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UNDP - World Bank
Water and Sanitation Program

Program for the Improvement of the Urban Environment
and Sanitation in Conakry

PADEULAC

The urban environment in Conakry:
behaviour, attitudes and practices of households

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UNDP - WORLD BANK
WATER AND SANITATION PROGRAM
REGIONAL WATER AND SANITATION GROUP - WEST AFRICA

The Program for the Improvement of the Urban Environment and Sanitation in Conakry (PADEULAC) was prepared with the support of the RWSG-WA, the West African Regional Group of the UNDP-World Bank Water and Sanitation Program.

Assisting underprivileged people to secure access to safe water and sanitation is a necessary precondition to sustainable human development. The efficient management of water and sanitation services facilitates improvements in the conditions of life of the deprived people, reduces significantly the development of diseases and helps to conserve the fragile natural ecosystem of the planet.

Sub-Saharan Africa is experiencing remarkable demographic growth, and despite the increases in the numbers of people served, the number of people without access to potable water increased by about 30% in absolute terms in the last 10 years. There are more than 265 million people without access to potable water in the region and around 350 million without appropriate sanitation facilities.

The UNDP-World Bank Water and Sanitation Program is a partnership put in place to face this challenge. This partnership started at the beginning of the 1980s and has evolved into a global network, with a mission to improving in a sustainable manner access of poor people to potable water and to improved sanitation.

In collaboration with the Governments, development institutions, the private sector and Non-governmental organisations, the Program has developed some innovative approaches adapted to the needs and local conditions. The Program is currently active in more than 40 countries on three continents (Africa, Asia and Latin America).

Based in Abidjan, the Regional Water and Sanitation Group (RWSG) is the executing structure of the Program in West Africa. It is operated through country offices in Burkina Faso, Ghana and Guinea. In the preceding year, the activities of the Group have also affected Benin, Cote d'Ivoire, Guinea-Bissau, Mali, Nigeria, Senegal and Togo. Its operations are financed by the World Bank and the UNDP as well as major contributions from Norway, Switzerland, Luxembourg and France.

About twenty people are currently employed full time. The Group also makes use of a number of consultants most of whom are from the sub-region.

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INTRODUCTION: Methodology of the study

This report is a synthesis of the studies carried out in households in Conakry during the project development phase of the Urban Environmental Management Program of Conakry (PADEULAC).

The studies consisted of the following:

- *a study of households carried out in March 1992, which was done on a representative sample of 647 persons (455 men and 192 women) throughout the city of Conakry. The questionnaire used in this study can be found in the annex to this report. The results of this study were already analysed in a report dated June 1992 [1]. They cover the attitudes, behaviours and practices of the population concerning water supply and consumption, disposal of wastewater, excreta and household waste, as well as stormwater drainage. The goal of this study was to assess the population's needs, the efforts already undertaken as well as additional efforts which the population would be willing to undertake to participate in or pay for improving sanitation services;*
- *background studies, carried out as part of the "community organisation" component[2], whose goal was to complete the statistical data using a less conventional approach as well as to assess the ability of the population and institutions to participate in activities to improve the situation, activities which would be planned and implemented with their assistance. These studies were carried out by two members of the permanent project team and a national consultant, and included interviews with men and women who live in areas which are representative of the main types of housing, interviews with representatives of neighbourhood committees, sector heads, Presidents of youth and women's groups, as well as with members of existing neighbourhood associations, data on lots which highlight sanitation problems within courtyards, between neighbouring courtyards and outside of courtyards.*

The following remarks concern the methodology used in the household study in general and for the assessment of willingness to pay in particular.

The PADEULAC household study used the data base from the ENCOMEC study.[3] This was based on the division of Conakry into 620 population zones carried out during the national census of 1983. Fifty zones were selected randomly, then, after extensive study of their population, a random sample of 8 to 12 households was taken in each of these 50 zones (probability of selection proportional to size); the selection was based on 1/150th. Besides the time saved in this way, using this data base also had the advantage of allowing an abridgement of the PADEULAC questionnaire, since for almost all the households interviewed in our study, we had access to precise, recent and viable data collected by ENCOMEC, covering in particular household revenue, expenses and health. For practical reasons independent of our project, the fusion of data from these two studies and the exchange of data originally hoped for have not yet materialised.

Originally, the PADEULAC study was supposed to measure the households' willingness to pay for improved equipment and services for disposal of both wastewater and excreta, trash collection and drainage in the neighbourhood. However, for both practical and theoretical reasons, the study of willingness to pay was only carried out for household trash collection. It seems useful to specify these reasons.

In a study intending to assess the financial effort which households are willing to put forth in order to have access to improved equipment or services, two crucial preliminary questions regarding the study's feasibility must be raised:

1. *Is enough known about the nature of the equipment or services presently available, their price and cost, as well as the users' attitude towards them?*
2. *Does the population whose willingness to pay is to be assessed know enough about the improved equipment or services to be in a position to appreciate the benefits of the improved services?*

Previous studies carried out in Conakry with which we were familiar did not pay sufficient attention to sanitation, or used definitions which were not precise enough for our

purposes. For this reason, we could not answer in the affirmative to the first question. Thus we were unable to say which improvements were desirable or technically feasible or hoped for, nor at what price.

Another complication lay in the fact that various potential improvements seemed to be unfamiliar or completely unknown to the local population, so that it seemed useless to assess the willingness to pay for these improvements without first demonstrating them.

In addition, a scientific article by Kahneman and Knetsch[4] published shortly before this time, pointed out an inherent bias in the technique of using bidding in a questionnaire: when asked questions on their willingness to pay for a series of improvements in their environment, interviewees responded significantly higher for the first good or service proposed, no matter in what order the questions were asked (embedding effect).

It is therefore impossible, for example, to ask an individual successively about his willingness to pay for an improved latrine, a collecting pit, a drainage ditch and for collection of household waste, hoping to gather reliable data.

It thus became necessary, in order to obtain the same confidence level on the other information to be gathered, to increase the size of the sample, which was not feasible within the constraints of the project.

In the household study, we therefore chose to ask only questions pertaining to the willingness to pay for household trash collection. This is a high-priority improvement which seems both desirable and desired (which was confirmed later by the results of the study), and which concerns a service for which the beneficiary is clearly identified and exclusion by non-willingness to pay is possible. It is also a service for which anyone can assess the effects in the city districts where it exists already. Since this service is generously subsidised, its extension is strongly conditioned by the level of financial participation of potential users. A recent experiment of pre-collection with payment in a district of Conakry gave us an estimate of the cost of service which could serve as viable data for the bidding technique.[5]

.....

[1] Republic of Guinea - PADEULAC Analysis of Household Study: Morel a l'Huissier, A. Conakry; June 1992; 2 volumes:

- Volume 1: Characteristics of Households, Water Supply, Water Usage, Disposal of Wastewater and Excreta; 70 pages.
- Volume 2: Household Waste, Stormwater Drainage; 54 pages.

[2] Republic of Guinea - PADEULAC Organisation of Communities; Preliminary Report. Durany, J., Konate S., Balde, M., Drame A.; Conakry; August 1992; 36 pages + annexes

[3] Study on Household Consumption in Conakry (ENCOMEC); Nutrition and Food Security Project; Republic of Guinea - Ministry of Public Health - National Direction of Health/USAID/UNICEF; Cornell University.

[4] Kahneman, D. and Knetsch, J. L. "Valuing Public Goods: the Purchase of Moral Satisfaction" In Journal of Environmental Economics and Management, No. 22, pp. 57-70, 1992.

[5] The wealth of data from the bidding technique on willingness to pay is in effect greater as the initial figure (here 750 FG - see questionnaire in annex) approaches the median (700 FG in our case).

1

1. Population and habitat

1.1 Demographic estimates and projections

Based on the results of the General Census of Population and Habitat of 1983 (700,271 inhabitants) and those of the ENCOMEC Study of the Nutrition and Food Security Project (955,562 inhabitants in 1989), we can estimate the population of Conakry as about 1,132,000 inhabitants in 1992 (applying the average annual growth rate of 5.32% per year for the period 1983-1989).

The same data give us the following estimates of population by district (Table 1).

Table 1: Population Estimates by District

COMMUNE	POPULATION	Annual growth rate 83-92
KALOUM	170 279	3,31
DIXINN	221 471	3,32
MATAM	329 481	5,14
RATOMA	112 271	7,00
MATOTO	298 302	8,46
TOTAL	**1 131 804**	**5,32**

The average annual growth rate of 5.32% approaches that of the studies carried out in the context of the Urban Development Plan (UDP): hypothesis of sustained growth of 6% per year from 1985 to 1990 due to the economic spurt centered in the capital, then a progressive dropping off resulting from the policy of land management whose goal is to reduce the discrepancy between rural and urban revenues (Table 2).

Table 2: Population Projections, UDP 1987

YEAR	POPULATION	Average annual growth rate
1985	830 000	-
1990	1 110 000	6,0
1995	1 450 000	5,5
2000	1 845 000	5,0
2005	2 300 000	4,5
2010	2 800 000	4,0

1.2 Classification of population by housing type

Except for a minority of households residing in a residential or luxury type of housing, and those living in housing developments built by public or semi-public companies, the vast majority of the population (about 90% in 1987) lives in a working-class type of housing, either in public housing dating from the colonial period (Kaloum district) or in more recent housing developments built since 1958, or again in informal lots which may or may not have been restructured (spontaneous shanty-towns or former villages swallowed by urban sprawl).

Table 3: Classification of households according to housing type (PDU, 1987)

HOUSING TYPE	Households (%)
Old-type evolving[1]	16
Recent evolving	7
Restructured	47
Spontaneous	18
Village	3
Residential	2
Low-income collective	7
Total	**100**

With the recent and progressive construction of housing on lots in the districts of Matoto and Ratoma (several thousand lots), this classification of households will change in the near future.

[1]The term "evolving" refers to the density of housing on the lot; landlords will build additional housing units, often to rent out, as they can afford to.

1.3 Type of occupation of lots [2]

The main characteristics of working-class housing which can have an impact on the program to improve the urban environment are the following:

- occupation of the same lot by several households, especially in the oldest districts (three households on the average, but 6.3 in the old-type evolving areas). The successive building of additional units is rarely accompanied by additional sanitation facilities; use and maintenance of common installations leads to problems;
- a large number of households who rent or are housed free: 78% of households surveyed in 1987 did not own their housing. This situation does not encourage efforts to improve the environment either in the lot or the neighbourhood, since there is a high degree of mobility among the tenants;
- a relatively high number of absentee landlords, which affects one-fourth of the lots.

Table 4: Average number of households and persons per lot according to housing type (UDP, 1987).

Housing Type	No. households / lot	No. people / lot
Old-type evolving	6,3	48,5
Recent evolving	2,1	17,9
Restructured	3,7	29,3
Spontaneous	2,8	20,2
Village	2,1	18,5
Low-income collective	1,2	11,8
Luxury apartments	1,0	4,0
Residential	1,3	16,0
TOTAL	**3,0**	**24,0**

Except for old-type evolving housing and village-type habitats, where more than 40% of the buildings are made of adobe, the majority of buildings are made of concrete blocks, and 90% have corrugated aluminium roofs.

[2] Source: Ministry of Habitat and Urbanisation - Urban Development Plan, 1987.

1.4 Socio-economic characteristics of households [3]

The average household contains 7.35 persons, a figure less that that found by the UDP study (8.0). This average size masks a great variety of situations. Seven per cent of households are headed by a female.

Table 5: Distribution of households according to size (ENCOMEC, 1991)

Household size	Average	Percentage
1	1,00	7,67
2-4	3,20	24,74
5-7	6,00	28,11
8-12	9,60	26,11
>13	17,10	13,36
Total	**7,35**	**100,00**

According to the preliminary results of the ENCOMEC studies, average monthly expenditures of households were about 217,000 FG in 1991. Households can be classified into five categories according to standard of living. The UDP studies showed up a great discrepancy in standard of living among households who own their own housing and those who rent or are housed free. This last group has only one-third of the resources available to home-owners.

Table 6: Distribution of households according to standard of living (ENCOMEC, 1991)

Socio-economic category	Average expenditure	Percentage of households
Very poor	110 900	10
Poor	155 à 164 000	20
Lower-middle class	178 à 189 000	20
Middle class	205 à 281 000	40
Wealthy	428 000	10
Total	**217 000**	**100**

[3]Source: Ministry of Public Health and Population - Well-being of households in Conakry: Preliminary Analysis - ENCOMEC, February 1991.

According to the study carried out for the UDP, there are an average of two active people per household; 73% of these were employed at the time in the informal sector, and the majority of the 27% employed in the modern sector were salaried employees of either public or semi-public institutions. Informal sector activities are also carried out by people who have a formal job, and these second jobs are often a necessary condition for the economic survival of the household. This factor should be taken into account in proposals for sanitation activities which call for participation by the population, since these informal activities require a large input of time.

On the average, 53% of the household budget goes to purchase food (including alcoholic beverages), but among the poorest 30% of the population, expenditures for food account for 60 to 65% of total expenditures (ENCOMEC). After food, transportation and housing constitute the greatest expenditures. Depending on the categories used for housing expenditures, the results vary considerably from one study to another (6.6% for ENCOMEC, 14.8% for the National Institute of Statistics and Economic Studies, 1990).

According to studies carried out for the UDP (1987), the purchase of a lot and the construction or renovation of housing were the highest priority expenditures expected or hoped for; this was true for all socio-economic categories. Forty-three per cent of household heads had undertaken maintenance, renovation or extension of housing on their lots during the year which preceded the study, and 6% had begun or were about to begin construction on another lot. These investments also include sanitary facilities, but to a lesser degree. For lower-middle and middle income households who were able to save or to obtain financial assistance from family members for a construction project, priority is given to building a residence (in Conakry or in the hometown). Investment to add a latrine or shower generally comes after the construction of the main building.

The relative importance of household expenditures for transportation as well as for construction of housing is specific to Conakry, which differentiates Conakry from most other African capitals. High transportation costs are due to the lengthy commuting necessary to get around in Conakry, which is quite spread out, while high investments in housing are explained by the housing boom which had been suppressed for a generation during the previous regime.

2

2. Water supply

2.1 Drinking water supply situation

Conakry seems to enjoy a relatively privileged situation compared to most other West African capitals since more than half of the households live in courtyards which have piped-in water. Compared to the average coverage rate (54%), the five districts can be divided into three groups: Kaloum (with a coverage rate of more than 70%) and Ratoma (23%) represent the two extremes, while the three districts of Dixinn, Matam and Matoto are closer to the average.

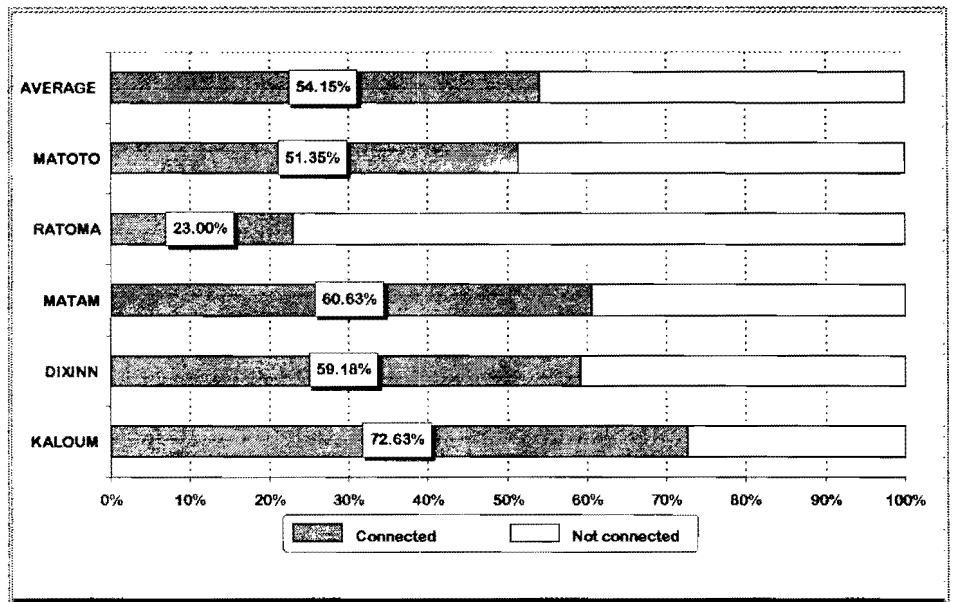

figure 1 coverage rates by districts

On the other hand, public taps are few and far between. Only the district of Kaloum, where the rate of household water connections is higher, is well-equipped with public water points: with only 15% of the total population of the city, it possesses more than half of the existing standpipes, as shown in Table 1.

Table 7: Distribution of Standpipes per District
(Source: SONEG, January 1993)

DISTRICT	Total Standpipes	Functioning Standpipes	Non-functional Standpipes
Kaloum	48	35	13
Dixinn	23	14	9
Matam	13	7	6
Ratoma	4	1	3
Matoto	0	-	-
Total	**88**	**57**	**31**

A project to rehabilitate the standpipes, financed by the World Bank, began in 1993: 85 water points were to be repaired and twelve new ones installed, which would still not be enough to re-establish a balance among the districts and satisfy the demand in the poorest areas.

2.2 Types of water supply for household use: the situation

Nearly 70% of households have access to suitable drinking water, while the rest still depend on well water to satisfy their needs (including for drinking).

