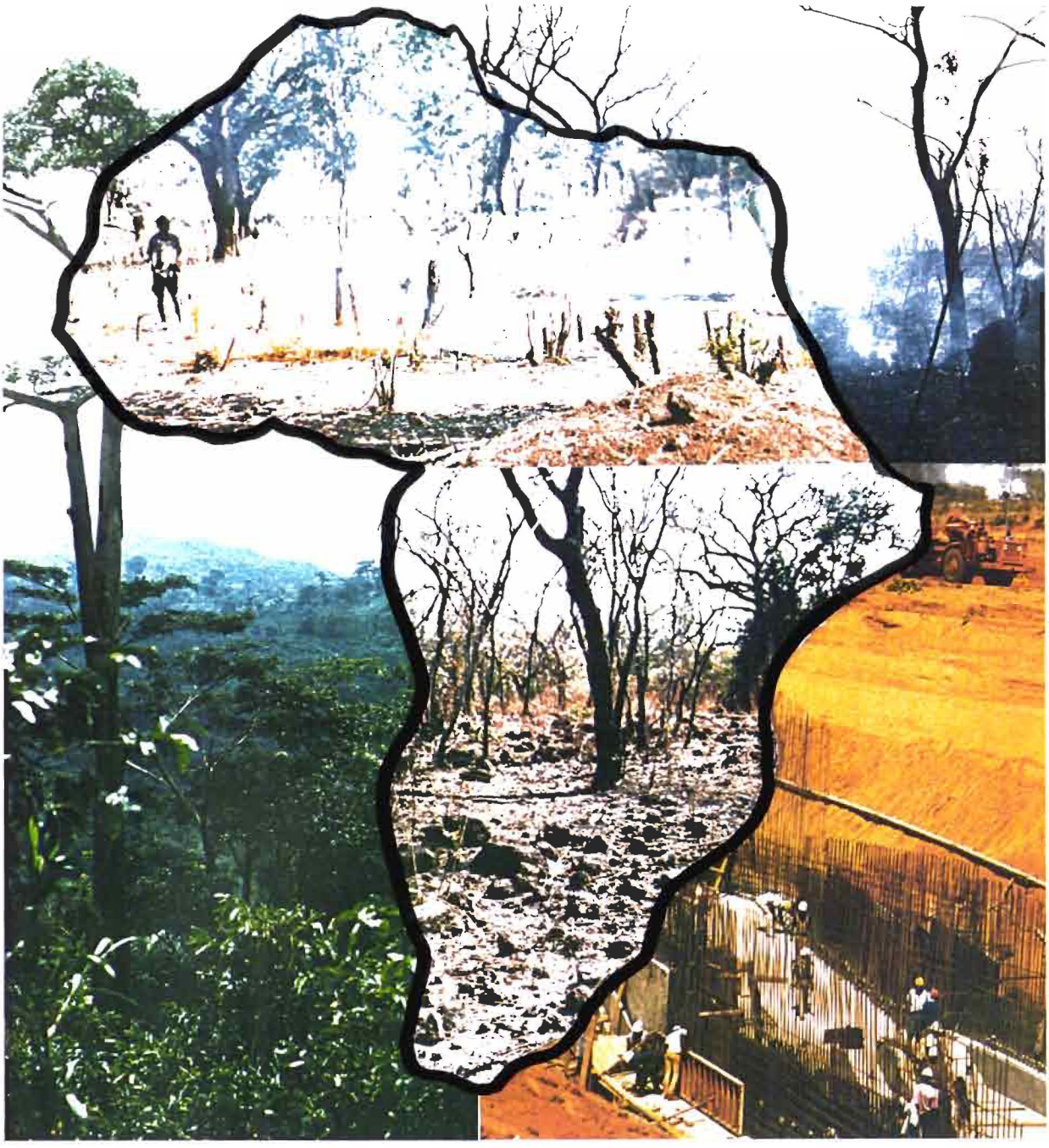
AID ENVIRONMENT
Advice and Investigation for Development and Environment

DEVELOPMENT YES... BUT AT WHAT PRICE?

Identification of priority issues with regard to the analysis of the possible environmental impact of the WHO Onchocerciasis Control Programme



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A I D ENVIRONMENT
Advice and Investigation for Development and Environment

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Cover picture
center:
how the African continent will look in a few years time in case no drastic attempts are made to stop abusive landuse

left:
islands of forest which still exist in the south-eastern part of Guinea

up right:
bush fire along the road between Kankan and Kissidoudou in Guinea

below right:
construction of a dam in the upper Komoé basin west of Banfora (picture taken on 15 February 1990)

CONTENTS

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

1. Objective of the mission

The major objective was to identify priorities for further research and monitoring with regard to the possible primary and secondary impact of the Onchocerciasis Control Prgoramme - OCP - (for a full account see Annex 1).

2. Programme of the mission

(1) Visit to the Programme Headquarters at Ouagadougou to discuss the Terms Of Reference with the Director and staff (13-2-1990).

(2) Discussions with authorities, UN representatives and scientists involved in activities relevant to development and environment in Burkina Faso (14-15/2/1990).

(3) Evaluation of recent publications and official reports on socio-economic and environmental developments in Burkina Faso.

(4) Site visits in Burkina Faso and the Republics of Guinea and Togo (both ground and aerial observations) in order to assess the environmental consequences of various forms of development, as well as to make detailed observations on the present state of the art of aquatic monitoring (16-24/2/1990).

(5) Assessment of the possible secondary impact of OCP on the environment on the basis of the results of (2), (3) and (4).

(6) Presentation of preliminary report to the Director of OCP and the Ecological Group during the 11th Session of the Group at Lama-Kara, Republic of Togo (25-28/2-1990).

3. Main results

(1) Environmental policy in Burkina Faso

A full account of the discussions with the authorities and other persons is presented in Annex 2.
This country was selected because with respect to Onchocerciasis it was the most heavily affected country of the region (more than 90% of the population was carrier) and the first where the disease got under control.
A conclusion which could be drawn immediately after the interviews and the consultation of relevant documents was, that the Government of Burkina Faso gives a high priority to the environmental problems it faces, such as desertification, erosion, deforestation, and the impoverishment of the fauna and flora.
It is generally recognized, that the main factor responsible for these effects is the continuous increase of the human pressure on the lands.
Almost no reference was made to OCP during the discussions.
Of key importance is the recent publication of a National Action Plan for the Environment (Plan d´Action National pour l´Environnement, PANE, Ouagadougou, Octobre 1989). A few weeks after the publication the plan was discussed during a workshop organized in Bobo Dioulasso by the Comité National de Lutte Contre la Désertification (Actes de l´Atelier sur le Plan d´Action National pour l´Environnement). This is a rather unique development as there are only few countries in the world, including most Western countries, which have so far established national plans aimed at the preservation and restoration of environmental quality.

It was also observed that most of the numerous national and international authorities, organizations and institutions, which are involved in the implementation of development programmes act more or less independently from each other.
There is a strong need for the creation of infra-structural arrangements which would enable an appropriate coordination and a concerted approach of the numerous projects and programmes. A similar recommendation was made by the Workshop at Bobo Dioulasso referred to before.
It is also important to note, that the report of the first five year plan (Rapport d´exécution du premier Plan Quinquennal de Développement Populaire, Novembre 1989) shows, that over this period no financial support had been found for 15 projects which the country had put on the priority list, including projects on wildlife preservation, fisheries, provision of fuel wood to towns and cities and others.

