDDA (The Industrial Development Decade) ,
- identify technical cooperation projects to be requested from member states.

The use of the project would be to define UNIDO's technical assistance programme on energy and industrialization, to provide African Governments with specific guidance in the development of their long-term energy/industry development programme, to prepare background papers for an Expert Group Meeting on Energy in Africa to be organized by UNIDO and to identify possible areas of a closer cooperation between UNIDO and other international organizations in the context of the IDDA.

This is a very ambitious undertaking and the project leaders are aware of the difficulties. They are also aware of the problems of using models developed elsewhere in a study on Africa. We also discussed at length the problems of rural energy needs and resources.

UNIDO is quite right in trying to develop some background material for a better understanding of its role in the energy sector and trying to make a survey of existing material. Such material (World Bank reports, UN statistics) is often not very helpful in its aggregated form. Thus most industrial statistics deal with the three categories steel industry, chemical industry and others. Information will have to be disaggregated if UNIDO is ever thinking of having an impact in the small-scale industry field. The importance of rural energy is also appreciated.

But it is very difficult for a team of two, however qualified to tackle such problems, especially as none of them have any developing country experience. The amount of material in stencil

form, hidden in libraries and offices all over Africa just is not available unless it is dug out and copied on site. This type of material often has the most recent up to date information on energy balances, decision making in the energy sector, energy policies or a critique of such policies.

I cannot see how any in depth analysis will be possible of, for example, the rural energy development problems or small scale industry (agricultural tools, bicycle repair etc) energy needs or even the energy balance situations. The energy substitution problems in the millions of African households which today burn the forest cover of the continent is also a major problem. The problem may lend itself to modelling - help from IIASA, at Laxenburg, just outside Vienna was promised - but it is quite some way from such models to a working energy sector policy.

Resource persons:

Dr H.J Laue, the Special Adviser to the Executive Director, is the Coordinator of UNIDO's Energy Programme in the Office of the Executive Director. Dr Laue who is a former German University Professor has recently been appointed and was until sometime ago an executive of the International Atomic Energy Agency (IAEA). He has no developing country experience nor has his second in command, dr Balabanoff.

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5.2. Ivory Coast

5.2.1. Energy situation

9.3 million inhabitants 1985.

Potential resources: 12 400 GWh (3 000 MW) of which 20% harnessed, 500 000 toe of biomass residues / year.

Large , but decreasing forests: 12 million hectares in 1956 is now down to 3 million hectares in 1985. Firewood still makes up half of the energy consumed in the country.

Crude oil production approximately 20 000 BP from reserves of over 100 million barrels and $85 \times 10^9 \text{ m}^3$ natural gas. Oil goes to transport(59%), and to thermal power production, (33%,) balance exported to neighbouring countries. Imports: oil imports approximately 12-15% of exports.

5.2.2. Structures:

Ministère de l'Industrie since 1984/85:

Direction de l' Energie et de l' Infrastructure:

Section Politique Energétique et les Energies Nouvelles

Section Energies Conventionnelles

Section Infrastructures

Under this ministry Energie Electrique Cote d'Ivoire (EECI) which is the main (95%) producer of electricity consumed.

Ministère des Mines:

Direction des Hydrocarbures

responsible for petroleum policy formulation. Under this ministry also Societé Nationale d' Operation Petrolières de la Cote d'Ivoire (PETOCI).

Ministère de l'Agriculture, Eaux et Forêts:

Direction Forêts responsible for biomass. Here also recently set up government agency: Societé pour le développement des Plantations Forestiers (SODEFOR).

5.2.3. Major problems:

-Petroleum and gas exploration very costly. At present no idea what the Phillips drilling in the Espoir field will give. Esso is scheduled to drill an exploration well on its APE 4 plot. Tenneco has completed contractual obligation to drill 3 (dry) holes.

- Reliability of rivers is a major problem for example at the Soubre dam (on Sassandra river, 280 MW). 1983/84 drought and no water in river at Soubre caused expensive emergency installation of new thermal generators at Uridi. Electricity production has fallen 21 % from first half of 1983 to the same time 1984.

- The fuelwood situation is interesting. Although the country has large forest reserves these are being depleted at an astonishing speed for fuelwood, but mainly for timber. Figures vary, but the 3 million hectares with some 113 million m³ of various commercially interesting trees are cut down at a rate of 450 000 hectares /year. Family consumption is estimated at 6 million m³ /year, plus the 150-180 000 tons of charcoal, of which a main part is exported to France for Sunday barbecues! The charcoal situation in Abidjan is in the meantime critical.

