Dissertation

By

ADEAGBO ADEMOLA LUQMAN

UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF PHILOSOPHY IN ECONOMICS

Peri-Urban Water Situation: An Examination Of How Residents Meet Their Water Needs (Case Study Of Ibadan)

AUGUST, 1995

PERI-URBAN WATER SITUATION: AN EXAMINATION OF HOW RESIDENTS MEET THEIR WATER NEEDS (CASE STUDY OF IBADAN)

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B.SC (HONS) URBAN AND REGIONAL PLANNING (Ife)

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF URBAN AND REGIONAL PLANNING (M.U.R.P)

CENTRE FOR URBAN AND REGIONAL PLANNING
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DEDICATION

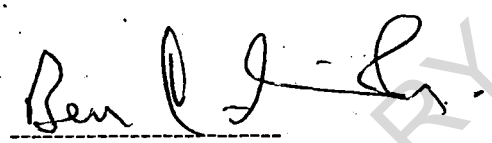
To the Glory of God Almighty, the only ONE who can give and take.

To the memory of my late friend, Lt. Akinropo Egbinola Tiamiyu.

To the underprivileged, who are victims of circumstance.

CERTIFICATION

I certify that this work was carried out by ADEAGBO, Ademola Luqman at the Centre of Urban and Regional Planning, University of Ibadan.



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August, 1995

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'Demola Adeagbo
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ABSTRACT

Water is a basic necessity. However, its distribution over space is quite uneven. The case at hand is that of the peri-urban water situation. This study was undertaken to examine how peri-urban residents meet their water needs, the activities of Community Based Associations, those of the Local Government Councils as well as those of the State Water Corporation towards ameliorating water supply problems in the fringe. The study also examined factors associated with and those determining households' choice of source of water using Multiple Regression Analysis adopting the Dummy Dependent Variable Technique.

A total number of 300 households were sampled and interviewed randomly in seven peri-urban communities picked through a lucky dip method from the seven peri-pheral Local Government Areas in Oyo State. A set of questionnaire was also administered on the relevant officials of the respective Local Government Councils and the State Water Corporation.

Findings of the study reveal that ordinary well constitutes the major source of water to most of the peri-urban residents and that only a few could afford safe and hygienic source, while in most cases quantity of water needed is not usually met especially in the dry season. Furthermore the impacts of Community Based Organisations are not impressive while local governments and the State Water Corporation are financially constrained.

Multiple correlation analysis revealed positive association between source of water and socio-economic variables such as household size, income, distance to source of water and amount spent on water procurement, though with low correlation co-efficients. Multiple regression analysis indicates that these socio-economic variables offer only 9 per cent explanations for the households' choice of water source suggesting that other factors not included in this analysis account for the remaining 81 per cent.

Among the recommendations made are the involvement of Community Based Associations in water provision, introduction of appropriate user charges to enhance efficient water production and effective co-ordination between actors in urban development activities and agencies responsible for provision of utilities.

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CHAPTER ONE

BACKGROUND TO THE STUDY AND STATEMENT OF RESEARCH PROBLEM

1.1 INTRODUCTION

Of the the three basic essentials of life - water, food and shelter, water is accorded the highest priority. As observed by Wong (1987), access to an adequate, safe and convenient source of water supply is a basic human need which is indispensable for the national health and economic well-being of every society. However, he further observes that it is not within the reach of everyone as good quality fresh water is not uniformly distributed over the earth's surface. In cases where the utility is accessible, not every household is privileged to be served with it.

Biswas (1981), quoting figures supplied by WHO in 1970 reveals that among 71 developing countries studied, only 68 per cent of the urban population and 14 per cent of the rural population were adequately served with potable water. The statistics for 1980 indicate a worsening situation compared to the situation in 1970. Less than 75 per cent of the world's urban population and 15 per cent of the rural population had access to clean water.

The situation in Nigerian urban centres is worse. According to Olokesusi (1987), only between 23 - 25 per cent of the population have access to pipe-borne water suply in Nigeria. The vast majority rely on wells, streams and rainwater. A critical issue compounding the

problem of water inadequacy is the unplanned rapid urban growth. As observed by Adeniji (1988), the unplanned rapid growth of Ibadan city puts serious strain on the city's utilities including pipe-borne water supply. This is true for most urban centres in developing countries. For instance, Ibadan expanded from 12.5km^2 in 1934 to 176km$_2$ in 1988 (NISER, 1988). The extent of its geographical area now is 296.7km^2 (Fieldwork, 1995). This phenomenal increase has weakened the capacity of the state water corporation to supply newly developed areas - the periphery with pipe-borne water.

For instance, GKW Consult (1992) in a report prepared for the Oyo State Water Corporation, states that the required water supply network capacity is 636,500 cbm/day while the existing supply network capacity is 139,000 cbm/day, giving a shortfall of 78.16 per cent. Most of the areas not covered are in the periphery. Thus the need to examine how the residents of the urban fringe meet their water needs cannot be over-emphasised.

1.2 THE RESEARCH PROBLEM

The research problem can only be comprehensively discussed with reference to inadequate coverage by the State Water Corporation, impacts of inadequate or lack of potable water supply and inadequate attention by past studies on peri-urban water supply.

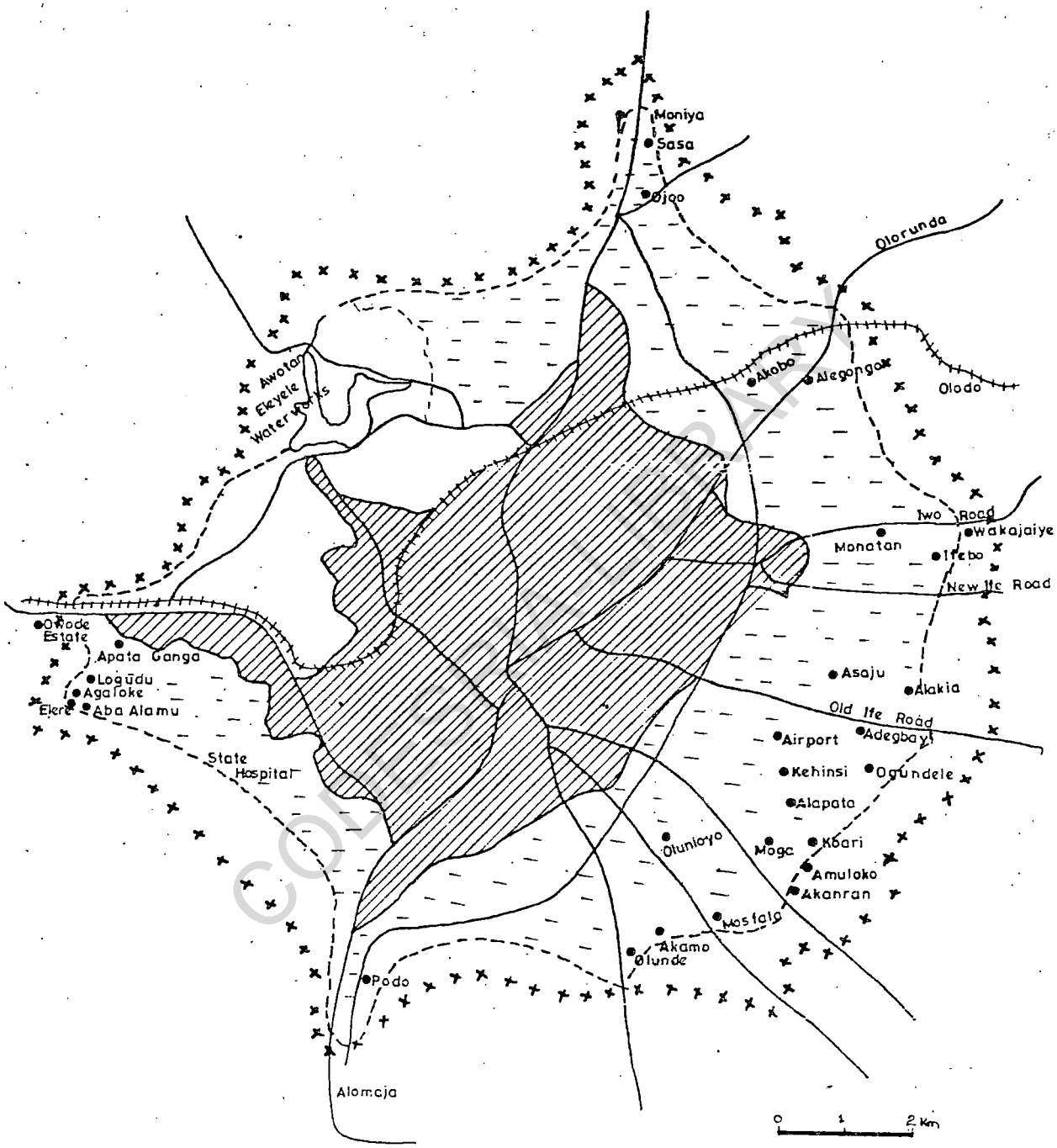
For instance statistics supplied by GKW Consult (1992) reveal that most of the areas or neighbourhoods outside the boundaries of the existing water supply network are peripheral neighbourhoods as illustrated in Figure 1.1. This implies that majority of the inhabitants of such

neighbourhoods do not have access to pipe-borne water. Thus, it is considered necessary to examine how the inhabitants meet their water needs.