(2) Present developments in Burkina Faso

A full account of observations made during the site visits is presented in Annex 3.
A lot of positive developments were observed during the site visits with experts and responsible authorities, like the large scale irrigation programmes in the western part of the country (Banfora, Loumana, Banzon, Kou-valley), the AVV-UP 10 Programme near Diébougou, classified forests and nature reserves.
However, serious symptoms of environmental damage were also recorded, both in connection with certain programmes and specially protected areas and elsewhere in the country.

The following observations were made:

- Extensive forest fires, not only in crop and fallow lands, but also in forests, including classified forests, gallery forests outside classified forests and nature reserves. (The National Plan gives a high priority to future actions against forest fires). It was observed, that in many places the fires lead to a complete loss of the tree cover. Large amounts of harvestable wood are lost completely, there are serious signs of soil erosion in places where shrubs and grasses have disappeared almost completely, leaving denuded, infertile laterite soils.
  Of special concern is the destruction of the vegetation on the stream banks (gallery vegetation), which results in a loss of many exploitable species of trees, river bank erosion, an increased rate of evaporation of the water, an increased velocity of the flow, a diminished flow of nutrients into the river affecting the fisheries potential of the streams and a serious impact on the habitats of exploitable wildlife species.

- Environmental problems start to arise in the Komoé basin. During the dry season so much water is trapped by the many larger and smaller dams and the irrigation systems (e.g. the sugar-cane plantations near Banfora), that very little water remains downstream. The gallery forests already show serious signs of deterioration because of water shortage.

- During the aerial survey it was seen that some of the protected areas south of Diébougou, the partial reserves of Bontioli, are heavily occupied by human settlements. The gallery forests along the Bougouriba and Volta Noire in the southeastern part of that region have almost disappeared as was also mentioned by Devineau et al. (1986).

- Another development, which started about 5 years ago in the southwestern part of Burkina Faso, concerns the introduction of cotton production at the village level. This has brought about a considerable change in their economy and a dependency on external developments (international market prices, industrial demands). The traditional production has become less secure because of these developments (See Annex 2, discussion with J.P. Hervouet) and a further extensification of this type of agriculture could easily lead to serious environmental deterioration and a diminished carrying capacity of the lands.

- The new developments in agriculture have also led to an increased use of pesticides. There are no accurate data on the basis of which an assessment can be made of the possible impact the agricultural use of pesticides may have on fish and invertebrates in the streams.

(3) Present developments in other countries visited

During the mission observations could be made on various occasions from a 4-seater Cessna flying at low altitude. Additional ground observations were made during land trips in the Republics of Guinea and Togo. (See Annex 3).
It became clear, that in the northeastern parts of Guinea the damage caused by forest fires has reached dramatic proportions. A local expert reported, that the total area of infertile lands is increasing quickly. Signs of serious surface erosion were seen everywhere. According to local informants hunters play a predominant role in setting the fires. On the other hand bush fires will certainly also result from agricultural practices with uncontrolled extension as well as by traditional management of the bush in order to get fresh grass for domestic animals.
It was also seen that the cutting of trees takes place at a large scale everywhere. Most of the wood is exported to the central parts of the country and to all the big cities. Fire damage and signs of gallery forest destruction were also observed frequently in south Mali and northern Ghana. Both aerial and ground observations clearly showed, that the condition of the tree cover is considerably better in Togo than in any of the other countries visited.

(4) The role of OCP with regard to development and environment

Ever since the start of the programme OCP has accepted responsibility for the possible primary impact of the larviciding operations on the biota of the rivers. The effects of the larvicides on fish and invertebrates are still monitored on a regular basis by national hydrobiological teams under the auspices of the Ecological Group and the ecotoxicological unit at the Headquarters in Ouagadougou. There is a good basic knowledge on the possible environmental effects of the larvicides which are used.
The present state of the art of the scientific evaluations of the larviciding operation is excellent and gives a good general picture of the ecological condition of the streams. It is also recognized by the mission that the Ecological Group and the National hydrobiological teams have played a vital role in the selection of larvicides, and so far most of them seem to be acceptable from an environmental point of view.

We endorse the decision of the Ecological Group to reduce the number of monitoring sites, while at the same time increasing the intensity of the studies at some suitable and representative sites. Such in depth investigations are essential for an appropriate analysis of possible long-term effects on fish and other organisms. It is also recognized that some detailed studies are necessary because some of the larvicides which were introduced in recent years (e.g. permethrin, pyraclophos) appear to be more toxic to the aquatic fauna than the traditional ones (e.g. temephos and B.th.), especially when they are applied in over-dosage during dry season conditions. Fortunately these lesser toxic compounds (especially B.th.) are still used successfully in many places.
It is obvious, that all fundamental and side-effect studies made on West African river ecology within the framework of OCP are of primary importance for an appropriate understanding of the biology of the

rivers. However, it should also be stated that the monitoring activities have only considered the water phase of the rivers. An adequate monitoring programme aimed at a long-term assessment of the biological quality of the rivers would include a regular assessment of the quality of the river banks (vegetation, physical condition, land-use etc.).

OCP does not bear direct responsibility for the possible secondary impact of the programme on the environment. OCP controls the disease and the countries are responsible for developments afterwards. Nevertheless at the Joint Programme Committee (JPC) meeting at Geneva in 1985 it was decided, that the Committee of Sponsoring Agencies (CSA) led by the World Bank should look into the development aspect in order to make recommendations to the countries in the region. At the JPC meeting at Accra in 1986 the CSA stated, that the development of liberated land should be handled using the mechanisms available, such as the World Bank consultations, UNDP round-tables and bilateral meetings, whereby the governments propose development activities. The CSA went further in order to see that before the eleven countries approached the donors, two studies should be made. One primarily aimed at the identification of suitable regions and needs and economic potentials for development, and a second study on the migration dynamics of human populations. In the meantime the results of the first study have been published (Hunting report, 1988). Thereafter additional studies will be made by individual countries in order to identify their own priorities (Etudes Nationales sur les possibilités de Développement, ENDP).

In this context it should be stressed, that onchocerciasis control has not been the only factor, which has given rice to the settlement of areas which were previously unoccupied. Studies by Hervouet (1985, 1990) show, that the relationship between the elimination of the disease on the one hand and the establishment of new settlements on the other are not necessarily correlated in a causal sense. Other variables are climatic change, political and socio-economic developments, cultural factors and other diseases (e.g. trypanosomiasis). For instance in the high basin of the Volta Noire and the Komoé-river high population densities were found despite the presence of hyperendemicity. There were also poorly inhabited areas, where conditions of hypo- and meso-endemicity prevailed. Furthermore it is known (e.g. Devineau et al., 1986), that the shift from intensive to extensive agriculture (one of the causes of the present deterioration of the land in many places), already started before the onset of OCP.
It should also be stressed, that the human attitude versus the environment varies considerably from one ethnic group to another, depending on their respective cultural traditions. The mission believes, that OCP has markedly **accelerated** the socio-economic developments in certain areas, especially in regions with organized or integrated settlements, but also, though to a minor extent, in areas of uncontrolled settlement.