- Although the Ivory Coast has a large and diversified indigenous energy base, the tight financial situation prevents the country from using the potential fully. Pricing of utilities production has been based on long-term marginal costs of supply established in 1981. The recent operational difficulties (Uridi installations, drought etc) ? have pushed up considerably the short term marginal generating costs. The pricing policy of public enterprises are now being reviewed to better reflect such costs.

- None of the above mentioned ministries have any overall planning function for the energy sector. The part of the Direction de l'Energie dealing with energy policy is mainly used as a liaison office with the major players in the field. EECI is the major power in the electricity field. The staff situation is not very favourable and there is a lack of committed and trained staff in all the above offices.

There is therefore a need for new institutional arrangements (the World Bank suggests a National Energy Committee and a directorate or ministry for all energies) which could take a comprehensive view

and take into account the objectives and constraints of the different energy sectors.

5.2.4. Institutions:

Centre Ivoirien des Recherches Economiques et Sociales (CIRES).

This is an institution well known to IDRC. They have an interest in the economics of the different energy sectors and a wide and very interesting general research programme in agriculture, environment etc. They have tried to put the area of energy policy which tends to fall between disciplines on the research agenda, with a joint project on charcoal with the Centre Technique Forestier Tropical (CTFT). For any initiative in the Ivory Coast one would like to see this institution involved.

Ministère de l'Industrie.

The section dealing with energy policy is a small group with no political power whatsoever. They maintain liaison between the ministry and some other interested national or regional institutions. Contact person: M. A. Anguie, telephone 38 20 84.

More interesting is the

Energie Electrique de la Cote d'Ivoire (EECI).

They have a large department for Etudes et de la Recherche Technologique with several directions including new and renewable energies. This is, as is said above a major player in the field and will have to be involved in any activity in the Ivory Coast.

There are also other institutions:

Institut de Recherche sur les Energies Nouvelles

at the Université d'Abidjan which has a considerable teaching programme on solar and biomass energy. Telephone 44 08 59.

The Ecole Inter africaine Supérieure de l'Electricité

is a post-graduate training institution for LV and HV electricity engineers. They have recently held a meeting on Energy and economy, and the management of energy production and are developing a project with CIRES and the Université de Lausanne on energy consumption models and modelling.

Centre Technique Forestier Tropical (CTFT)

has already been mentioned. One of their interests is the effectiveness of charcoal production and the economics of its distribution.

5.2.5. Resource persons:

Dr P. Perrault

of CIRES (Agricultural Development Council) is well known to IDRC. He has a wide overview of the social science/economics research that goes on in the Ivory Coast, including energy related initiatives. Telephone: 44 09 53.

M. Rene B^rancart at the EECI Direction des Etudes et de la Recherche Technologique (BP 452, 01 Abidjan, telephone 32-53-00 ext. 463, home 41-55-64, is according to many the person who knows everything that goes on in the energy field in the Ivory Coast. He has been a participant in other IDRC seminars and made a very good impression.

5.3. SENEGAL

5.3.1. Energy situation.

Population mid 1985 approx. 7.5 million.

Potential resources: Oil, potential existence. Hydropower potential large :1 400 MW in rivers like the Senegal, suggested projects often in collaboration with other countries: Sambangalou with Guinea, 125 MW; Manatali with Mali, 240 MW.

Installed thermal energy capacity 1982 165 MW, production 1982: 631×10^6 kWh.

Fuelwood situation barely manageable at present. Production from 14 million hectares 5×10^6 m³ of which 25% for charcoal, much of which is exported.

Oil imports are 18 % of all imports.

Minor experiments with new energies (photovoltaic pumps.

5.3.2. Structures:

Ministère du Développement Industriel et de l'Artisanat:

Direction de l'Energie:

Several divisions, also secretariat to the Comité National de l'Energie and the Commission Nationale de l'Energie

Ministère de la Recherche Scientifique et Technique

Direction de l'Innovation et de Promotion Technique

(foyers améliorés, renewable energy sources, experimentation)

5.3.3. Major Problems

-Forests: Present small surplus and additions to supply will be eroded by population growth before turn of the century.