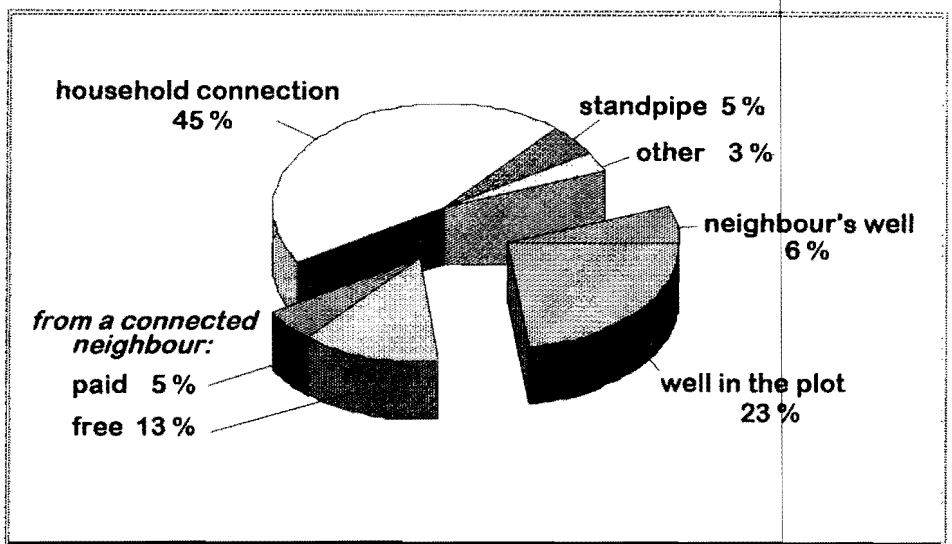

figure 2 water supply service levels

Only 45% of households have private water connections as of March 1992 (Figure 2). This discrepancy from the coverage rate is undoubtedly explained by the number of non-functional connections or those which have been cut off due to non-payment of water bills. However, the results of studies differ greatly from the SEEG statistics: 14,651 household connections in 1992, which should represent a coverage rate of only about one-third of the population. The discrepancy could be due to the number of undeclared connections, since the survey was carried out before the normalisation of the system which took place during the restructuring of the water supply system.

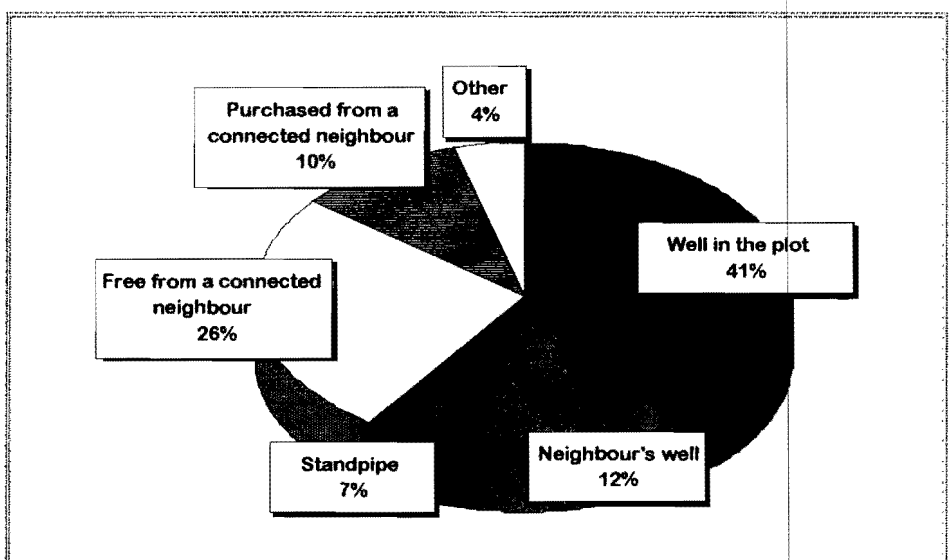

figure 3 water supply type for the not connected

Since the number of public taps is insufficient, access to drinking water for those who do not have their own private water connections, is generally through neighbours' private connections. Purchase of water from water vendors is not a general practice in Conakry.

As shown in Figure 4, supply types vary considerably from one district to another, especially as regards the two most common methods: private connections or wells. Thus, more than half of the households in Ratoma are supplied by wells (in their courtyard or a neighbour's courtyard), as compared to 5% in Kaloum.

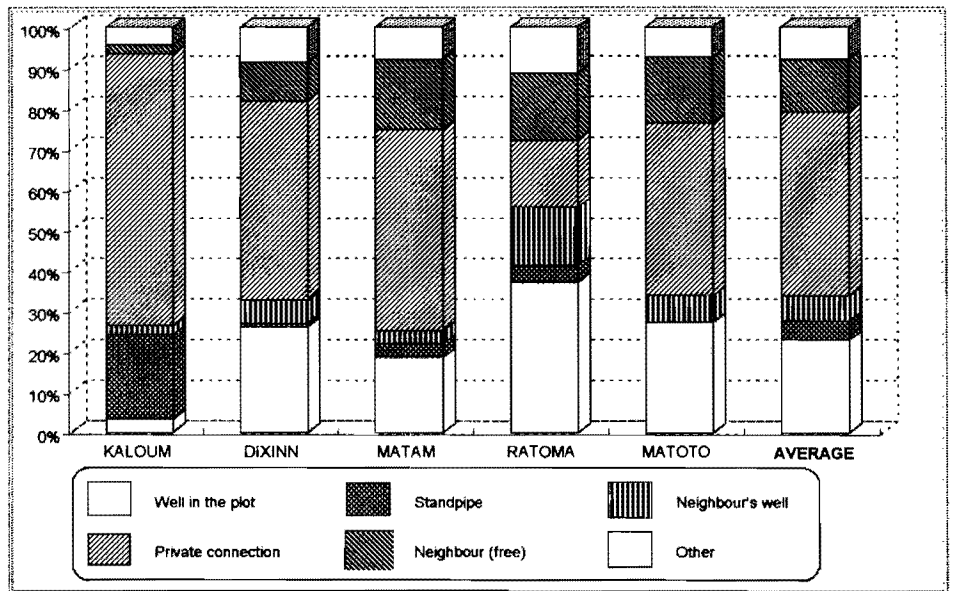

figure 4 **supply types by districts**

2.3 Practices and attitudes according to types of supply

2.3.1 Private water connections

Having running water in one's courtyard does not guarantee an easy supply free from health problems. Having running water on the premises is still the privilege of the wealthy minority. Generally, a single water tap installed in the courtyard is used by all the residents: according to survey results, a single tap serves an average of 27 people. Most households do not use the running water directly, but store it in various containers, and the supply chain (from drawing to consumption) is often exposed to the same transfers as for water supplied from outside the lot.

In addition, the low water pressure, intermittent supply and frequent breakdowns in the network force households to stock water, to restrict their consumption and to find alternate sources of water when their supply is cut off for a long time. When the supply of running water is cut off, nearly half of households use water from either their well or a neighbour's well. The rest get their supply from a neighbour's tap. The availability of these alternatives varies from one district to another. In Kaloum, public taps, when they are functional, are used more frequently.

For 70% of households with private connections, these problems in the distribution of water are experienced as the most critical ones regarding their water supply.

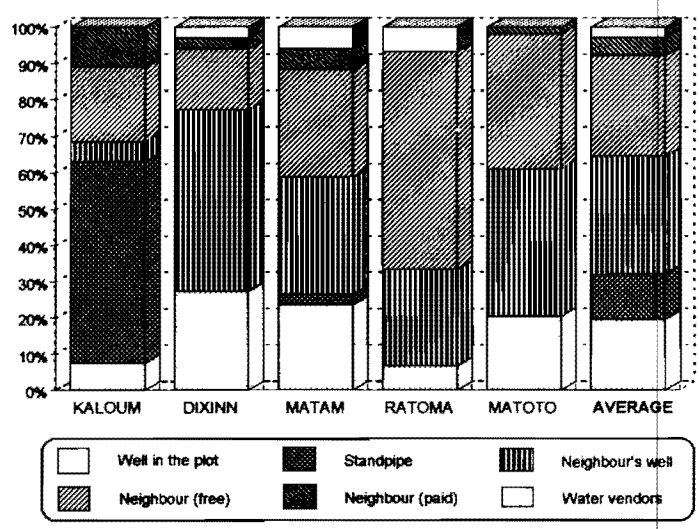

figure 5 **alternatives in case of breakdown**

2.3.2 Neighbours' private connections

In spite of the constraints which it represents, nearly 18% of households depend on their neighbours for their water supply. Traditionally, and according to Muslim practice, this service is rendered free of charge. However, due to water shortages and behavioural changes in the urban environment, certain households have begun charging their neighbours for this service. The status of neighbour no longer guarantees that one can obtain water without paying for it.

At the present time, only 5% of households pay for water which they obtain from neighbours, but it is likely that the tendency to charge for this service will increase with the changeover from a fixed charge type of payment to payment for water actually consumed as per a water meter, which is the system presently being installed by the SEEG.

"Sometimes, the neighbours forbid us to use their water, so we have to go elsewhere."

"Our neighbours ask more and more to use our water, but they don't help pay the bill. This is a social constraint."

2.3.3 Purchase from water vendors

Purchasing water at one's home is a marginal method of water supply (less than 1% of households). However, this service tends to increase when there are prolonged breakdowns in the supply network, in particular in the districts of Matam and Ratoma. Prices fluctuate during crisis periods, when a 23 litre drum can be sold for as much as 200 FG (Ratoma).

2.3.4 Public taps

Those who use public taps (a total of 5% of households, but 12% when household connections are cut off) are mostly concentrated in Kaloum. This supply is free at the moment, and the main reasons for complaints are irregularities in the supply and long waiting periods during rush hours.

2.3.5 Wells

There is some awareness of health risks related to the use of well water: nearly 30% of households which use this water complain of its poor quality.

However, the main problems cited by the majority of households relate to shortages during the dry season when wells dry up, some already in February, which forces women to wait for the water to well up intermittently in order to meet their families' daily needs.

2.3.6 Rainwater collection

Rainwater is used as a supplementary source of water by many households (72%). This practice varies from one district to another according to the situation of the supply network: it is less frequent in Kaloum (58% of households) and more frequent in Ratoma (83%). Various types of containers are used to collect rainwater (basins, buckets, pans); only about 20% of households have a 200 litre barrel placed under a rain gutter.

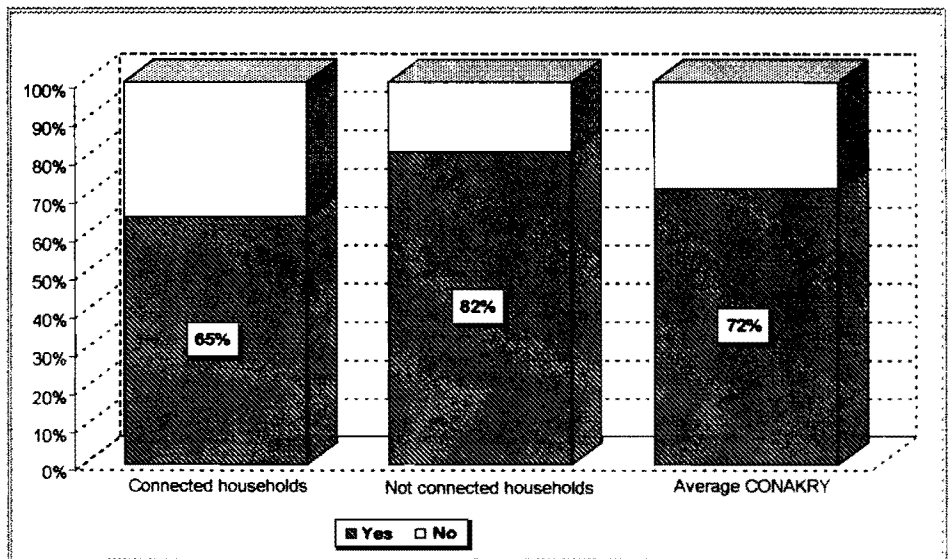

figure 6 **rainwater collection**

The main reasons cited by those who do not use this method are that they are satisfied with their water source (43%) and that water collected in this way is impure since the roofs are dirty (52%). Those who do collect rainwater only use it for other purposes than drinking.

2.3.7 Supply from outside the compound

Nearly one-third of households do not have any supply of water within their compound (neither well nor piped-in water): 37% of these feel that the place where they do obtain water is very far from their home, a feeling which seems justified, since the same proportion said that they must go a distance corresponding to ten compounds.

2.3.8 Attitudes towards water quality

Several indicators show that the population of Conakry is aware of water quality.

In fact, 28% of households do not use the same source for drinking water and water for other household needs. For the question on preferred water source for drinking and cooking, piped-in water was cited as the first choice by 91% of households and well water as the second choice by 67%. In spite of the reluctance to use rainwater for these purposes, rainwater was preferred over river water.

2.4 Payment for water

At the time when the survey was carried out, the fixed charge was still applicable for the majority of subscribers, which explains the relative infrequency of references to the cost of water expressed by households. Attitudes would be very different today: payment for water actually consumed, accompanied by an increase in rates (while the expected improvement in services is not yet evident), is strongly criticised by households served by the network.

For the households covered by the survey, 8% did not pay for the water they consumed, because they did not receive a bill, or did not participate in the payment of the bill (5%).

In multiple family compounds, payment was generally made on the basis of dividing the total equally (56% of cases); however, the desire to avoid conflicts and to make the payment more equitable regarding the quantity of water actually consumed often led to dividing the bill based on the number of persons in each family (20%) or the number of rooms occupied (17%).

For the public taps, the SEEG's policy is to encourage the beneficiaries to be responsible for maintenance and to have the users pay for the water they consume. This policy is already being applied in cities in the interior where projects to rehabilitate or install drinking water networks have started up. However, for the standpipe project in Conakry, water consumption at the water points which have already been rehabilitated in Kaloum was to be paid for by the district administration.

Nevertheless, the population is aware that the installation of new public taps is contingent upon the users' taking responsibility for their maintenance (or at least their guarding). The mayors ask neighbourhood leaders to include proposals covering these points in the requests submitted by their residents.

2.5 Water consumption

Based on the studies undertaken for the UDP, average consumption of water from the network varies according to the type of service:

- 48 l/day/inhabitant for a private water connection
- 20 l/day/inhabitant for supply from a neighbour's connection
- 17 l/day/inhabitant for a public tap

For private connections, this information hides differences in behaviour according to living conditions. In multiple family compounds, and in particular those which have problems regarding disposal of wastewater on the premises, water consumption at the common tap is probably lower. Several common practices in fact limit water consumption: the tap is sometimes sealed with a padlock and is open only at certain hours; young children do their washing at the public tap or on the edge of the sidewalk, and so forth.

3

3. Disposal of wastewater

Aside from the separate wastewater disposal network which covers part of the district of Kaloum and several mini-networks in housing developments built by real estate companies such as those in Dixinn and Matam, most wastewater is disposed of by means of on-site systems. In this case, it is necessary to distinguish between household sullage and wastewater from latrines and toilets since in the majority of cases, these are disposed of by different methods.

3.1 Waste water from latrines and toilets

3.1.1 Sanitary facilities

On-site facilities

According to survey results, 95% of households have some form of sanitary facilities. These are generally within the compound (80%) and are used in common by all households: on average one or two cabins are shared by three families, i.e. about 25 persons. Only 15% of households have a toilet in their apartment. In the wealthiest families, these indoor toilets are only to be used by the landlord, his wife, or other "respected persons," and another outside toilet is to be used by the children and tenants. Children under the age of five do not use these sanitary facilities for safety reasons.

Four per cent of households surveyed do not have any toilet facilities on the premises; most of these (68%) use their neighbours' latrines. It must be noted that many households who live in multiple family compounds in heavily populated areas do not live in a comfortable situation: it is not rare to find that up to 50 or 60 people must share a single cabin, which is often non-functional or temporarily unusable while it is being emptied.

Characteristics of sanitary facilities

Half of the installations consist of only a simple pit, while 36% have a squatting bowl and 14% have a WC seat.

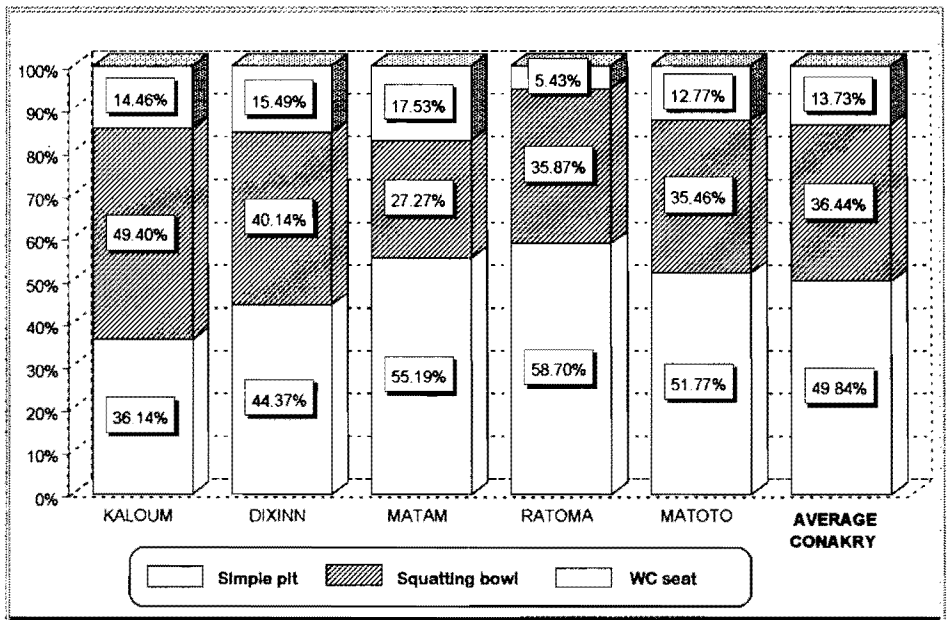

figure 7 **sanitary facilities by district**

The slabs are usually made of cement (81%), reinforced by iron bars or railroad ties. However, a local industry to produce cement and tiled slabs is developing, and is popular with the population: 16% of households surveyed have a slab of this type. Its cost varies between 3,000 and 15,000 FG, and is easily affordable by the middle classes.

The type of facility depends on the standard of living and also on the existence of sewer systems. It is therefore in the district of Kaloum that we find the most squatting bowl and WC seats.

