

**Institute of Environmental  
Studies (IES),  
University of Khartoum  
&  
IDRC - Canada.**

**African Urban Management Project**

**The Management of  
Greater Khartoum  
Urban Ecosystem**

**Report No. ( 2 )**

**August, 1985.**

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1. INTRODUCTION :

This is a progress report on Khartoum study group research findings after Abidjan Workshop of February-March 1985. In between the mentioned meeting and the Toronto one we believe that our group has achieved much progress towards the realization of the research project objectives.

At Abidjan our group expressed its interest in shifting the focus of the research from the health area, initially suggested at the stage of project identification, to city planning, administration, finance and management with emphasis on services delivery, singling out the health component for more detailed treatment. We kept with this plan and for the purpose of a shorter reference to the above areas of investigation we agreed on "the management of Greater Khartoum Urban Ecosystem" as a title for our research case.

Guided by the suggested outline for preparing the summary paper for this meeting we attempt the following coverage.

2. RESEARCH AREAS AND METHODS :

2.1. General :

The specific fields of investigation covered are population, city administration and finance and urban services. Among the latter the ones explored are water supply, excreta and sewage, garbage collection, electricity and medical care. As stressed the health component both preventive and curative is given more emphasis to test the efficiency of the urban ecosystem as an administrative and financial mechanism in the provision and delivery of services to the urban dwellers. It is to be pointed out that since we are tackling a system with many intricate relationships the research focuses on how this system works, hence the areas covered are not treated in isolation but as related parts of a total whole.

The research methods adopted involved many ways of data collection, including designing and applying a questionnaire. For more detail the methods used shall be explored under each research topic and a full accounting on how the questionnaire was designed and conducted shall be furnished after.

## 2.2. Population Study :

The importance of population in this study is two-folds :-

~~despite the above difficulties~~

- 1) Birth and death registration records: although these are theoretically the best that give continuous assessment of such vital demographic events;

yet people are less keen to register births or deaths particularly in the urban prepheries, which are constituting about 40% of Greater Khartoum population.

ii) Department of Statistics periodic survey: these include surveys such as the Housing and Population Survey 1966, Sudan Household Fertility Survey etc. These are specialized, infrequently undertaken and rarely addressed to questions of urban management.

iii) The three national censuses, 1956, 1973 and 1983, which present information in form of salient statistical tables, with little efforts made for their careful interpretation and manipulation to serve tackling management and planning questions.

iv) Ministry of Housing Surveys for planning and replanning of residential areas: these surveys are overcharged by engineers' perception of planning with little room left for close examination of population matters as such.

v) Ministry of Health annual and periodic reports, which are in statistical data forms, wholly based on official records.

- vi) The Greater Khartoum Commissionary's records which stress budgetary matters, administrative reforms, etc.
- vii) Higher education institutions especially University of Khartoum which carry out academic research, mostly trapped in unpublished M.A., M.Sc. and Ph.D.s thesis.

In spite of the extensive coverage of Greater Khartoum urban population by such sources, research which is focussed on population as an integral component of trends of change in the urban crisis is very meagre.

In fact the main problems associated with the demographic data presented by the above mentioned sources are :-

- i) lack of coordination between the different concerned agencies,
- ii) most of the information is in form of statistical data, not interpreted or manipulated to be meaningful,
- iii) lack of interdisciplinary approach as to mobilize the wealth of data collected so as to contribute to the solution of the complex urban problems, and

iv) the dynamic nature of Greater Khartoum population due to excessive migration from the rest of the country, which makes most of these sources out-dated i.e. only describing the situation at a specific point in time, therefore limiting the prediction viability of such sources.

Still all of these sources combined constitute a data bank on population changes which is useful in this context. As for the current changes in demographic features these are covered by the field survey, an account of which is given elsewhere in this synopsis.

### 2.3. Administration and Finance Study :

The study started with an identification of the main problems and constraints as related to the two fields of investigation. That was initially made through personal interviews with selected groups and officials in order to figure out the range and complexity of the urban management crisis in Greater Khartoum.

This was followed by a comprehensive review of urban administration laws and regulations in order to ascertain what sort of a system is governing city administration in Khartoum, and how compatible it is in meeting the challenges

that pertain to urban management. The review also explored the evolution of the system to see whether it has been consistently developed in accordance with a certain philosophy of urban government by the series of legislations enacted in the area of city administration; and what the implications of this evolution are with regard to the present condition of Khartoum urban management system.

The structure of city administration bodies was also examined to see whether they reflect clear channels of communication and chains of command in their both executive and legislative capacities. In this regard the relationships which exist with the regional level as well as the central one were also investigated to find out how all that bear on the system.

