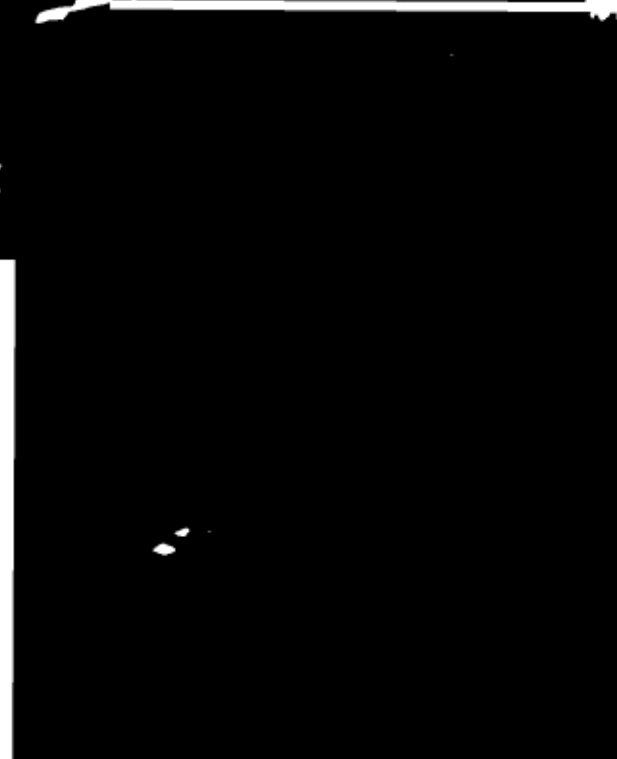
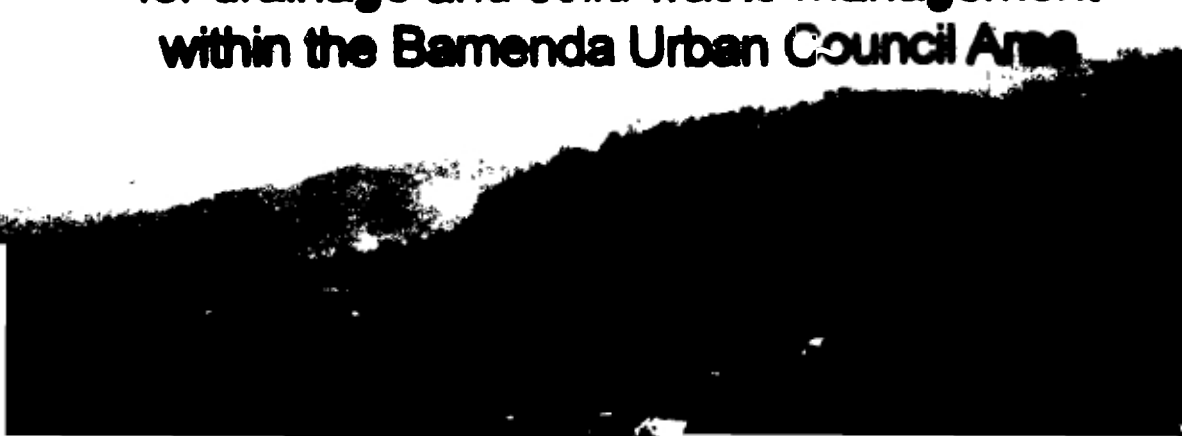


Fieldwork and recommendations for drainage and solid waste management within the Bamenda Urban Council Area



Co-operation between Bamenda Urban Council (Cameroon) and
the City of Dordrecht (Netherlands)



CONTENTS

1.	Introduction	3.
2.	Fieldwork on drainage problems	5.
	a. Mezam River	
	b. Holiday Hotel - Fishpond - La Chance Bridge	
	c. Ayaba stream - Post Office - Church Centre	
	d. Central Market	
	e. Rota Cinema	
3.	Master plan	10.
4.	Fieldwork on solid waste management	11.
5.	Recommendations for improvements	14.
	- drainage	
	- solid waste	
6.	Co-operation between Bamenda Urban Council and Dordrecht Council	17.
7.	Executive Summary	18.
	a. drainage	
	b. recommended action	
	c. solid waste management	
	d. community involvement and hygiene promotion	
	e. conclusion	
8.	Epilogue	26.

Annexes :

- 8 photographs
- 1 map West-Cameroon
- 2 maps Bamenda Urban Council

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Drainage and solid waste management within the Bamenda Urban Council Area.

1. Introduction

Part of the co-operation agreement between the municipalities of Bamenda (Cameroon) and Dordrecht (The Netherlands) was that the city of Dordrecht would send a group of experts to Bamenda to investigate the serious problems with water drainage during the rainy season and solid waste management.

In the period from 21 January to 5 February a group of 3 experts visited Bamenda. This group consisted of the following people:

- Albert Zwols, Director of Public Works, Dordrecht
- Hans van de Velde, Chief of Solid Waste Department, Dordrecht
- Han Heijnen, Consultant WHO/IRC International Water and Sanitation Centre, The Hague.