(5) **Appraisal**

The mission concludes, that the condition of the West African environment is deteriorating quickly, but as elsewhere in the world there are marked regional differences, both within and among countries. It seems that most damage to the environment occurs more or less inadvertently. The vegetation bordering the rivers is cut by people which do not know or understand, that the gallery forests are essential prerequisites for the preservation of the resource value of the rivers. Devastating fires are set by hunters in search of the last remnants of the originally extremely rich African fauna and many expatriate "experts" and development projects are deficient in the sense that the possible environmental implications of their actions have not been a matter of concern.

OCP is a good example of a programme in which the possible environmental consequences formed a matter of consideration since the beginning of the operations. However, there are still many other ongoing programmes with narrow objectives and without inbuilt concern for the environment. Although the countries in the region are primarily responsible for the often miserable condition of their environment, foreign aid programmes have also caused a lot of environmental damage. For instance the many programmes oriented on one single objective only, such as irrigation, a certain disease, the construction of a dam, the establishment of a crop etc. aften do not take into account the possible negative side-effects.
In a sense this approach reflects the Northern academic tradition of specialization; people qualify in tropical medicine, tropical agriculture, irrigation, forestry etc. Most projects are implemented by departments and institutes which are specialized along these lines. Fortunately there is an increasing tendency towards a more integrated approach in landuse development.

(6) **Priorities for further research and monitoring with regard to the possible primary and secondary impact of the programme**

With regard to the primary impact of OCP, the mission would like to promote the following research objectives:

- A study on the basic physico-chemical characteristics of the rivers in the OCP countries should preferably be included in the Global Environmental Monitoring Programme for Water (GEMS-Water).
- An investigation of the role of non-point sources of pesticides on river pollution, covering cause-effect relationships and including an inventory of agricultural pesticides or other chemical discharges.
- Studies to improve the taxonomy and ecology on African fresh-water invertebrates.
- A study on the feeding behaviour and stomach contents of a selected number of fish species, to be conducted at sampling stations which are regularly monitored under the auspices of the programme.
- Studies of aquatic refugia, including an inventory of treated and untreated stretches of river and the detailed mapping of major biological refugia in and adjacent to the programme area.

It is also recommended, that links be established with existing research institutes in the donor countries to provide fellowships and further training facilities to the national teams in the region.

As far as the secondary impact of OCP is concerned the conclusion can be drawn, that the programme may have accelerated processes leading to serious environmental damage in areas of uncontrolled settlement. However, it is only one out of many factors, including other foreign aid projects, which are presently responsible for deforestation, desertification, erosion, losses of valuable species, hydrological disturbances etc, etc.
Fortunately, national authorities in the region recognize the need for an integrated interdisciplinary and interdepartmental approach (e.g. see the National Action Plan for the Environment in Burkina Faso). We recommend, that donor countries and international agencies make an effort to integrate their support to the countries concerned with regard to the solution of the environmental problems they face. The CSA certainly could act as a primary platform for the planning of useful action.
A meaningful action could be to develop a regional system of river-basin management. The river systems are primary resources. A further deterioration of these systems would make most countries in the region unfit for human habitation.

The following actions could be envisaged:

(1) A survey of the condition of the river-systems and their surroundings as a follow-up of Devineau et al., (1986), using all existing data, including Landsat- and Spot-images, aerial photographs etc.
(2) In depth studies on the functional relationships between the gallery forests and the aquatic biology of the rivers, including fisheries, hydrological aspects, energy flows, and all socio-economic development aspects.
(3) Studies on the international management possibilities for river systems (e.g. river boards).

The mission is of the opinion, that the World Bank should act as the major convener for the foreign component of such action. First of all the Bank has played an important role in other regional development schemes (e.g. OCP). Secondly the bank wants to integrate environment in all its activities. On the occasion of the Workshop at Bobo Dioulasso, Mr. Peter Watson, representative of the World Bank, stated: "De plus, il vient d´annoncer la semaine dernière à Tokyo diverses mesures visant à renforcer notre programme environnement. Il s´agit d´abord de l´allocation de plus d´**un milliard de US** $ sur les trois ans à venir, exclusivement pour des projets environnementaux. Le Président à insisté que les efforts que nous faisons pour intégrer l´environment dans **tous** nos projets de développement. C´était dire que l´environnement c´est l´affaire de nous tous, ce n´est pas seulement l´affaire des écologistes. Il est important que nous puissions intégrer l´environnement dans tous nos projets de développement dans tous les pays".

ANNEX 1

Terms of reference

TERMS OF REFERENCE

On the occasion of the 10th session of the Joint Programme Committee (JPC) in the Hague (4-7 December 1989) the Netherlands Deputy Director General for International Cooperation expressed appreciation for the work of the independent Ecological Group and he also stressed the importance of incorporating the secondary environmental impact of the programme.
The main task of the mission was to formulate possible useful action within the framework of the environmental activities of the programme.

The Terms of Reference for the mission, as formulated by Mr. K.P.M. de Beer, Head UN-Section, Multilateral Development Cooperation Department, Ministry of Foreign Affairs of the Netherlands, were to:

- analyze the present institutional setting of the bio-monitoring programme, including the role and tasks of the biological teams and recommended improvements;

- identify major constraints, faced by the environmental section, partly as a result of the departure of ORSTOM staff;

- define major needs in terms of scientific support, logistics and training of the environmental component within OCP;

- identify important priorities for further research and monitoring both in terms of primary impact and secondary impact of the programme;

- to review the sampling protocol and to recommend possible improvements in terms of cost-effectiveness of the bio-monitoring programme;