More than 60% of the latrines do not have flushing mechanisms, whether they are only simple pit or squatting bowls set over a pit. Among the latter, only 36% are equipped with siphons. Where waste disposal requires flushing, this is usually done by hand (with a bucket of water), even when there is a WC cistern, since this is usually non-functional due to technical problems or lack of water.

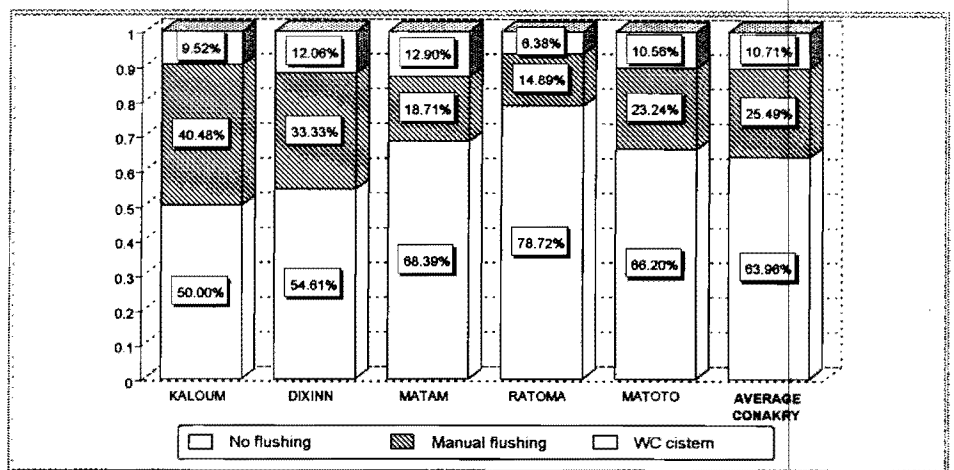

figure 8 flushing mechanisms

In contrast with semi-urban areas where the traditional tendency is to leave the latrine roofless, most sanitary facilities in Conakry have a roof (nearly 78%) and 26% are equipped with ventilation pipes; 14% of these are equipped with fly screens.

Waste collection mechanisms

As Figure 9 shows, there are three main types of pits: simple traditional unlined pits (21%), those lined with cement (39%) and septic tanks, as they are called by the population although they do not usually meet the standards for this type of equipment (29%) since they generally consist of two separate pits which are rarely connected to a cesspit.

The need to line the pits depends on the nature of the soil. Where the soil is soft and crumbly, the sides of the pit must be lined, and a slab must be placed at the bottom equipped with a drain which allows water to seep through. In rocky soil, the sides are only rarely lined.

Across districts, the greatest differences are between Kaloum, where 35% of sanitary facilities are connected to the sewer system, and Ratoma, where the number of septic tanks is lowest compared to the districts which do not have a collective sewer system.

Latrine builders

Construction of latrines is done by well-diggers who dig the pits and masons who construct the slabs, line the walls or make separate compartments as needed, and erect the superstructure.

There are traditional well-diggers in Conakry, but the job has been opened up to other professions (in particular workers in gold or diamond mines) as well as to the unemployed; the most

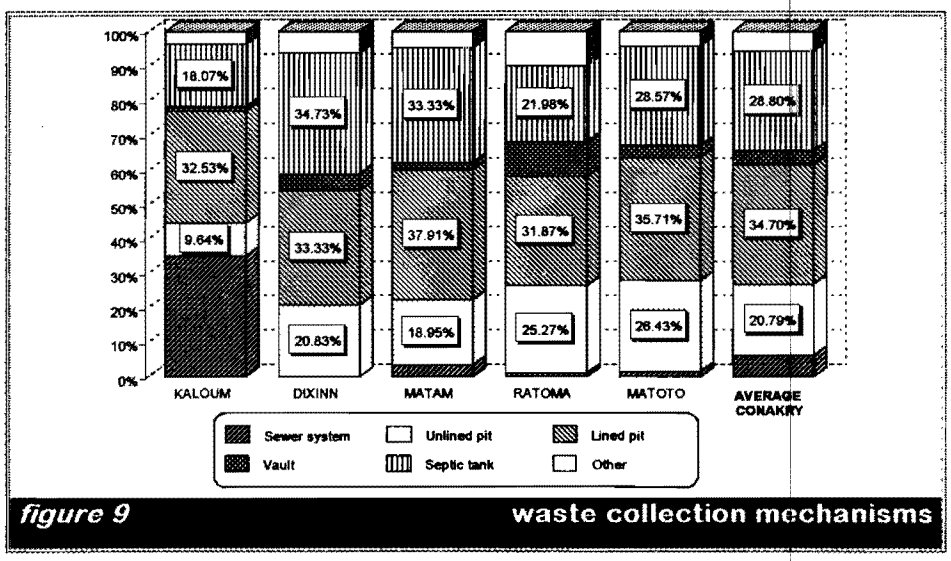

figure 9 waste collection mechanisms

important qualification is physical strength, and training is done on-the-job. The well-diggers generally work in teams with only rudimentary tools (hammers, chisels, hoes, shovels, buckets, ropes). The site and the dimensions of the pit are determined by the homeowner along with the advice of the well-diggers. The cost varies according to the nature of the soil (soft or rocky); thus for a pit measuring 24 m3 (4 x 3 x 2 meters), the contract between the homeowner and the team of well-diggers can vary between 225,000 and 500,000 FG.

The masons generally work with material and equipment furnished by the homeowner.

3.1.2 Emptying

According to the results of surveys, 64% of latrine pits are emptied by the UPSU or the fire company. (See Figure 10).

These results seem somewhat optimistic when one realises how under-equipped these services are. The UPSU only owns one water truck theoretically intended for repair work on the sewer system, but used more and more often for jobs needed by administrative services and individuals (emptying an average of 5 pits a day). The fire company only possesses two old trucks equipped with water pumps (emptying an average of 9 latrine pits per day per truck).

In addition, several zones are inaccessible by truck, and numerous compounds are located within non-structured blocks. Most of this market is therefore in the hands of manual workers who use very rudimentary methods and who work in very unsanitary conditions. Chemical products (lime, diesel fuel, caustic soda) are poured into the pit well before it is emptied, in order to reduce odours and vapours and to soften the sludge formed by the excreta.

Besides the part-time emptying services, there are about thirty teams of more professional drainers who have received on-the-job training by the UPSU or the fire company, who do this work outside of their regular work hours (which undoubtedly explains the confusion among households questioned about the operators). These teams sometimes "rent" garbage dumpsters (at 15,000 FG a day) in order to transport waste to the dumping site. Only two private contractors offer a motorised service, one of whom has two small trucks (4m3) and the other a tractor attached to a tank measuring 4m3.

No matter who does the emptying, the final disposal of the sludge is a high-risk polluting factor (See Figure 11). For the UPSU and the fire company, the sea coast is the main outlet right in the middle of the city. For individuals and private contractors, the waste is theoretically deposited in a pit dug for this purpose when the latrine is emptied, but in practice and when the lot or soil makes digging difficult, the waste is deposited next to the pit or in the drains. Some households take advantage of the rainy season to dispose of the waste in the street.

The cost of emptying varies according to the difficulties encountered in the field, the volume of waste to be disposed of and the operator. A single trip by a tank truck costs between 30,000 FG (for the fire company and private contractors) and 40,000 FG (UPSU). To this cost must be added

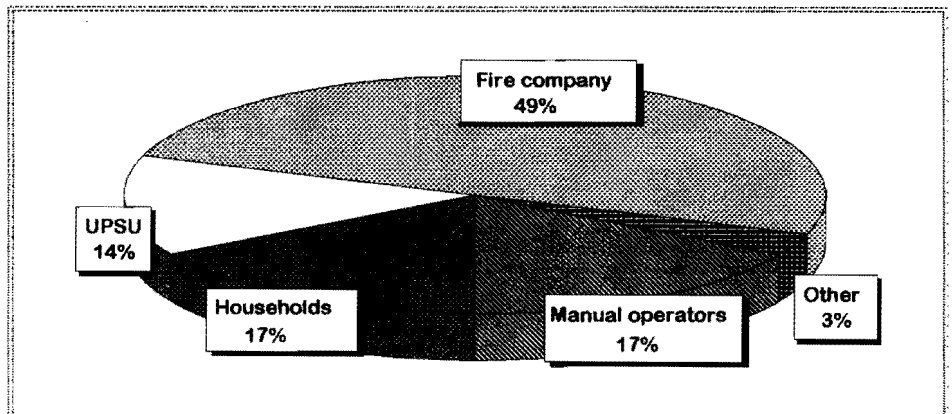

figure 10 **latrine pits emptying operators**

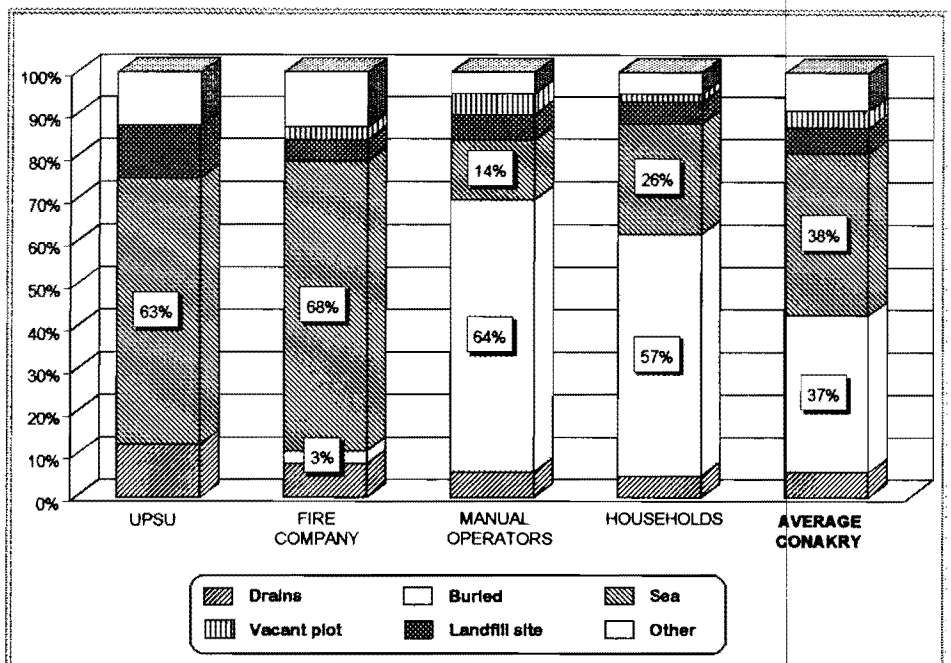

figure 11 **final disposal of the sludge depending on operators**

that of the damage to the sanitary facilities in order to allow for emptying: 58% of households interviewed stated that repairs had to be made after emptying.

In multiple family compounds, all the households (tenants as well as landlord)) must help pay the cost of emptying the latrine. The landlord, or the head of the compound, must collect the contributions before contacting the emptying service. According to surveys, it is this time needed to collect the money which delays the operation (in 62% of cases) rather than the waiting period after the emptying service is contacted. This waiting period is generally not longer than a week (84%), but it can be as long as one to three weeks (10%) or even longer (6%).

3.1.3 Attitudes towards existing facilities

Two-thirds of households surveyed say they are satisfied with their sanitary facilities.

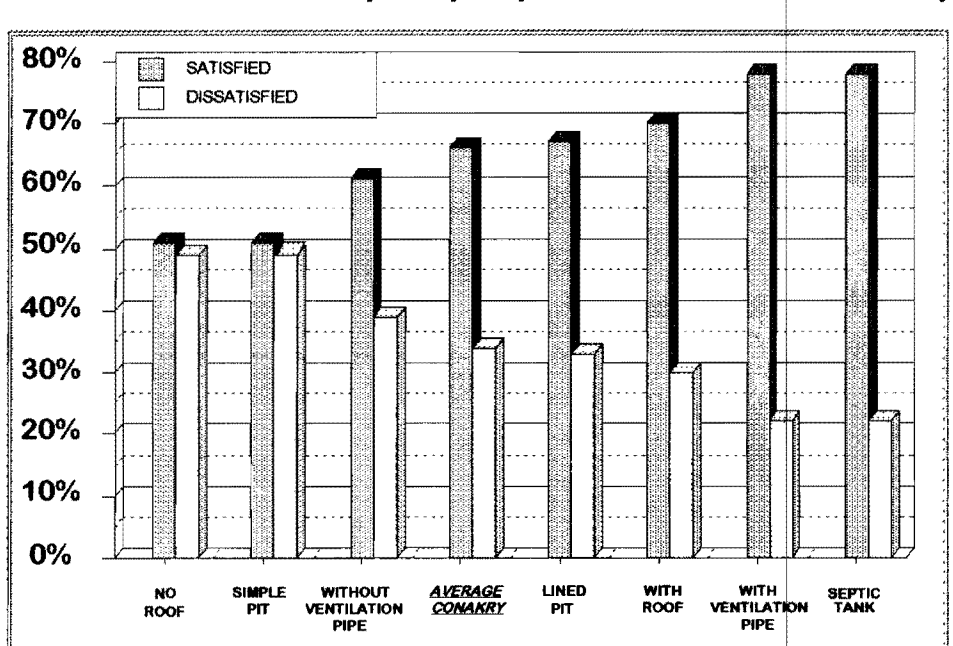

figure 12 **attitude towards latrines**

According to the type and characteristics of the latrine used (See Figure 12), the rate of satisfaction varies from about 50% (for roofless single pit latrines) to 80% (for facilities with septic tanks or ventilation pipes).

However, many households complain about the inconveniences caused by swarming flies and cockroaches (about 75%) and unpleasant odours (50%). Other reasons for complaint relate to lack of water, which makes maintenance difficult and to problems related to emptying (See Figure 13).

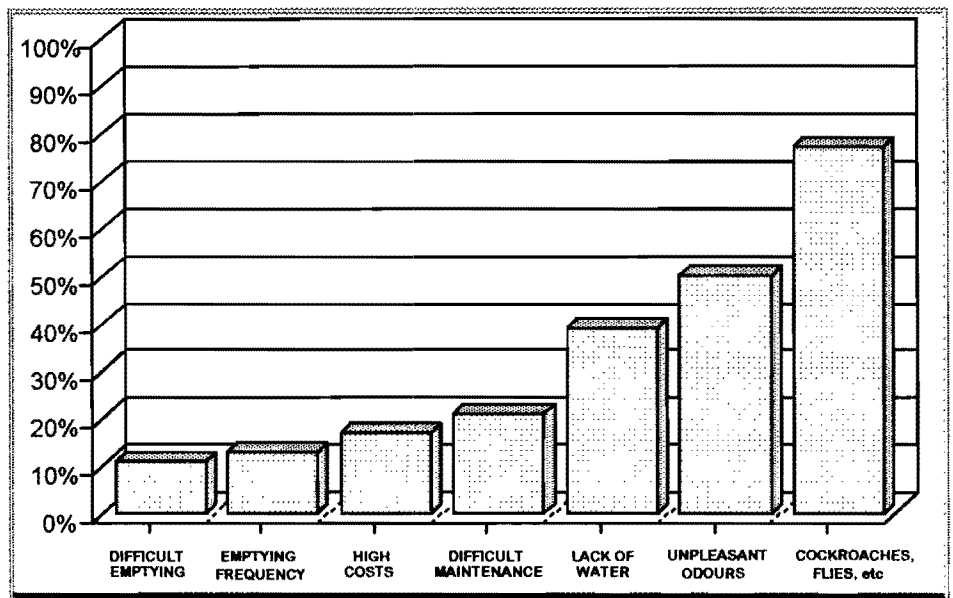

figure 13 **complaints related to latrines**

Interviews carried out during the environmental study describe the situation experienced by many households, and highlight the problems related to emptying and the insufficient number of latrines for the number of potential users:

> *"There is only one latrine for the fifteen households which live in the compound: when it is full and we can't afford to call the emptying services, the latrine is closed until the sludge settles; during this time, everyone gets along as best he can." (Dixinn Mosque)*

The approaching need for emptying is experienced with even more apprehension by families living in enclaves inaccessible by trucks:

> *"Our compound is surrounded by the neighbours. We don't know what to do when the latrine is full. We are afraid." (Carriere)*

Certain households complain about the inefficiency and cost of the official services:

> *"When we call the UPSU or the fire company, it seems as though the trucks are already half-full when they arrive, because they only remove half of the contents of the pit. A month or two later, the pits are already overflowing again. That is why people prefer to empty their latrines themselves or call subcontractors. The sludge is poured into the ditches, especially during the rainy season." (Bonfi Marche)*

Problems relating to the usage of sanitary facilities are almost as severe in compounds which are connected to the sewer system, when the sewer pipes are blocked:

> *"When the sewer pipe is blocked, we have to dispose of waste in the sea." (Manquepas)*

3.2 Household sullage

Among the methods used by households to dispose of household waste water, it is important to distinguish those who dispose of it outside the compound (poured out in the street, or in the drainage ditches, or in other ditches dug near the courtyard) and those who dispose of it within the compound (poured into the toilet pit, into a soakaway pit, or poured out in the courtyard). These methods vary according to the type of waste water: shower water or waste water from laundry or dishwashing.

3.2.1 Waste water from showers

Water from showers is more often poured down a pit. Forty-five per cent of households use the toilet pit (this information is important when proposing VIP latrines with double pits) and 20% in a soakaway pit usually dug within the compound. These practices limit the problems caused in various West African cities by soakaway pits for showers situated outside the walls of the compound. In addition, the soakaways are generally covered (76%) and 46% are filled with stones or other filtering materials. Stagnant water near the soakaway has only been noted in 15% of cases.