A careful study was made of city council monthly and annual reports as well as monthly and annual statements of accounts. City, town and neighbourhood councils minutes of meetings were also examined as primary sources of information on the performance of the machinery of city administration. The purpose of this study was to review for the working of the committee system within the city, implementation of council resolutions and the role played by

elected members and technical personnel. In addition to the above the study was essential to see if there exist institutions within the city system that are functional and operational to meet the overwhelming challenges of city management in Khartoum.

The main problem encountered in the course of the field work was that the primary sources of information consulted were either not kept to-date, or in several other cases not available altogether.

#### 2.4. Services Study :

For this study the main data sources explored included literature survey: Publications documents and reports released by Khartoum water Corporation (K.W.C.), Khartoum Sewerage Department (Kh.S.D.), Public Health Office (PHO), Ministry of Industry Energy and Mining (MIEM), National Energy Administration (NEA), Ministry of Health and other concerned bodies. In addition to the written material, contacts were made with the concerned persons in KHWC, PHO, MIEM, NEA and the Ministry of Health for consultation.

Another important source of information cited was M.Sc. degree research work carried out by students in the

Faculty of Engineering and Architecture, I.E.S., Faculty of Medicine and diploma work in the School of Hygiene.

Field visits were made to concerned persons and sites, including water works, sewage treatment works, garbage disposal sites, NEA Offices, Ministry of Health headquarters, and hospitals and health centres.

The main constraints faced in the services study part were the lack of up-to-date information, since in many cases the available data was fragmentary and not systematically kept. Also the data available was in raw form. The absence of analysed statistical data seems to be an established feature of most statistical offices associated with these services.

### 3. THE FIELD SURVEY :

#### 3.1. Objectives of the Survey :

The main objectives of the field survey were :-

- i. To fill the gaps in available literature, provide up-to-date data and test the validity of the findings obtained from published or unpublished documents and from other sources of information consulted by the team members.

- ii. to test the responses of the urban inhabitants to the issues raised by the research project and the services made available by the urban authorities, and
- iii. to enable the team members to arrive at some sets of correlations between the major variables of the urban ecosystem for the purpose of analysing how the system works and for guiding any suggested plan of action.

### 3.2. Survey Procedure

After setting the theme of the study in the interim report, and reviewing the available literature, the team decided that there were specific aspects that ought to be covered by a field survey. In preparation for the survey a series of meetings were held. These meetings considered the previous surveys, examined the supporting literature, and decided on the sample size and procedures, which were developed through the following steps :-

- i. Consultation of the generalized Greater Khartoum map, prepared by the Department of Statistics based on the national census, 1983. The map was useful only in giving the divisions of Greater

iv. The six categories and their sub-divisions of quarter councils were then tabulated. Table 1 conveys the results of this exercise. It also shows panel household and sampled quarter councils.

*Int. Attributed*

The purpose of such stratification was to get a reliable and representative sample of Greater Khartoum urban complex in order to reduce heterogeneity, cost and time demanded by the survey. The adopted sampling ensured fair representation and enabled acquiring a spectrum of the urban problems and responses which are usually associated with differences in occupation, duration of stay, cultural background of respondents, etc.

v) After a close examination of the urban population the administrative sub-division and the urban morphology, it was decided to adopt a two step sampling system involving selection of households and quarter councils. The household was decided to be the smallest sampling unit, while the quarter council to be the largest one; providing the necessary frame for checking the small sample of households chosen.

Khartoum into quarter councils as census areas and administrative lower order units. Using the 1983 census data tables of names and populations by quarter councils were prepared. Quarter councils were then located on the base map and categorized according to their status as 1st. 2nd., 3rd., class residential areas or spontaneous settlements for example. The prepared tables were detailed including population, family size, number of households, etc..

- ii. After careful demarcation of the main residential areas, and quarter councils, shading or colouring was assigned for each.
- iii. Six main categories were derived from the standard Ministry of Housing classification of residential areas ranging from 1st.-4th. class plus spontaneous and squatter settlements. The six categories were grouped into established (new or old) and in process of establishment (new or old). These were identified on the base map and shaded.

vi. In applying the questionnaire it was agreed to base the survey on direct interviewing of the head of household male or female, to furnish the data needed about his or her household. A female was included in the enumeration team to cover female heads of households.

vii. The sample size was decided to be 1100 head of household (0.5% of the total heads of households: 219,691). One thousand was chosen to ease computation purposes and the extra one hundred to cover poor or no response and failure answers.

viii. From a total of 2,267 Quarter Councils 30 quarter councils (12.5% of the total) were selected and proportionally distributed among the six categories, according to the number of heads of households in each quarter Council (Table 1).

ix. The Quarter Councils selected were demarcated on the base map within the selected six categories showing the following distribution :-

$$\begin{array}{r} 30 \times 10 \\ \hline 240 \\ 245 \quad 12.5 \\ \hline 24 \quad 3.00 \\ \hline 6.0 \\ 4.8 \\ \hline 1.2 \end{array}$$

- First class - a. Established, old or new.  
b. In process of establishment  
old or new.
- 2nd. class - a. Established, old or new.  
b. In process of establishment  
old or new.
- 3rd. class - a. Established, old or new.  
b. In process of establishment  
old or new.
- Community planned. - a. Established, old or new.  
b. In Process of establishment  
old or new.
- Squatter settlement. - a. Established, old or new.  
b. In process of establishment  
old or new.
- 3rd. class with refugee concentration.

x. The panel families were decided to be chosen  
randomly for each Quarter Council.