As further revealed by GKW statistics, there is astonishing short fall between the required water supply network capacity and the existing one. For instance, the required water supply network capacity is 636,500 cubic metres per day (cbm/day) but the existing capacity is 139,000 cbm/day, a shortfall of 78.16 per cent. Also the required network area is 160 sq km while the present network is 72 sq km, giving a short fall of 55.0 per cent. Most of the areas uncovered are in the fringe. Furthermore, the required population figure to be served is 3,282,800 but those connected presently are just 1,606,000. This gives a short fall of 51.08 per cent, majority of whom reside in the fringe. In this regard it is considered pertinent to examine how the inhabitants of the fringe meet their water requirements as well as the constraints of the state water corporation.

Another aspect of the research problem is inadequacy of comprehensive studies on the 'fringe'. Though previous studies on the fringe and, those on water exist separately, much has not been done in terms of indepth analysis of water situation in the fringe. For instance, those on the fringe have only succeeded in characterising the fringe and identifying their problems. For example, Sada's study (1970) on the fringe of Lagos was only able to identify areas in the fringe, causes of fringe development and attending problems. His findings are similar to those of Akande (1987) and Ayorinde (1989) on the fringe areas of Ibadan.

Fig 1-1 AREAS COVERED BY THE EXISTING WATER SUPPLY



key

Areas covered by the existing water supply

The Fringe (1988) :

The Fringe 1995 :

Sources Onibokun, 1988, GKW Consult, 1992, Fieldwork 1995.

A recent study on water by Arimah and Ekeng (1993) focussed factors explaining residential water consumption in Calabar metropolis.

Furthermore, the issue of fringe and water situation was only touched as a component of the study conducted by the Nigerian Institute of Social and Economic Research (NISER) in 1988 - the socio-economic survey of Ibadan. It only considered aspects such as availability of pipe-borne water, alternative sources and regularity of water supply. The study had a limited scope not in terms of geographical extent but in terms of focus. This necessitates a more comprehensive study.

Another aspect of the research problem is the implication of not having adequate supply of good quality water. According to the Nigerian Environmental Study/Action Team (NEST, 1987), these implications include: tremendous economic waste as people spend too much time and effort looking for water; low level of personal hygiene and environmental sanitation; and widespread incidence of incapacitating and delibitating diseases as well as limited industrial production. Furthermore, Adeniji (1988) observes that the proportion of sub-urban residents who had suffered from water-borne diseases such as Diarrhoea, Dysentry, Typhoid fever and cholera were 7.2 per cent, 27.1 per cent, 32.8 per cent and 18.4 per cent respectively.

Based on the foregoing it is necessary to examine the water situation in the fringe with respect to how the residents meet their water needs, their constraints, the efforts of the state and local governments as well as their constraints.

1.3 AIM AND OBJECTIVES OF THE RESEARCH

The aim of the research was to examine the water situation in the fringe, with respect to how residents meet their water needs, their constraints, local and state government efforts and their constraints, with a view to profering measures for improvement.

Based on this, the specific objectives of the research are:

1. to identify the various sources of water in the fringe;
2. to assess the identified sources with respect to adequacy in terms of quantity and regularity; cost in terms of distance, monetary expenses and health hazards;
3. to examine factors that determine a household's choice of source of water;
4. to assess the efforts of the peri-urban residents, the activities of the Oyo State Water Corporation, and those of the local government councils in respect of water provision in the fringe;
5. to recommend measures to alleviate the problems of the peri-urban residents with respect to water supply.

1.4 HYPOTHESIS TESTED

In this research, the hypothesis tested was as stated below:

Ho: Household's choice of water source is determined by the level of education of the head of the household, his/her income, household size, distance to source of water and the cost of procuring water. This hypothesis was related to the third objective.

1.5 RESEARCH DESIGN

1.5.1 Primary and Secondary Data

Data for this study were obtained from two principal sources -primary and secondary sources.

The secondary data used were obtained from libraries, the relevant local government councils and the Water Corporation of Oyo State. From the libraries, review of literature on utilities and water provision was carried out. As regard the local government councils, information on water provision (types of water schemes implemented, locations and cost) was collected from their records. In addition, reports on the activities of the Oyo State Water Corporation with respect to water provision for the city of Ibadan were collected and reviewed.

With respect to primary data, three sets of questionnaire were prepared. A set was administered on peri-urban residents. It elicited information germane to the accomplishment of

objectives 1, 2 and 3. Questions asked bodered on sources of water, adequacy, regularity of water, water quality, distance to source of supply, cost of procuring water and incidence of water-borne diseases or other health hazards. Other questions bordered on practice of community self-help efforts in area of water provision, assessment of success and constraints.

The second and third sets of the questionnaire were administered on the officials of the Oyo State Water Corporation and those of the Local government councils respectively to accomplish objective 4. With respect to the second set of the questionnaire, questions asked bordered on the activities of the State Water Corporation in the area of water provision for the city in general and for the fringe and other areas not covered by the existing supply network. The third set of the questionnaire contained questions investigating activities of the local government council in the area of water provision, types of water supply scheme executed, quantity provided and locations. Both questionnaires elicited information on prevailing constraints, future programmes and problems envisaged.

1.5.2 Delimitation of the Fringe

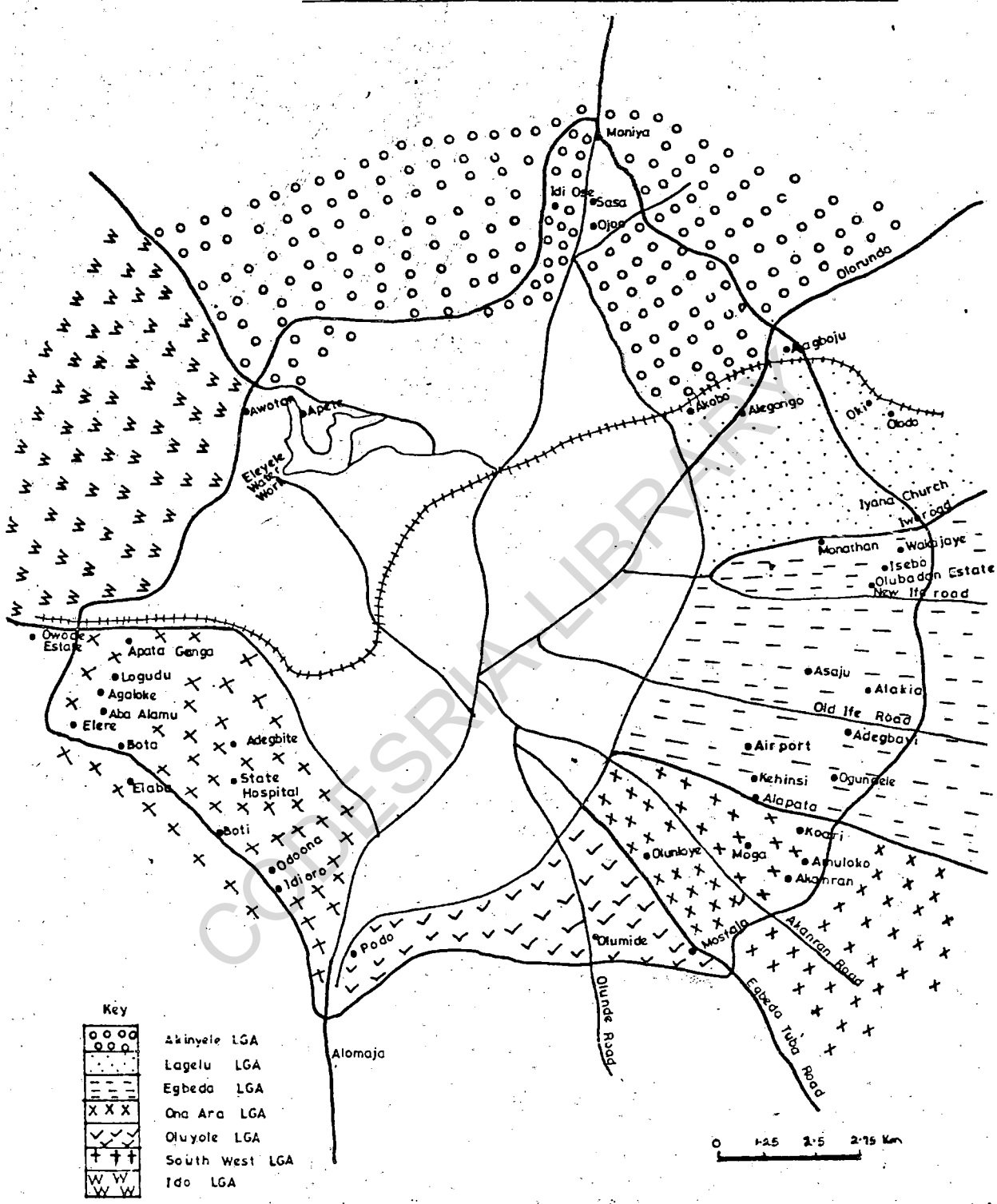
From various definitions of the fringe or peri-urban, there is a general concensus that it is an area outside the city boundary where there is concentration of non-village-rural, non-farm population (Smith 1937, Pryor 1968, Sada 1970). In delimiting the peri-urban communities in Ibadan, NISER (1988) did a morphological classification of the city. This is illustrated in Figure