-Existing hydropower in combination with irrigation dams have been on the agenda for many years but financing of large construction has been difficult and environmental problems have not been solved.

- Ban al Souf stoves do exist but very few have been installed.

- Structures: as in most Sahelian countries the energy sector decisionmaking and policy making is fragmented. There exists a commission and a committee for energy at the national level, which for political reasons has been rather lethargic during recent years. Sometimes such commissions are set up to pacify donors or local power groups even if everybody knows that they are not going to be able to work.
- Oil pricing is not consequent. Fisheries have large subsidies. SONELEC has recently escaped increased oil prices for their 4 billion CFA oil bill.
- increased demand for charcoal in the urban areas.

5.3.4. Institutions

Direction de l'énergie.

This section, in the Ministry of Industrial Development has an interesting Division de la Planification et des Etudes which looks after most industrial and related economic surveys and studies, of which some are concerned with energy supply and demand. Other Divisions deal with conventional energy, new and renewable energies and energy economics. There is also in the Section a small secretariat for the National Energy Committee and the National Energy Commission. (Information per telephone, M. Cissé). Address: BP 4037, Dakar.

Environnement et Développement du Tiers Monde, (ENDA).

This is probably the most powerful and also best international NGO in the field of environment generally in Africa. They support alternative development research efforts, they work with local groups at levels which are not usually perceived by donors, and they have an ambitious training programme. It is financed by a variety of bilateral donors.

Its energy programme, started in 1981 carries out research and training programmes in the energy field: energy balances, energy planning and policy making(a three month course, organized every year from 1985).

The research programme is also connected to the EDT (Energie et Developpement du Tiers Monde) programme in Latin America, and Asia. Their main interests are handling and normalization of data, case studies of energy use, and methods of analysis and projection, energy pricing and decision-making in the energy field.

Any seminar in Dakar or even in any of the Sahelian countries could well be organized in cooperation with ENDA.
Address: Programme d' Energie (in an office apart from the main office) BP 3370 Dakar, telephone 22 59 83 (Bernard Duhamel, dr. Youba Sokona).

The African Regional Centre for Technology/Centre Regional Africain de Technologie (ARCT/CRAT)

is a regional organisation headed by Dr Babatunde Thomas. Mr Vitta of the IDRC Social Sciences/Technology has worked there and can probably give you a picture of what they are doing. According to Dr Thomas, they are totally member/receiver oriented, and make studies and consultancies and training seminars on behalf of the member countries. This state of affairs, which characterises many regional and UN organisations is not conducive to great new initiatives or spreading of new ideas beyond the Lagos Plan of Action. I do not think that much would be gained from cooperation with CRAT in any IDRC seminar venture. They should of course be invited.

Their documentation division (head: Mr. Mohamed Timoulali) produces an useful if incomplete list of ongoing energy projects in Africa. (Attached).
Address: BP 2435, Dakar, telephone 22 77 12/13.

Centre d' Etudes sur les Energies Renouvelables (CERER).

Unfortunately, and because of the Deuxième Salon sur les Energies Nouvelles et Renouvelables en Afrique, which was held at my visit to Dakar I was never able to get in touch with any of the persons suggested (M. Sall, and M. Fall, the Director). I visited the site twice (and was stood up twice) talked to some researchers and saw the laboratories and the prototypes of various solar contraptions in the yard. They do research and experiments on solar energy,

biogas, improved stoves (several were on display) and more important maybe on the energy needs of the rural populations.

Address: BP 476 Dakar.

The University of Dakar has an Institute for Environmental Science which does research within the University curriculum on deforestation, and renewable energy sources.

There is also the Ecole Nationale Supérieure Universitaire de Technologie (ENSUT)

which is a teaching institution but which has in their engineering curriculum sections on the problems of biomass, solar and wind energy.

Address: BP 5085 DAKAR-Fann, telephone 23 03 34.

Council for the Development of Economic and Social Research in Africa (CODESRIA)

should also be mentioned because of their interest in social and economic problems although they do not really deal with energy problems, except for some minor studies. They have a small library, and a conference room, which however would be too crowded if there are more than 15 seminar participants. Address: BP 3304,Dakar, telephone: 23 02 11.

IDRC West Africa Office in Dakar.