Table 1.

Sample Procedure and Selection of Panel Quarter Councils (Q.C.) from the Major Residential Categories of Greater Khartoum 1985.

Main Category	Subsidiary Category	Total Quarter Councils	Selected Quarter Councils	Heads of Household	Total Households	No. of Selected
1.1st. class:	i. established old or new.	7	1	574	40	
	ii. in process of establishment old or new.	5	1	408	34	(74)
2.2nd. class:	i. established old or new.	3	1	-	31	
	ii. in process of establishment old or new.	3	1	-	41	(72)
3.3rd.class:	old planned.	26	3	-	(550)	
	New gov.planned.	31	3	-	-	
	New gov.established.	6	1	-	-	
	New unplanned estab.	82	8	-	-	
4.Community planned:	Established.	29	6	-	(220)	
	In process of est.	27	3	-	-	
5.Squatter :	Established.	14	2	-	(107)	
	In process of establishment.	9	1	-	-	
6.Areas with:	Core refugee concentrat- ion.	-	-	-	30	
	Prepheries	-	-	-	44	(74)
Total		240	30		1087	

Source: Based on research findings.

0.5%

Legend -

### 3.3. The Enumeration Team :

A ten-member team was formed, headed by an experienced person from the Department of Statistics and included <sup>the</sup> post-graduates from Department of Geography and I.E.S.- University of Khartoum. The team included an Eritrean to cover quarters having refugee concentration and a female to cover female heads of household.

The survey team was briefed about the objectives of the research, sample size and procedure, the questionnaire contents and the exact distribution of the Quarter Councils selected on the base map, as a way of training in direct interview surveys.

### 3.4. The Questionnaire :

A questionnaire was designed and printed covering the following areas of investigation :-

1. General information.
2. Identification of respondents.
3. Household demographic characteristics.
4. Immigration for employment.
5. Education level of household members.
6. Tenure system.
7. Housing conditions
8. Water supply.

9. Gray water and sewage disposal.
10. Garbage collection.
11. Electricity.
12. Energy for cooking.
13. Lower order community services used by household.
14. Higher order community services used by household.
15. Health services.
16. Recreational facilities.
17. Transport.
18. Income and expenditure.
19. Standard of living index.
20. Community institutions.
21. People perception of quality of life.
22. People perception of urban hazards.

Most of the questions were based on multiple choice system, with some opinion questions also included, especially those related to perception. The preference of multiple choice was to make computation easy and minimize time and effort expected to be wasted in direct interviews. At the same time it was intended to fill specific gaps identified by the team members in their research assignments.

P

### 3.5. Data Processing :

After completion of the survey, the data was handed over to University of Khartoum Central Computer, which was consulted during the layout of the questionnaire stage, for processing, tabulation, cross-tabulation and necessary correlations. After much chasing and pressure put on the experts the data prints were made available for the team. The team examined these handouts in a series of meetings and was satisfied with the results which clarified many points and provided a wealth of data to meet the set objectives of the research project and any related future research.

The computer was instructed to prepare the data in totals, and in percentages for each community by town Omdurman, Khartoum and Khartoum North and to run correlations of specially selected variables. A copy of all prints prepared was handed out to each member of the team to use the data in preparing his section of the study.

### 3.6. Survey Problems :

Like all direct interview surveys, the survey was faced by a number of problems including time and cost limitations, weak response to specific questions, accessibility etc.. The visualization of such problems by the

*It is the 6th  
one of all  
very serious but  
we don't see it  
in the free PAF*

team was the main reason for the choice of the household and the quarter council so as to provide the necessary checking measures and reliability. The major problem encountered was the delay caused by the computer due to power cuts, low staff capacity, and limited experience with socio-economic survey programming and coding in spite of the substantial help offered by the survey team in sorting out the questionnaire, coding and transferring the questionnaire data to computer language.

### 3.7. Assessment of Data Reliability :

- i. The data was generally reliable and comprehensive and the response was very satisfactory.
- ii. Fairly satisfactory results related to income, health, etc..
- iii. Response to opinion questions was satisfactory and telling.
- iv. The data showed evidently the sharp disparity in the urban milieu and its dualism.
- v. The data projected the problem of management particularly in specific communities.