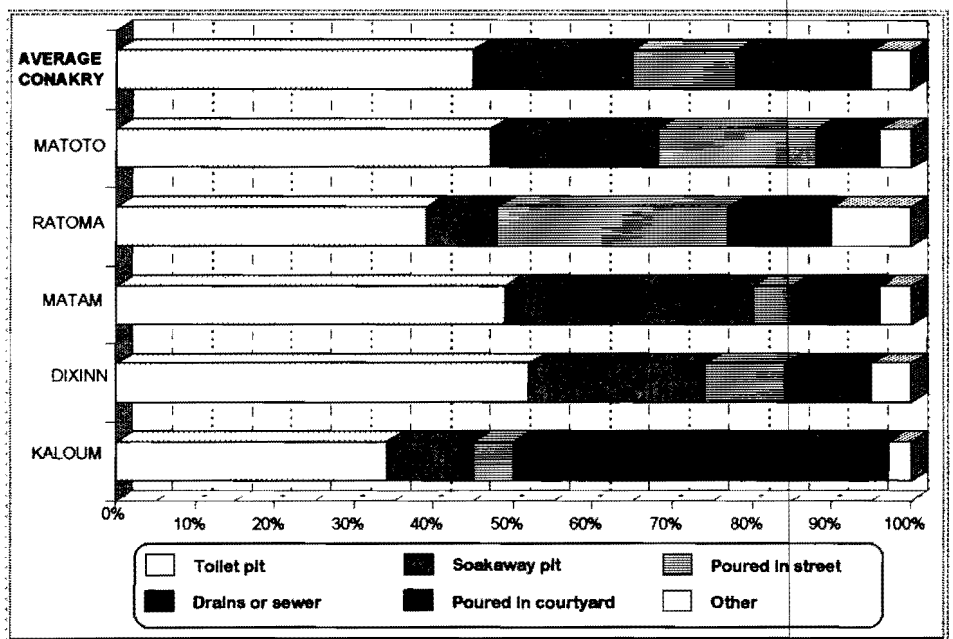

figure 14 **disposal of shower water**

This situation varies from one district to another. The use of soakaway pits is less common in Kaloum since part of this area is equipped with sewers, and in Ratoma, where households often let shower water flow outside of the compound, or pour it in the courtyard. In areas which have drainage ditches, shower water is often carried directly to the ditches by pipes.

3.2.2 Dishwater

Dishwater is less often poured into a pit or soakaway (24%); the tendency is usually to get rid of it outside the compound (42%). Even in areas served by the sewer system, many women hesitate to pour dishwater into the pit because of the problems it could cause (see figure 15).

However, 25% of households have stated that they pour the dishwater onto the ground in their own courtyard. This practice seems to vary according to the population density of the district: it is more common in Ratoma (54%) and to a lesser extent in Matoto (34%) than in the more heavily populated districts of Kaloum, Dixinn and Matam.

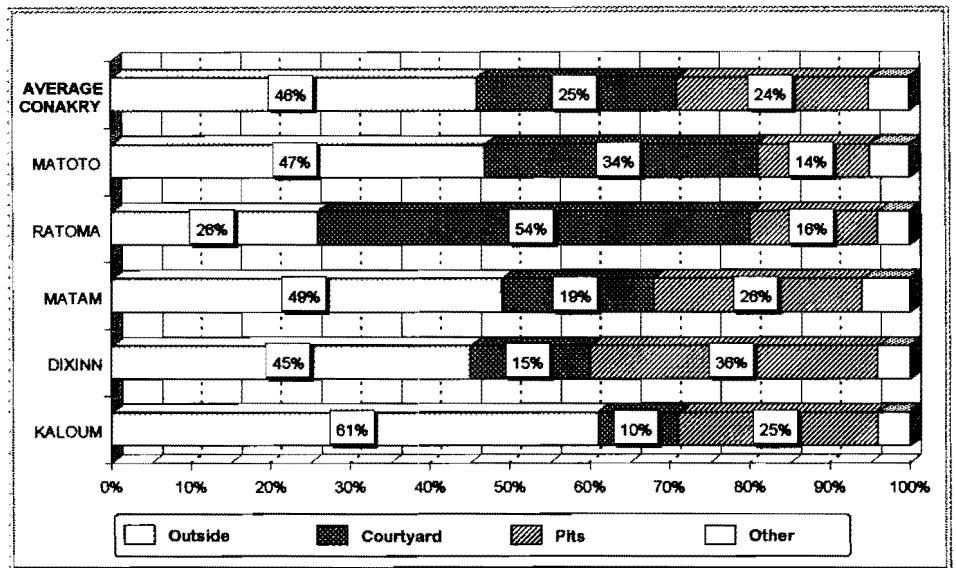

figure 15 **disposal of dishwater**

3.2.3 Waste water from laundry

According to the results of surveys, women usually do their laundry in the courtyard (85%) and less often at the water hole (6%) or in the street (4%). In the districts of Ratoma and Matoto, laundry is more frequently done at the water hole (18% and 10% respectively). Among the women who go outside the compound to do their laundry (15%), about 26% feel that the distance they must walk is somewhat long, and 12% feel that it is very long.

The absence of washtubs is strongly felt especially in densely populated areas where the disposal of household waste water causes huge problems.

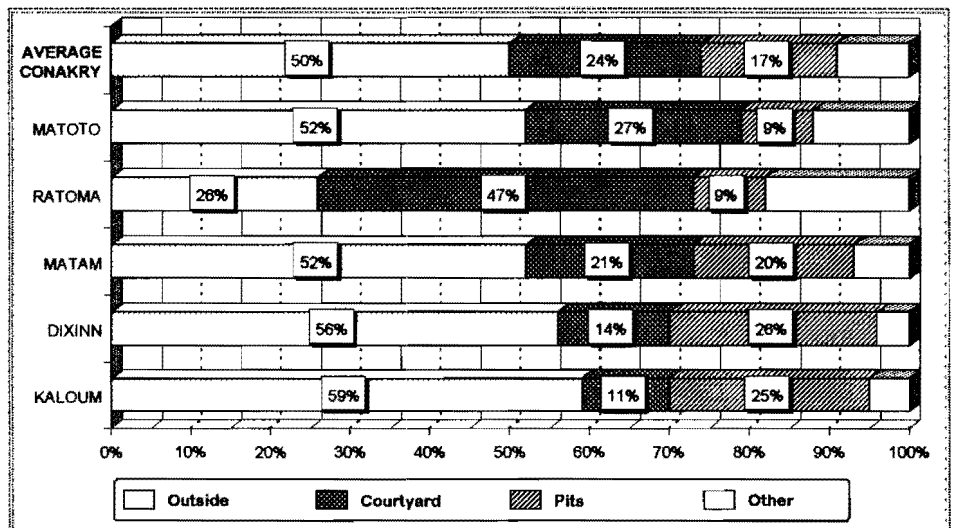

figure 16 **disposal of laundry water**

Only 17% of the people interviewed stated that they pour the waste water into a pit or a soakaway. As for dishwater, waste water from laundry is most often disposed of outside the compound (47%), except for Ratoma where it is usually poured out within the courtyard (49%).

3.2.4 Soakaway pits for waste water

Soak pits for waste water are most often installed within the compound (80%) and covered (76%). Forty-six per cent are filled with stones or other filtering materials.

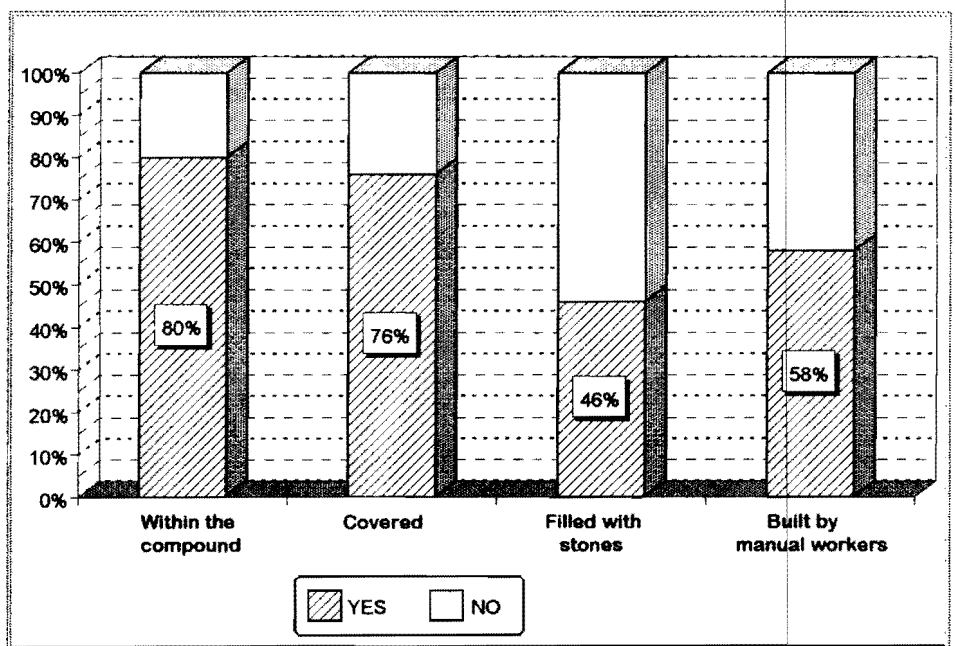

figure 17 **characteristics of soakaway pits**

3.3 Inconvenience caused by household waste water

3.3.1 Within the compound

According to the results of studies, stagnation or pouring out of waste water within the compound only causes marginal inconvenience to the residents: only about 12% of households complained of this, whether water from bathing, dishwater or water from laundry (See Figure 18).

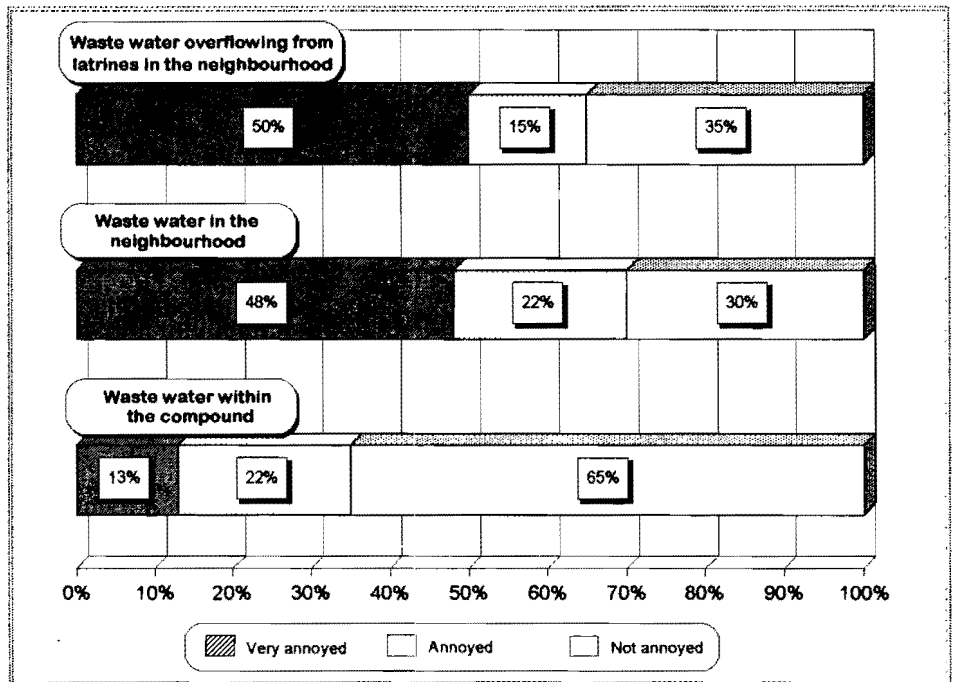

figure 18 **inconvenience caused by waste water**

It is especially in multiple family compounds in the old, densely populated neighbourhoods that disposal of waste water causes problems. The problem is often so severe that residents must limit the quantity of water used or carry out certain activities outside the courtyard (probably more often than appears in the survey results): washing dishes, laundry, washing children and sometimes adults' showers. In effect, saturation of the area makes it difficult to pour water inside the courtyard, and the soakaways or latrine pits quickly overflow if women pour waste water from laundry or dishwashing into them. When the soakaway from the shower overflows, the person in charge of the courtyard often forbids the use of the shower until the pit is drained. In Kaloum, neighbourhood leaders have forbidden the pouring of waste water onto paved roads; more recently women are also not allowed to do laundry near the public taps. These measures force women who have no other alternative to dispose of waste water outside of their courtyards.

3.3.2 In the neighbourhood

On the other hand, nearly half of households surveyed experience as an extreme nuisance, for the environment and their comfort, the stagnation or flowing of household waste water and overflow from latrines in the neighbourhood (See Figure 18). In certain areas these problems lead to conflicts between neighbours:

> *"We are annoyed in our courtyard because we want to pour waste water in the street or in the gutter; there are always problems with the neighbours or with the authorities."*

> *"Our neighbours don't listen to us when we tell them not to pour dishwater in the street. The accumulation of dishwater causes arguments among neighbours."*

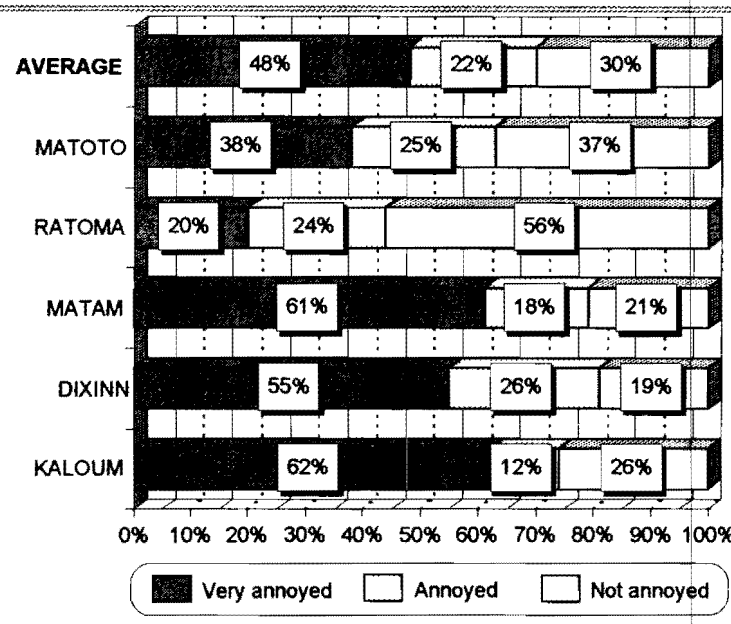

figure 19 **inconvenience due to waste water in the neighbourhood**

The degree of annoyance varies according to population density in the area. In outlying areas, vacant lots, less densely populated compounds and dirt roads allow for disposal of waste water, which although not a long-term solution, does not constitute a major inconvenience. On the other hand, in Kaloum and also in Dixinn and Matam, disposal of waste water is a major problem for women, who do not know how to get rid of it, and for residents who deplore the pollution of their environment.

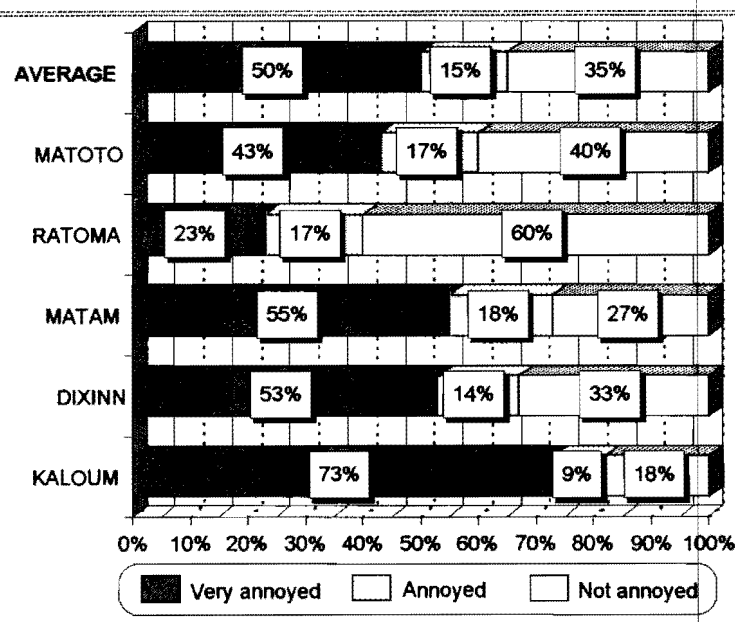

figure 20 **inconvenience due to waste water overflowing from latrines in the neighbourhood**

The inconvenience caused by overflow from latrines is strongly felt in the district of Kaloum (more than 70% of households) when the pipes are blocked and the waste flows out onto the sidewalk, but also in the heavily populated areas of Dixinn and Matam:

> *"If the latrines overflow, we suffer; the excreta smells terrible and the liquid flows all over the place." (Boulbinet)*
>
> *"We can't walk around outside at night in our neighbourhood: we might drown in waste water and the overflow from latrines." (Carriere Centre)*

4

4. Household refuse

4.1 Methods of refuse disposal

Only 29% of households have access to a garbage collection service by one of the compacting garbage trucks of the public service (Unite de Pilotage des Services Urbains, or UPSU). These trucks cannot reach a certain number of areas with impassable roads, particularly in outlying areas. Thus the rate of individual garbage collection is 87% in the district of Kaloum, but only 10% and 17% respectively in the outlying districts of Matoto and Ratoma (See Figure 22). In the districts of Dixinn and Matam, where the street network is relatively limited and the roads are in good condition, this rate is respectively 29% and 26%. These households dispose of their garbage in cartons (24%) or other containers (60%) rather than in "official" garbage containers made of PVC (4%). These are sold at a modest price in city markets, but are more often used for storing water. Certain households also use plastic bags (12%).