For any seminar of a regional or national kind which would be held in Dakar there are obvious reasons for involving the WARO, both in terms of organisational capacity but also resource persons such as Sidiki Coulibaly, dr Zaki, M. Bassey and others. Dakar would for these reasons be the obvious place for a regional workshop. Address BP 11007 CD Annexe Dakar,telephone 21 09 20,21 42 31.

5.3.5. Resource persons:

Dr Youba Sokono at the ENDA Energy Programme is at present engaged in a major energy balance study for Senegal and Senegalese industry. He is very knowledgeable about the situation in the other Sahelian countries and also about other resource persons. It would

seem that the Energy Programme now has more of a latitude from central ENDA decision-making, which can be somewhat heavy. Dr Sokono would be an ideal co-organiser of any IDRC meeting in the energy field. Telephone: 22 59 83, telex 456 ENDATM SG.

5.4. Mali

5.4.1. Energy situation

Population approx 8.2 million in mid-1985.

Given the almost total absence of current economic statistics it is difficult to quantify economic development in the energy sector.

Oil: So far no known reserves. Test drilling in Taondeni (Esso, Elf & Shell) has come up dry.

Hydropower: 2 - 3000 MW could give up to 5 000 kWh/year

In production: 6 MW : Sotuba (on the Niger) 35 000

kWh/year, Filou (Senegal river) 500 kW or 2 700 000 kWh/year,

Selingue 44 000 kW or 184 million kWh/year. Much of this production cannot be used because of an antique distribution system. Thermal installation ca 40 MW, production 36 000 kWh/year.

Agricultural residues estimated at 2.3 million tons/year and are equal in importance to fuelwood from forests from the existing 4 million hectares.

Consumption of fuelwood: 2.2 million tons/year(?) of which 800 000 for urban use. Most is now transported by truck as distances from major urban centres to the forests have increased. The whole country will be deficit in fuelwood in ten years with the present consumption. Small production of charcoal.

Import of petroleum products (1979!) 185 600 toe.

5.4.2. Structures:

Government reinforced structures in 1983:

Electricity:

Ministère de l'Industrie et du Tourisme

Direction nationale de l'Hydraulique et de l'Energie (DNHE)

(Hydropower)

Office pour l'Exploitation des Ressources hydrauliques du Haut-Niger(OERHN)

Ministère de Tutelle des Sociétés de l'Etat:

Société d'Energie du Mali (EDM), (thermal power, monopoly on low tension electricity distribution).

Hydrocarbons:

Research: M.d. Dev. Industriel et du Tourisme

but drilling and exploration is under

Direction National de la Geologie et des Mines.

Stockage and distribution:

Ministère de Transport et Travaux Publics

via a parastatal, PETROSTOCK, responsible for public security stock and for negotiations with oil companies

(Shell,Mobil,Texaco,Total, organized in Groupement Professionnel des Petroliers (GPP)).

Firewood and charcoal, improved stoves:

Ministère des Ressources Naturelles:

Direction des Eaux et Forets

collaboration with Laboratoire de l'Energie Solaire,

Union des Femmes de Mali , Direction Nationale de l'Alphabetization Fonctionnelle et de Linguistique Appliquée(DNAFLA), Centre National de Développement Communautaire, Direction Nationale de la Cooperation and other ministries such as M. de Développement Rural, M.de Transport etc.

Renewable Energies :

Many ministries, also sometimes several directions in the same ministry

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Biomass fermentation:

Division de Machinisme Agricole

Training:

Ecole Nationale des Ingenieurs

Ecole Normale Supérieure

Pricing:

Commission Nationale des Prix et Revenues chaired by M.de Finance et de Commerce which submits ,for government approval prices of cereals, energy products, etc., after " instructions des dossiers par l'Office de Regularisation et de Stabilization des Prix et la Direction Nationale des Affaires Economiques".

Irrigation dams:

Office du Niger and

Office pour l'Exploitation des Ressources Hydrauliques du Bassin du Haut-Niger (OERHN)

NGO:s and private organisations which develop applications for new energies:

Mali Aqua Viva

Solaire Elf-Mali

Compagnie Malienne des Textiles

5.4.3.Major problems:

-Fragmentation of decision-making(EDM vs DNHE), none of the above has any responsibility for a national energy policy. DNHE, when asked but energy coordination said they had the mandate, at least to talk to CRES!

-Forests: " L'ensemble du pays sera deficitaire en bois à l'horizon 2000,les regions de Tombouctou et Gao le sont déjà".