4. PRELIMINARY RESEARCH FINDINGS :

4.1. Population and Demographic Features :

4.1.1. Size and trend of population increase.

Greater Khartoum assumed population dominance in the Sudan, because of its administrative function during the different political eras of Sudan recent history. The rise in its population was very rapid mainly due to the influx of rural population. Its population in 1942 was 176,000 persons, constituting over 52% of the total population of the eight major towns; compared with 52% in 1956, 65% in 1973 and 1983. Its average increase between 1956-1973 was 235% and about 100% between 1973-1983, showing an average annual growth rate of 14% and 10% respectively. Greater Khartoum constituted approximately  $\frac{1}{3}$  of total Sudan urban population in 1983 with an urban primate index of 7.1. The contributing factor to such growth is immigration where 43.3% of the urban population were immigrants in 1980.

The main problems associated with such substantial growth rates in the context of management are :-

- i. The substantial increase and diversity of population are not matched by developing management capabilities to cope with population pressure,
- ii. difficulty of forecast of population needs in a situation of declining urban economy, and
- iii. even within the urban ecosystem the growth rate is uneven i.e. poor areas increasing at higher rates.

#### 4.1.2. Population Structure

The biological structure of Greater Khartoum population

① is in favour of males and young people due to the excessive migration trends. Occupationally about 59% of the population in 1973 were engaged in non-primary activities compared with 14% as an average of the top 8 urban centres. Culturally

② Greater Khartoum represents a typical dualism of third World capital cities of western culture superimposed on a growing indigenous culture and social network.

The implications of such structure on management issues  
are mostly :-

- i. a diverse generated need reflecting the sharply contrasting class structure between the different communities within the urban ecosystem, and

of old poor and middle class residential areas and the heavy influx from rural areas,

ii. the pattern of distribution is by no means uniform, the heavily populated 3rd. and 4th. class areas are interrupted by pockets of sparsely populated 1st. class residential areas mostly in the process of establishment, and

iii. in the peripheries distribution is controlled mostly by ethnic and social background of migrants, and by the local organizational capabilities in providing basic services through self-help and tapping of community resources, as well as by land speculation.

It could be featured from the above discussion that the population of Greater Khartoum is rapidly changing in size, structure, distribution, aspiration and perception, beyond the capacity of the urban authority. These features should be viewed in relation to the national parameters of change. At the present stage of development of Greater Khartoum the population is very fluid with a clear tendency for concentration in the peripheries which are receiving more population and generating horizontal expansion. Furthermore there is a dominance of population of rural backgrounds with an increasing demand for basic services. Equally there is a big contrast in population education, skills, urban status, income, etc. between those of the core and those of the peripheries. This has produced a sharp urban dualism generating an equally sharp difference in population needs.

#### 4.2. City Administration :

Khartoum urban management system initiated as early back as the late thirties is by and large a pioneer system in Africa. Problems and constraints that are posed by it seem to be too complex to be readily surmountable by its present machinery of urban administration. A host of these challenges comprise unwarranted urban development with adverse impacts on Khartoum urban management system, which already suffers from strained resources, shortcomings of fiscal performance, problems of structural reorganization, limited popular participation, inefficiency and incompetence of the machinery of urban administration. This is obviously a telling embodiment of the urban management crisis in Khartoum which is not uncommon to LDCs primate capital cities, however.

The evolution of the system has been marked by a series of legislations effecting changes and amendments in structure, powers, duties and responsibilities; almost consistently encompassing each decade since 1937 through 1951, 60, 71, 80, 81 and at last 1983 Act of the National Capital. In other words certain attempts were made to systematically revise and develop the system since its

initiation by the British. These attempts were, however, politically motivated and coloured. The British introduced city government as a limited measure for training in democracy so as to meet some of the aspirations of the national liberation movements which started gaining momentum in the Sudan by then. The political colouring came after independence with national governments. During General Aboud's and May regimes for example the system was used to enlist political support for both <sup>i.e.</sup> ~~National~~ governments. The association of the evolution of the system with this political bias impaired the system considerably through political aversion, indisposition and opposition leading to ingenuine popular involvement, or rather often weak participation by Khartoum urban community.

Structurally Khartoum urban management system comprises a three tier system with neighbourhood councils at the base of the hierarchy, the town councils in the middle and the city council at the top. The city council is fully electoral, locally autonomous as a corporate body with a legislative capacity. It is legally bound to delegate powers and duties to town and neighbourhood councils to integrate the three levels of administration. Literally speaking the system is decentralization based and necessarily oriented

to facilitate grass-root involvement. However, the performance of the system is not quite reflecting the applicability of this philosophy.