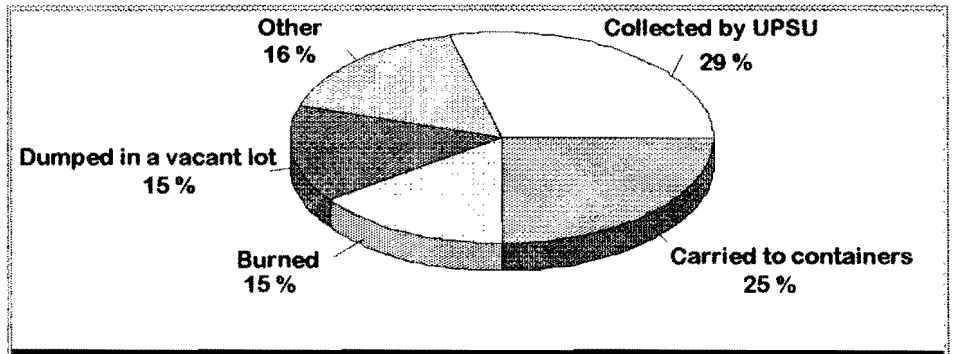

figure 21 **disposal of household refuse**

In contrast with other West African capitals, the public collection service has hardly any competition from private refuse collectors, since only 2% of households in Conakry state that they use private services, which are mostly limited to a particular area (Hafia-Mosquee).

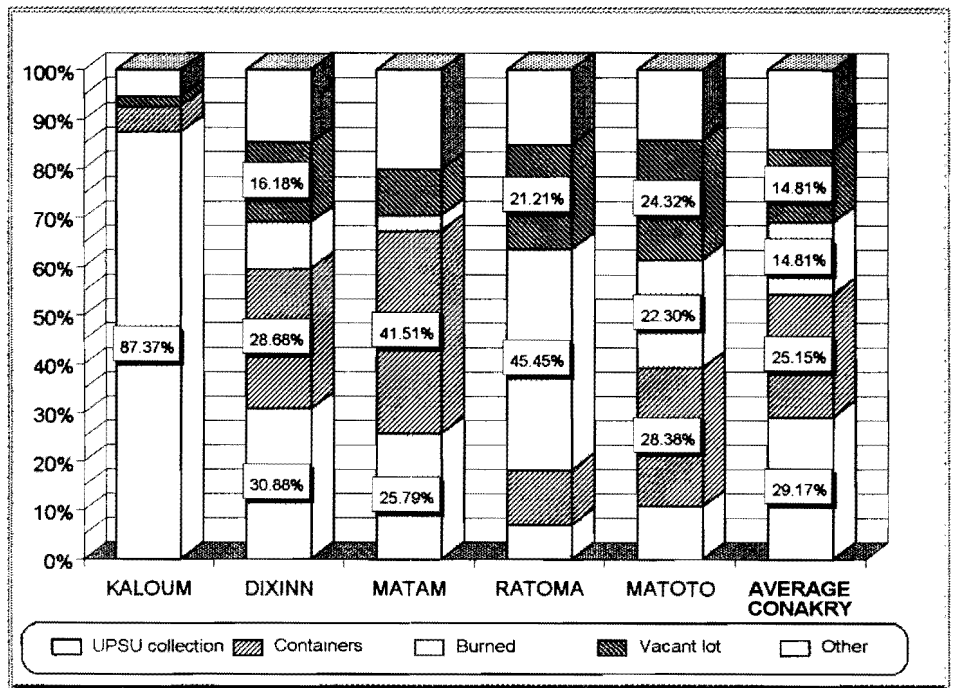

figure 22 **disposal of household refuse by districts**

Marginal in Kaloum, the carrying of garbage to containers constitutes the second method of disposal of household refuse in the city (25%), and the main method for the residents of Matam (42%) and Matoto (28%) (See Figure 22). As shown in Figure 23 it is sometimes necessary to walk long distances (more than 300 meters: 36%) to reach the 160 or so containers of the UPSU. It is usually the children of the household who carry out this task.

An identical and non-negligible proportion of households (15%) burn their garbage or dump it in a vacant lot outside of their compound. These practices are more common in the districts of Ratoma (67%) and Matoto (47%), where relationships are more relaxed and there are more vacant lots. Where there is no collection service, trash is not dumped indiscriminately, except perhaps along the beach and during the rainy season. If the garbage is not burned in front of the compound, it accumulates at specific sites familiar to the population. This represents an effort on the part of households who must walk a certain distance (See Figure 23: 28% between 100 and 300 meters, 18% more than 300 meters) to dispose of garbage where it is not collected. This effort is in fact encouraged by neighbourhood leaders.

"We are trying to raise the women's awareness so that the compounds are clean and so trash will be dumped at specific places along the road or the railroad. We have no other choice since there are no containers or collection services available. For now, the railroad track is our main dumping place." (Dixinn-Mosquee, President of Women's Group)

It can be noted that these distances are not really shorter than those walked by the residents of neighbourhoods which do have containers, which shows if need be how useful they would be in outlying districts.

Certain households practice some form of recycling, although they are few and far between according to the household survey (5.5%). They separate cans and bottles from garbage to be burned or composted; they also take out scrap iron as recommended by the UPSU. Plastic objects are sometimes taken to the factory or the market to be sold, along with cartons or anything else that may be turned into cash. Sometimes organic matter such as rice is separated and buried in order to avoid unpleasant odours.

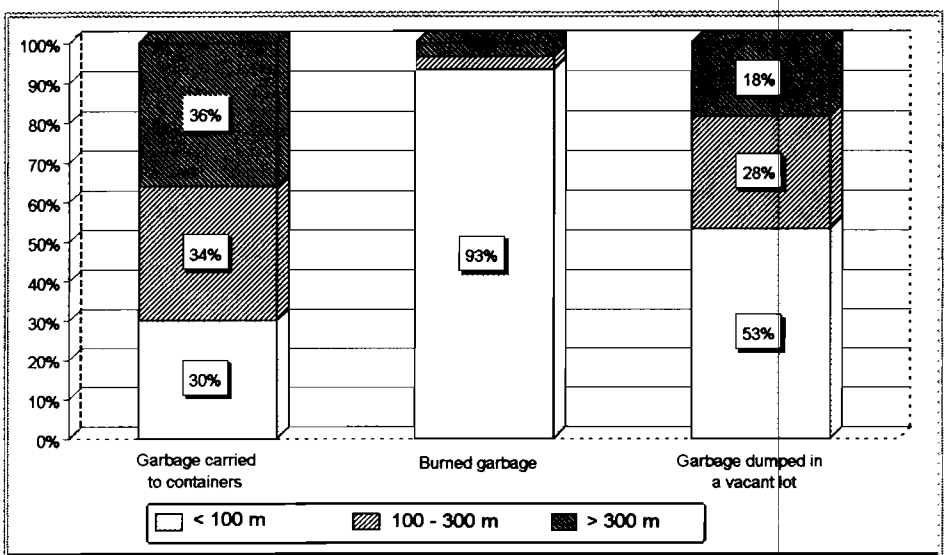

figure 23 **walking distance according to method of household refuse disposal**

4.2 Attitudes towards refuse and collection services

For those who have access to it, the door-to-door collection service of the UPSU is generally appreciated, in spite of some irregularities in its frequency. Although trash is supposed to be collected daily, it is not rare that various problems in management or maintenance immobilise all the compacting garbage trucks at the garage for several days in a row. The same is true for the trash pick-up from containers; this lack of regular service is the number one complaint among the households surveyed (52%). The distance to the containers and their unpleasant odour are also reasons for complaint (31% and 25% respectively).

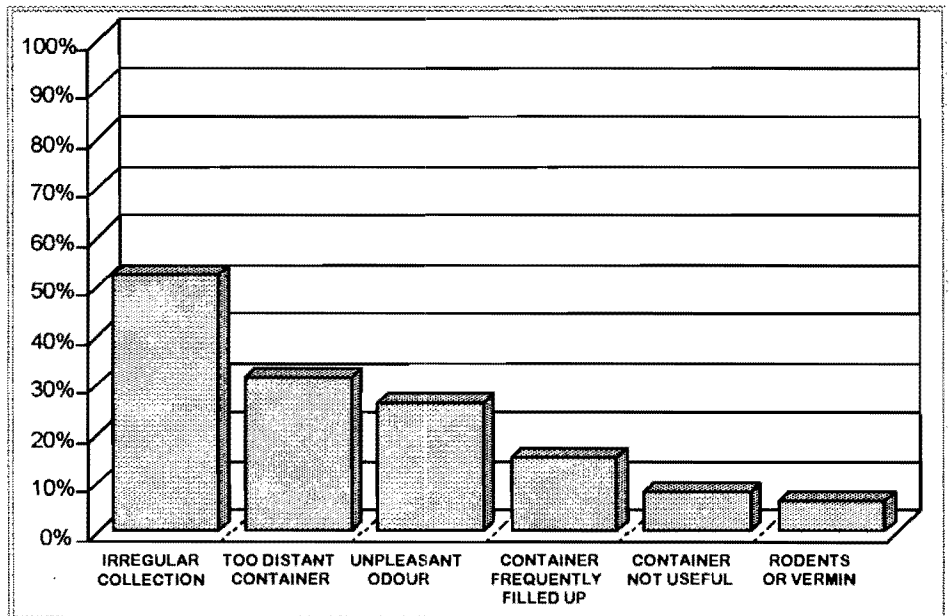

figure 24 **dissatisfaction towards collection service**

On the other hand, the sixteen persons in our sample who pay young people in the neighbourhood to dispose of their trash are unanimous in expressing their satisfaction with the service thus rendered. Most of these people live in the area called Hafia-Mosquee, where a door-to-door collection service was set up in 1991 upon the initiative of the neighbourhood leader in a project financed by UNICEF (PADU).

"Informal dumps" are widely scattered around the entire city (See Figure 25). Fifty-seven per cent of households admit their existence in their neighbourhood, although half of these households live in zones served by the UPSU.

When asked about the origin of the informal dump sites, those surveyed blamed lack of discipline on the part of city residents, the distance from containers and the irregularity of collection.

A high percentage of households (60%) said they are "very annoyed" by the household

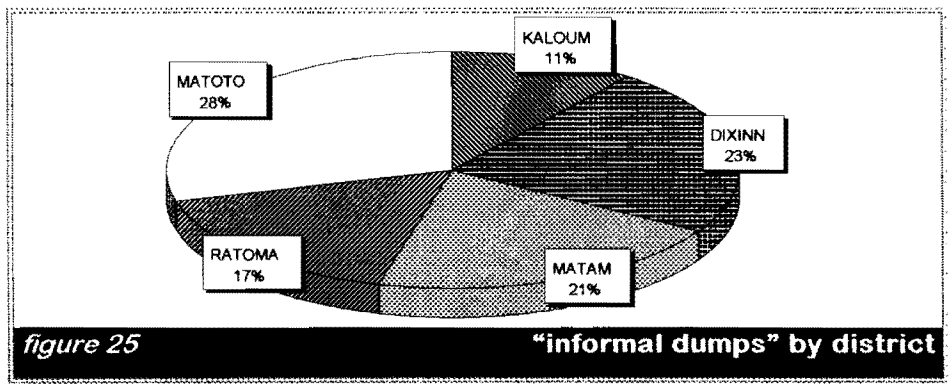

figure 25 **"informal dumps" by district**

garbage in their neighbourhoods, especially if there are informal dump sites (75%). In reality, the lack of garbage collection leads all the residents to experience the degradation of the environment in which they are participating themselves, as shown in Figure 26, which represents the degree of annoyance felt by those interviewed according to the method trash disposal.

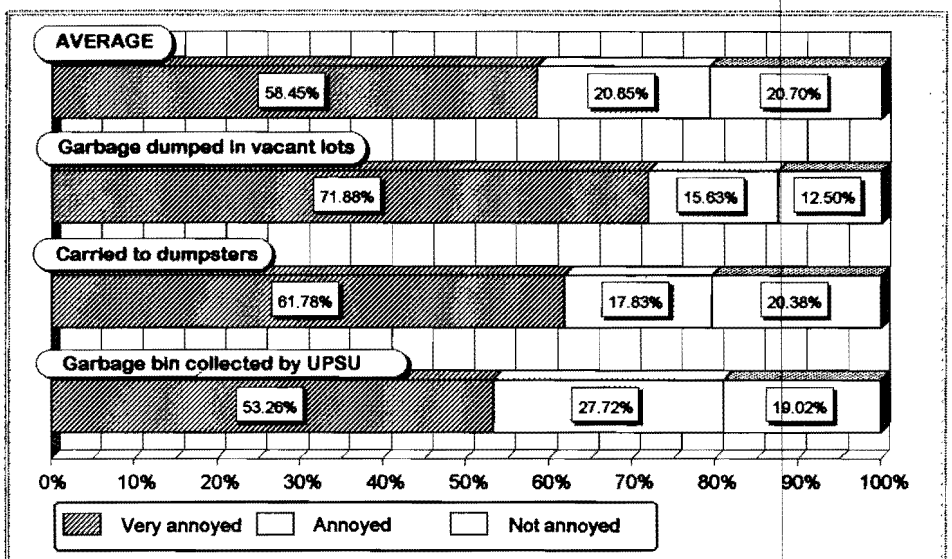

figure 26 **inconvenience due to garbage in the neighbourhood according to method of disposal**

4.3 Willingness to pay for collection service

A majority of households (59%) state that they are willing to pay for a regular collection service (at least two times a week) in front of their compound, but reject completely the idea of paying each time trash is removed. Predictably, agreement is related to the degree of annoyance expressed (See Figure 27) as well as to the present method of trash disposal used by the household (See Figure 28).

As a result, the willingness to pay exists to a variable degree in different districts. As shown in Figure 29, households in Dixinn, Matam and Matoto are most inclined to pay for such a service. In Kaloum and Ratoma, the willingness to pay is less than the mean for the city for different reasons: in the first case, there is already a widespread service; in the second, nearly half of the households dispose of their trash by burning it near the compound, with no apparent annoyance.

Certain households were very willing to pay. However, this attitude was often contingent on regularity of service, indeed on its actual existence.

"We can't live forever with this garbage..., we are ready to do anything, even to pay so that our street will be clean."

"We won't refuse to pay as long as the service is effective."

"Yes, but on condition that the trucks come regularly."

"Yes, if it's true that they'll come and pick up the trash."

> *"If they don't come to our front door every day, we won't pay the 25FG. We'd rather carry our own trash to a vacant lot."*

In addition, the affirmative responses are not always sure:

> *"We'll pay at the beginning for trash collection, but we can't keep it up because we can't afford it."*

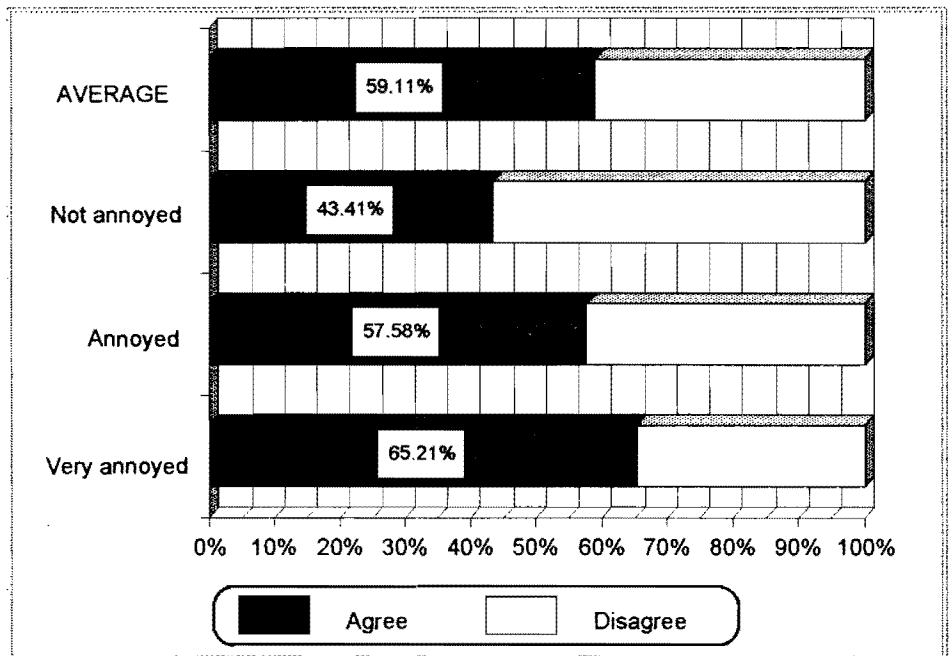

figure 27 **willingness to pay for a collection service according to inconvenience due to household garbage**

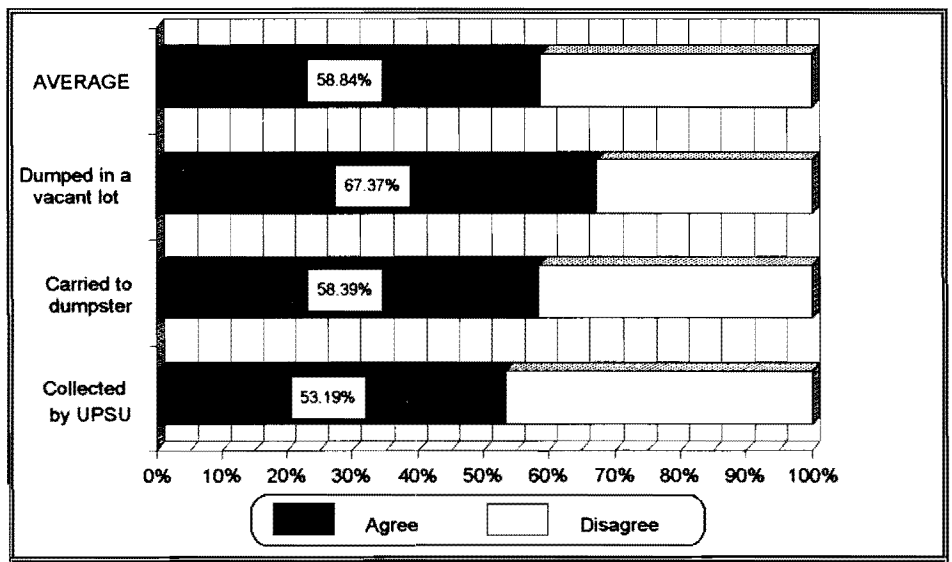

figure 28 **willingness to pay for a collection service according to method of garbage disposal**

Those who refuse to pay for trash collection have alternatives which are satisfactory and free of charge... or only bother women and children (in the case of male respondents):

> *"We burn our trash and it's no problem. So instead of paying for it, we'd rather burn our garbage in the morning or evening." (Dar-es-Salam)*
>
> *"We can pay for water or electricity, but not for trash collection even if we can afford it. We are near the sea coast." (Matoto Market)*
>
> *"Our wives can throw the trash into the sea. For storm water, household trash and all the rest, we just throw it all in the sea."*
>
> *"We have children, and our wives are here. If the UPSU can't do the job for free, we can do it ourselves." (Landreah)*

Sometimes the refusal to pay is not due to the existence of viable alternatives, but to scepticism about the effectiveness of a potential service, or even to a rejection of the idea of paying for a service which should be public and free of charge.