On their arrival in Bamenda the group immediately made a start on the required field work, namely visiting the following areas in Bamenda:

- Mezam River flood plain
- Area from the Holiday Hotel up to La Chance Bridge via Fishpond
- Area of the Ayaba Stream, via Waterfront, and the Post Office to the Church Centre
- The neighbourhood of the Rota Cinema
- The Central Market of Bamenda.

In chapters 2 and 4 the results of the field work are described in detail.

In chapter 3 attention is paid to Bamenda's Master plan as presented during a visit to the Provincial Chief of Town Planning. In chapter 5 the

recommendations for the improvement of the drainage and solid waste management are given. Chapter 6 goes on to define the way in which, according to the authors of this report, further co-operation between Bamenda Urban Council and the Municipality of Dordrecht may be continued.

Following their return to the Netherlands Consultant Han Heijnen produced an 'Executive Summary'. Although this publication deals with a number of matters which are also described in other chapters, the Consultant's contribution has been integrated into the report as chapter 7.

An important fact is that the 'Executive Summary' also focuses on community involvement and hygiene promotion.

2. Fieldwork on drainage problems.

a. Bridges crossing the Mezam River were visited

- arched bridge at Menteh
- wooden bridge at Menteh
- Mubang Bridge (concrete)
- Mulang Bridge (concrete)
- Tanka Bridge (wooden)
- Latita Bridge (two concrete bridges)
- Mezam Bridge (concrete).

The Mezam River, whose width varies from between approx. 300m at Latita Bridge to less than 50cm at Mezam Bridge, flows through a flood plain.

The Mezam flood plain is an ecologically valuable area.

Agricultural activities take place in many areas.

Some house building close to, and even in the flood plain was observed.

Information received from residents specified that the area is flooded several times each year, during the period from June till October. On such occasions some of the bridges are completely flooded. It was stated that the water level at Tanka bridge rises to a level of 0.5m above the planking. At such times, it is (almost) impassable for several hours.

Most of the land is privately owned. It was satisfying to see that Bamenda Urban Council was carrying out earthworks at Latita Bridge to complete the connection between the embankments of the Mezam River, a project sponsored by Dordrecht.

At Mezam Bridge (span 15m, height 6-7m) the authorized dump site was visited.

Although some of the waste is polluting the river, the situation seemed to be under control. It was noticed that a large quantity of the solid waste is degradable. It was stated that most of the solid waste comes from the Bamenda Central Market.

- b. The area from the Holiday Hotel, through Fishpond to La Chance Bridge was surveyed in detail.

With regard to the flood plain of the tributary the observations were quite striking. Although not legally permitted, several owners have built houses or other buildings in the flood plain of the stream. In some places buildings traverse the tributary, forcing the stream to divert. The stream and the flood plain are extremely dirty. On the one hand solid waste is dumped by the residents and on the other hand waste also flows into the stream via the connecting drains. In several places the stream is almost blocked by the enormous quantity of waste.

In several places bridges and culverts which were built years ago obstruct the flow of water.

Such obstacles have been noted near the Holiday Hotel (culvert), west of the market (bridge) and north of Fishpond (La Chance Bridge).

The combination of small bridges and culverts, unauthorized building activities and large quantities of solid waste, cause severe flooding during the rainy season. One resident stated that storm water runs into houses which accommodate up to 15 people. That resident built his house in the flood plain of the stream because, as he said, there was no alternative.

Due to the irregular and meandering course of the stream it was observed that buildings and embankments are damaged in several places.

Based on technical information provided by Bamenda Urban Council and local residents it was concluded that the situation at La Chance Bridge is critical.

During the rainy season storm water regularly floods the road and the bridge, causing very dangerous driving conditions.

Over the whole area the drains do not function properly, due to the large quantities of solid waste dumped into them. In particular, drains with bends, corners and narrow culverts are regularly blocked by waste. It can be concluded that the drainage problem is in fact a solid waste problem. A resident complained that stagnant water is causing a plague of mosquitos in that area.

Apart from the blocked drains it was also noted that the drains have been poorly designed in some places, and drains are lacking in other places where they are urgently needed. Residents have built retaining dykes along roads to prevent water running into their houses. As a consequence the road is regularly flooded, causing dangerous driving conditions.

It was noted that the local engineers are very well aware of the problems with the drains and also know where improvements need to be made.

We were informed that a large area of reclaimed land near the Fishpond is the site for a future food-market. At present the site serves a dual purpose as a parking area and a dump.

- c. The Ayaba-stream along Waterside and the Post Office, down as far as the Government Delegates Residence shows the same characteristics as mentioned before. The first section of the two streams, between the SNEC-office and

the area east of the market has quite a deep bed. Residents informed us that flooding of the adjacent land does not occur. Near Waterside the situation gets worse, probably due to the low and narrow bridge located there. Residents said that houses stand in water up to 0.7m deep during the rainy season. In some places the embankment has been severely damaged; some houses have been damaged as well.

Further downstream the bridges near the Post Office and near the Government Delegates House act as barriers, forcing the water up to a higher level. Therefore it can be said that the three small and narrow bridges play a dominant role in the flooding which occurs in that area. But there are also other important factors that influence the stream. Again it was noted that many houses have been built in the flood plain, often very close to the stream and thus narrowing the profile of the stream during the rainy season. This narrowing of the stream profile was also evident in the section between La Chance Bridge and Church Centre where the flood plain is 50-70m wide.