The decision-making process is apparently governed by the specialized committees system work in preparing recommendations to the city council, for taking resolutions according to council work procedures and regulations. Whether these decisions are usually made in consistence with clear-cut local policies, articulately designed plans and programmes and in conformity with regional and national policies, or whether they are self-oriented or group-interests-based in the main is considerably debatable. What profoundly matters in this connection is the low level implementation of councils decisions as indicated by records in all areas which is a serious manifestation of the inefficiency of the system or rather how it is applied now.

The implementation of local orders formulated by the city council, in its capacity as a legislative body at the local level is likewise seriously jeopardized by the lack of appropriate, or instrumental implementing machinery. It mainly depends on courts for that purpose. The capacity of the latter is so limited that they could not daily try

more than 5% of all the violations of local orders that could be brought before them in the area of sanitation, markets, public order, building, licensing etc. Promulgation of these local orders by Khartoum City Council is in essence an embodiment of its local policies in all these areas. Hence failure to apply them is more than serious with regard to city council performance.

It was also found that the local heterogeneity and homogeneity of the administrative structure in Khartoum city council, as well as the economic and social viability of its administrative units have had their bearing remarkably on the performance of the urban management system.

A town council might comprise more than one residential class type together with squatter quarters, thus including plus and tax-payers, /non-tax-payers, displaying conflict of culture at large and a variety of ethnic structure.

Another finding in this area relates to the pronounced shortage in trained and qualified personnel to man services and development in Khartoum city. The shortage is mainly due to the brain and body drain afflicting the country for about the last 20 years which is as well a telling instance of the urban management crisis in Khartoum.

#### 4.3. City Finance :

*Budget deficit*

Of the major findings in this area is an overall annual budget deficit, which seems to be inbuilt in the financial system of Khartoum city council, as it has been perpetuated for about the last 20 years. It is a main attribute of the urban management crisis in Khartoum.

*Right side 60% wages*

Furthermore there is a pronounced budget imbalance due to allocating more than 60% to Chapter I (for salaries and wages) of the annual budget provisions. This perhaps indicates the presence of a sort of underemployment i.e. a mismanagement of human resources.

*Liquidity*

There is also a lack of liquidity which is a formidable challenge throughout the fiscal year - partly attributable to inefficient tax collection system and poor and inadequate collection efforts.

*Financial performance*

The financial performance is also confused by unrealistic budget estimates with regard to revenue items which are characterised by shortage in collection percentage as well as by discrepancies in expenditure accounts which annually impair budget implementation considerably.

*Bottom left side by total*

All of these shortcomings result in a strikingly diminishing budget capacity, to appropriate adequate funds for the renewal accounts of the council operating fleet in due time, including heavy machinery owing to insolvency of the annual budget. This obviously leads to far-reaching adverse repercussions on city council performance.

Besides, the overwhelming additional or unforeseen budget burdens entailed by unwarranted urban development in Khartoum, simply frustrate budget operation in connection with social and basic services provision as well as the implementation of local development plans.

There is a marked sense of dependence of the city annual budget on the national capital sources and the central government aids which seriously hampers popular initiative. The revenue sources of Khartoum city council comprise assigned taxes, local rates, services fees, licensing fees, council rents, grants-in-aid, loans, self-help etc. There are in the main direct taxes which are difficult to collect compared to the indirect taxes of the central government which are perceived by the city council authorities as putting them at a disadvantage in this connection.

Some additional taxes ought to be assigned to Khartoum city council from the central or the national capital levels. This is only natural to resort to, as none was added to those initially assigned since 1954. This could be justified on grounds of the striking disparity in this connection i.e. the management obligations and the actual finance available; owing to the enormous development in the magnitude of council work and its complexity which is best expressed by the perpetual city budget deficit.

Grants-in-aid system needs to be rationalized as it is not based on clear-cut criteria such as per capita expenditure in connection with certain basic services provision. This is suggested in order to secure at least a bare minimum provision standard for meeting these services and in view of the fact that overload, congestion, and acute shortages in services provision, which are met out of the strained resources of Khartoum city council, originate in a national context rather than a local one. Budget estimates are primarily based on the average of the last three years expenditure or revenue outcome. Allocations are made according to estimates thus calculated, in addition to an assessment of the present situation and

a forecast of what funds that could be raised for the rest of the fiscal year. Council specialized committees make recommendations about budget proposals to the city council for making resolutions about the budget approval. When there is a chronic budget deficit the whole process becomes in essence rather futile and merely a tedious job.

Squatter quarters inhabitants contribution to the city council revenue is almost nil, while they constitute about 30% of Greater Khartoum population, spreading in about 91 spontaneous settlement areas.

The two instruments vide which allocation of budget funds for community services are annually made are the annual budget and the local development budget. While the former has been utterly handicapped by a chronic deficit the latter's problem is one of profound shortage of funds allocated to meet local aspirations for local development in a national capital.