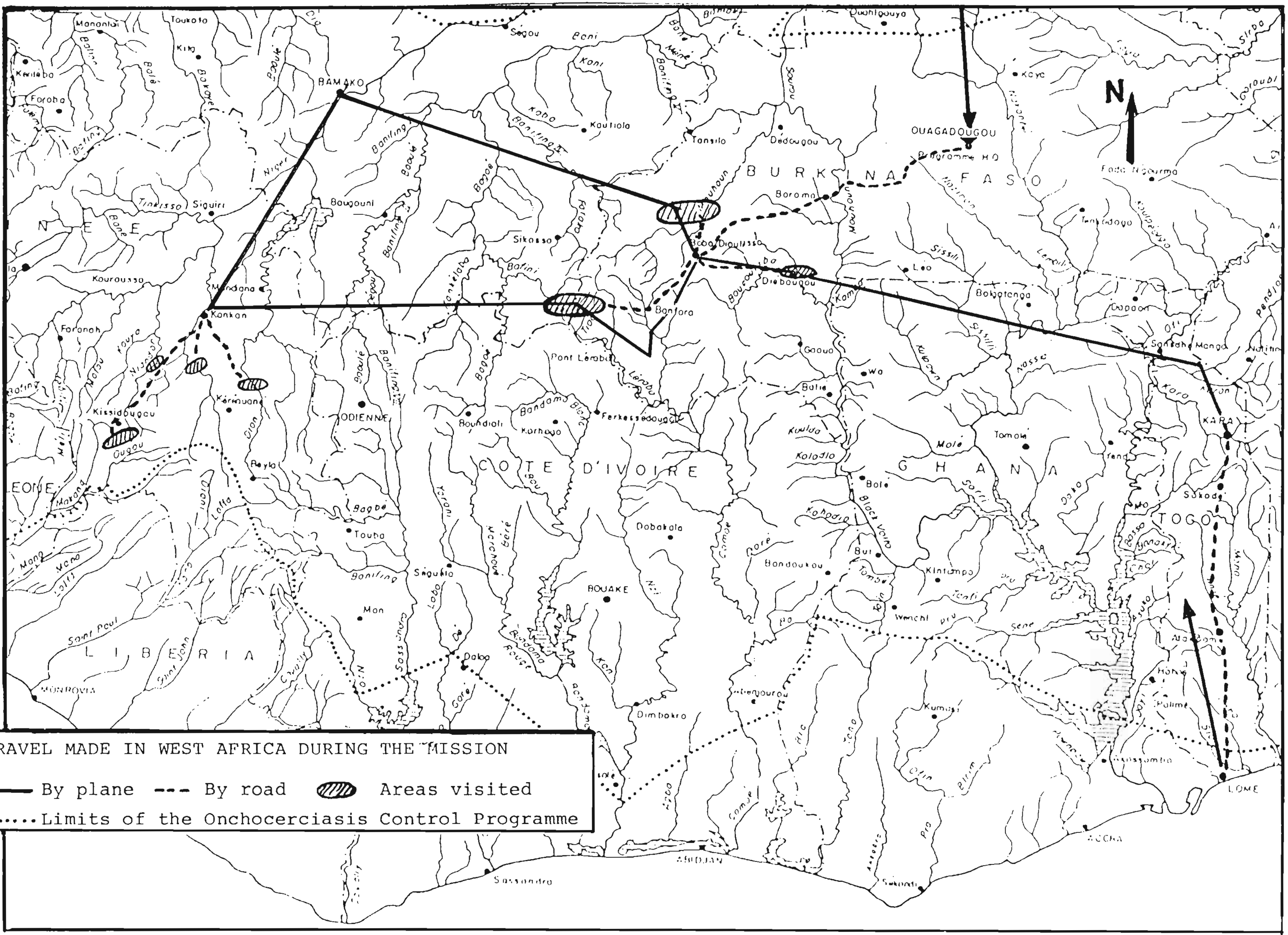
- recommend on major action to be taken to overcome the identified constraints, enforce the institutional setting and improve the performance of the bio-monitoring programme.

The mission further took note of some statements in the speech of the Netherlands Deputy Director General for International Cooperation, who also stated:
" The virtually uncontrolled migration of the population into the OCP areas raises questions which the programme will have to address now and in the future ", and
" More attention could be devoted to the secondary environmental effects, such as the clearance of the vegetation and the problems of soil erosion which follow where populations are resettled".

On the first day of the mission at Ouagadougou the TOR were discussed with the Director of OCP, Dr. E.M. Samba. He gave his support to the mission and mentioned, that next to its primary objective, the control of onchocerciasis, OCP experience could contribute to developments in the area which relate to environmental problems, for instance with regard to environmental monitoring, systems development, management capabilities and others. The Director of OCP also mentioned, that apart from the Netherlands other donors had also touched the problem of the possible secondary impact of the programme on socio-economic development and environmental impact (JPC, 1989).

ANNEX 2

Visits and interviews



TRAVEL MADE IN WEST AFRICA DURING THE MISSION
By plane
By road
Areas visited
Limits of the Onchocerciasis Control Programme
N
BAMAKO
OUAGADOUGOU
Programme H.Q
BURKINA FASO
COTE D'IVOIRE
GHANA
TOGO
LIBERIA
Segou
Sikasso
Bougouni
Siguiri
Kankan
Kissidougou
Kouroussa
Bobo Dioulasso
Banfora
Diebougou
Boromo
Dedougou
Koutiala
Tansila
Leo
Bobatenga
Dapaon
Fada N'gourma
Tenkodogo
Kaya
Sansane Mango
KARA
Sokode
LOME
ACCRA
ABIDJAN
Sassandra
MONROVIA
BOUAKE
ODIENNE
Korhogo
Ferkessedougou
Boundiali
Pont Lerabe
Gaoua
Wa
Bole
Bui
Bondoukou
Dabakala
Kintampo
Wenchi
Tamale
Kumasi
Dimbokro
Daloa
Man
Touba
Seguela
Beyla
Karinuana
Palime
Hohoe
Black Volta
Niger

VISIT TO THE MINISTRY OF ENVIRONMENT AND TOURISM

General background

The "Ministère de l´Environnement et du Tourisme" was established in 1974.
In 1979 the "Programme bois de village" was launched (since 1984 this programme is known under the name "Programme National de Foresterie Villagoise (PNFV)". The main objective is to give the rural populations their own means to develop their lands.
In 1986 a "Plan National sur la Lutte contre la désertification" was developed.
It is also important to mention, that environmental objectives are explicitely dealt with in the "Premier Plan Quinquennal de Développement Populaire", which runs from 1986-1990.
All these activities now culminate in a real national environmental programme, which was presented in October 1989 under the name "Plan d´Action National pour l´Environnement (PANE)". It is also interesting to note, that in the same month the plan was submitted to a critical discussion in a workshop by the Comité National de Lutte Contre la Désertification". The workshop took place in Bobo Dioulasso and was supported financially by the World Bank, GTZ/CILLS and the Canadian Agency for International Development. The proceedings were published in October 1989 under the name "Actes de l´Atelier sur le Plan d´Action National pour l´Environnement".
Most recently the preliminary version appeared of Project BKF/86/014 "Appui a la direction des études et de la planification du Ministère de l´Environnement", which describes the major policy objectives and the role of other ministries.

The major objectives are:
- to protect and restore environmental quality
- to obtain self-sufficiency in food production, and
- to satisfy the national needs for energy and wood.

In order to meet these objectives the following three urgent actions are announced:
1 Actions against forest-fires.
2 Actions against the uncontrolled movements of domestic animals.
3 Actions against the uncontrolled cutting of trees.
Other actions include the protection and reconstitution of the gallery forests (certainly also of interest from an OCP point of view), the protection of classified forests, the creation of seeding plantations and the preservation of the fauna.

Persons interviewed:

Mr. Alfred ZONGO, Director for studies and planning at the Ministry of environment and tourism.
Mr. Jean LINGANI, Chief forest and reafforestation division (MET).
Mr. Goudouma ZIGOMI, Reafforestation service (MET).

The Ministry of environment has to manage the following sections:
- Desertification.
- Deforestation and reafforestation.
- Fisheries and game.
- Urban pollution.
- Tourism.

The Director of studies and planning explained to us the Ministries concern about the environmental degradation presently occurring in the whole of the Sahelian area.
He listed the factors affecting this degradation as follows:

A Desertification and degradation of the vegetal cover is a consequence of the dryness occurring in the Sahelian area over the years.

B The desertification phenomenon is markedly accelerated by anthropogenic actions. Migration of the population precedes the desertification front. Extensive use is made of detrimental practices such as bush fires and intensive agricultural land use.

C Increasing demography and its consequences on the urban population leads to an intensive use of timber and wood for domestic purposes.

D Most development projects do not adequately consider their possible impact on the environment.

Responsible persons are aware of the necessity to incorporate environmental aspects in the general education scheme at schools, in order to make the children more aware of the problems of environmental protection. A pilot project was established in coordination with the Burkinabe and Danish Red Cross, at the primary school level (Anon.a, 1989).

Recommendations made by the Ministry of environment and tourism.

- The liaison between the Ministry of Environment and Tourism and the institutions and agencies involved in development programmes should be improved.

- Environment aspects should be taken into consideration in all development projects.