A resident reported that houses near the small pedestrian bridge stand 2 meters deep in water during the rainy season and residents then have to leave their homes for a period of time.

Although the annual floodings are strongly influenced by structures like bridges and houses, one also has to realise that flooding of the flood plain during the rainy season is in fact a normal occurrence in a tropical country like Cameroon.

- d. In the area of the Central Market of Bamenda the solid waste problem is probably the most urgent of all. Large quantities of solid waste are left behind by the numerous hawkers of food, vegetables, fruits and other

agricultural products.

We were informed that the waste is discharged from the dumping sites by Bamenda Urban Council twice a week. As the market starts rather early, around 7 a.m., the Council does not always succeed in removing all the waste; consequently the garbage is regularly left for more than three days, causing an unhealthy environment for the surrounding stall holders. Due to the lack of waste disposal facilities, many drains are filled with garbage, rendering them incapable of coping with the storm water. The situation becomes even more complicated, due to the fact that several drains are covered with heavy concrete blocks, which cannot be displaced by hand, so cleaning them out becomes a real problem.

Two special problems were noted at the marketplace. At the butchers' corner the drainage is inadequate. During the rainy season the drain is flushed out satisfactorily, but during the dry season stagnant water, polluted by the butchers is causing a threat to public health.

The other problem was found on the west side of the Stadium. Two drains converge into a depression, causing serious flooding during the rainy season.

e. Another drainage problem was noted near "Rota Cinema".

On the east side of the T-junction the drain is too narrow and because of the garbage which has been thrown into it, the drain is unable to disperse the storm water.

On the south-eastern side of the junction the drain ends abruptly against the pavement. The culvert under the road is completely inadequate. The road near "Rota Cinema" is flooded regularly during the rainy season.

3. Master plan.

The master plan of the Bamenda area, devised in 1985, was discussed at the office of the Provincial Chief of Town Planning. We were informed that structure plans have been derived from the master plan.

For some time now Town Planning has been working on a revised master plan, but it is not yet complete.

The master plan and the structure plans lay down strict rules regulating housing areas, industrial estates, public green areas and so on.

It was surprising to see that the flood plain of the Mezam River and the flood plains in the centre of Bamenda had originally been appointed as green areas with construction prohibited. A very important perspective of the new master plan might be that the so-called mono-centre vision will be abandoned.

Sub-centres will be developed at Nkwen, Mankon and other villages. The centre of Bamenda and the sub-centres have to be connected by road networks.

In that vision the flood plains of the Mezam River and its tributaries play an important role. Of course the primary role of the rivers and flood plains is to act as a water-transport-system during the rainy season.

But the area is also of great importance from an ecological point of view. The quality of life in the greater Bamenda area is also determined by the flood plains which are the future 'green lungs' of the town.

In co-operation with other authorities concerned, Bamenda Urban Council has to play an important role in the realization of a new master plan for the town area.

4. Fieldwork on solid waste management.

A. What were our observations on our field survey?

a. The dump sites

- * Many areas in the town have illegal waste dumps, often very close to the streams.
- * There are two legal dump sites; in principle the municipality collects waste from official dump sites in town, and disposes of the waste in the legal dump sites on the outskirts of the town. However, this service provided by the Bamenda urban Council is irregular.

b. The blocking of drains and streams

- * All streams are polluted. Occasionally even car wrecks are dumped.
- * In front of most of the culverts and bridges waste accumulates. The water carries this waste which inevitably blocks the culverts, causing flooding of the roads in the rainy season.
- * These obstructions reduce the water drainage capacity of the streams.

c. Composition of the waste

- * The amount of solid waste which is generated is, at most, 10% of the waste produced by a citizen of Dordrecht.
- * A lot of waste material is already being re-cycled by the inhabitants. For example, bottles, car tyres and wood are all re-used.
- * The waste that has been dumped has a high organic content and readily decomposes. A lot of compost is spontaneously generated in the various dump sites in town.

d. Garages

- * Spread all over town there are garages and workshops. The soil surrounding them is polluted with oil. This oil is gradually polluting the groundwater in town and the water of the River Mezam.
- * Around the garages many car wrecks can be seen.

B. Why do we need to improve this situation?

- 1) Because of public health;
- 2) Because drainage problems are being caused;
- 3) Because the groundwater, the River Mezam and the soil are being polluted;
- 4) The urban environment is being spoiled and the town is made to look dirty and unattractive.

C. What changes are necessary?

- * Waste collection in town needs to be modernized and restructured. The municipality must be able to collect and dispose of the waste.
- * At convenient locations, local dump sites have to be appointed. The inhabitants will dump their waste at these sites and the Bamenda Urban Council will collect it. These dump sites should not be too far away from the town centre.
- * At this moment separation of waste into degradable and non-degradable material does not seem to be necessary. At the same time the inhabitants should be encouraged to compost their own organic waste in their compounds.
- * The municipal dump sites are presently inadequate. However, to reduce the risk of polluting the River Mezam for other communities,

e.g. Bafut, it is essential that, in the near future, Bamenda Urban Council acquires one suitable sanitary landfill.