#### 4.4. Services :

##### 4.4.1. water supply

It has been observed that the city expansion is faster than the rate of provision of services, both in terms of planning as well as implementation. This is not only applicable to illegal settlements / squatter areas, at the

outskirts of the town, but also to the planned legal expansions such as Abu Adam, El Thawra, or Al Aawda quarters. Even settlers in some of these districts had to dig their own shallow wells to ensure water supply, and for them other services such as garbage collection or electricity supply are not provided.

Khartoum depends mainly on municipal water supply which is founded on five water works treating the Nile water, and supplemented at the moment by a good number of boreholes. The boreholes are connected throughout the system. However some isolated districts at the outskirts of the town are having localized boreholes, and distribution system e.g. Kalakla, Shagara etc. The same is true for extensions such as Abu Adam.

The town is experiencing a real water shortage both in terms of the capacity of the treatment plants and the distribution system, to the extent that the quality of the distributed water is endangered.

The unreliability of the supply on one hand and the low pressure on the other, led a good number of the consumers to connect private pumps to the distribution system without the advice nor the approval of the water

authorities, thus worsening the situation further. Others in some of the new extensions not awaiting the connection dug their private water wells.

The water production has been increasing but the demand is increasing at a faster rate. In 1978 the average daily deficit of the supplied water was 26,200 M<sup>3</sup> and in 1983 it became 57,100 M<sup>3</sup> although the production increased from 137,000 M<sup>3</sup> to 216,500 M<sup>3</sup>. The peak demand was 259,000 M<sup>3</sup> in 1978 and became 426,400 M<sup>3</sup> in 1983.

The obvious reasons for this deficit are :-

- (1) i. the unplanned growth of the city in terms of population and industry,
- (2) ii. technical and financial constraints; and
- (3) iii. administration and management problems.

#### 4.4.2. Excreta and Sewage :

Technologies used for this purpose are mainly : pitlatrines, septic tanks, sewerage system, and aqua privy. The allocation and coverage is as such :

<u>Technology</u>	<u>Residential Area-class</u>
Sewerage system	Part of first, second and third class areas.
Septic tanks	Part of first, second and third class areas.
Aqua privies	Small part of third class areas.
Pitlatrines	More than 98% of the third class areas.

Less than five per cent of Greater Khartoum is served by modern sewerage system. The experience with the sewerage system (El Goz sewage treatment plant, El Haj Yousif S.T.P. - the relief plant) is not a promising one. This is attributed to :-

- i. Operation and maintenance problems, (Power cuts, spare parts, etc..),
- ii. lack of qualified personnel, partly attributed to immigration, and
- iii. the non-familiarity of most of the users with the system operational nature and capabilities.

At present El Haj Yousif plant is not operating and El Goz treatment plant is overloaded. In fact a very small part of the first class areas in the three towns is enjoying this facility and it is mostly misused. The septic tank seems to be the technology mostly used in the first and second class areas. Also it is used in many plots in the

third class areas where it is gradually replacing the pit latrine. This phenomenon of extensive use of septic tanks and deep pit latrines is subjecting the ground water to pollution risks. Also the extensive use of flushed toilets increases the water demand and this worsens the situation of the water supply. It could be concluded that :-

- i. the septic tank is constituting an immediate ground water pollution risk as it is used in densely populated areas,
- ii. aqua privy is not successful because of low KAP. in this respect since its effluents are disposed to groundwater, and
- iii. pit latrine stands as the most appropriate for third class housing, but needs to be upgraded.

#### 4.4.3. Garbage Collection.

Garbage collection along with other environmental health services in the three towns is the primary responsibility of four senior public health officers, under the supervision of the director of the environmental health section in the health commissioner. The administration system in this field is as such :-



- director-environmental health
- senior public health officers
- public health officers
- sanitary overseers
- assistant sanitary overseers
- chief collectors, and
- collectors.

The methods of garbage collection include :-

- i. collection by township councils as well as disposal by traditional methods,
- ii. house collection of sacks by township councils,
- iii. house collection of sacks by contractors,
- iv. collection of quarter containers by contractors, and,
- v. collection and burning of garbage in situ.

The means of collection encompass :

- i. garbage compressing vehicles "Atlas type",
- ii. garbage lifting through containers and transport vehicles,
- iii. collection and transport by tractors using machine drawn trailers, and
- iv. the use of trailers drawn by horses.

Garbage collection is generally satisfactory. Thanks to the low rate of waste production ( .5 Kg C/d) and the comparatively low population densities along with the non-biodegradable nature of garbage since most of it consists of inorganics e.g. glass, sand, ash, clay, tins. It could be remarked that the town is not as dirty as it might be expected because of the above factors.

The constraints facing garbage collection could be summarised in :-

- i. the available quantity of machines for collection is insufficient, besides there are budgetary deficiencies which reflect on the supply of spare parts and the running of regular maintenance,
- ii. shortage in personnel including public health officers, sanitary overseers, sweepers, mainly due to lack of job satisfaction,
- iii. difficulties in securing fuel and oil for the daily running of collection,
- iv. negative attitude of urban dwellers towards garbage collection and its significance in environmental sanitation, besides the other,
- v. management and administration problems.