-Improved stoves: In Bamako at least 50 000 families, but only 5 - 600 stoves marketed. Costs too high?

-Lack of any organized data for planning except for major consultancy studies on hydropower development projects. There exists a World Bank energy planning study.

- There is a need for a major structural reorganization of the whole energy sector as no one today has the overall responsibility for energy policy.

5.4.4. Institutions:

Groupe de Recherche et d'Applications Techniques (GRAT).

This is a modest but important NGO which has brought together a small group of engineers, researchers and technicians to discuss problems of technology and development. Energy problems are important in their work. (Publications from the group are available at IDRC/ERG) They have done studies on the decision-making structures of the energy planning in Mali, on the role of case studies in energy research in the Sahel and a variety of small things on renewable energies. A study on energy problems in Mali was financed by ENDA. They are at present into a biogas project to solve the cold-chain-storage of vaccines in veterinary practice in Mopti. Address: BP 2502 Bamako Mali, telephone Secr. Gen .S.Diallo 22 67 17.

Centre Régional d'Energie Solaire (CRES).

This is one of the CEA0 (Communauté Economique de l'Afrique de l'Ouest) and CILSS joint ventures financed by UNDP and bilateral donors. It has been under planning since 1978 but is now being built on the hills overlooking the Niger on the other side of the bridge in Bamako. As with most CILSS/CEAO project plans do not or in this case may not match the performance. But it is a regional institute, therefore politically important, with very fine facilities, but little activity so far. Obvious site for seminar in Mali, but not to organize. Director: M.Ba, Chief of Documentation M. Gaouson Coulibaly, B.P. 1872 Bamako. Telephones 22 67 91/22 61 88.

Laboratoire de l'Energie Solaire (LES0).

This is a national research centre founded 1964 financed by government and, for projects, by outside bilateral funds, incl. IDRC. It has a fair number of researchers and a fairly active research programme on prototypes in various parts of the country, high and low temperature solar energy bioconversion and economics of fuelwood and also wind energy. Has published some reports. Address BP 134 Bamako, contact person M. Modibo Dicko.

Division Energie et Barrages

has the responsibility of coordination with CRES and other national, regional and international organisations in the energy field. The Division is in charge of studies to change some of the absolutely ridiculous situations that exist in the coordination of energy production. Also in charge of lethargic national energy committee. Director general M. Sitapha Traoré. Address: BP 67, Bamako, telephones 22 25 89/22 21 78.

5.4.5. Resource persons:

M. Souleymane Diallo, GRAT, very knowledgeable of the major problems in Mali and has published on decisionmaking problems. Good resource person for any seminar. Telephone 22 67 17.

Mme Odette Ba, DNAFLA. In charge of womens' programmes and improved stoves. Well connected also in CRES where she works also as a consultant. Telephones 22 24 50, ext. 74, home: 22 26 25.

Mr Ba (no relation), director CRES, has to be involved in any energy seminar IDRC would set up in Mali, or in the Sahel. Telephone 22 30 41.

M Bouba Camara, Chef de la Division, Energie et Barrages in DNHE, would be the ideal partner in any national venture, very well connected, and knowledgeable and also interested in the theme and in participating in organization of a national seminar. Telephone 22 25 88.

5.5. Burkina Faso

5.5.1. Energy situation

Population, approx. 8 million in mid-1985.

Energy resources:

Forests: fuelwood production ca 3 million tons/year from 13 million hectares or 144 million m³. Consumption over 4 million tons for family consumption (cooking, brick making and pottery, beer) at the rate of 620 kg/person/year. Estimated time for end of forest: 2013. Agricultural residues, 31 kg/person/year and charcoal only 12 kg/person/year in urban areas.

Hydropower: Not yet exploited, but estimated resources 12000 MW.

Plans: Dams at Komienga - financing, main part FRG, in hand for approx. US \$100 million - for 32 GWh/year, Bagré and in the long term Koulbi Noumiel in cooperation with Ghana, 300 GWh/year.

Petroleum: all needs imported, approx. 130 000 toe/year, of which 60% for transport needs and 5 % for thermal power production. Balance for household kerosene and agriculture. Import costs estimated at 50% of total exports.