- * Old cars and wrecks can also be removed to the sanitary landfill. The possibility of commercial exploitation of such a car-graveyard deserves further investigation.
- * The drains and culverts have to be kept clean by the municipal services. Public participation should be encouraged to assist the Bamenda Urban Council.

5. Recommendations for improvement.

Drainage.

- a. For the sustained development of Bamenda town, an up-dated, comprehensive master plan and structure plans are urgently needed.
- Areas for housing, industry, trading, roads, agriculture, green areas and so on, have to be defined effectively. Bamenda Urban Council has to ensure that the plan specifications are strictly observed.
- b. Within the master plan the flood plains of the Mezam River and its tributaries should be appointed as green areas, where building and construction activities are strictly prohibited.
- c. The policy of Bamenda Urban Council should be focused on the gradual removal of buildings, structures and obstacles along the following tributaries :
- Holiday Hotel, Fishpond, La Chance Bridge;
 - Ayaba Stream, Waterside, the Post Office down as far as the Government Delegates Residence;
 - La Chance Bridge down as far as Church Centre.
- d. In order to implement the cleaning up operation of the flood plains, Bamenda Urban Council should compensate residents and urge them to move to new urban areas, appointed in the new master plan.
- e. Improvement of the alignment of the tributaries through Bamenda is recommended in order to accomplish better stream flow.
- Special attention has to be paid to constrictions, bends, corners, shallows and obstacles of all kinds.
- It is recommended that measures to improve the flow of the tributaries, should start downstream.

f. Special attention must be paid to the bridges to be improved:

- La Chance Bridge
- Bridge near Mayor's residence
- Bridge near Post-Office
- Waterside bridge
- Bridge west of market area
- Culvert near Holiday Hotel

As previously stated, improvements have to start on the downstream section. Consequently improvements should start at La Chance Bridge and the bridge near the Mayor's residence.

The flow capacity of both bridges, (height and width), has to be expanded considerably.

g. As regards the drains, one measure has to be taken before anything else, namely cleaning of the drains.

It is thought that properly cleaned drains can disperse the storm water quite satisfactorily.

In some places drains have to be constructed where they are urgently needed. The advice given by the engineers of Bamenda Urban Council should be followed on that matter.

h. The drainage situation near Rota Cinema is in urgent need of improvement.

It is recommended that designs be made for new drains and culverts which will have a much greater capacity, and that priority should be given to reconstruction at that particular location.

i. Improvement of drainage and waste-treatment-facilities should be a long-term project. It is recommended that a committee of technicians be appointed who, together with the experts and authorities concerned, will

prepare, execute and monitor the various improvements.

The committee should also develop plans for community involvement and education on the subject of waste disposal.

- j. Co-operation between Bamenda Urban Council and the Town of Dordrecht should be extended.

Solid waste.

- k. Improve the waste collection system in and around the market, including Commercial Avenue.
- l. Shift the vegetable market to the newly proposed site.
- m. Provide a refuse collection truck with compression facility, plus a number of refuse containers (1.500 litres).
- n. Place these containers in various sites around the present market place and the new vegetable market, to facilitate collection.
- o. We will see whether we can make high pressure pumps available to clean the inaccessible drains.
- p. Information, education and communication are vital to maintain people's awareness of waste management. From Dordrecht we can assist you in developing this communication exercise.

DON'T WASTE

BAMENDA,

KEEP BAMENDA

CLEAN!

6. Cooperation between Bamenda Urban Council and Dordrecht Council.

- a. The Council of Dordrecht has agreed to provide Bamenda Urban Council with a refuse collection truck with compression facility, plus a number of refuse containers, each with a capacity of 1500 liters.
- b. Furthermore, the question of whether high pressure pumps to clean out the drains can be made available is under consideration.
- c. Dordrecht is willing to receive two or three technicians with the object of educating them in refuse and drainage matters and road maintenance.
- d. Dordrecht Councillors will be asked to consider to what extent they are prepared to contribute to infrastructural projects like :
 - La Chance Bridge
 - bridge near Church Centre junction
 - drainage near Rota Cinema.

The Council of Dordrecht will investigate whether financial contributions can be made available through National and/or European budgets.

7. Executive Summary.

(Han Heijnen)

In the contacts developed between the municipalities of Bamenda/Cameroon and Dordrecht/The Netherlands, Dordrecht expressed a willingness to assist Bamenda in its efforts to solve the problem of flooding which it regularly experiences during the rainy season. The flooding problems are associated with inadequate drainage and insufficient solid waste management.