1.1. An update of the NISER study was carried out to determine present areal/extent of the city and include new communities to which physical growth of the city has extended. This was considered necessary in order to have a current and up-to-date fringe communities. The method adopted was an extension of the one used in 1988 by NISER since the researcher was the leader of the team that did the particular aspect of the study in 1988. The major peri-urban communities were visited and the various routes in the fringes were traversed. Distances between major landmarks used to determine the extent of growth and the present growth limits were measured with the aid of manual and vehicle speedometres. Thus the present extent of growth was determined as illustrated in Figure 1.1.

1.5.3 Sampling Framework

There are seven Local Government Areas which have within their geographical areas, the fringe communities. These Local Government Areas are: Egbeda, Lagelu, Oluyole, Akinyele, Ido, Ona Ara and Ibadan South West Local Government Areas. The fringe communities in each of the Local Government Areas were identified and located on a map of Ibadan as indicated in Figure 1.2. Through the lucky-dip method, a community was chosen from the total number of communities in each of the Local Government Areas. There emerged seven communities.

FIG. 1.2 LOCAL GOVERNMENT AREAS AND THE FRINGE



Source: Survey dept, Ministry of Lands and Housing, Oyo State

Allocation of questionnaires to each of the selected communities was based on the proportion of the total number of communities in a particular Local Government Area with respect to the overall number of the fringe communities for all the seven Local Government Areas. The summary of the sampling framework is as indicated in Table 1.1.

A total of three hundred questionnaires were administered randomly on the inhabitants of the selected communities by trained field staff.

Table 1.1 Sampling Framework

L G A	No. of Communities	Proportion of Total	Sample Size
Akinyele LGA	5	10.9	33
Lagelu LGA	6	13.0	39
Egbeda LGA	11	23.9	72
Ona Ara LGA	5	10.9	33
Oluyole LGA	4	8.7	26
South West LGA	13	28.3	85
Ido LGA	2	4.3	12
Total	46	100.00	300

Source: Author, 1995.

1.5.4 Testing of the Hypothesis

In testing the hypothesis, the Multiple Regression Analysis was adopted. This is because the dependent variable (type of water source) has six types. Each type is run in turn against the

five independent variables - level of education of the head of the household, his/her income, household size, distance to source of water and the cost of procuring water.

Due to the fact that the variables used were social and economic in nature, the Dummy Dependent Variable technique was adopted. Regression was run six times (number of the type of water sources - the dependent variable). At a time a source was given a value of 1 while others were given zero. It was then run against the independent variables. This was done for all the types of sources in turn.

1.6 PROBLEM OF DATA COLLECTION

The problems encountered on the field bodered on suspicion and apathy. The respondents were apprehensive owing to their suspicion that the study had something to do with increase in water rates. Respondents without access to tap water were skeptical about the possibility of getting their areas connected to the main water supply network. This apathy resulted in their not co-operating with field staff. Consequently, a lot of time was wasted appealing to and persuading respondents before they could finally agree to respond to questions. This led to the extention of the duration of the fieldwork.

At the local government councils lack of organization in the way records are kept necessitated repeated calls as a lot of time was spent searching for necessary files. With patience and determination, necessary information was collected.

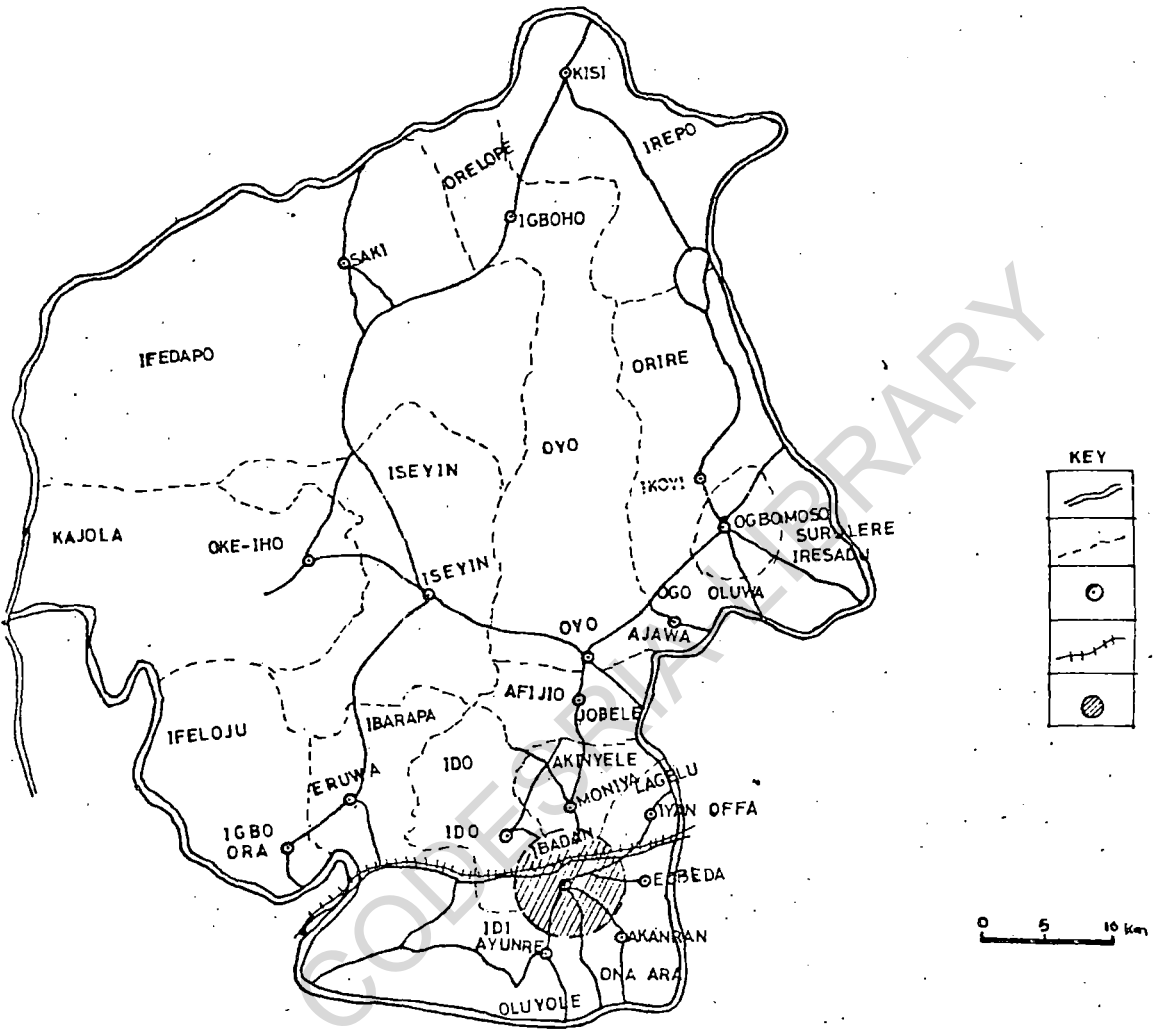
1.7 THE STUDY AREA

Ibadan is located in the zone between the grassland and forest region of Yoruba land. This is illustrated in Figure 1.3. The first location of the city was on a hill and this gave the city the singular advantage of security against aggression and attack by the Fulani horsemen during the Fulani invasions of the Yoruba kingdom in the 19th century (NISER, 1988). Due to its secure location, it was one of the few Yoruba towns into which escapees and deserters in the face of Fulani advancement and attacks on Yoruba towns flocked.