#### 4.4.4. Electricity.

Electricity service was introduced in Sudan in 1908 through the installation of a small thermal engine in Khartoum, producing 1 MW supply. Ever since the production of electricity has been increasing. Today it is estimated at The city is supplied by hydropower through the Blue Nile Grid. The sources of electricity are dams on the Blue Nile and thermal power from old Burri Thermal station which was recently innovated. During the last two years the electricity supply has been increased through Power III Project.

Power III Project is supplying 180 MW (80 hydro + 100 thermal). In spite of this increase Greater Khartoum is still facing an acute electricity shortage. Hence a new project (Power IV) is anticipated. This project is to generate 140 MW thermally.

The current policy adopted by the National Energy Administration (NEA) to overcome the existing shortage is through : load shedding, self generation (private generators) and holding back the extension of the service to new consumers.

The problems of electricity sector include :-

- i. insufficient investment in generating capacity,
- ii. limited investment in the electricity sector which is of low priority in national investment,
- iii. insufficient use of the existing system due to inadequate maintenance, lack of spare parts, large losses, manpower brain drain, delay in implementation of power projects, depletion of hydro storage capacity, and wide annual and seasonal variations in hydro ability,
- iv. increase in demand due to economic growth arising from agricultural and industrial growth and population increases, and
- v. the rise in consumption rates as a result of low prices, and unbilled consumption, uncontrolled demand, and growth without priorities.

The main constraints in the electricity sector centre around deficiency in records, power cuts, transport difficulties, and non-supporting attitude of some respondents for improvements such as increasing the prices of electricity.

#### 4.4.5. Medical Care.

The health facilities i.e. health centres that are distributed in Greater Khartoum are to receive cases for medical care and refer them to one of the three main hospitals. Although there are 15 general hospitals yet only the three civil hospitals in Khartoum, Khartoum North and Omdurman are fully equipped and have emergency services throughout the day. Because of the emergency services these hospitals are considered the best in terms of the medical care rendered to the patients. Therefore there is a great rush for these busy places and the bed occupancy rate is very high. The three hospitals collectively have 2,000 beds serving a population of 1.8 million in urban Khartoum.

In order to decrease the load on the three civil hospitals, health centres were set up with the main objective of receiving cases treating them and if necessary refer them to hospitals if there is need for that. However, patients consider the hospitals as the only place for medical care and prefer to go directly there by-passing the health centres. There are several reasons for this attitude ranging from lack of organization, quick turnover

and poor attendance of doctors to the health centres and unavailability of drugs. In short, these health centres do not function according to a definite health plan. They are places for receiving medical advice i.e. following the same old trend of hospital services.

The health centres are not made use of to introduce the concept of health care to the population and to involve the community in the health service system. The maternal and child health services and the vaccination activities delivered by these health centres have attained poor coverage. Only 13% of the children in Khartoum have been vaccinated in spite of the availability of the vaccine at these health facilities. According to the reports of the Department of Immunization of the Ministry of Health, the reason for this low coverage is the fact that 75% of the mothers have no idea about vaccination. This fact explains further the deficiencies of the existing strategy for the delivery of services at these centres. There is a total lack of community participation which is making it difficult for the health authorities to attain the goals of the intended health plan.

During the last ten years, there has been a rapid increase in the population of urban Khartoum. This increase is not matched with a comparable addition in the health facilities which accordingly resulted in the deterioration in the delivery of services. The knowledge about family planning amongst the population is not very clear. The use of contraceptives and other family planning devices is not widely practiced. This reflects again the absence of health policy regarding the control of the high population growth rate of 2.5 in urban Khartoum.

Recently with the high influx of population and the poor services, the capital has faced a number of outbreaks i.e. typhoid, jaundice and lately acute gastro-enteritis; while malaria is holo-endemic in Sudan. The commonest diseases amongst children are diarrhoea, malaria as well as typhoid and jaundice. These affections are closely related to the sanitary standards and reflect the health status of the whole population.

From the aforementioned health problems, one can clearly detect the poor administrative, managerial and planning set ups of the health services in Khartoum. The increase in population is not met with any plan to improve the delivery of services or to check the flow of population towards the capital.

In order to meet the basic health needs of the community, it is important to orient the function of the health centres towards the primary health care system. In the urban area, these health centres are the first level of contact between the population and health services. This relationship would serve as a good opportunity for establishing proper understanding to health, based on the primary health care concept where the involvement and full participation of the communities would not be receivers of health services, but should take part in planning and managing these services, delivered through the health centres.