A mission was undertaken from January 21 to February 5, 1994, to study the drainage situation in the Bamenda Urban Council (BUC) basin, and the solid waste issues in the urban area of the municipality. A technical team was formed consisting of the Director of Public Works, Dordrecht, the Municipal Engineer of Bamenda, the Chief Draughtsman of the BUC, the Chief of Town Planning within the Provincial Delegation of Town Planning and Housing, and a consultant from WHO/IRC International Water and Sanitation Centre, the Netherlands. The technical team was advised by a technical committee headed by the Government Delegate of Bamenda and included a wide representation from local professional bodies.

a. Drainage

The mission started its field studies by looking at the peripheral drainage provided by the River Mezam. The tributaries of the Mezam drain the whole of Bamenda, discharging water in a mainly south-north direction until they reach the flood plains of the Mezam on the northern boundary of the municipality. While following the course of the Mezam, it was noted that the river originates east of the town proper in the watershed area

formed by Ndza. Ndza village is a rural settlement situated in a wide basin where water collects easily during a rain storm. The Mezam widens into a series of flood plains after passing Nkwen. Near Mulang and Latita the river broadens further to between 100 and 250 metres when it converges with the waters coming from its tributaries in Bamenda town. Further west it discharges into a river bed, 20 metres deep and 50 metres wide, and flows on to Bafut village. The mission concluded that the flood plains are essential to ensure proper drainage from the Mezam during the rainy season, especially during July, August and September. No permanent structures should be permitted in these flood plains and the bridges and connecting roadways should be constructed in such a way that an adequate flow is guaranteed. Attempts to control the river should be restricted as the costs may be high and lead to a false sense of protection against flooding.

As indicated in an earlier town development structure plan, the flood plains should be designated as green areas, with limited agricultural activities being permitted during the dry season.

The BUC should assert its authority where these flood plains are concerned, and see to it that no developments take place which reduce the capacity of the Mezam to drain Bamenda of its storm water.

In view of the rapid expansion of the town and its population, the mission recommends the conservation of the flood plains as ecological areas so that they may act as future 'green lungs' to the city and its inhabitants. The team studied the various watercourses traversing Bamenda with respect to their discharge capacity and the risk of flooding due to restrictions in the flow at particular locations. In particular the drainage and

streams were studied, first, from Metta Quarter via Holiday Hotel, along the west side of the market, north towards the Fishpond area and ending at La Chance Bridge, and secondly, from Ayaba stream, via old town, parallel to Commercial Avenue to Post Office Bridge and on to Church Centre junction. The streams from La Chance and Church Centre junction converge a few hundred metres further north in the flood plain that joins the Mezam proper near Mulang. Severe flooding problems were evident from the numerous damaged houses, roads and retaining walls observed near the stream, near the bridges crossing the streams and in the flood plain of the river. Inadequate drains and culverts, blockages caused by solid waste, downstream restrictions in the available profile of the streams which disperse the water, and non-compliance with building regulations, are the main causes of the flooding and the stagnating water. Physical damage, health risks and general nuisance are the result.

In Nkwen a similar problem exists near Rota Cinema where drains are totally inadequate to accommodate the water flowing through this busy junction following rain storms. This important thoroughfare then becomes impassable for a few hours. Reconstruction of the junction with improved drains and culverts will allow water to flow to the Mezam River less than a hundred metres away.

b. Recommended action

The municipal council, in consultation with the various other authorities involved, should reconsider Bamenda's physical plan in view of the present growth and potential role of the town as a multi-faceted centre for the North-West Province, and define in plans the vision it has for the future of the town. To back up the plan it is necessary to up-date, amend and

develop bye-laws regulating development and construction in the town. Control and action with respect to non-compliance by approved developments is essential. Raising the people's awareness of the importance of the flood plains and soliciting their support for their conservation should furthermore be enhanced through a sustained information campaign.

c. Solid Waste Management

The situation in respect of solid waste is very critical. Many illicit dump sites exist and people dump waste in water courses and drains, causing not only a general build-up of dirt and waste, but also potential health and drainage problems. Although the solid waste is a problem in nearly all residential areas, the issue is more acute in the markets and the commercial areas. It was thus decided to concentrate on the main market on Commercial Avenue and its surrounding areas. The covered market is supervised by a market master and appeared to be quite clean. As part of the rent contract, stall holders have to dispose of their garbage every morning in a designated spot outside the market. From there the municipality is supposed to collect the waste. However, these collections are very irregular for a number of reasons. The dump site is located in an area which has, over the last few years, been taken over by hawkers of vegetables and small groceries. The place is a mess and a lot of vegetable waste can be seen on the street and in the covered drains. All around the market similar problems with waste collection are evident. The problems seem to be not so much related to the reluctance of the people to clear their garbage, but more with the inability of the municipality to remove the waste from the designated dump sites.

The butchers' section in the market discharges its waste into an open

gutter which is riddled with vermin. Lack of water makes it difficult to clean the place properly and to ensure proper flushing of the drains. The area constitutes a serious health risk which needs to be addressed urgently. Near the rubber market, the absence of a key drain makes it impossible to prevent the flooding of the roadside stalls.

The municipality has prepared plans for the removal of the vegetable hawkers to a new site on the other side of the market area, near Fishpond. In addition, further action should be taken to effectively decentralize market activities for daily foodstuffs and transfer them to Nkwen Mile 7 and other newly developed market sites on the outskirts of town. The municipal market and Commercial Avenue could gradually be reserved for larger scale shopping and service establishments.