> *"We won't pay anything because we know the job won't be taken seriously."*
>
> *"We don't agree with paying a cent for household trash."*
>
> *"The problem of household trash – that's the government's problem."*

The willingness to pay for a door-to-door collection service according to the methods described above was measured in the survey by using the technique of bidding. In studies using the contingent valuation method, when a few precautions mentioned in the introduction are applied, bidding gives better results than simply asking the respondent to name the highest amount that he would be willing to pay for such and such a service. We will not describe this technique in greater

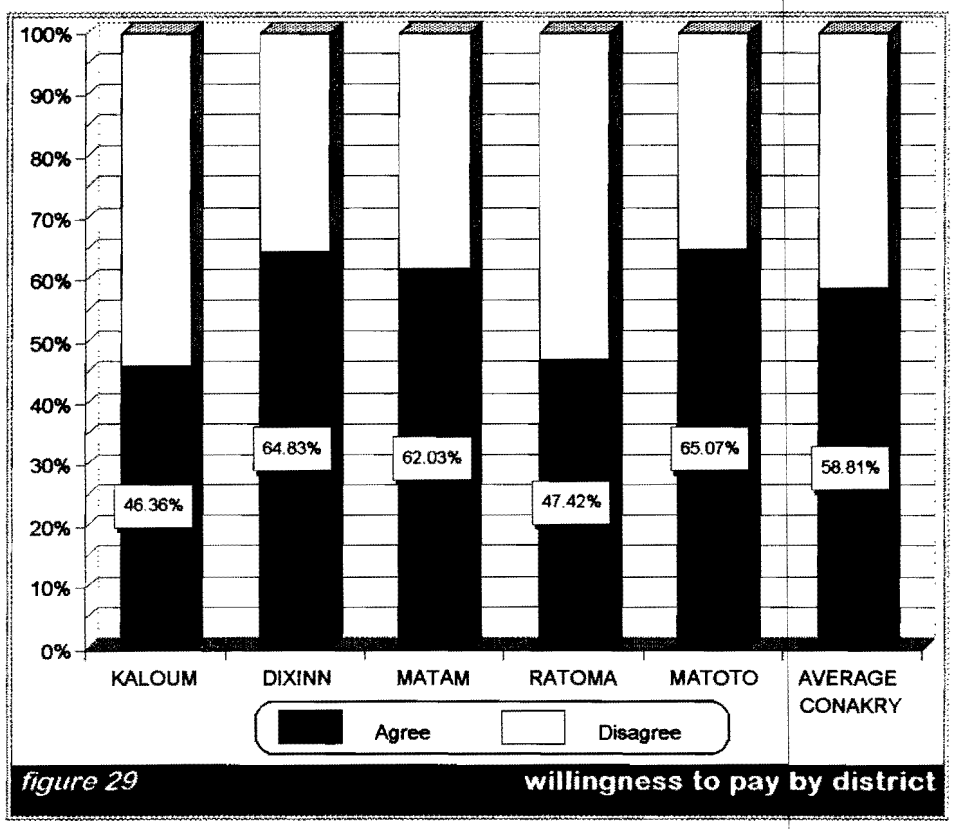

figure 29 **willingness to pay by district**

detail, since it has already been well documented in the literature.[1] In this case it consisted of asking the respondent if he would be willing to pay 750 FG per month for a twice weekly trash collection service in front of his compound. Upon an affirmative response, he was asked if he would pay as much as 1000 FG, and in the case of a negative response, if he would be willing to pay 500 FG. Those who agreed to pay 1000 FG were asked to state the highest amount which they would be willing to pay, while those who refused to pay 500 FG were asked to name the smallest amount they would pay. This bidding technique was only used with respondents who accepted the principle of paying for the service; thus the willingness to pay assigned to each household took one of the following values:

* 0 FG if the respondent did not accept the principle of paying;
* the highest amount stated if the bidding fell in the interval [0,500];
* 625 FG if it fell between [500, 750];
* 875 FG if it fell between [750, 1000];
* the highest amount stated if the respondent agreed to pay more than 1000 FG.

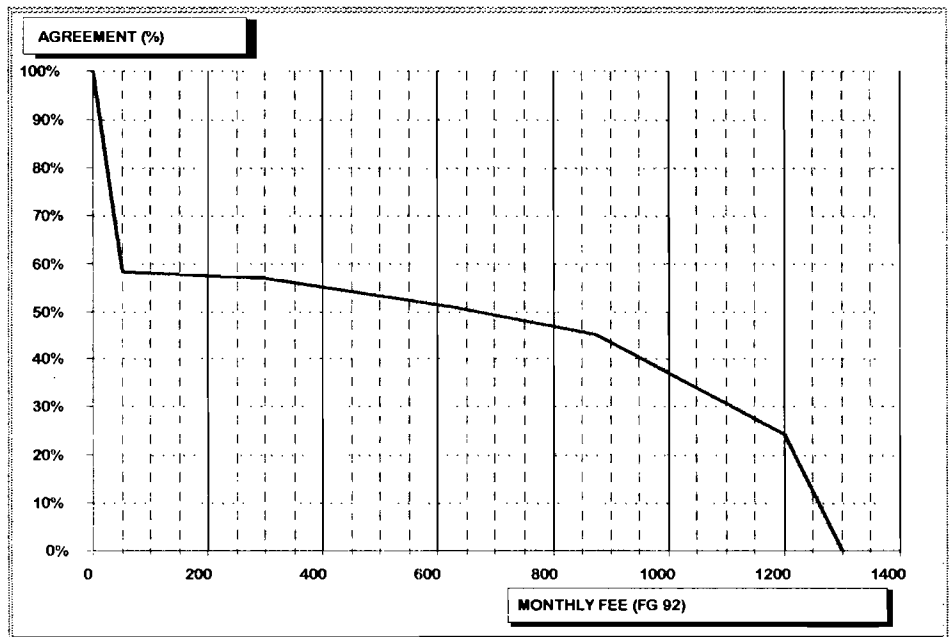

figure 30 **willingness to pay for a collection service**

The results are shown in Figure 30, which shows the percentage of agreement to pay for trash collection depending on the amount of the monthly fee. As shown in the figure, the median value would be approximately 700 FG. On the average, this payment amounted to about 525 FG.

We can note significant differences in the mean and median payments across districts, which reflect the differences noted above in the respective proportions of households willing to pay across districts. In Kaloum and Ratoma, only 45% of households accepted the principle of payment (See Figure 29), and they accepted a mean monthly payment of 380 and 470 FG respectively. In Dixinn and Matoto, on the other hand, more than 60% of households are willing to pay and the average amount they would agree to pay was 570 and 610 FG respectively. In Matam, the mean monthly fee is close to the average for the city, i.e. 527 FG.

[1]See in particular Cummings, R.G., Brookshire, D.S., Schulze, W.D.: Valuing Environmental Goods: An Assessment of the Contingent Valuation Method: Totowa, New Jersey; Roman and Allanheld: 1986 and Mitchell, R.C., Carson, R.T. Using Surveys to Value Public Goods: The Contingent Valuation Method: Washington, D.C.: Resources for the Future; 1986.

5

5. Stormwater

5.1 Situation of stormwater drainage

More than two-thirds of the households in Conakry do not have access to any public system of stormwater drainage near their compounds. The drainage network is especially concentrated in the districts of Kaloum, Dixinn and Matam (80%). In Kaloum, most of the drainage ditches are covered. We find, although to a lesser extent, covered drainage ditches along the main roads going through Matam. In Matam as well as in Dixinn, a certain number of primary and secondary roads are equipped with open drainage ditches. In the outlying districts of Matoto and Ratoma, only a few main highways are similarly equipped.

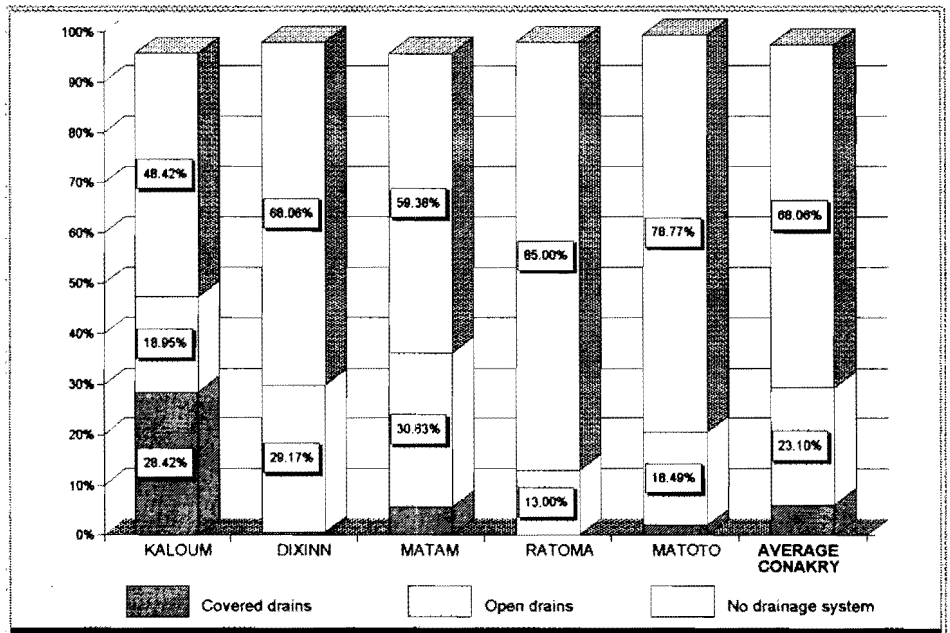

figure 31 **stormwater drainage systems**

With the exception of a recently built drainage ditch in Hafia-Mosquee (Dixinn), which is made of laterite blocks, these ditches are either cemented or unlined earthen ditches. More than 40% of households complain of the presence of garbage in the section of the drainage ditch along their compound and 29% complain of stagnant water in the ditch.

In the eyes of residents, the UPSU does not fulfil its responsibility for the maintenance of these ditches: barely 13% of households surveyed stated that the public service takes care of cleaning the ditch near their homes, while 61% claim that they clean it themselves. For one out of five residents, no one cleans it.

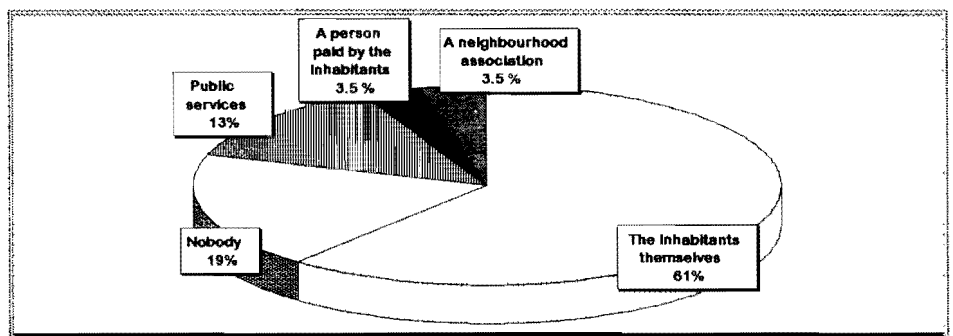

figure 32 **who is in charge of maintaining the stormwater drainage system near the compound?**

5.2 Inconvenience due to stormwater

During the rainy season, 30% of the compounds have more or less temporary problems of flooding, and 60% of the households in the city say they are more or less bothered by the effect of rainwater in their compounds. A significantly higher proportion (80%) say they are bothered by the impact of rainwater in their neighbourhood.

In the compounds, they are especially bothered by stagnant puddles of water (50% of those who expressed annoyance), and to a lesser degree by the muddy ground (about 30%). Less than one-fourth of the households who expressed annoyance mention the presence of mosquitoes, overflowing of latrines, or other reasons.

The annoyance due to an absence of proper drainage is tied to the perturbation during the rainy season of the numerous activities which ordinarily take place outside. If the gender of the respondent is not a discriminating factor, his/her status as a resident in the compound does have a significant impact. The tenants declare that they are more bothered than the landlords due to the fact that the latter have invested more in installations for protection. (See below)

The loss of utility is more noticeable for all the activities that take place outside. If 59% of the households say they are bothered by rainwater in their neighbourhood (and an additional 22% say they are "somewhat bothered"), it is especially by the difficulties caused in getting around, especially on foot, by puddles (59%) and mud (29%). Walking time to one's destination is often increased, sometimes considerably, since many streets become temporarily impassable. In addition, some households are temporarily delayed at home for several hours because they cannot get out, as shown by the stormwater survey carried out in the target areas.

When asked about the cleanliness of their compounds, households attribute the main reason for annoyance to factors related to stormwater.

During the household survey, they were asked to cite the three main causes of annoyance (See Figure 34). Overall, household waste was the most often cited (52% of households). However, "puddles during the rainy season" was the factor more frequently cited as the main source of annoyance (25% of responses) and "mud during the rainy season" in second position (35% of responses). Eighty-six per cent of households surveyed cited at least one of these sources of annoyance among the three possibilities.

This means that for the city as a whole, more people complain of the absence of trash collection, but on the other hand, for those who suffer because of it, the absence of proper drainage is more strongly felt.

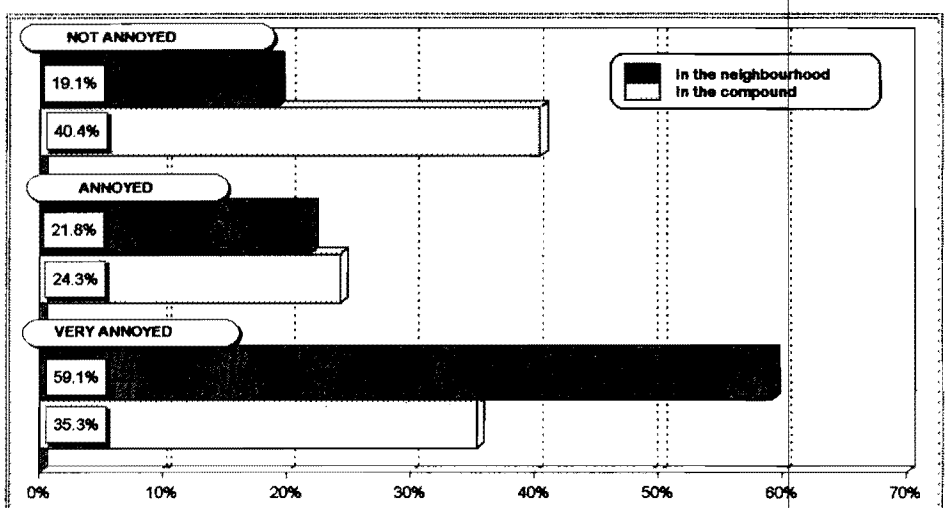

figure 33 inconvenience due to stormwater in the compounds and in the neighbourhood

It is therefore especially important to identify "target neighbourhoods" in which the impact of stormwater can cause great damage and to intervene first of all in those areas.

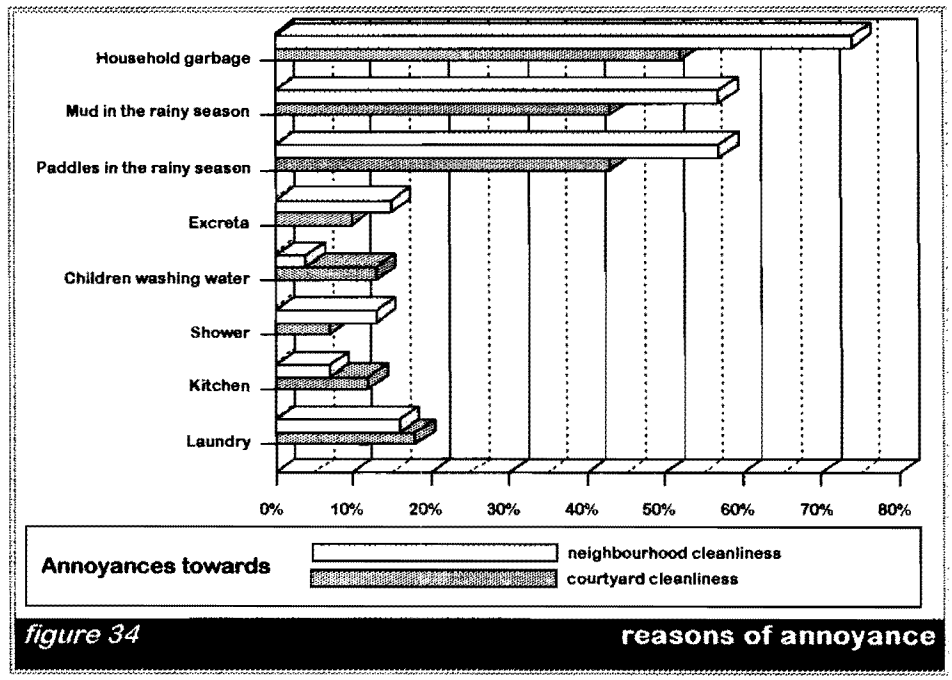

figure 34 **reasons of annoyance**

5.3 Rationale and methodology of the additional study of flood zones

The cost of investments undertaken by individuals in order to protect themselves from the impact of run-off as well as the cost of damage which they sustain needs to be estimated if one wants to evaluate their willingness to pay for improved drainage.