VISIT TO THE PLANNING MINISTRY, GENERAL DIRECTORATE OF COOPERATION

Persons interviewed:
Mr. Christophe DABIRE, General Director of Cooperation.
Mr. Onasene NAGDA, Chief of the division "direction and unwavering of the projects".
Mr. Abdoulkader A. CISSE, Director of studies, programmation and unwavering of the financements.

These interviews led us to the financial section of the International Cooperation Office where numerous financial forms were presented to us. These dealt with the financial evaluation of several development projects, including an "up to date" statement of their present cost.
We asked for more details on certain technical aspects (finalization and duration of the projects, superficies concerned, potential impact, etc.). However, there were no documents available at that time.
The Directorate of Cooperation is responsible to the Planning Ministry Office and takes care for the incorporation of a specific paragraph on environmental protection in all UNDP financed projects.
An overview of the projects in realization was presented by the Director.

Some of the presented projects:

- Hydro-electric and agricultural project of the Kompienga area (FRG financed).
- Involvement of FAO with the hydro-electric project of Bagre amongst others through reafforestation.
- Integrated hydro-agricultural project of the Sissili. Particular attention is paid to migration of populations in connection to the prevention of deforestation.
- Integrated development project in the Attenga Passore region (Projet du Sourou, financed by the EDF).

The Ministry for Farmers Cooperative Action coordinates the use of the development budgets. It takes into account all aspects of agroforestry and has also to ensure the protection of land-property. For example, it administers an amount of 15.000.000 DM for forest protection.

The Directorate of Cooperation stressed the need for a better coordination between institutions, offices and political instances involved in development projects. A consultation is being undertaken for this purpose.
The Planning Ministry is determined to integrate all types of projects, as in the case of the Sissili integrated development scheme (budget: 11.000.000.000 CFA).

VISIT TO THE PERMANENT SECRETARY OF THE COMMITTEE FOR ABATING DESERTIFICATION (CNLCD)

The Director Mr. Adama SANOGO was absent and we met Mr. Ouniyida ZOURE, responsible for rural development technics. He showed us numerous interesting reports which we could not get directly from the library of the Ministry for Environment.
The CNLCD is a joint service of the Ministry for Environment and Tourism, and acts mainly in the following fields: forest protection and game regulation. The Permanent Secretary is aware of the necessity to establish a regulation for any kind of deforestation, to prohibit bush fires and promote reafforestation schemes in parallel to each development project. In that respect, Mr. ZOURE stressed that Eucalyptus is certainly not the most suitable tree specie to use.

Mr. ZOURE is aware of the necessity to manage all environmental problems by an integrated approach, but such a way of thinking is still to new to already be in systematic use. It would necessitate the regular application of technical aid by qualified staff.

When asked for his opinion on the successful role played by OCP in the recolonization process of the liberated areas, Mr. Zoure stressed the necessity to take more care of the secondary consequences of the programme. An acceleration of the recolonization rate presently observed in the whole southern region of Burkina Faso can easily lead to an excessive land use and accelerate the degradation of the vegetal cover.

VISIT TO THE FRENCH OFFICE FOR COOPERATION

It was not possible to meet the people in charge of the Aid and Cooperation Service connected to the French Embassy, as some were absent and others were too busy.

It was recommended that we should visit the International Centre for Documentation (dependent of the French Aid and Cooperation Mission), where we could talk with the Director (Madame GINES) and get information on some projects receiving a financial support from the French government.

VISIT TO THE FAO OFFICE

Persons interviewed:
Mr. Bamba M. MAGDY, in charge of the FAO Programmes
Mr. Kassim TRAORE SOGOSSI, Programmes Assistant
Mr. Raoul PIERRE-LOUIS, responsible for the FAO/UNDP CTP-BKF- 86/014 programme.

Mr. MAGDY, who was recently assigned to Ouagadougou to coordinate the implementation of the FAO programmes, informed us of a conference taking place in Ouagadougou at the time of our visit. The conference dealt with the establishment of a coordination system for the development projects undertaken by the different UN Agencies. The coordinators of FAO, PMA, UNDP and UNICEF were present at this conference.

After a short presentation of the projects in course, it became apparent that none of the projects was directly connected to OCP. Furthermore, we noted a total independence of the general programmation with the positive results obtained by OCP at the level of the onchocerciasis liberated areas.
However, Mr. MAGDY considered that, at the present time, AVV was more suited to take into account the success of OCP. He also considered the present programme of AVV as totally adapted to the socio-economic situation in Burkina Faso.

We were informed about the strong desire of FAO to systematically include environmental impact studies in all projects under the responsibility of UNDP and FAO. It was stressed that the environmental component could no longer be ignored and that all efforts to this end should be supported by specific funding.

Mr. PIERRE-LOUIS, in charge of the CTP/BKF -86/014 programme (fisheries and water management) pointed out the difficulties encountered by the FAO in that field. They faced a conflicting situation between fishermen, farmers, stockbreeders and water consumers in all hydro-electric and hydro-agricultural projects. Each category of users wanted a kind of exclusive use of the water resource. These problems should be carefully studied before the implementation of each project and not after conflicts rise. There is an evident need of consultation between professionals on this at the design of each project.

VISIT TO AVV
(Autorité pour l´aménagement des vallées des Volta)

We met Mr. SAMA, AVV Director at Bobo Dioulasso, in order to obtain general information about the AVV projects and to assess their present stage of implementation.

During a field trip, it was possible to visit the Diebougou AVV project (UP 10), located in the south-eastern region of Burkina Faso.
This project started in 1974, and is strongly linked to positive OCP results in this area. Ninety-one villages were created, housing more than 400.000 inhabitants. It was intended to integrate "spontaneous migrants " into the primitive sedentary human settlements as far as possible..
The typical structure of an AVV village is based on the use of a ten ha area, one ha being reserved for habitations. The way of exploitation and cultivation is regulated according to the limitations of space.

Although multi-cropping was being practiced, special attention was paid to cotton cultivation, in order to obtain devises and repay the credits advanced. This system worked perfectly until 1982. Then, due to an overall decline in the quality of cotton produced, and subsequent conflict with Sofitex (a major purchasing textile company), the commercial interest in cotton production decreased. There is now new interest in maize and sorgho.
Organic fertilizers, as well as N-P-K fertilizers, are regularly used. Animal production is extending.

Generally, the average income of an AVV-village family of less than ten persons is about 600.000 CFA (net). Comparatively, the yield of a family of eight or more members in a traditional village is about 77 000 CFA. However, the AVV village represents a certain constraint in respect to the traditional use of the land.
All AVV projects, even if they have not reached their planned extension rate, can be considered as a success, mainly for the following reasons:
- Good choice of responsible persons.
- The projects are conducted by pioneer farmers.
- There is a good professional formation at all levels and a good gradation in the competencies.
- There is a strong continuity of actions.

The main difficulty encountered was to establish limits for each village. Traditional limits of cultivation plots remained secret for cultural reasons.

Apart from the organization of villages, the AVV had other achievements. For example:
- Logistic infrastructures for mechanical maintenance.
- Sanitary services.
- Schools.
- Training centres for women.

During our visit to Diepoloko, an AVV village close to Diebougou, we got a good impression of another successful aspect of AVV projects. Diagara villages were established very close to Mossi communities and remained apparently in total independence but in harmony. Both had their own traditional storehouses full with corn reserves. Reafforestation plots were present at regular intervals.