Car wrecks and garages are scattered around the town. Parts of condemned vehicles have been removed but the scrap remains lying around, sometimes even blocking the waterways. The municipality should attempt to gradually remove these wrecks from the town centre. Simultaneously, garages should be encouraged to move to designated areas rather than allowing businesses to be established all over town. Also regulations should be adopted with respect to the spilling of engine oil and the dumping of car wrecks, in order to avoid pollution of the soil and water, and to enhance the attractiveness of the town.

Solid waste is at present being dumped at a site near the Mezam Bridge. Waste and pollutants therefore enters the Mezam River, causing water pollution which effects the Bafut community downstream. The municipality is advised to acquire another site suitable for the development of a

sanitary landfill. Near this sanitary landfill a site could also be set aside as a scrapyards for condemned and abandoned vehicles. The commercial exploitation of such a scrapyards should be explored.

The percentage of degradable waste is estimated to be relatively high. In at least one case it was confirmed that women sometimes collected organic waste for use in their nearby vegetable plots (Ayaba stream/SNEC). The refuse collected by the municipality could, after simple composting and a little sieving, be prepared as good quality compost. This compost might have a good commercial value if used in the landscaping features of institutions around the town.

However, to reduce the amount of waste, householders should be encouraged to compost domestic organic waste in their compounds. This would reduce the amount of garbage generated and would be a first step in finding a solution, at least until the municipality has developed the capacity to also collect waste from designated dump sites in the residential areas.

d. Community involvement and hygiene promotion

The traditional system of occasional community labour still seems to exist in the urban areas. The Latita Bridge and access road, sponsored by Dordrecht, was constructed with community labour from the surrounding areas. The degree to which similar mass labour could be generated in the town itself is unclear, but one can assume that - in view of the respect given to the local traditional leaders (the Fons) - community labour would be feasible in some instances such as the cleaning of drains. The Christian Women's Fellowship set a striking example when they decided to clear the drains in a particular area for one week using community labour. Unfortunately the lack of response by the Bamenda Urban Council, with respect to removal of the waste, caused the effort to fizzle out. All the

same, the potential for household and community action to move dirt to the periphery of a quarter is working. However, the system to collect the waste from these 'illegal' dumps does not exist at the moment and so the beauty of the town is spoilt by all the dirt that is lying around.

The existing - essentially non-governmental communication and community-involvement structures in the town could well be mobilised to promote and support a plan for improved solid waste management.

Once a good plan has been developed, awareness campaigns linked to community action might well be possible. The Council would however need to formulate the plan and indicate the role of the community. With regard to the solid waste management, the Council would probably also need to supervise (if the service is privatized) or be responsible for the transportation of waste from collection points to sanitary landfills or to the composting sites. Households in the town should also be encouraged to compost their waste.

Monitoring of solid waste collection in each ward is best left to the ward representatives as they would also be the ones to take action against those who do not comply with the local bye-laws.

e. Conclusion

In the course of the mission only a few key areas of concern could be addressed. A practical approach has been chosen which should lead to relatively quick and concrete results. However, a number of the aforementioned issues need further detailing and discussion in the BUC. The preparation of an up-dated town planning development plan is considered crucial for a sustained and effective strategy for improved solid waste management and drainage in the greater Bamenda area.

To support the efforts of the BUC to get solid waste management under way, the municipality of Dordrecht has agreed to provide a refuse truck with a compression facility and a number of matching 1,500 litre refuse containers to the BUC.

To further support development in solid waste collection and drainage, a number of additional actions will initially be considered:

- a financial contribution to drainage improvement through reconstruction of bridges and roads at La Chance and Church Centre (note: cleaning and clearing of the flood plain behind these two bridges is also necessary to make this intervention effective);
- a similar contribution to the reconstruction of the junction at Rota Cinema, Nkwen;
- despatch of some high pressure pumps for the flushing out of clogged drains;
- an exchange programme for 2 municipal workers from Bamenda to come to Dordrecht to work for a time within the solid waste and public works departments; and vice versa, for some Dordrecht municipal workers to spend some time working alongside their colleagues in Bamenda;
- to share promotional material, developed in the context of solid waste management and public hygiene, with Bamenda Urban Council in support of the development of community involvement.

Lastly, the mission would like to thank the people of Bamenda, the various officials encountered, the technical committee, the technical team colleagues, and, in particular, the Government Delegate for Bamenda Urban Council, for their hospitality, inspiration and determination in ensuring the successful execution of this study on drainage and solid waste management.

8. Epilogue.

In this report attention has been paid to problems in Bamenda concerning drainage and solid waste management.

The experts, however, also paid attention to other matters.

In chapter 3, for example, it is recommended that Bamenda's Master plan be revised. It is especially recommended that the flood plains of the small rivers in Bamenda, as well as the Mezam River be declared ecologically protected areas and that building activities be forbidden in those zones.

Announcements by officials of the Bamenda Urban Council that they are working on plans to transfer the trading of vegetables, fruits and foodstuffs from the Central Market to the Fishpond area, are warmly welcomed by us.

This would reduce the waste problems in and around the Central Market considerably. It is self-evident that the proposed site near Fishpond must be laid out well, while ensuring that the collection and disposal of solid waste is also well-organized.