The growth of Ibadan has been influenced by such factors as transportation, establishment of educational institutions and employment opportunities. One particular characteristic of the growth trend of Ibadan is that growth has been accompanying the establishment of certain institutions, construction of roads or railline as it was the case in the early years of the century.

It will be recalled that the major factor that initiated the growth of Ibadan was its location which was found favourable for executing trading activities and which later made it a market place. Favourable factors of growth include the road improvements of 1896, the establishment of a residency on Agodi Hill by the Colonial Masters in 1893. The construction of railway line from Lagos to Ibadan in 1901 and the establishment of old Gbagi market in 1903. Other favourable factors include the status of Ibadan as the headquarters of the Western provinces in 1946, the establishment of the University College, Ibadan (now University of Ibadan) in 1948 and the development of Bodija Estate in 1959.

FIG. 1.3. OYO STATE MAP, SHOWING THE LOCATION OF IBADAN



1.7.1 The Growth of the Fringe

The outward growth of Ibadan city can be largely attributed to the construction of the Ring Road in 1963 and that of the Lagos Ibadan expressway in 1973. This process is illustrated in Figure 1.4. These two major landmarks opened the the hitherto inaccessible areas which resulted in land speculation. This process was enhanced by improvement in the wage condition of the civil servants especially the Udoji Award. People with the aid of this could afford to acquire plots of land which were as at the time relatively cheaper.

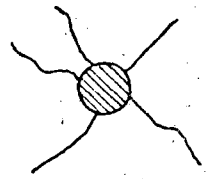
Other factors contributed to the outward growth of the city. They include major physical developments in the fringe areas, for instance Oluyole industrial and residential layout and Owode Housing Estate in the South West, Olubadan housing and industrial estate as well as the Airport in the East, the Leyland Manufacturing Company in the North East and the International Institute of Tropical Agriculture in the North. Recent developments include the New Gbagi Market in the East, the new Alesinloye market in the South West and the Odogbo Military Cantonment in the North. All these establishments attracts develoments to the peri-urban areas. The growth pattern is illustrated in Figure 1.5.

Due to the fast pace with which physical developments were taking place in these fringe areas, strict enforcement of physical planning principles could not be observed. The situation was made worse by a second republic commissioner in Oyo State who ordered that town

planners must not penalise non-conforming developers whose houses had reached the lintel level. This led to sporatic development of squatter settlements and degeneration of existing ones into slum in the fringe areas. Thus, most of the fringe communities lack necessary amenities.

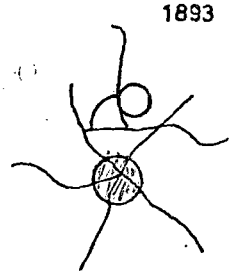
Fig. 1.4. IBADAN : PHASES OF GROWTH AND MAJOR LANDMARKS

1830



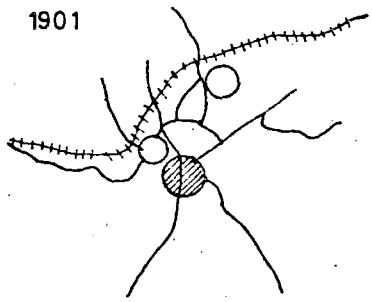
Pre 1830 Development Comprising Oja'ba Market and its Environ

1893



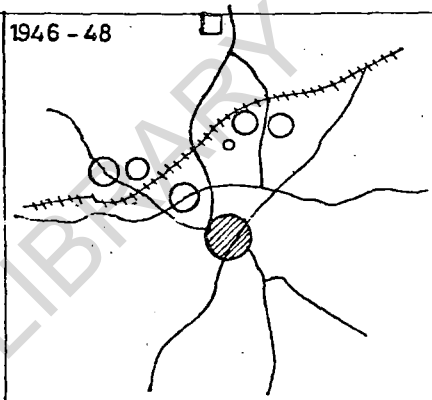
The British Established Residency on Agodi Hill. Roads were improved in 1896. Development outside the initial core began.

1901



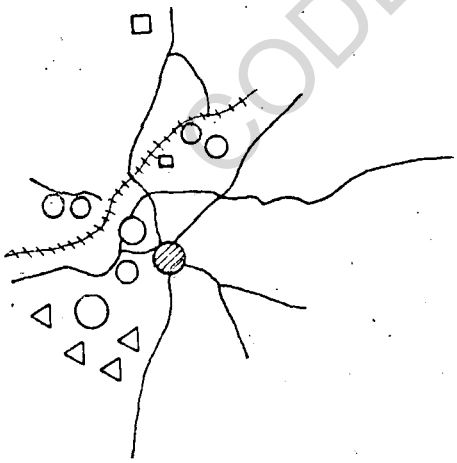
Rail construction reached Ibadan in 1901 this led to the influx of European traders and the eventual establishment of old Gbagi market in 1903.

1946 - 48



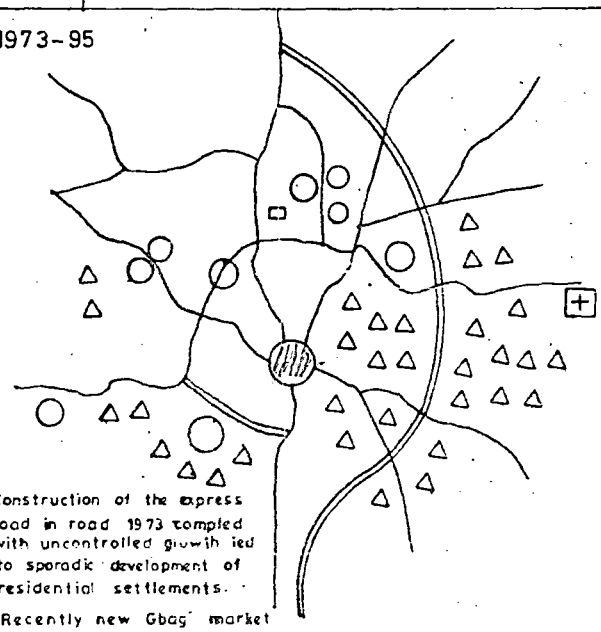
The Western State Secretariat was established in 1946. The premier University was also established in 1948. This led to the establishment of more reservations.

1963



Construction of bye-pass in 1963 led to the development of the Southern Sector.