VISIT TO ORSTOM OFFICE AT OUAGADOUGOU
(French Institute for scientific research for the development in cooperation)

Persons interviewed:
Mr. Jean Claude GAUTUN, Director of the ORSTOM centre.
Mr. Jean Marie LAMACHERE, Hydrologist.

During our visit we were informed about different development projects occurring in Burkina Faso at that time and projects that were planned for in the near future. The information coincided with that previously obtained from other Institutions. The main projects with a potential impact on the environment, were located in the Sourou region, the Kou valley, the Banfora region, the Kompienga catchment or near villages such as Banzon, Bagre, Noumbiel,etc.

There was always good coordination between ORSTOM and OCP, not only in carrying out the biological monitoring programme (primary impact), but also in realizing several specific studies such as:

- Study of the process and recolonization possibilities in valleys free from onchocerciasis.
- Study of the degradation of the physical biota in recolonization areas.
- Study of the management strategies used in low wetland cultivations.

Other more general studies are carried out by ORSTOM, dealing with different aspects of environment protection. For example, the study of the inundation risk related to the management of the Niena-Dionkolé plain. This work shows the risk of excessive run-off and erosion resulting from the degradation of the vegetal cover or deforestation in that region.

We were also informed about the important wok carried out by J.P. HERVOUET, an ORSTOM geographer. He has mainly studied the man/space relations in the OCP area and its environmental consequences. A detailed statement related to his work is made in the following pages.

VISIT TO THE PROJECT "NATIONAL MANAGEMENT PROGRAMME OF THE VILLAGE SOIL"

Person interviewed:
Mr. Koussoube ARZOUNA, Agronomist

This programme will soon become official at a Ministry level, within the context of an "interministerial cell for reflexion and action". Based on some pilot projects, it has been set up to achieve the optimal management of an agricultural space.

This programme will last for 15 years and contains three main components:

1 Training for organization and participation of the population, outside the actual academic training structures.
2 Development of specific projects (under detailed agreements), which stipulate the work protocols accepted by farmers and the organization of socially oriented activities, and which take into account the allocation of equipment budgets.
3 Agrarian reform taking into account the initial land property.

This programme is running well, although it has sometimes been regarded as too "preservationist" for the environment and not enough linked to development!

Problems have occurred in the running process of this programme, due to heavy migration of population on a North-East/South-West axis (Mossis, Peuls etc.).

INTERVIEW WITH J.P. HERVOUET, GEOGRAPHER ORSTOM, BOBO DIOULASSO

Our meeting with Mr. J.P.Hervouet was of special interest because of his vast knowledge of landuse developments in the region concerned. A brief account will be given of the conclusions drawn from the conversations with Mr. Hervouet.

A change from intensive to extensive agriculture should be regarded as a normal reaction of man to unfavorable climatic conditions, such as prolonged periods of drought. For instance until 1975 the Senufo used to practice intensive agriculture around their villages, which consisted of the Faiherbia albida management system in combination with cattle husbandry. Thereafter an extensive landuse system was adopted and most of the trees were cut. This has led to massive erosion. Locally people are presently returning to more traditional ways of cultivation.

In general traditional socio-economic and landuse traditions seem to have been neglected within the framework of many development programmes. An example is the introduction of large scale cotton production at the village level which started about five years ago in the south of Burkina Faso. This has caused a considerable change in agricultural practice and the local economy. Important consequences are (1) increasing dependency on a number of external developments (international market prices, industrial demands of cotton, etc.) and (2) a reduced security with regard to the local production of food.

Frequently the concepts underlying large scale agricultural programmes such as the large scale hydro-agricultural projects) stem from the minds of expatriate "experts", who are unaware of the traditional and often successful management systems. Already in 1850 René Caille noted that perfect land management systems existed in dry (rainfall less than 800 mm) and densely populated (500 persons/km^2) areas, for instance in the Bissa region.

Some considerations with regard to OCP activities

In the OCP area, the valleys reclaimed from Onchocerciasis are not of a homogeneous nature. They vary according to their physiography, geomorphology, vegetation and hydrological regimes, and especially also with regard to characteristics of the local human populations (density, culture).
It is often claimed, that Onchocerciasis control is the only factor, which has given rise to the settlement of areas which were unoccupied previously. However, studies by Hervouet (1985, 1990) show that the relationship between the elimination of the disease on the one hand, and the establishment of new settlements on the other are not necessarily correlated in a causal sense.
Other variables are climatic change, political and socio-economic developments, cultural factors and other diseases (e.g. trypanosomiasis). For instance in the high basin of the Volta Noire and the Komoé-river high population densities were found despite the presence of hyperendemicity. There were also poorly inhabited areas where conditions of hypo- and meso-endemicity prevailed. There are even totally depopulated valleys outside the areas affected by river-blindness (Hervouet, 1990).

ANNEX 3

Observations made during the site visits

OBSERVATIONS MADE DURING THE SITE VISITS

The site visits made are summarized in table 3.1.

Table 3.1. Sites observed during the mission

Date	Location	Landuse aspects[1)]
15/2	Banfora, Loumana, Komoé-dam	Large scale irrigation agriculture
16/2	Banzon, Kou-basin, Volta Noire	Integrated agriculture
18/2	Diébougou, Bougouriba	Settlement Programme AVV-UP 10
19/2	Aerial survey Bobo Dioulasso-Kankan, including Komoé-basin	Forest management Condition gallery forest
20-23/2	Various sites near Kankan and Kissidougou	Forest management Aquatic monitoring
24/2	Aerial survey Kankan-Bamako	Forest management
25/2	Aerial survey Bamako-Kara (crossing southern Burkina Faso and northern Ghana)	Observations on project development (Banzon), condition classified and gallery forests

1) During the site visits expert advice was provided by Mr. Campaore Boureima, Ingénieur Agronome, Chef de Projet AVV-UP 10; Mr. J.P. Hervouët, chercheur ORSTOM, antenne ORSTOM/OCCGE, Bobo Dioulasso and Mr. R.O. Sawadogo, Entomology assistant, OMS/ONCHO, chief sector Bobo Dioulasso.

A lot of development takes place in the formerly heavily infested valleys of the Komoé and the Léraba.
Near Banfora in the Komoé valley the large scale sugar-cane project is still expanding. Presently a new dam is under construction in the upper basin of this river system. Environmental problems start to arise. So much water is trapped by dams and irrigation during the dry season, that very little remains downstream of the project areas within the river system, including both deterioration. It was also observed that because of these developments, the riverine vegetation becomes much more vulnerable for the impact by bushfires.
Another development, which started about five years ago in the southwestern part of Burkina Faso (e.g. area around Niankorodougou and Loumana), concerns the introduction of large scale cotton production at the village level. This has caused a considerable change in the local economy and a dependency on various external developments (e.g. international market prices, demand by industries). The traditional production of food has become less secure because of these developments (see also Annex 2, discussion with J.P. Hervouet).

At Banzon, a village situated in the upper-basin of the Volta noire (Mouhoun), a multiethnic rural community has established itself with the technical support of China. Within a decade a small Toussian village has become a community of 6000 people, comprising six different ethnic groups (Bobo, Dioula, Mossi, Sama, Sembla and the original Toussian).
Ground and aerial observations indicate, that a further increase may soon lead to over-exploitation of the region. At the inlet of the irrigation canal the whole waterflow of the Volta Noire is trapped leaving an almost dry river bed "down-stream" during the dry season.