A different matter to be considered by the experts is the status of Commercial Avenue. It might be worth considering making Commercial Avenue a restricted traffic zone, in order to create more space for parking (visitors to the market and shops) and for the provision of green open spaces.

Before deciding on such a measure, Bamenda Urban Council should develop a policy on traffic flows. The drawing up of a traffic circulation plan to this end is advisable. Based on such a plan it would be possible to determine the location of future bridges across the rivers in the town.

The impression is that these choices should be based on more constructive data.

Finally a remark on the quality of asphalt roads in Bamenda. Only limited sections of the roads in the town are asphalted. It struck us that the quality of the asphalt is deteriorating fast in many places. We recommend that high priority be given to road repair. The municipality of Dordrecht is quite willing to give a technician special training and to acquaint him with simple and cheap repair techniques.

Although the visit to Bamenda was relatively short, much valuable information was gathered, enabling us to draw up useful recommendations. Many people contributed to the success of the mission. Our thanks to the Government Delegate for his untiring assistance.

The contacts with officials, united in the technical committee, resulted in us obtaining extremely useful information.

The officials of Bamenda Urban Council and the provincial department of Town Planning gave us essential support. They ensured that the project, on the basis of acquired information, had a flying start.

We would also like to thank the friendly inhabitants of Bamenda who gave the experts much useful information.

The present technical report may provide a foundation for further co-operation between Bamenda Urban Council and the Municipality of Dordrecht. This co-operation may also contribute to the development of feelings of friendship and solidarity between the inhabitants of Bamenda and Dordrecht.

Dordrecht, March 1994.





Mezam river, floodplain



Mezam river, Latita bridge





Mezam bridge, dump-site



La Chance bridge

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



Church Centre junction bridge



Rota Cinema bridge

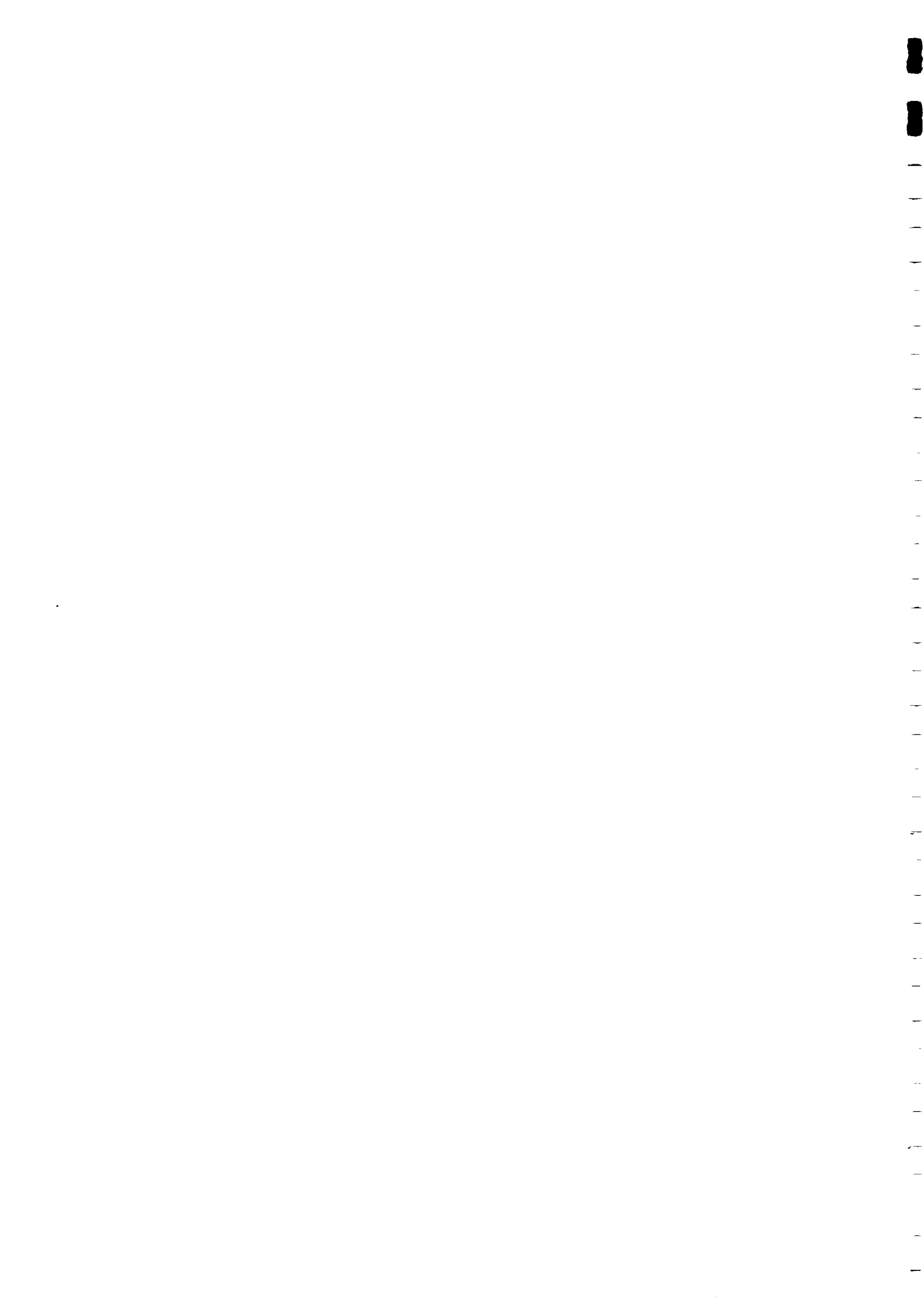
100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120