1973-95

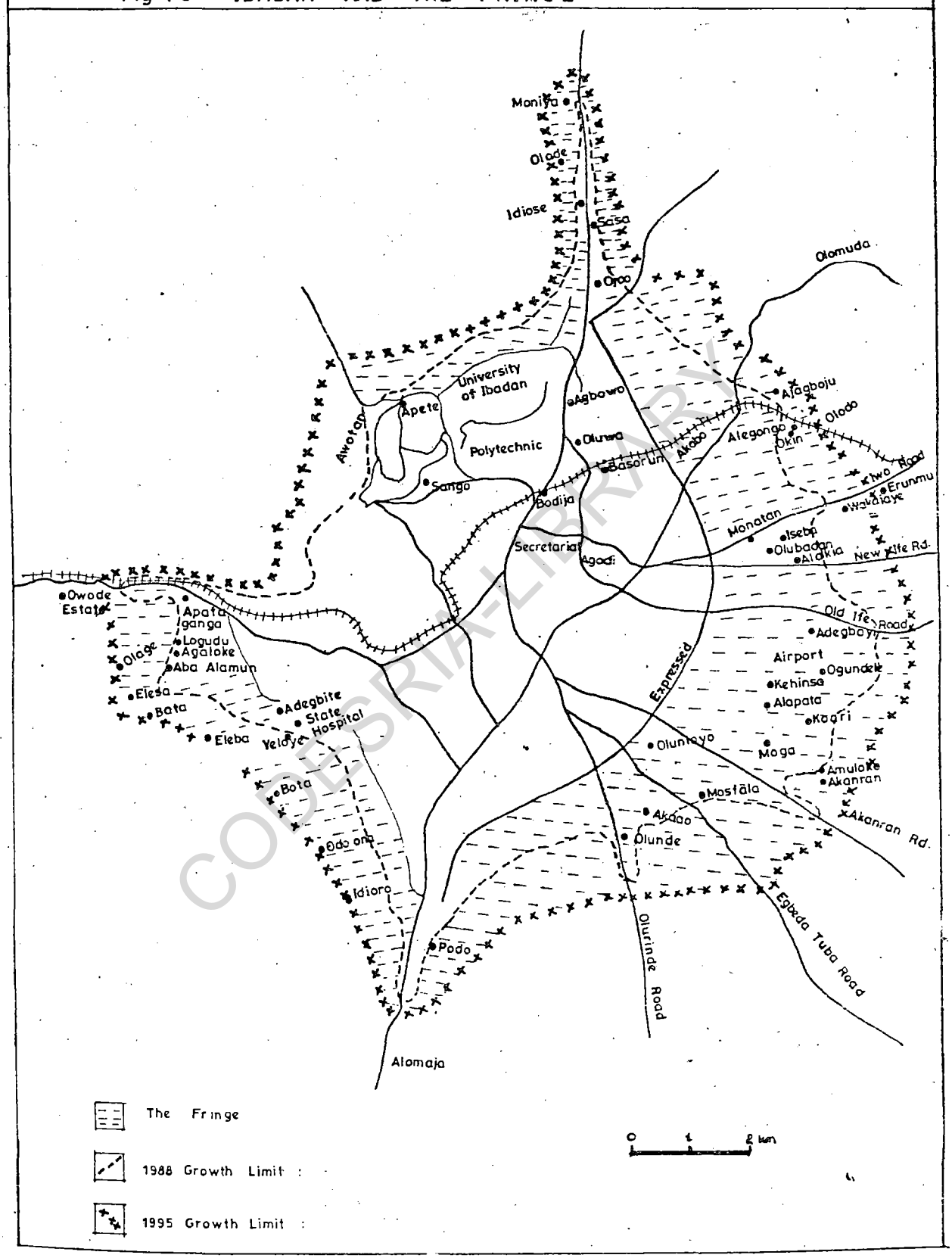


Construction of the express road in road 1973 compled with uncontrolled growth led to sporadic development of residential settlements.

Recently new Gbagi market was established along the new Ife road in 1991

- Planned growth
- Institutions
- Unplanned development
- Traditional core
- The new Gbagi market (est. 1991)

Fig. 1.5. IBADAN AND THE FRINGE



Sources; Onibokun 1988, Fieldwork 1995.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

2.1 CONCEPTUAL FRAMEWORK

This study has four main issues, the fringe, water as an utility, demand for water and supply of water. In this regard some concepts of relevance to these issues are reviewed here. With respect to the fringe, the concept of locational preference is reviewed. This gives an insight into why people may want to live in the fringe and not in the core of the city. With respect to water, the concepts of social or public good and the consumer surplus are found to be relevant. On the issue of demand for water, relevant concepts include household behaviour and consumer choice, while on the supply side the concepts of public capital investment and the optimal provision of public goods are considered germane.

2.1.1 Locational Preferences

According to Richardson (1973), locational preferences are important for understanding the process of growth in the space economy and particularly its spatial distribution. Going further, he perceives locational preferences to probably be more significant for households in the sense of having impact on the spatial distribution of population. This is more so because without locational preferences, one would expect households to crowd into the centres of agglomeration, in the city centre. However, because of locational preferences people chose to

live far away from the centres of the city in the fringe even if it involves sacrifices in income and access to amenities including good quality water.

Richardson further observes that more preferences of this kind are not the pecular perversions of one or two eccentric individuals but, on the contrary, are an attribute general to large segments of the population. This is because there are clusters of such people in lagging regions as opposed to prosperous regions and within these regions, in smaller cities and towns.

This concept is very crucial in understanding why people live in the fringe far away from city centres where transport and other social facilities are lacking. Such preferences may vary with individuals and according to Richardson (1973), they are reinfoced by political considerations which ensure that urban infrastructure and other government resources are channelled into the lagging regions where people choose to reside.

2.1.2 Social Service, Merit Want, Social Want or Public Goood

Carathers and Browne (1977) relate these concepts to the status of water. As a social service, water supplies are generally regarded as an important element of social overhead capital. A good is also a merit want when it is considered that more should be provided than would have been provided by the market mechanism alone. Since water is considered basic to the health and social well-being of the population, it is considered a merit want.

Case and Fair (1989) regard public goods as having two characteristics - they are nonrival in consumption and, or their benefits are non-excludable, that is, it is difficult or impossible to exclude anyone from enjoying their benefits once produced. According to them, a good is called non-rival in consumption when A's consumption of it does not interfere with B's consumption of it. This means that the benefits of the goods are collective - they accrue to everyone. Carathers and Browne (1977) using this analysis, regard water as a public good or a social want since a consumer cannot be excluded from the enjoyment of it if he doesn't pay for it. This is what Case and Fair (1989) regard as a "free-rider problem". It is a problem intrinsic to public goods because people can enjoy the benefits of public goods whether or not they pay for them. Everyone is disinclined to pay, consumption is not contingent upon payment. Another problem they attribute to public goods (like water) is the "Drop-in the market" problem. This is because the service (water) is usually costly that the level of its provision does not depend on whether or not any single person pays or not. This explains why a profit making firm cannot embark on provision of water for public consumption.

2.1.3 The Concepts of Demand, Household Behaviour and Consumer Choice and Consumer Surplus

Case and Fair (1989) discuss relevant issues with respect to the concept of demand, household behaviour, consumer choice and consumer surplus.

There are several factors that influence household demand in a market. These include: the price of the product; the income available to the household; the amount of accumulated wealth of the household; the prices of other products available to the household; the tastes and preferences of the household and expectation about future income and prices. In this regard Carathers and Browne (1977) did something similar on effective demand for water. According to them, effective demand for water means the quantity of water that people demand and are prepared to pay for at a particular price level. It is determined by a complex inter-relationship of a number of factors including the size and nature of the population, the level of education, social and religious philosophy, income, housing conditions, water use habits, climate, available technology and the accessibility of supply.

Of relevance to the concept of demand is that of the 'Budget Constraint' which Case and Fair (1989) regard as the limits imposed on household choices by income, wealth and product prices. With respect to choice of water source, wealth in this regard may be related to other social attributes like level of education, household size, religion and economic attribute like income.

Apart from budget constraint, households' ultimate choices are governed by their individual preferences and tastes. Thus, the choice of water source to a particular household may be determined by taste and other preferences apart from the price the quantity from that source attracts.

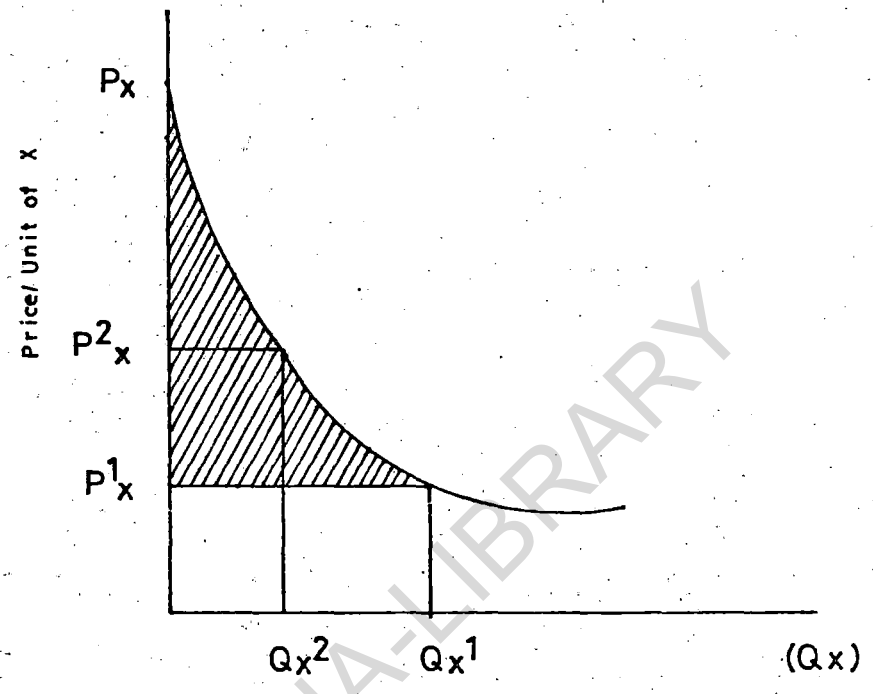
The concept of 'Consumer surplus' describes the difference between the maximum amount a person is willing to pay for a good and its current market price. This is illustrated in Figure 2.1.