6. TENTATIVE CONCLUSIONS AND RECOMMENDATIONS :

6.1. Population:

1. The population of Greater Khartoum is very dynamic and with the current changes and difficulty of forecast it will be impossible to set a matching management machinery. Therefore a population council or agency need to be established to feed the management authorities with the necessary data to base the appropriate planning policy.

2. A national population policy need to be clearly identified to help in attaining an optimum population redistribution. The central point in this policy is to challenge Greater Khartoum primacy and make available work chances elsewhere in the country.

3. There is a need to activate the family planning efforts already started to attain the optimum "urban family" size.

4. Of priority also is to restructure the community institutions, not only to tap local resources; but also to channel their involvement in formulating a grand urban planning policy geared towards reducing the increasing trend of urban dualism and its potential social and political dangers.

#### 5.2. City Administration :

5. The present structure of Khartoum city council has adverse impacts on the performance of its machinery of administration. Hence an overall restructuring of the city council is an urgent issue to create administrative units which are socially and economically more viable as viability in this connection is very instrumental for urban management.

6. Decision-making in Khartoum ought to be more positively responsive to challenges of urban management. To secure this it is to be guided by clearly defined policies, comprehensive plans and well-designed programmes worked out with the maximum possible involvement of all concerned. These are to include priorities which are more public oriented and to address problems and constraints more objectively.

7. Decision implementation organs and instruments of Khartoum city council are to be revised, revitalized, renewed and restructured. In this connection :

- a. Council work procedures regulations are to be updated.
- b. Selected qualified officials are to be entrusted with decision implementation and in-service training courses are to be specially designed and held for them.
- c. Special and competent courts are to be set-up solely for local orders implementation owing to their instrumentality in urban management efficiency.
- d. Special council sessions are to be periodically held for revising decisions implementation as a supervision measure.

8. Squatter quarters inhabitants have adverse impacts on social services provision e.g. sanitation, education, transport, supplies etc. They considerably account for the collapse of Khartoum urban management system. Though the issue of squatter quarters or spontaneous settlements is extremely debatable, resorting of necessity to replanning them as third and fourth residential class areas seems to be the most instrumental measure, that could readily be adopted in connection with city administration and city finance.

9. Khartoum urban management crisis has a national dimension and hence it should be addressed in a national context.

### 5.3. City Finance :

10. The financial performance of Khartoum city council is the core issue in dealing with urban management in Khartoum in view of the almost perpetual deficit which has been afflicting its budget for about the last twenty years.

11. Measures to mitigate or finally eliminate this deficit could include :-

- a. Assigning more central and national capital levels taxes for Khartoum city council e.g. business profit tax or at least a percentage of its revenue in Khartoum.
- b. Reassessing house tax, local rates, etc. which have a great potential for revenue increase as a tax-base in view of the enormous residential, commercial and industrial urban development that has been going on in Khartoum for quite a long time.
- c. Restructuring of the tax collection system, through organizing collection campaigns, resorting to short-run collection plans etc. which might result in more than double the currently collected revenue.
- d. Grants-in-aid are to be applied according to what we pointed out earlier in the findings section - in order to make them more equitable and more instrumental in realizing their stated ends. Though they represent about 45% of the council total annual revenue, the sum obtained is mainly allocated for Chapter I of the budget i.e. earmarked for salaries and wages.

*conference*

12. The financial issue is so central to Khartoum urban management crisis that it is worthwhile holding a special conference to discuss the issue at length since none has been held for this purpose for almost the last quarter of a century. This could be initiated by a research project to be conducted in the area of city finance.

#### 5.4. Services :

13. The situation of services points out clearly to problems of mal-distribution and inadequacies of varying magnitude from one community to the other. The questionnaire data analysed for the writing of the main report shall reveal a better picture of such variations, including other community based services as well.

14. Besides, the data on community perception shall substantiate the findings reached through assessing the urban community attitude towards the performance of those services studied.

15. The areas of environmental health and medical care seem to be of priority. With regard to the former, the country at large and Khartoum in particular are plagued with environmentally communicable diseases such as gastro-enteritis, skin diseases, etc. all of which are related to

environmental sanitation, and in this connection domestic water supply, garbage and excreta disposal are the pillars of environmental sanitation.

16. It is assumed that the ineffectiveness of these services is responsible for the deteriorating health status of Khartoum community. Hence it is suggested to carry out research in these areas with the purpose of :-

- a. assessing the water supply, excreta and garbage disposal in 3rd. and/or 4th. class residential areas and see whether these are correlated with the prevalent diseases ,
- b. studying the knowledge, attitude and practice of residents ,
- c. organizing health education sessions and use available mass media to improve the KAP, and
- c. carrying out a post-test and a pretest to evaluate the impact of such education programmes.

Such a research programme will require organizing a team to include a sanitary engineer, a community physician, a sociologist, a public health officers , and some students to assist in the field work.