5.5.2. Structures:

Hydrocarbons:

Ministère de Commerce:

Security stocks and related policy, pricing through new parastatal:

Société Nationale Burkinabé des Hydrocarbures,

Dams:

Ministère de l'Eau

Ministère des Travaux Publics

Ministère de l'Agriculture

Electricity:

Ministère de l'Energie et des Mines

SONABEL (formerly Voltélec, thermopower)

Firewood, charcoal, improved stoves:

Ministère de l'Environnement et Tourisme

Direction de l'Aménagement Forestier et de Reboisement,

Service de Vulgarisation des Foyers améliorés

5.5.3. Major problems:

- Deforestation is at present the major problem as fuelwood is clearly the major issue both in rural and urban areas. Although the fuel consumption per capita is one of the lowest in the world 230 Kcp (Kilo equivalents /person) deforestation goes at a unacceptable speed. Recent developments include fuelwood rationing, licensing of fuelwood transporters (green and white trucks)

--Local beer (dolo) production takes inordinate amount of firewood, approx 25 000 tons/year for a consumption of 240 litres per person/year. 600 dolotieres make 36 million litres annually in OUagadougou (it would be interesting to estimate total beer industry energy consumption).

-- The fragmentation of the policy aspects of the national energy planning. Like in the Ivory Coast and Mali, Burkina Faso has several fairly well defined policies or sets of policies in the different sectors, but there is no organisation that has any major national responsibility. A Haut Comité d' Energie was suggested by the Government Seminar in 1982 and again by the World Bank in July 1985, but recommendations have not yet been acted upon.

5.5.4. Institutions:

Direction Générale de la Recherche Scientifique et Technologique and Centre de la Recherche Scientifique et Technologique is the umbrella organisation for all research in the country. Under this organisation you will find veterinary science, forestry ,etc and also

l'Institut Burkinabé de l' Energie (IBE).

The institute was founded some years ago after the Government Seminar in 1982. Its physical facilities are being provided by FRG and are at present being built. The institute will provide research facilities for all kinds of energy research, testing of prototypes etc. The GTZ -IBE project is one of the GTZ Sonderenergieprojekte (also in Mali, Niger, Sudan, Kenya and Tanzania) and is placed in the IBE. It has at its aim to develop appropriate energy technologies.

DGRST/ CNRST, BP 71 92 Ouagadougou, Director, Dr. Kaburé
IBE ,BP 7047, Ouagadougou. Director: Dr Rigobert Yaméogo.

Ecole Inter-Etats d'Ingenieurs de l' Equipement Rural (EIER)

This is a mainly French financed post-graduate teaching institution especially geared towards rural engineering, including a variety of energy problems. Their pupils have an engineering degree and at least two years of working experience. They have facilities for holding seminars and are interested in participating.

Director : M.J.de Boissezon, BP 7023, Ouagadougou, telephone
33 35 28 /33 35 29.

CILSS ,

a regional organisation set up to attack the drought problems in the Sahel has its headquarters in Ouagadougou. It has a variety of activities, most financed by bilateral donors and kept as separate entities (Programme Allémand pour le Sahel, etc). The reason for this is that the management of the outfit has been very variable and sometimes almost intolerable.

The documentation centre, which contains a mass of documents and information was an international scandal for years (It is now being rehabilitated by CIDA who has put a competent documentalist in charge: M. Trottier). CILSS is of course interested in participating in any seminars or activities IDRC would like to suggest. As CILSS new management(which seems excellent in comparison) has not yet established themselves, a cooperation which is too close may cause resource persons to abstain from participating.

The United Nations Sahelian Office (UNSO)

has its headquarters in Oagadougou. They are mainly responsible for the evironmental aspects of energy prob;lems. The term Sahelian is

rather loosely interpreted to include all dry land areas in Africa and their area of activities stretches from Cabo Verde to Djibouti.

5.5.5. Resource persons

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Dr M Nacro , professor of Chemistry at the University of Ouagadougou (former DG of CNRST) was one of the resource persons for the Government Seminar on Energy in 1982. An absolutely indispensable person for any type of national or regional seminar. Telephone 33 29 45.

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ent
Mr Ph Simanlis, GTZ-IBE was the other resources person for thgat seminar. He is now directing the GTZ project in the IBE, and has a long experience of Sahelian energy problems.

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ent
Mr Rigobert Yameogo , Director IBE is a person to keep in mind. IBE could well be the venue for a national seminar.