Case and Fair (1989) relate this concept to water consumption. According to them, though nothing is more useful than water, it commands a very low price. The reason is that water is plentiful. Thus, since water has such a great use value, but sells for a low price, we all receive a large consumer surplus. Figure 2.2 shows the relationship between price and value for water.

2.1.4 Public Capital Investment and Optimal Provision of Public Goods (The Samuelson Theory)

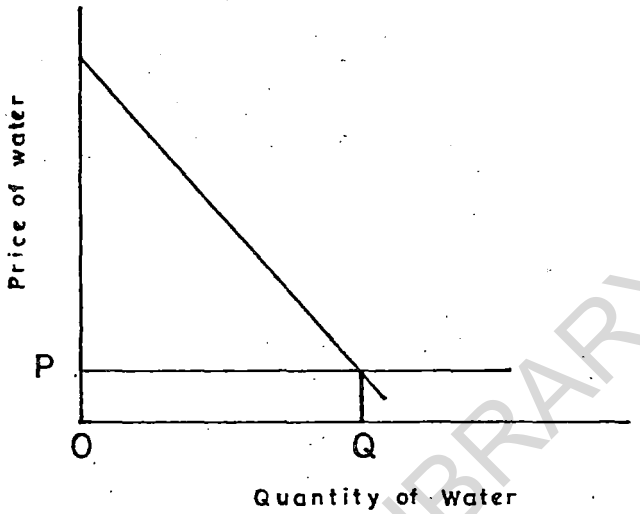
The work of Leven, Legler and Shapiro (1970) on public capital investment was discussed by Richardson (1973, p. 155). This concept is relevant to the supply aspect of water. With the concept of public capital investment, it is believed that a large and important share of the regional stock consists of social and public capital: transport infrastructure, the urban fabric, health, education and social welfare facilitie and so on. These include water provision. It is further believed that the scale and spatial distribution of public capital may have a big impact on subsequent private investment decisions made by firms and households (or the distribution of population in space as people may want to settle where they can have access to facilities.

Figure 2.1. Consumer Surplus



Source : Case and Fair (1989) P.147)

Figure 2.2. Relationship between price and value of water

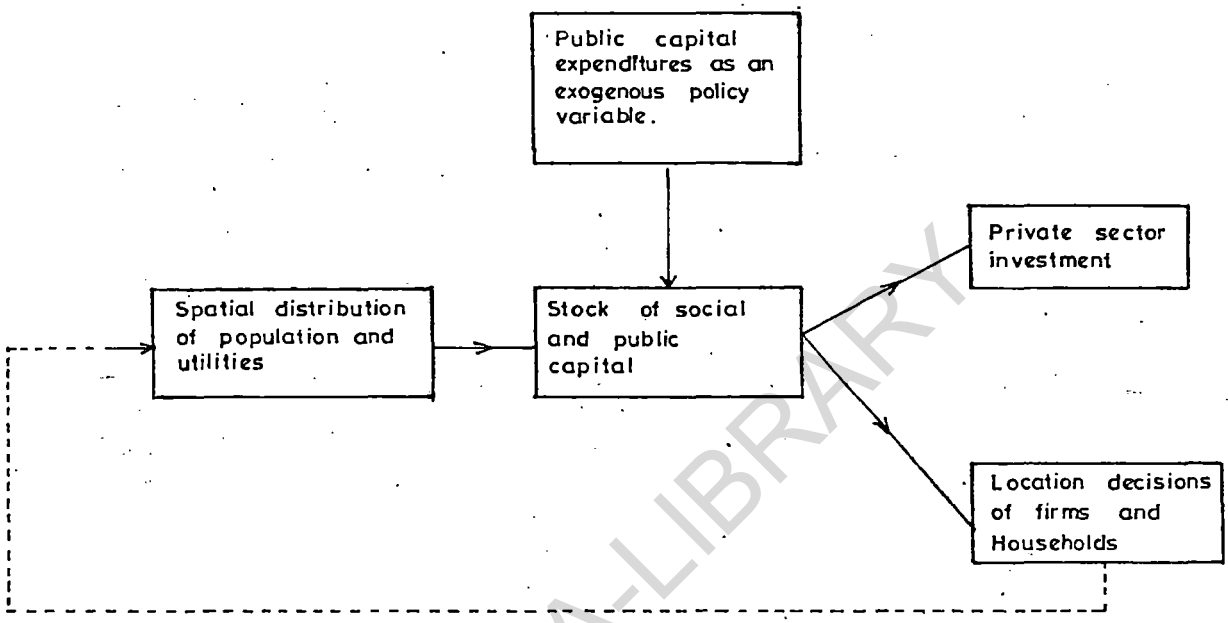


Source: Case and Fair (1989) P.147

There is a kind of interdependent system, as illustrated in Figure 2.3, since the intial size and distribution of the public capital stock is in part pre-determined by he prior distribution of people and economic activities in a particular region. However, if the initial population and level of activity are small and their spatial distribution costly and inefficient, a region may remain disadvantaged, without essential facilities and necessary economic activities. This may explain why many communities in the fringe have not attracted public investments in terms of provision of social infrastructures and economic activities.

The concept of optimal provision of public goods is also relevant to the supply aspect of water. Samuelson (1955), quoted in Case and Fair (1989 p. 394), argues that an efficient level of production of public goods exist. According to him since public goods are non-rival, that is, benefits accrue simultaneously to everyone, one and only one quantity can be produced and that is the amount everyone gets. If X_1 units are produced, A gets X_1, and B gets X_1. If X_2 units are produced, A gets X_2 and B gets X_2. Concluding his argument, Samuelson opines that once we know how much society is willing to pay for a public good we need only compare that with the cost of its production. As long as the society is willing to pay more than the marginal cost of production, the good should be produced. This concept if applied to water provision will ensure sustainanance in the provision of good quality water and replicability of water facilities in lagging communities.

Fig. 2·3: Cumulative Investment Growth Sequence Loop.



Source: Richardson (1973) P. 156

It is pertinent to state that all these concepts are of relevance to the study. Since the study covers choice of water sources (household/consumer choice and demand) and the activities of the state water corporation and the various relevant local government councils (public capital investment, optimal production of public good), as well as water characteristics (public good, merit want etc), the concepts provide a comprehensive framework.

2.2 LITERATURE REVIEW

Various studies had been conducted on peri-urban characteristics, water supply sources, impacts of water shortage and improvement strategies. All these are reviewed in this section.

2.2.1 Peri-Urban Characteristics

Peri-urban neighbourhoods had attracted the attention of some scholars whose concensus, based on their findings, reveal pathetic condition of the peri-urban neighbourhoods with respect to social and infrastructural amenities as well as the general living condition (Golledge 1960, Pryor 1968, Sada 1970, James 1974, Akande 1987, Ayorinde, 1989).

According to Sada (1970), the major characteristics of the peri-urban neighbourhoods include the paucity of social amenities, though electricity appears to be the most universal social facility to the sub-urbanites, pipe-borne water is yet a luxury in the fringe.

The findings of Akande (1987) and Ayorinde (1989) from their studies on the fringe of Ibadan are not at variance with the view of Sada. On a wider scale, Whyte (1977) observes that

most people in developing countries who live in rural areas and fringe of large cities do not have access to inadequate water supply and the prospect is that their number will increase in future despite improvement programmes which may not keep with population growth going by the pace of growth.