The large-scale rice-programme along the Kou river (tributary of the Volta Noire) near Bama started at the end of the sixties with technical support of Taiwan. In the beginning it was financed by the West African Development Bank together with the Netherlands. After a few years the Netherlands became the main donor. The second phase expired in 1989. The project proposal for the third and last phase is presently considered for approval. The total irrigated area amounts to 1000 ha, the average farm size 1 ha. Thus the cooperation counts approximately 1000 members. The project is aimed at the self-sufficiency of the cooperation. In the last phase emphasis will be put on the improvement of the socio-economic conditions in the whole project area. As in the case of most other projects of which descriptions were seen and/or which were actually visited apparently no attention is paid to aspects of environmental damage in/or outside the region. The river valley downstream the Kou-Volta Noire confluence is deteriorating quickly as has been demonstrated for instance by the surveys made by Devineau et al., (1986) in the Lahirasso area. Next to population pressure water shortage in the river bed could be an important threat to the valley.

The AVV-UP 10-project in Diébougou appears to run very well. The main donor is GTZ (FRG) and the success is claimed to be a consequence of the German approach called ZOPP (Ziel Orientierte Projekt Planung = Target oriented project planning). The project comprises 245 000 ha on the left bank of the Bougouriba. It is claimed, that the project would not have been possible without control of onchocerciasis. There are 229 traditional and 91 new villages which were established under the auspices of AVV. Together they comprise four different ethnic groups, Dagara, Pougouli and Peul (the original inhabitants) and Mossi. The latter dominate among the immigrating populations. Presently a number of infrastructural provisions are becoming operational, such as road-systems, dispensaries, shops and schools.

There is a reforestation programme and bush fires are not allowed or completely under control. There are problems too. The most serious problem is, that the project (as elsewhere in comparable projects) attracts migrants who either settle within the project area or in the immediate vicinity. This may easily lead to overexploitation of the local resources because of high population pressure, inadequate farming systems and extensive cutting of trees. The large scale irrigation projects elsewhere in Burkina Faso (e.g. the Kompienga project) already show serious signs of environmental deterioration because of such developments. Another problem in AVV projects and other comparable projects is formed by the disputes about the extension of the fields of the migrants relative to rights of possession of the original inhabitants. This is a problem which can only be solved once the projects become fully self-sufficient and capable to organize the structure of the community (see also the discussion with the staff of AVV-UP 10 in Annex 2).

Ground and aerial observations showed, that signs of serious deterioration of the environment occur in the region south of Diébougou. Extensive tree-killing forest fires appear to occur in the Bontioli nature reserve (Réserve totale de Bontioli). The "Réserve partielle de Bontioli" is completely occupied by settlements and apparently does not exist anymore. Furthermore it should be mentioned, that the gallery forests of the Bougouriba Volta Noire in this region show very serious signs of deterioration. Our findings confirm the findings by Devineau et al., (1986), namely that the majority of the gallery forests alongside the Bougouriba and the Volta Noire near their confluence have either disappeared completely or are in very bad shape.

During the mission in the Republic of Guinee, it became obvious both from ground and aerial observations, that the area seen, the northwestern part from Kissidougou to the frontiers with the Ivory Coast and Mali, is in a state of more or less complete destruction. Over 50 per cent was burning at the time of the visit or had burned recently. Local informants told us, that the range of completely infertile lands is expanding quickly. It was also told, that hunters play a predominant role in setting the fires in order to catch the last remnants of wildlife. In the same way bush fires will also result from other causes (e.g. traditional control of grass on fallow land and traditional management of the bush in order to stimulate the growth of fresh grass for domestic animals). It became also obvious from the piles of wood alongside the road between Kankan and Kissidougou that trees which survive the fires are cut at a speed, which very probably exceeds the regeneration potential of the forests considerably. We made a rough assessment of the amount of wood along the road during a single trip. The results are summarized in table 3.2.

Table 3.2. Evaluation of the quantities of wood for sale along 100 km section of the road between Kankan and Kissidougou (observations made on February 22)

Distance from Kankan (km)	Number of selling points		Volume in m^3	
	left	right	left	right
0 - 10	0	1	0	0.5
10 - 20	3	3	3	9.5
20 - 30	5	3	4.5	2.7
30 - 40	8	9	10.1	21
40 - 50	5	6	8	19.9
50 - 60	11	9	21.7	53.5
60 - 70	13	14	66.2	64.5
70 - 80	5	5	39.5	11.5
80 - 90	4	3	13.5	7.5
90 - 100	0	1	0	2
TOTAL	54	54	155.5	192.6

The wood is collected by lorries at least weekly and carried to Kankan and Kissidougou. In the immediate vicinity of both cities (e.g. within a distance of circa 20 km) the wood is transported into the cities by small vehicles. Moreover it was seen that many private persons purchase wood alongside the road.
Wood forms by far the most important source of fuel in this region as in many other parts of West Africa. However, considering the losses by burning as well as the cutting efforts, this part of Africa will deteriorate into desert proportions if no attempts are made immediately to stop these developments. We feel, that in this country onchocerciasis control does not play any role at all in the course of events leading to a complete destruction of the environment.

Low altitude aerial observations also revealed a lot of fire damage in southeastern Mali and even more in northern Ghana. The landscape in the Republic of Togo appears to be in a much better condition as could be seen from the air in the northern part of the country and from the ground by following the road from Kara to Lomé.

ANNEX 4

Biological monitoring

BIOLOGICAL MONITORING

During our mission, few days were specifically reserved to check the present stage of aquatic monitoring in the western extension phase of OCP. At Kankan, we met M.K. Nabe, invertebrates specialist of the Guinea National team and the only member of the monitoring staff present in Guinea at the time of our visit (the other members were at Lama-Kara, attending an hydrobiologists meeting).
We also had the opportunity to make some on-site checks and to evaluate the results already obtained in Guinea.

A. General situation

At the present time, three sites are monitored for fish and only one (not included in those three...) is studied for invertebrates.
The Boussoulé site, which was monitored at the beginning for fish and invertebrates, has been strongly affected by the accumulation of suspended solid matter coming from a diamond mine located upstream on a small affluent of the Milo. However, there was no reason to stop the invertebrate monitoring at that site and to follow fish monitoring. Both invertebrate and fish monitoring were necessary in order to demonstrate drastic effects on populations in the riverine communities, from other sources than insecticides.
Mine contamination of the Milo has now reduced, due to political action, The invertebrates fauna has rapidly recovered, another illustration of its potential capacity to recover to the more or less original state.

The methodology used in the invertebrate monitoring appeared adequate to us. The periodicity of visits was also convenient but the number of sites monitored (only Sassambaya) was too limited to give us a good picture of the hydrobiological situation in the surrounding of Kankan.
After a visit to the Sassambaya site and checking available data, it appeared that condition of the fauna at this site was very poo . This situation possibly resulted from several applications of a pyrethroid compound at the end of the last rainy season. During our visit we found some first-instars of small Ephemeroptera which, perhaps, attest to the beginning of a faunal recovery, occurring after a long series of B.th. applications. As we had encountered the same situation at the Bambaya site, located on the upper basin of the Niandan River, it could be stated that the whole treatment procedure since the last summer, alternated with the use of different products such as Permethrin, Abate, Chlorphoxim or B.th. is the cause of the poor biological situation encountered.