Mme Marguerite Kabure , Chef de Service, Service des Vulgarisations des Foyers Ameliores is the national coordinator for these efforts. She and her service has succeeded better than anywhere else in the Sahel, and she would therefore be an important resource for any national or regional seminar.

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ent
Mr D.E. Ghozali , SIDFA representative UNIDO,, PO Box 911 Lome telephone 21 20 08 Lome, is the local UNIDO representative, responsible for the Sahel countries and the Ivory Coast. Has some experience in the energy field (Algerian oil administration) and is a very knowledgeable person.

S A E D = So Auteurs Africains

et Etrangers de développement.

So. Lyman B A R R O

6. Programme of meetings

September

26 p.m. departure Ottawa.

27 11 00 arrival Vienna,

p.m. meeting with dr H.L Laue Special Adviser to the Director General, and coordinator of the Energy Programme UNIDO

28 report preparation and reading

29 Sunday

30 a.m. UNIDO, Mme Doblmeier, ex- desk officer Burkina Faso

Mr Balabanoff, Energy Programme

UNIDO Center of Documentation

p.m. Meeting Mme G Kerl, Institute of African Studies,
University of Vienna formerly documentalist UNDP Ouagadougou
1980-83 and librarian GTX/CILSS Projet Allemand 1983-85

October

1 departure Vienna 900

arrival Dakar 1800

2 a.m. IDRC office. Meetings with Mme Kane, Bruce Scott dr Zaki

Francis Childe

p.m. Meeting UNDP Resident Representative. Mr Salif Ndiaye.
IDRC office library.

3. a.m. ENDA Energy Project, Mr Y Sokono,

Mr Ba documentalist

p.m. IDRC office, meetings Michael Bassey, Gilbert Ndiaye

4. a.m. African Regional Centre for Technology

Dr B. Thomas, Director,

Mr M Timoulali, Chief documentation

Biogas project

Visit to 2e Salon sur les energies renouvelables

p.m. Visit CERER laboratory

5. a.m. Visit CERER laboratory

p.m. Departure Dakar

Arrival Bamako

6. Sunday

a.m. redaction des notes

p.m. Meeting Mr Souleymane Diallo, General Secretary GRAT

Mme Odette Ba, DNFLA

7. a.m. Visit CRES

Meeting M Bouba Camara, Chef de la Division Energie et
Barrages, DNHE

- p.m. Departure Bamako
Arrival Abidjan 1900
8. a.m. Meeting Dr. P.Perreault, Dr T. Epounou CIRES
p.m. Visit Ecole Inter africaine Supérieure de l'électricité
9. a.m. meeting per telephone M Angui, chef Section Politique
Energetique, Direction de l'Energie, Min.de l'Industrie.
Otherwise no meetings possible due to the 8th convention of
the ruling political party, PDCI-RDA in Abidjan
10. a.m. Departure Abidjan
Arrival Ouagadougou
p.m. Meetings Dr M Nacro, University of Ouagadougou
Dr Clement Ouedraogo, Rector de l' Université
Dr Kabouré, Director General CNRST
Mr Guarda, Resident Representative, UNDP
Visit to L' Institut Burkinabé de l'Energie
Mr Ghozali, UNIDO Sidfa.
11. a.m. Visit UNDP Documentation centre
dr Brah, Director General CILSS
M. Trottier, Chief Documentalist CILSS
Meeting EIER dr J de Boissezon, Director , dr Gresillon
departing director
p.m. Institut Burkinabé de l'Energie, Meetings mr Werheme
Alhadi, acting director, Dr Godefroy Thiombiano,
researcher, Mr Ph Simanlis, GTZ/IBE project director
Mme M.Kaburé, Chef de Service de vulgarisation des foyers
ameliorés,
Dinner Dr Peter Matlon, ICRISAT
12. a.m. Meeting Mme Noellie Kyelem, UNDP
Meeting M Simanlis IBE and dr Nacro
Meeting M. J.Dubus, hydrogeologist, UN expert
p.m. UNDP Res Rep ,M. R. Guarda
Ms Eva G-dotter Johnson, sociologist/ Service des foyers
ameliorés
13. Sunday Redaction des notes
14. a.m. Meeting UNDP Office- World Bank representative
p.m. Departure Ouagadougou
arrival Paris 22 00
15. a.m. departure Paris
p.m. arrival Ottawa 20 30