2.2.2 Water Sources

The importance of water has often been emphasised (Whyte and Burton, 1977, Olokesusi, 1987, NEST, 1991). It is a daily necessity and a key factor in human health and well-being. In this regard, adequate supply of water is pertinent. Hughes (1985) describes the component of any municipal or village water supply system as comprising of supply sources, transmission facilities and demand zones. He identified supply sources as springs, wells, surface diversions and associated treatment facilities. Whyte et al (1977) further observe that for low income communities both rural and urban water facilities range from no public service at all, through public stand pipes to instances of adequate pipe supply. They further observe that the choice of a particular source of water by an individual is a function of the cost of water to the particular individual. Cost according to them, is made up of any cash payment made to the water authority, to the stand pipe owner, to the water carrier or vendors etc; the value of the time-energy expended in collecting water where the individual lacks water supplied to the dwelling; and the cost of sickness related to the use of polluted water, to the use of insufficient water or to the disease acquired in the cause of water collection. However, the need for a choice only

arises when there are alternatives. Thus despite the cost to an individual he/she may find it difficult to abandon a particular source if alternative sources are limited.

Kendie (1992) in his study of some villages emphasised the seasonal variation in the choice of water sources. It was discovered that more people used the pump per day in the dry season, every woman by necessity must go to a hand pump for water during that period. It is in the wet season when natural and other sources are available and often easier to draw water from. The issue of distance and time is germane to the choice of water sources. Where time is short and the distance to a hand pump great, water is likely to be collected from the nearest source regardless of safety. Where the alternative source and the hand pump are of equal distance the energy expended to draw water is put under consideration.

From the study conducted by Wong (1987) in some villages in their province, four main sources of water to the community were identified - conventional and moonsoon rain, Klong (man-made canals) pond and ground water or well. Rainwater, a component of conventional and moonsoon rain is obtained from the roofs of houses through the rain pipes that lead to earthing jars. It was further gathered that none of the households interviewed, except one, rely on a single source of water supply. Most of them obtained their water from a combination of 2 or 3 sources. The use to which water is put depends on its source. For instance, rain water is used for washing dishes, clothes and for bathing regardless of season. As for well water it is hardly used except as an alternative source during the dry season. He concludes that in a

community without organised water supply system rain water becomes a crucial source of supply.

Frank et al (1973), went further to explain factors that determine the choice of sources, the quantity of water and the way it is used. Users criteria, according to them include taste, temperature, colour and appearance than consideration of bacteriological quality. While villagers in North East Thailand prefer rainwater for drinking, women in the Bustees of Calcutta use tank water for washing but not for drinking (Lee 1969).

2.2.3 Supply of Water

In supplying water, there must be certain objectives. These, in the view of Harry et al (1977) include; provision of adequate supply of water that is free of health hazards, aesthetically acceptale and of adequate quality for household, commercial and industrial use; provision of prompt and reliable service and minimization of injuries damage associated with the system.

An analysis on the water supply situation was done by the Nigerian Environmental Study/Action Team (NEST, 1991). It observed that by 1985 only about 46 per cent had access to improved water supply in the form of pipe borne water, boreholes or well managed wells. The proportion, however, varies from state to state. It ranges from 4 per cent in Benue to 100 per cent in Lagos. Quoting the works of Kolade (1982), NEST (1991, p. 69) describes the water situation in Jos: "Large parts of the town were not supplied from the municipal source

until recently. For example, when Bukuru, with a population of 22,400 had no central water supply until 1975 and about 90 per cent of the population drew their water from ponds and wells. Available water is not supplied equally throughout the town. Rather, the Government Reservation Area and the new layouts where the rich and elite live have a greater share of the water. The situation of the areas where the poor reside especially the fringe is quite pathetic.

A report prepared by GKW Consult (1992) for the Oyo State Water Corporation reveals that water supply situation in Ibadan is unwholesome. Giving figures which have been earlier discussed under introduction and the research problem, it reveals that only 160,600 people are being served compare to about 3,282,000 population of the state (1991 census provisional figure). This establishes the acute water shortage in Ibadan. Most parts of the city are without tap water supply especially the fringe areas. As observed by Adeniji (1987) the problem of inadequate supply has been compounded by the rapid growth of the city and the unplanned nature of most parts of the city especially the fringe.

Whyte (1977), in her own contribution regards the situation in the peri-urban as worse. She observes that the population of the urban fringe may have access to a fair quantity of water from stand pipes or from local streams or ponds but their health risks from crowded condition leading to contamination and from poor waste disposal facilities is likely to be very high. According to her, there may be a few stand pipes, but each is supposed to serve large number

of people. In practice, it is more probably that a single stand pipe serves some 500 people but even this number could involve considerable time wasting at peak morning and evening hours. Due to unsatisfactory services from sources; rain water, ditches, ponds, wells or streams, especially in the wet season, another source is the vendor who goes from house to house.

McGarry (1977), further views the lots of the rural and peri-urban dwellers with concern. While regarding the prospects for 1980 as unfortunately worse, he regards the hope of reaching 25 per cent of the peri-urban or rural dwellers by 1980 as optimistic judging by the pace of installing needed facilities as at the late 70s. McGarry's optimism may not be realised giving the prevailing economic depression which constrains various governments financially, coupled with the fast pace at which the fringe develops.

2.2.4 Water Shortage

Onibokun (1986), points out some causal factors of water shortage. In his opinion, water resources system are influenced by the character, quality, quantity and timeliness of inputs and by the ability to mitigate the ever present constraints. All these which determine the output (water products) are not yet satisfactory, hence acute shortage. Specifically, he attributes water shortage in Oyo State to several factors. These include: inadequacy of funds and misallocation of the little fund available; economic depression; low water rates; poor revenue; inadequate manpower; incessant electric power failures; fluctuations at water works and booster stations;

frequent damage to water pipe networks; water wastage and illegal connection as well as the ever rising demand due to population growth and unplanned physical expansion of human settlements.

These problems have made it extremely difficult for Oyo State government to meet its water supply goals. This is confirmed by Olokesusi (1987). He notes that the 1980 per capita daily consumption value of 15.211 litres per day is about 3 per cent of the Third National Development Plan (1975 - 1980) goals. The situation is not peculiar to Nigeria. For instance, as claimed by the National Water and Sanitation Agency (1984), 50 per cent of the municipality's water was consumed by only 18 per cent of the users while 20 per cent of the population who lived in the marginal areas (including the fringe) consumed just 6 per cent.

Similarly, NEST (1991) observed that for those parts of the country served with improved water, the supply falls short of the minimum required for healthy bodies and healthy environment. It regards the situation in areas which are not served by improved supplies and which may not have access to unimproved sources (especially the fringe) as very much worse.

2.2.5 Impacts of Shortage

Water shortage has serious impacts on the people. As noted by Arimah and Ekeng (1993), in cities where water vending is rampant, poor households pay as much as 18 per cent of their income on water. Households spend considerable amount of money and time sinking

wells and collecting water fron stand pipes. In the same vein, Adeniji (1987) observed that owing to water shortage, inhabitants of the city spend a substantial part of their working time and financial resources on the procurement of water for their daily basic requirements. Furthermore, due to acute shortage, inhabitants have often resorted to obtaining water from many dubious sources.

2.2.6 Administration, Planning and Improvement of Water Supply System

In planning water supply system, Feachman (1977) suggests the need for definition of goal since the goals of a high income community are likely to be different from those of a low income community. He opines that because there is no immediate prospect of providing a significant proportion of low income communities with high grade water facilities, it is necessary to examine closely, the goals of water supply in order that scarce resources may be allocated in the most effacious and rational manner.

He further opines that while immediate aims of water supply improvements have been established by prosperous communities, they are still unattainable for the majority of the population of developing countries, thus their case should be of immediate concern. These immediate aims revolve round improving water supply to enhance its quality, quantity, availability and reliability. He also emphasises the need for complementary inputs. According to him, a water supply development must be accompanied by a carefully designed package of

complementary inputs if it is to achieve its stated goals. He regards active community participation and support, adequate facilities for operation and maintenance as fundamental.

The immediate aims of community participation include acute community participation and support, competent design, adequate facilities for operation and maintenance and utilization of appropriate technology.

According to Spencer (1985), institutional arrangements for water supply vary from country to country. In some countries, water supply responsibility is shared between two or more authorities while in others like Nigeria, responsibility is borne by the same authority such as the State Water Board, Water Corporation or national body. He identifies five management requirements. These are: money, manpower requirements, materials, machines and methods. The most important is money. Budgets are required for immediate operational needs, also for more forward-looking activities such as plant overhaul, renewal of system components and manpowr development (as well as expansion of connection). Though money is the most important, there is a problem. Ideally a water supply system should be able to meet its financial needs, however, water must be made available at a price which can be afforded by potential consumers, otherwise it will not be sold. Balancing these two elements can be a problem for many water undertakings especially in developing countries. Spencer, therefore, suggested a way out. Since there is usually a stratum of the population who are relatively affluent in urban

areas, they can afford to pay water charges which not only cover the costs of water supplied to them but which also, through the use of an appropriate tariff system can subsidize supplies to poorer sections of the community including the fringe.