The financial impact of flooding and erosion caused by stormwater needs to be assessed more precisely. Indeed, the economic analysis which underlies almost all drainage plans or projects is weak: we find few clear hypotheses and even fewer economic justifications. Funding agencies now rightly insist on the need for just such a rationale. The sector thus must develop the basis for an economic analysis of investments.

The assessment of the cost of damage can give an idea of the level of public investment to be allocated. We must note that technically appropriate public installations, for an equivalent overall investment, lead to a more significant improvement than the sum total of private investments. As the amount of public investment in drainage installations depends in large measure on the level of protection sought, the cost of damage must also be tied to decision-making parameters intervening in the choice of the scale of the installations, in particular: the height and frequency of flooding to be protected against.

It was not possible during the household survey to quantify these parameters and the cost of damage and private investments without making the survey too long. It was therefore decided to carry out an additional survey which would be briefer and more specific, aimed at the sectors which experience severe problems with flooding. This study, co-ordinated by a national consultant, employed three enumerators for a two-week period. An interview schedule was developed by the international consultant and the local consultant, then presented and discussed with the enumerators (a sociologist, an economist and an engineer). The survey was carried out in the target zones chosen following interviews with the central and local technical services, the Colonel of the fire company of Conakry as well as with the local authorities (mayors of the five districts, city council members, neighbourhood presidents and sector heads. One hundred thirty-two households were thus surveyed in the following target zones (See Table 8).

Table 8: Target Zones for Additional Survey on Stormwater

DISTRICT	KALOUM	DIXINN	MATAM	MATOTO	RATOMA
NEIGHBOURHOOD	Tombo	Cameroun Camayenne Hafia-Mosquée Hafia-Minière	Mafanco Madina Centre Madina Ecole Lanseboundji Bonfi	Gbessia Port Yimbaya Ecole Yimbaya Tannerie Simbaya 2	Taouyah Ratoma Hamdallaye I Hamdallaye II Kipé

The water level recorded during this study varied between 8 cm. and 1.75 meters with an average level of 52 cm. The length of time the areas were submersed varied from several minutes (for high water levels) to several days (for shallow levels). *Half of the 132 households surveyed experienced flood levels greater than 45 centimetres for more than three hours.*

The cost of domestic installations for flood control and damage, as found during this study, are presented and analysed in the following paragraphs.[1]

[1]See below: 5.4 INDIVIDUAL STRATEGIES FOR PROTECTION and 5.6 COST OF DAMAGE TO HOUSEHOLDS

5.4 Individual strategies for protection

Environmental studies have confirmed previous notions of the types and limits of individual strategies for flood control.

- the strategy of those living in well-drained areas was usually limited to facilitating the drainage of their compound by constructing ditches leading out into the street, and if necessary, in diverting water coming from upstream by building low walls;

- in low-lying areas or those with insufficient slope, the same types of installations can be used, but they offer a solution which is derisory or unacceptable to those living nearby. Some people therefore try more expensive solutions, which are also more effective: filling-in or gravelling of courtyards, or raising of constructions.

Except for the case of gravelling the courtyard, these individual strategies often only transfer the problems downstream, thus aggravating the problems of erosion or flooding in other areas.

In addition, solutions which consist of draining stormwater from one's own living area or preventing it from entering one's courtyard often lead to conflicts with neighbours.

The large number of households who have invested in the construction of flood control devices shows above all that the individual response to the problem has developed to a great extent throughout the city. More than 30% of the households surveyed stated that they had indeed dug a drainage ditch within their compound.

"We can't dig any ditches or anything. If we do, we have problems with our neighbours. They live very close."

"The neighbours won't let me dig a ditch which will drain the water in their direction." (Matoto Centre)

"The neighbours have all blocked off the overflow. So we are flooded during the rainy season." (Gbessia Port II)

The specific study on stormwater drainage carried out in the target zones resulted in precise information on the type and cost of installations which have been constructed.

The total cost of protection is on the average about 300,000 FG per household (median: 200,000 FG) and varies according to the type of preventive measure, as shown below:

- *Filling-in of courtyard and construction of walls or dikes:* mean expenditure 170,000 FG (median: 55,000 FG);
- *Foundation of buildings* (including latrines, frequently mentioned because of the cost of repeated emptying caused by rainwater flowing into the pit, seepage or raising of the water table): mean expenditure 50,000 FG (median: 0);
- *Gravelling of courtyard:* mean expenditure 20,000 FG (median: 0);
- *Drainage devices (channels, ditches):* mean expenditure 70,000 FG (median : 0). It must be noted that 48% of households have undertaken the construction of such devices in the target zones, as compared to 30% for the city as a whole.

A multilinear regression analysis was carried out to analyse the cost of flood control measures, using as variables "flood level" and "number of years of flooding."

It appears that the frequency of flooding in the area (number of years of flooding) and especially the level of flooding have a significant impact[2] on the level of investment, but these variables only explain a small proportion of the variation in costs measured (low multiple correlation coefficient: R=0.269).

[2]For a confidence level of 5%, P=0.12 and T=1.57 for the variable "number of years of flooding" and P=0.02 and T=2.31 for the variable "level of submersion."

5.5 Collective strategies for protection

Certain areas have undertaken collective projects such as at Bonfi-Marche, where storm drains were built in 1990 with the residents' own equipment (shovels, wheelbarrows, etc.). But these efforts sometimes turn out to be failures, as in Dixinn-Mosquee, where the residents had constructed an earthen ditch along an alley leading to the primary school:

> *"The results were not positive, and now a "rich guy" has built a house there which blocks the flow of the water. We notified the Ministry of Public Works, but got no response. The area is still flooded." (Neighbourhood leader, Dixinn)*

For the residents who suffer from this situation, the construction of storm drains seems to be the only viable solution, with government assistance, of course, as requested by those who believe that these drainage ditches could also solve the problem of waste water.

However, the population groups who are most threatened by potential floods say that they are willing to participate in these construction projects:

> *"Our houses are flooded and the foundations eroded by stormwater. My compound is located in a low-lying area where all the water from Pharmaguinea flows. We need deep drainage ditches and we are willing to participate in helping build them." (Dixinn-Mosquee)*

5.6 Cost of damage to households

The cost of flood damage is considerable.

If less than half of the households in flooded areas cite physical damage (especially scabies, sometimes handicapping, and a few cases of accidental drowning), the ENCOMEC study established a clear correlation between the frequency of certain illnesses and seasonal variation.

The proportion of illnesses rises significantly during (and especially at the end of) the rainy season: from 6.9% in the period March-May, to 10.3% for the period from September to November).

Especially for young children (under age 6), who are the most frequent users of the medical system, an increase in intestinal infections can be observed during the rainy season (7% to about 14% from December-May and June-August) as well as for malaria and other fevers during and immediately after the rainy season (from 2.2% in December-May to 6.2% in June-November).

Diarrhoea in particular, which represents the major health risk for young children, affects 17% of under-two-year-olds during the rainy season.

In the target zones, half of the dwellings experienced flood levels of more than 45 centimetres for a period of several hours (when flood levels can be as high as one meter) to several weeks.

Physical damage to dwellings was assessed at an average of 650,000 FG, and for half of the households surveyed, cost more than 400,000 FG.

For the 132 households surveyed, the total cost of physical damage to dwellings over the last five years was assessed at more than 65 million Guinean francs.

A multilinear regression analysis was carried out to analyse the cost of damage using as variables the level and duration of flooding. These two variables have a significant impact on the cost of physical damage experienced by the households surveyed[3], but they only partially explain it (multiple correlation coefficient R=0.419; more than 80% of the variance is still unexplained).

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[3]For a confidence level of 5%, T=2.226 and P=0.03 for the variable "duration of flooding" and T=3.400 and P=0.001 for the variable "depth of flooding."

Conclusion

Field studies carried out within the project development phase of the Program to Improve Sanitation and the Urban Environment of Conakry (PADEULAC) furnished basic information for the subsequent implementation of the program.

A combination of various approaches (household surveys, environmental studies, lot surveys...) allowed us to determine the level of equipment at the disposal of households in the areas of liquid and solid waste disposal, and the types of improvements which are desirable or hoped-for. The residents' priorities regarding the cleanliness of their environment could thus be determined, which made possible more precise targeting of actions to be undertaken: restructuring and privatisation of door-to-door trash collection services, establishment of a program including both on-site and collective sanitation systems covering the needs of two-thirds of the population, and the development of innovative low-cost techniques for stormwater drainage.

Concerning the urban environment in general and its diverse components in particular, certain of the techniques applied during these studies are tools which have not been used much previously; their application in Conakry thus allowed us to test them, and if not to validate them, at least to improve their application for replication in later studies (i.e. studies of willingness to pay, studies on flood damage).

However, these studies and surveys only give us a "snapshot" of the practices and aspirations of the residents. During its implementation phase, the project will bring about a modification of these practices, to the extent that most of the potential improvements are presently unfamiliar to the local population. In general terms, the population in question is not accustomed to having a clean and healthy environment, thus they cannot yet anticipate the benefits which they can drive from it. It is thus particularly revealing to note that the willingness to pay for a trash collection service is, on average for the city as a whole, very significantly lower than that of the residents of the neighbourhood where such a service already exists. Thus the demonstration effect of the first installations will undoubtedly stimulate to a certain degree the demand for improved services or equipment, indeed perhaps even leading to a modification in their technical nature.

The PADEULAC Project should therefore take up the challenge and adapt its proposals and implementation procedures to meet the evolving demand.

Annex

PADEULAC HOUSEHOLD SURVEY

REGISTRATION NUMBER:

ENCOMEC IDENTIFICATION NUMBER:

1. HOUSE NUMBER:

2. HOUSEHOLD NUMBER:

3. DISTRICT:

4. NEIGHBORHOOD:

5. SECTOR:

6. SUPERVISOR:

7. ENUMERATOR:

8. DATE OF INTERVIEW:

9. TIME START:

10. TIME FINISH:

11. DATE DATA ACQUISITION:

INTRODUCTION TO BE READ BY THE ENUMERATOR:

"My name is _____ and I work for the Sanitation and Urban Environment Project of the City of Conakry. For this project, we are conducting interviews in compounds around the city. In _____ you were visited by enumerators for a project called "Nutrition and Food Security." We would like to ask you a few more questions about your practices and opinions regarding the disposal of waste water, excreta, household garbage and stormwater. We have received permission from the Conakry authorities to conduct this study. We realize that you have been asked many questions in other surveys, but your answers will help us to better understand your needs for improved water and sanitation services. The responses will be kept strictly confidential. If, at any time during the interview, you would prefer not to answer any more questions, you have the right to stop the interview. If more than one household lives in this compound, we would like you to answer only for yourself and your household, and not for other households in the compound."

WOULD YOU BE WILLING TO BE INTERVIEWED?

YES=1	NO=0
I	I
V	V
CONTINUE	STOP INTERVIEW
	GO TO NEXT HOUSEHOLD

DOES NOT KNOW: CODE=-1
REFUSES TO ANSWER:CODE=-2

PART A. HOUSEHOLD CHARACTERISTICS

E (enumerator): *"First of all, I would like to ask you a few questions about your household."*

1. Sex of respondent:
   Male= 1
   Female= 2

2. Are you the head of the household?
   Yes= 1
   No= 0

3. What is your birthdate (month/year)? _____/_____

4. Are you or have you ever been married?
   Yes= 1
   No= 0

5. Number of households in this compound: _____

6. Is your household:
   Landlord= 1 .... *Go to A.8*
   Housed free of charge= 2 .... *Go to A.8*
   Tenant= 3

7. Monthly rent= _____FG

8. Including yourself, how many people are there in your household?
   a. Children-15 yrs.=_____ b.Attending school=_____
   c. Women+15 yrs.=_____ d.Men+15 yrs.= _____

9. What is the total number of people living in the compound? _____

10. Highest level of education of household members:
    Primary=1
    Secondary=2
    University=3
    Technical=4

11. What is the occupation of the principal wage-earner?
    Self-employed=1
    Civil servant=2
    Private sector=3
    Retired=4
    Other=5, Specify: _____

PART B: WATER SUPPLY AND WATER USAGE

E: *"Now I would like to ask you a few questions about your household's water supply."*

1. Do you have a private water connection:
   No, no private connection=1 .... *Go to B.9*
   In the compound=2
   In the house=3

2. Who is responsible for paying the bill:
   Yourself or another member of your household=1 ..... *Go to B.6*
   Another person living on the compound=2
   The landlord=3
   No bill received=4 .... *Go to B.9*

3. Does your household contribute to paying the bill?
   No=0 .... *Go to B.9*
   Yes=1

4. Is there:
   Sharing in paying the bill=1 .... *Go to B.6*
   Purchase of water from the person responsible for the bill=2

5. On what basis is water purchased?
   By the container=1
   Other=2, Specify..... .... *Go to B.9*

6. How is the bill shared?
   Not shared=0.... .... *Go to B.8*
   Shared equally=1
   According to number of persons=2
   Number of rooms=3
   Number of taps=4
   Other=5, Specify:

7. How much does your household usually pay?
   _____FG per month

8. How much was the latest bill and corresponding amount of water consumed? (Ask to see the bill if possible)
   a. Total amount=_____FG
   b. Quantity of water consumed=_____m3
   c. Fixed rate:..... Yes=1 .. .. No=0

9. Do you use the same source for drinking water as for other household needs (laundry, bathing, dishwashing...)?
   Yes=1.....Go to B.14
   No=0

10. Where do you obtain your drinking water?
    Well within the compound=1
    Public tap=2
    Neighbor's well=3
    Purchase from a neighbor with a private connection=4
    Purchase from a vendor=5
    Private connection=6
    Free of charge from a neighbor=7
    Other=8, Specify:

11. If you purchase this water, do you pay:
    By the container=1..... .... *Go to B.13*
    Fixed rate=2

12. Specify:
    a. Frequency of purchase=_____
    b. Price=_____FG
    Go to B.14

13. How much do you pay for the type of container in which you usually buy water?
    a. Type of container=_____
    b. Approx. capacity=_____liters
    c. Number purchased per day=_____
    d. Unit price (per container)=_____FG
    e. Other containers, specify:_____

14.a. Where do you get water for your daily needs *(including drinking water if Q9=1)*
    Well within the compound=1
    Public tap=2
    Neighbor's well=3
    Purchase from a neighbor with a private connection=4
    Purchase from a vendor=5
    Private connection=6.....Go to 14.b
    Free of charge from a neighbor=7
    Other=8, specify:

    14.b (Only if Q14=6) When your water is cut off, where do you obtain water:
    Well within the compound=1
    Public tap=2
    Neighbor's well=3
    Purchase from a neighbor with a private connection=4
    Purchase from a vendor=5
    Free of charge from a neighbor=6
    Other=7, specify:
    Go to B.20

15. If you purchase this water, do you pay:
    By the container=1.....Go to B.17
    Fixed rate=2

16. Specify:
    a. Frequency of purchase=_____
    b. Price=_____FG
    Go to B.18

17. How do you pay for the type of container used most frequently:
    a. Type of container=_____
    b. Approx. capacity=_____liters
    c. Number purchased per day=_____
    d. Unit price (per container)=_____FG
    e. Other containers, specify:_____

18. If you have to go elsewhere to obtain your drinking water, would you say that the place where you get it is:
    Very far=1 Somewhat far=2 Nearby=3

19. How many compounds away from your home is your source of drinking water?
    Less than 10=1 From 10 to 20=2 More than 20=3

20. Do you collect rainwater during the rainy season?
    Yes=1... .... *Go to B.22*
    No=0

21. If not, why don't you?
    Not necessary=1
    The roofs are dirty=2
    Rain water is not clean=3
    No appropriate containers=4
    Other=5, specify:_____
    Go to B.24

22. If yes, what sort of containers do you use?
    Cistern=1....Capacity=_____or Dimensions=_____x_____
    Containers with less than 30 liter capacity=2...Specify_____
    Containers holding 30 to 100 liters=3.....Specify:_____
    Greater than 100 liter capacity=4.....Specify:_____

23. How do you use the rainwater?
    For laundry=1
    Dishwashing=2
    Bathing=3
    Laundry,bathing and dishwashing=4
    Other uses=5, Specify:_____

24. What are the three (3) main problems with your water supply?

Low pressure=1	Waiting time=6
Shortages=2	Distant water source=7
Frequent breakdowns=3	Poor water quality=8
High cost=4	No problem=9
Rate increases=5	Other=10...Specify:

25. Which water do you prefer for drinking and cooking (Classify in order of preference):
    Wellwater=1
    Piped-in water=2
    Rainwater=3
    Surface water (river, etc.)=4

PART C: SANITATION (WASTEWATER AND EXCRETA)

E: *"Now I would like to ask you a few questions about the sanitation system which your household uses."*

1. Do you have any kind of toilet or latrine on the premises?
   Inside your house=1 .... *Go to C.5*
   In the compound=2..... .... *Go to C.5*
   None in the compound=3

2. What do you use then?
   Neighbor's latrine=1
   Public latrine=2
   Share a latrine=3
   Other=5.....Specify:

3. Do you pay to use this?
   No=0 .... *If C.1=3, go to C.45*
   Yes=1

4. How much?
   a._____FG per use
   b._____FG per month
   c._____FG other.....Specify:
   Go to C.45

5. What kind of latrine is it?
   Simple pit=1..... .... *Go to C.8*
   Squatting bowl=2
   WC seat=3
   Other=4.....Specify:

6. Do you use:
   Manual flushing system=1
   WC cistern=2
   Manual system because the tank has no water=3
   No flushing system=4 .... *Go to C.8*

7. Is there a siphon?
   Yes=1 No=0

8. Does the latrine (or toilet) have a roof?
   Yes=1 No=0

9. Is the stall made of:
   Concrete blocks=1
   Mud bricks=2
   Other material=3.....Specify:
   No stall=4 .... *Go to C.12*

10. Does the latrine have a ventilation pipe?
    Yes=1... .... No=0

11. A fly screen?
    Yes=1... .... No=0

12. A squat plate:
    Concrete and cement=1
    Concrete and tiled=2
    Wood=3
    Other=4.....Specify:

13. To what is the latrine (or toilet) connected?
    Sewer system=1 .... *Go to C.37*
    A simple (unlined) pit=2 . ... *Go to C.16*
    A lined latrine pit=3
    A watertight pit=4
    A septic tank=5
    Other=6, Specify:

14. What is the construction material (of the pit)?
    Stone=1
    Breezeblock=2
    Mud bricks=3
    Other=4, Specify:

15. How many compartments does it have? _____

16. Where does the sewage go?
    Into a collecting pit=1
    Into a cesspool=2
    Into seepage drains=3
    Into the drainage ditch=4
    Into the street=5
    No sewage=6
    Other=7, Specify:

17. Is the slab directly over the pit?
    Yes=1... ....No=0

18. What are the dimensions of the pit?
    a. Depth=_____m.
    B. Diameter=_____m. or _____m. x _____m.

19. Who determined these dimensions?
    Yourself or another member of your household=1
    The builder=2
    A health worker=3
    Other=4.....Specify:

20. Has the latrine pit ever been emptied?
    Yes=1... .... *Go to C.22*
    No=0

21. What do you plan to do when it is full?
    You will have it emptied by a tank truck=1, Specify:
    You will have it emptied by a subcontractor=2
    You will dig another pit or have one dug=3
    You will use the other pit=4
    Other=5.....Specify:
    Go to C.33

22. How long does it take to fill up?
    Years=_____ and months=_____

23. Who emptied it the last time?
    The UPSU=1
    The fire company=2
    Another public service=3 . Specify:
    A subcontractor=4
    Yourself or other members of your household=5
    Other=6.....Specify:
    [If the respondent does not know, go to C.33]

24. How much time did you have to wait between the time that the pit was full and the time it was actually emptied?
    Less than a week=1..... .... *Go to C.26*
    Between 1 and 3 weeks=2
    More than 3 weeks=3

25. Why? (Several answers possible) They needed:
    Time to save the money=1
    Time to collect the contributions=2
    Time to find someone to do the job=3
    Waiting period between the request and the actual emptying=4
    Other=5.....Specify:

26. What facilities do you use while you are waiting?
    Neighbour's latrine=1
    Other latrine in the compound=2
    Public latrine=3
    Other=4.....Specify:

27. What did or what will emptying the pit cost? a._____FG
    Or, your household's share of the cost? b._____FG

28. Did repairs have to be made because of emptying the pit?
    No=0 .... *Go to C.31*
    Yes=1

29. Cost of repair work? _____FG

30. Type of repair work?_____

31. How many trips are necessary to empty the pit completely?_____

32. If you or someone in your household or compound took part in emptying the pit, do you know where the sludge was disposed of?
    In the gutter=1
    Buried somewhere=2
    In the sea=3
    In a sewage dump=4
    On a vacant lot=5
    Other=6....Specify:

33. How long ago was this latrine built?
    More than 15 years=1
    10 to 15 years ago=2
    5 to 10 years ago=3
    1 to 5 years ago=4
    Less than a year ago=5

34. Who built it?
    [If the respondent does not know, go to C.37]
    Completely by you or another
    member of your household=1 .... *Go to C.37*
    Completely by you with the assistance of one or
    more other occupants of the compound=2 .... *Go to C.37*
    Completely by a subcontractor or company=3..... ..... *Go to C.36*
    Partly by you (or your household) and partly by a subcontractor=4

35. In what way did you participate?
    Digging the pit=1
    Lining the pit=2
    Furnishing building materials=3
    Building the stall=4

36. Could you put us in touch with the subcontractor or company?
    Yes=1 No=0

37. What would it cost to build this latrine now? _____FG

38. Who cleans the latrine?
    No one=1
    The men=2
    The women=3
    The children=4
    The children and women=5
    The whole household=6
    Other=7, Specify:

39. is the latrine used by all the members of the household in all circumstances?
    Yes=1... .... *Go to C.43*
    No=0

40. Do any members of your household use the latrine for bathing?
    Yes=1, Specify . ... *Go to C.42*
    No=0

41. Where do you bathe?

_____

_____

42. Please tell which household members are not allowed to use the latrine, in what circumstances, and what other solution do they have?

_____

_____

43. Are you satisfied with your latrine facility?
    Yes=1 No=0

44. What are the three main problems you have with your system? *(Do not read the answers)*
    Odors=1
    Flies=2
    Cockroaches=3
    Lack of water=4
    Difficult to maintain=5
    Difficult to empty=6
    Frequent emptying=7
    High cost=8
    No problem=9
    Other=10, Specify:

45. Where is water from bathing disposed of?

In the latrine pit=1	Flows into the gutter=2
Flows out of the compound=3	Into a collecting pit=4
Poured out into the courtyard=5	Thrown into the street=6
Into the sewer=7	Other=8, Specify:

46. Where is dishwater disposed of?

In the latrine pit=1	Flows into the gutter=2
Flows out of the compound=3	Into a collecting pit=4
Poured out into the courtyard=5	Thrown into the street=6
Into the sewer=7	Other=8, Specify:

47. Where is the household's laundry done?

In the courtyard=1..... .... *Go to c.50*

At the public tap=2	At the beach=5
At the waterhole=3	At a public washhouse=6
In the street=4	Other=7, Specify:

48. Would you say that the place where you do the laundry is:

Very far=1 Somewhat far=2 Nearby=3

49. How many compounds away from your home is the place where you do your laundry?

Less than 10=1 10 to 20=2 More than 20=3

50. Where does wastewater from laundry go?

Into the latrine pit=1	Poured out into the courtyard=5
Flows into the gutter=2	Thrown into the street=6
Flows out of the compound=3	Into the sewer=7
Into a collecting pit=4	Other=8, Specify:

If C.45=4 or C.46=4 or C.50=4, go to C.51
Otherwise, go to C.61

51. Is the collecting pit where this household wastewater is poured different from the one into which sewage from the latrine pit flows?

No=0 .... *Go to C.61*
Yes=1

52. Is this collecting pit:

Inside the courtyard=1
Outside the courtyard=2

53. Is it:

Only to be used by your household=1
Shared with other residents of the compound=2
Shared with neighbors=3

54. Is it covered?

Yes=1
No=0

55. Is it filled with stones or other filtering materials?

No=0 .... *Go to C.57*
Yes=1

56. How often are these stones (or other materials) changed?

a.Every _____years or b.Every _____months

57. What are the dimensions of the collecting pit?
    a. Depth=_____meters
    b. Diameter=_____meters or width=_____m. x length=_____m.

58. Who built it?
    Yourself or a member of your household=1
    A subcontractor=2
    Other=3....Specify:

59. How much would it cost today? _____FG

60. Is there standing water at the collecting pit?
    No=0 Yes=1

61. Within your compound, would you say that the overflow or stagnation of wastewater from laundry bothers you:
    A lot=1 A little bit=2 Not at all=3

62. Within your compound, would you say that the overflow or stagnation of wastewater from dishwashing bothers you:
    A lot=1 A little bit=2 Not at all=3

63. Within your compound, would you say that the overflow or stagnation of water from young children's baths bothers you:
    A lot=1 A little bit=2 Not at all=3

64. In your neighborhood, would you say that household wastewater (from laundry, dishwashing and bathing) bothers you:
    A lot=1 A little bit=2 Not at all=3

65. In your neighborhood, would you say that overflow from latrines bothers you:
    A lot=1 A little bit=2 Not at all=3

Respondent's comments:

_____

_____

PART D. DISPOSAL OF SOLID WASTES

E: *"Now I would like to ask you a few questions about disposal of household refuse."*

1. How do you get rid of your household trash?
   Individual trash bin emptied by the UPSU=1
   A private trash collector comes to get it=2
   You or a member of your household carries it to a container=3
   You burn it=4.... .... *Go to D.4*
   You bury it=5.... .... *Go to D.4*
   You deposit it in a spot within the compound=6
   You deposit it in a vacant lot outside
   of the compound=7..... .... *Go to D.4*
   You throw it in the gutter=8..... .... *Go to D.5*
   Other=9, Specify..... .... *Go to D.4*

2. The trash is collected:
   Regularly every day at the same time=1
   Every day but at varying times=2
   At least once every two days=3
   Less often=4

3. Do you put your trash in:
   A standard type of trash bin=1
   A carton=2
   A plastic bag=3
   Some other kind of container=4, Specify:
   Go to D.6

4. How far do you go to get rid of your trash?
   Less than 100m.=1 100 to 300 m.=2 More than 300m.=3

5. How often do you get rid of your trash?
   More than once a day=1 Once every two days=3
   Once a day=2 Less often=4

6. Who collects the trash in your neighborhood?
   No one=1 UPSU=3
   Private collection service=2 Other=4, Specify:

7. Are you satisfied with the service?
   Yes=1... .... *Go to D.9*
   No=0

8. Why? *(Do not read the answers - 2 answers possible)*
   Trash pick-up is irregular=1 Unpleasant odors=5
   Container is too far away=2 Rodents or vermin=6
   Container is quickly filled up =3 Other=7, Specify:
   Container is not practical=4

9. In your neighborhood, would you say that trash bothers you:
   A lot=1 A little bit=2 Not at all=3

10. Are there informal dumping sites in your neighborhood?
    No=0 .... *Go to D.12*
    Yes=1

11. The existence of informal dumping sites is due to (only one answer):
    Lack of discipline on the part of users=1
    Container is too far away=2
    Irregular collection=3

12. Do you pay for trash collection?
    [If the respondent does not know, go to D.14]
    Nothing=1 .... *Go to D.14*
    Fees are included in taxes=2
    Private collection service=3

13. How much do you pay? _____FG
    Per pick-up=1 Per month=3
    Per week=2 Per year=4

14. Do you sort your trash?
    No=0.....Go to D.16
    Yes=1

15. What do you sort out and why? (To re-use? To sell?...)

_____

_____

16. Would you accept the idea of sorting out organic waste [explain if needed] from other kinds of waste (metal cans, plastic, etc.)?
    Yes=1 No=0

17. Would you accept the idea of paying for your trash to be picked up regularly in front of your home, at least two times a week?
    Yes=1... .... *Go to D.19*
    No=0

18. Would you prefer to pay each time trash is picked up?
    Yes=1... .... *Go to D.22*
    No=0 .... *Go to Part E (next part)*

19. If payment were made monthly, would you accept to pay 750 FG a month for this service?
    Yes=1... .... *Go to D.21*
    No=0

20. What about 500 FG?
    Yes=1... .... *Go to Part E (next part)*
    No=0

21. What about 1000 FG?
    No=0 .... *Go to Part E (next part)*
    Yes=1

22. What is the most you would accept to pay? _____FG

Respondent's comments:

_____

_____

_____

PART E. STORMWATER DRAINAGE

E: *"Now I would like to ask you a few questions about rainwater."*

1. Is there any type of device for stormwater drainage near your compound?
   No=0 ....Go to E.7
   Yes=1

2. What type of device is it?
   Buried or covered drainage ditch=1..... ....Go to e.4
   Ditch or open gutter=2
   Other=3.....Specify:

3. Is this device:
   Unsealed=1
   Concrete=2
   Brick=3
   Stone=4
   Other=5, Specify:

4. In this device, is there:
   Standing water from wastewater or rain=1
   Household trash=2
   Presence of vegetation=3
   Other=4.... Specify:
   Nothing=5

5. Who cleans this device?
   The residents of the compound=1
   A person paid by the residents=2
   A neighborhood association=3
   The public services=4
   No one=5

6. When was this device last cleaned out?
   More than a year ago=1
   6 months to 1 year ago=2
   Less than 6 months ago=3

7. <u>In your compound</u>, during the rainy season, would you say that stormwater bothers you:
   A lot=1 A little bit=2 Not at all=3

8. Is this annoyance mainly due to:
   Stagnant rainwater=1
   Mud after it rains=2
   Mosquitoes in the puddles=3
   Other=4.....Specify:

9. <u>In your neighborhood</u>, during the rainy season, would you say that stormwater bothers you:
   A lot=1 A little bit=2 Not at all=3

10. Is this annoyance mainly due to:
    Stagnant rainwater=1
    Mud after it rains=2
    Mosquitoes in the puddles=3

Other=4.....Specify:

11. In your neighborhood, during the rainy season, there is standing rainwater:
    Often=1 Sometimes=2 Not at all=3

12. In your opinion or that of your neighbors, has it always been this way?
    Yes=1... ....Go to E.14
    No=0

13. When did the problem start?
    Less than 3 years ago=1 5 to 10 years ago=3
    3 to 5 years ago=2 More than 10 years ago=4

14. Where does standing water in your compound come from?
    From the neighbors'=1
    From the street=2
    Other=3.....Specify:

15. When it rains a lot, does the rainwater flow out of your compound?
    Yes=1... ....Go to E.17
    No=0

16. Does the rainwater soak into the ground?
    In a specific spot in the courtyard=1.....Specify:
    Throughout the courtyard=2
    No, it doesn't soak in anywhere=0
    Go to E.19

17. Have you dug any drainage channel or ditch?
    No=0 ....Go to E.19
    Yes=1

18. Where does this drainage channel or ditch lead to?
    Into the street=1 Into a cesspit=3
    Into the gutter=2 Other=4, Specify:

19. Respondent's comments:

_____

_____

_____

PART F. OTHER INFORMATION

1. In the following list, which three things bother you the most about the cleanliness of your compound?

Water from laundry=1
Dishwater=2
Waste water from bathing=3
Waste water from children's baths=4
Excreta=5
Puddles during the rainy season=6
Mud during the rainy season=7
Household trash=8
Other=9, Specify:
None of the above=10

2. In the following list, which three things bother you the most about the cleanliness of your neighborhood?

Water from laundry=1
Dishwater=2
Waste water from bathing=3
Waste water from children's baths=4
Excreta=5
Puddles during the rainy season=6
Mud during the rainy season=7
Household trash=8
Other=9, Specify:
None of the above=10

3. In the following list, which three actions do you feel are most important?

Collection of household trash=1
Construction of a dispensary=6
Electrification=2
Disposal of wastewater=7
Piped-in drinking water=3
Construction of your housing=8
Construction of a school=4
Other=9, Specify:
Stormwater drainage=5

4. Have you ever participated personally in collective projects in your neighborhood?

No=0 .... Go to F.9
Yes=1

5. Date of your last participation (month/year):_____/_____

6. Nature of work?

_____

7. Who asked that this job be undertaken?

The state or a central administration=1
The district (commune)=2
The neighborhood leader or a neighborhood committee=3
The residents themselves, spontaneously=4
A non-governmental organization=5
A local association (religious, etc.)=6
Other=7.....Specify:

8. Who organized and supervised this job?

The state or a central administration=1
The district (commune)=2
The neighborhood leader or a neighborhood committee=3
The residents themselves, spontaneously=4
A non-governmental organization=5
A local association (religious, etc.)=6
Other=7.....Specify:

9. Over a three-month period, how often would residents of your neighborhood be willing to participate regularly (without inconvenience) in the high-priority collective actions which you have mentioned? [in terms of half-days]

a. Per week:_____ or b. Per month:_____

PART G. OBSERVATIONS ON THE COMPOUND AND SURROUNDING AREA

1. IF THE HOUSEHOLD IDENTIFICATION NUMBER IS AN EVEN NUMBER, DRAW A SKETCH OF THE COMPOUND ON THE LAST PAGE

2. Description of the courtyard of the compound (not including buildings):

a. Bare earth — Completely=1, Partially=2

b. Cemented — Less than 50%=1, More than 50%=2, 100%=3

c. Other, specify: _____ _____ — Less than 50%=1, More than 50%=2, 100%=3

3.a. Is there a garden plot in the compound?
Yes=1 No=0

b. If yes, specify its size in relation to the courtyard:
....Less than 25%=1
....25 to 50%=2
....More than 50%=3

4.a. Are there any income-generating or handicraft activities taking place within the compound?
Yes=1 No=0

b. If yes, what kind of activities:_____
_____

c. Do these activities use water?
Yes=1 No=0

5. Observations on latrines
a. Clean: Yes=1 No=0
b. Odors: Yes=1 No=0
c. Condition of superstructure: Good=1 Poor=0

Other observations:

6. Observations on wells:
a. Covered: Yes=1 No=0
b. Curbstone: Yes=1 No=0
Other observations:
_____
_____

7. Observations on the outskirts of the compound: Remarks:
a. Presence of household trash: Yes=1 No=0 _____
b. Dirt road: Yes=1 No=0 _____

c. Covered drainage ditch:
Yes=1 No=0 _____

d. Open drainage ditch:
Yes=1 No=0 _____

e. Stagnant wastewater:
Yes=1 No=0 _____

Other observations:

_____

_____

_____

THE END, THANK YOU VERY MUCH!

QUALITY OF INTERVIEW

1. How would you describe the quality of this interview?
Good=1 Satisfactory=2 Poor=3

2. Was the respondent alone during the interview?
Yes=1 No=0

3. In what language was the interview conducted?
Sossou=1 Poulard=3
Malinke=2 French=4
Other=5, Specify:

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Title of the original French report:
L'environnement urbain à Conakry: comportements, attitudes et pratiques des ménages.