In comparison and despite the pollution occurring from the diamond mine activity, it was clear that the fauna observed on the Boussoulé site was the richest and most diverse.
Samples have been collected on all the visited sites. The study of the samples collected on the Milo site will allow a comparison to be made between the situation observed ten years ago during the first mission from Dejoux and Troubat in March 1980 and the situation encountered during the regular monitoring activity, i.e. in March 1987 and 1988.

The fauna we found during a visit on the Téré site, located on the Dion River, an affluent of the Sankarani, was very rich and diverse. Taxa, such as Trichory thidae and Oligoneuridae, were present in abundance. This in contrast with the Niandan river, where they had disappeared completely. Despite the present bad accessibility of the site by car, the Téré breeding site will be a good site to regularly monitor invertebrates.

Due to the absence of the scientist in charge of the fish monitoring, we are not in a position to make a statement on the quality and results for fish monitoring. However, during a short visit to the fish collection, Mr. Soropogui (fish technician) informed us about the recent decision to stop collecting fish stomachs for content-analysis. It seems to us that a continuation of such study would be particularly interesting if special attention was paid to the linkage between fish feeding habits and the drift increase of invertebrates occurring after each chemical application.
An examination of the last two reports presented by the Guinea monitoring team (1987/1988 and 1988/1989), did lead us to the conclusion that the monitoring job was correctly done there.

B. **Logistics**

Discussions with M.K. Nabe indicated that the monitoring team faced numerous logistic difficulties, such as a lack of transport, fuel, electricity, documentation, etc.
As this situation is no exception in Guinea, due to the present economical difficulties, we recommend to OCP to provide more support to this team.

C. Recommendations

As far as our short visit to Guinee allows conclusions, we recommend:

1 To add two more sites to the existing one for invertebrates monitoring in Guinea in order to reach the following scheme:
   - Sassambaya (Niandan) - visits with the same periodicity as presently done;
   - Boussoulé (Milo) - same periodicity as for the Sassambaya site;
   - Téré (Dion) - three visits a year during the dry season; i.e. in February, March and April (see map).
2 As we found no evident advantage in collecting two night dried samples (one with a 500 mesh size and one other with 200), we propose to cancel the 500 sample.
3 Upon their request, it would be convenient to assist the Guinea team (and certainly the other national monitoring teams...) with a complementary training program in aquatic ecology. The need of assistance, in the form of, for example, financial support and scientific advice, in collecting documentation dealing with aquatic biology and ecology is stressed.
4 The team(s) should be given more room to carry out specific support research on river ecology, in order to facilitate the interpretation of the monitoring results and for a better understanding of the aquatic ecosystems.
   - Studies on the relationship between drift of invertebrates (natural and "catastrophic" drift) and fish feeding habits, through stomach contents analysis.
   - Evaluation of the importance of the refugias in treated areas in relation to recolonization potential.
   - Studies on the importance of slow moving sections of a river in the general ecology of lotic ecosystems (in comparison with the importance of rapids or riffles).
   - Studies on the taxonomy, biology and ecology of some dominant species (fish or invertebrates).
   - Evaluation of the life cycle duration of some important invertebrate species, in order to better explain specific impacts.

ANNEX 5

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ILLUSTRATIONS

photographs made by the authors

PLATE A

1 large scale cotton production at the village level
2 idem

PLATE B

1 traditional granaries in the Senoufo region near Lumana (southern Burkina Faso)
2 traditional use of agricultural land, showing a *Faidherbia albida* plantation near a village associated with cattle breeding

PLATE C

1 Komoé waterfalls north of Banfora, picture taken in the beginning of 1973
2 the same place in the beginning of 1990. All the water is trapped for the irrigation of the suger cane plantations

PLATE D

1 aerial view of the sugar cane plantations near Banfora. The round shape of the fields reflects the 'merry-go-round' principle of the mechanical watering system

2 the watering system in use on mid-day at a temperature of circa 40 C, using the water of the Komoé river

PLATE E

1 aerial view of the agricultural development scheme at Banzon
2 (left) the condition of the Volta Noire just upstream the catchment point for the Banzon project (picture taken on 16 February 1990)
3 (right) the same river immediately downstream the catchment point (picture taken on the same day as the left one)

PLATE F

1 bush fire, the most powerful method for clearing the fields and... to kill trees

2 (left) ringbarking represents a first step when trees are elimenated in the course of forest reclamation

3 (right) in most places in West Africa fire forms the second step. Together with the trees the remainder of vegetation disappears as well, leaving a bare soil which is extremely vulnerable for erosion. Picture shows a complete denuded laterite surface

PLATE G

1 typical gallery forest in the northern Komoé basin with a good river bank protection and high biological potential

2 (left) aerial view of the Bagoué river in northern Ivory Coast showing extensive fire damage and simultaneous losses of valuable gallery forrest

3 (right) pictures like these could be made near almost every village along the roads in Burkina Faso and the Republic of Guinee

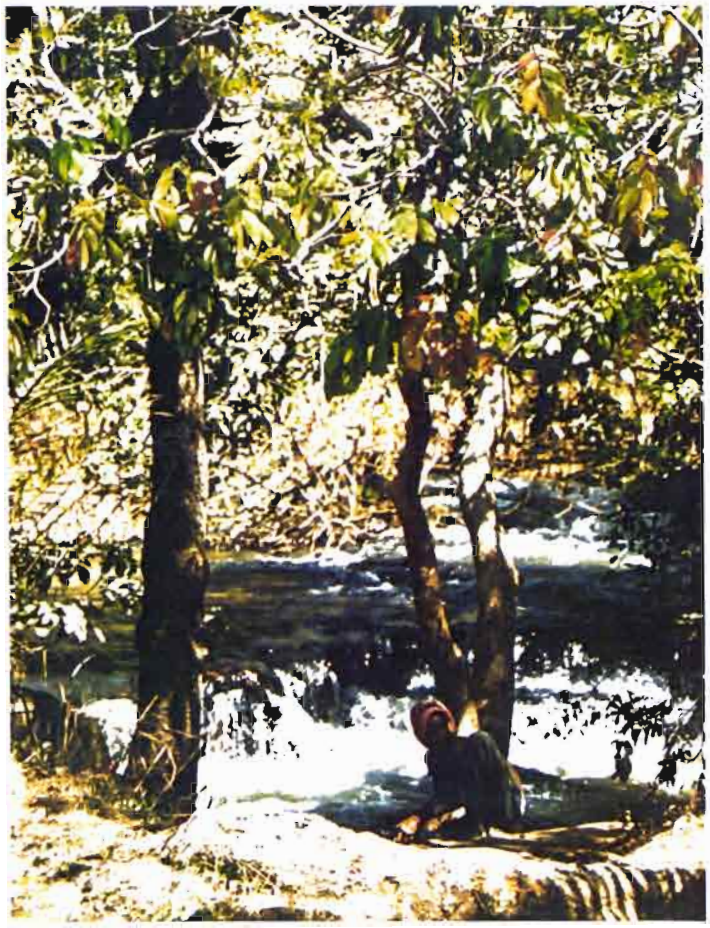

PLATE H

1, 2, 3 successive stage in the progress of gallery forest destruction. The final stage as shown in picture 3 can be seen in many places: Soils are denuded, no vegetation remains and the rivers dry out very quickly in the course of the dry season