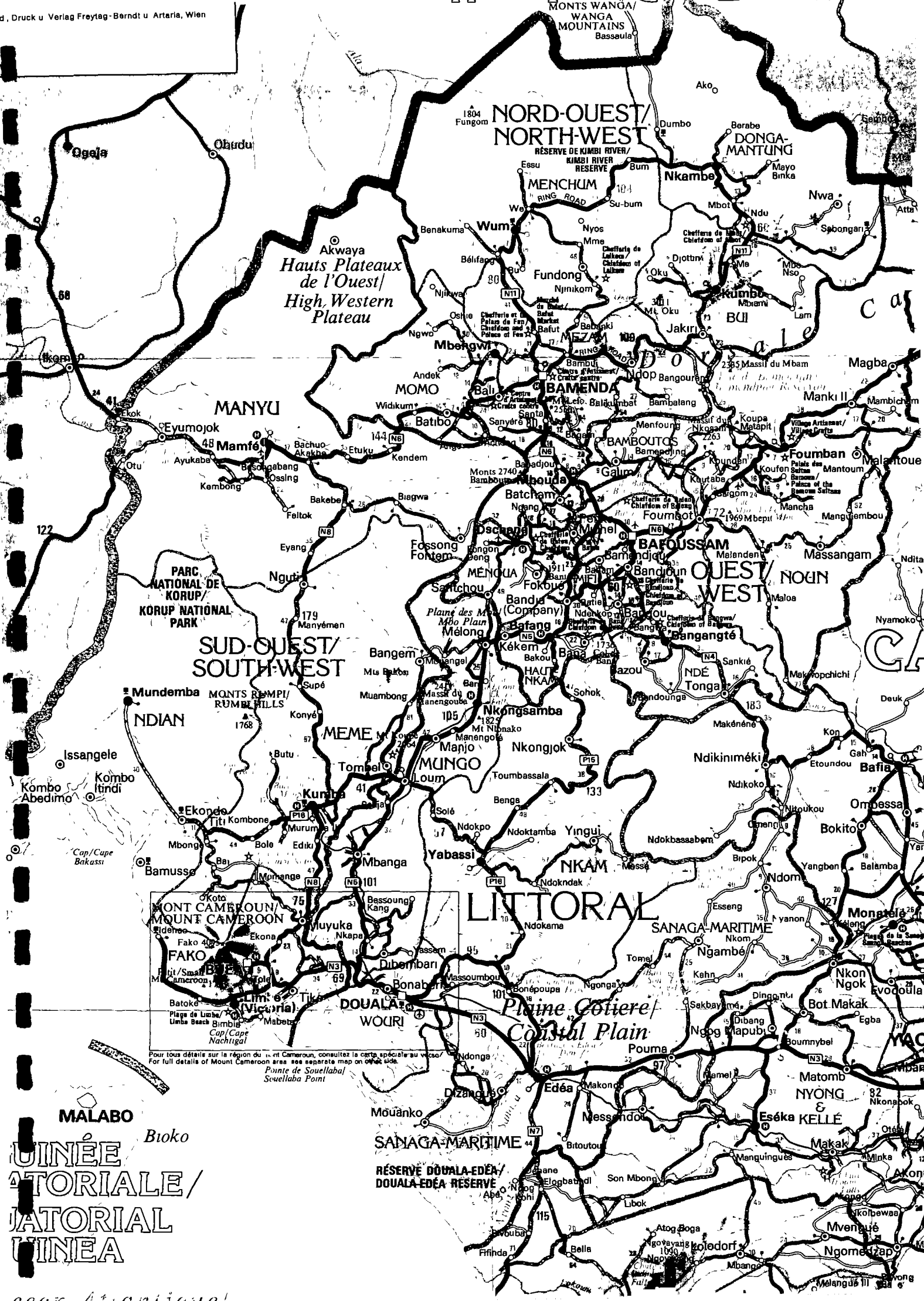


Central Market, dump-site



Central Market, blocked drain





Akwaya
Hauts Plateaux de l'Ouest
High Western Plateau

PARC NATIONAL DE KORUP/
KORUP NATIONAL PARK

SUD-OUEST/
SOUTH-WEST

LITTORAL

Plaine Côtière
Coastal Plain

MONT CAMEROUN/
MOUNT CAMEROON
FAKO
Batoké
Plage de Limbe/
Limbe Beach
Mabots
Cap/Cape Nachtigal

Pour tous détails sur la région de Mount Cameroon, consultez la carte spéciale au verso/
For full details of Mount Cameroon area see separate map on other side.
Pointe de Souellabal
Souellaba Point

MALABO

Bioko

GUINÉE
ÉQUATORIALE/
EQUATORIAL
GUINEA