From the foregoing, one can realise that much has been done on fringe characteristics as well as water sources and supply, however attention on the water situation in the fringe has not been comprehensive, hence the need for this study to bridge the gap.

CHAPTER THREE

DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS

This chapter is considered necessary to highlight the socio-economic background of the respondents. Apects discussed include, sex, age, marital status, nationality, educational qualification, household size, occupation and income. Some of these variables were used to test the stated hypothesis in chapter one using multiple regression analysis. They include household size, educational qualification and income. The results of the test are dicussed in chapter four.

As indicated in Table 3.1 majority of the respondents (65.3 per cent) were females while males accounted for 36.7 per cent. This should be expected because the task of water provision for the use of the household members is the main responsibility of the wife and other female offsprings. This agrees with the conception in Droplet (1991) that women and children are mainly responsible for water procurement for the use of the household.

With respect to age, Table 3.2 indicates that majority of the respondents (72.3 per cent) were between the ages of 18 and 45 years. This is because housewives are directly involved in water procurement, thus their knowledge of water situation is considered reliable.

Table 3.1: Distribution of Respondents by Sex

Study Area	Male		Female		Total	
	No.	%	No.	%	No.	%
Akobo	2	8.7	37	74.9	39	13.0
Apete	5	38.5	8	61.5	13	4.3
Isebo	36	50.0	36	50.0	72	24.0
Moniya	10	30.3	23	69.7	33	11.0
Mosfala	2	7.7	24	92.3	26	8.7
Olunloyo	12	36.4	21	63.6	33	11.0
State Hospital Area	37	44.6	47	56.0	84	28.0
Total	104	34.7	196	65.3	300	100.0

Source: Field Survey, July 1995

Table 3.2: Distribution of Respondents by Age

Study Area	Under 18		18-45		46-66		55+		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Akobo	-	-	26	78.8	13	21.2	-	-	39	13.0
Apete	-	-	10	76.9	3	23.1	-	-	13	4.3
Isebo	10	13.9	29	40.3	23	31.9	10	13.9	72	24.0
Moniya	-	-	30	90.9	3	9.1	-	-	33	11.0
Mosfala	-	-	22	84.6	4	15.4	-	-	26	8.7
Olunloyo	1	3.0	30	90.9	2	6.1	-	-	33	11.0
State Hospital Area	2	2.4	70	83.3	12	14.3	-	-	84	28.0
Total	13	4.3	217	72.3	60	20.0	10	3.3	300	100.1

Source: Field Survey, July 1995

Majority of the repsondents (79.0 per cent), as indicated in Table 3.3 were married while the single ones accounted for 17.0 per cent. This enriched the quality of data collected as married women had more to tell about water situation than single ones, owing to their experience dealing with larger household size.

Analysis on educational attainemnt is contained is Table 3.4. It reveals that an insignificant proportion of the respondents went as far as acquiring post secondary qualification. Those that had only primary education and just secondary/technical qualification accounted for 35.7 and 37.3 per cent respectively. Respondents without education constituted 16.3 per cent while those with adult education represented 3.3 per cent. Educational background of the respondents is a very important variable to water sourcing analysis. Carathers (1977) regards it as one of the variables that determine effective demand for water.

Table 3.3: Distribution of Respondents by Marital Status

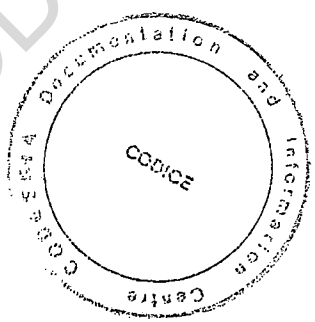
Study Area	Single		Married		Divorced/ Seperated		Widowed		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Akobo	7	21.9	32	78.1	-	-	-	-	39	13.0
Apete	1	7.7	12	92.3	-	-	-	-	13	4.3
Isebo	12	16.7	53	73.6	-	-	7	9.7	72	24.0
Moniya	1	3.0	32	97.0	-	-	-	-	33	11.0
Mosfala	1	3.8	24	92.3	1	3.8	-	-	26	8.7
Olunloyo	9	27.3	23	69.7	1	3.0	-	-	33	11.0
State Hospital Area	20	23.8	61	72.6	3	3.6	-	-	84	28.0
Total	31	17.0	237	79.0	51.7	1.7	7	2.3	300	100.0

Source: Field Survey, July 1995.

Table 3.4: Distribution of Respondents by Educational Qualification

Study Area	No Education		Primary School		Adult Education		Secondary/ Technical		Post Secondary		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Akobo	11	28.7	11	28.2	-	-	9	23.1	8	20.5	39	13.0
Apete	1	7.7	5	38.5	-	-	7	53.8	-	-	13	4.3
Isebo	13	18.0	14	19.4	8	11.11	28	38.9	9	12.5	72	24.0
Moniya	10	30.3	19	57.6	-	-	4	12.1	-	-	33	11.0
Mosfala	9	34.6	7	26.9	-	-	8	30.8	2	7.7	26	8.7
Olunloyo	1	3.0	16	48.5	-	-	14	42.4	2	6.1	33	11.0
State Hospital Area	4	4.8	35	41.7	2	2.4	33	39.3	10	11.9	84	28.0
Total	49	16.3	107	35.7	10	3.3	103	34.3	31	10.3	300	100.0

Source: Field Survey, July 1995



In Table 3.5, it is revealed that majority of the respondents (50.7 per cent) had a household of between 5 - 8 members. Thus, it cannot be said that they have too large household size. However, there are cases of those with between 9 - 12 members (15.0 per cent) and those with more than 13 members (8.0 per cent). Respondents with household members of between 1 - 4 accounted for 26.3 per cent. Household size as a variable is quite relevant to water situation analysis. Arimah and Ekeng (1993) found it to be significantly associated with quantity of water consumed while Carathers (1977) regards it as one of the determinants of effective demand for water.

As indicated in Table 3.6, majority of the respondents (37.0 per cent) were traders. Next to this group were civil servants who constituted 17.7 per cent. These were private company employees (11.3 per cent) students (8.3 per cent) and artisans (17.0 per cent). About 5.0 per cent of them were full housewives while farmers and the unemployed constituted 1.7 per cent and 2.0 per cent respectively.

Analysis on respondents' income is contained in Table 3.7. It is revealed that a substantial proportion of them (32.0 per cent) earned between N1.00 - N1,000.00 per month while 14.3 per cent earned nothing, perhaps because they were students/apprentices, full housewives or unemployed. Those that were relatively better off with monthly income above N3,501.00 constituted a small proportion of 11.0 per cent. Between these two extremes were

those that earned N1,001.00 - N2,500.00 (34.0 per cent) who constituted the majority. Income as a variable is also very crucial to water situation analysis. While Carathers (1977) established its significance in influencing effective demand for water, Arimah and Ekeng (1993) found it to associate significantly with the quantity of water consumed by households.

Table 3.5: Distribution of Respondents by Household Size

Study Area	1 - 4		5 - 8		9 - 12		13+		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Akobo	9	23.1	18	46.2	6	15.4	6	15.4	39	13.0
Apete	3	23.1	8	61.5	-	-	2	15.4	13	4.3
Isebo	17	23.6	27	37.5	18	25.0	10	13.8	72	24.0
Moniya	6	18.2	26	78.8	1	3.0	-	-	33	11.0
Mosfala	8	30.8	10	38.5	3	11.5	5	19.2	26	8.7
Olunloyo	8	24.2	22	66.7	3	9.1	-	-	33	11.0
State Hospital Area	28	33.3	41	48.8	14	16.7	1	1.2	84	28.0
Total	79	26.3	152	50.7	45	15.0	24	8.0	300	100.0

Source: Field Survey, July 1995.

Table 3.6: Distribution of Respondents by Occupation

Study Area	Unemployed		Student		Housewife		Civil. Serv.		Priv. employee		Trading		Artisans		Farmers		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Akobo	-	-	-	-	-	-	9	23.1	7	17.9	17	43.6	6	15.4	-	-	39	13.0
Apete	-	-	1	7.7	-	-	1	7.7	1	7.7	5	38.5	4	30.8	1	7.7	13	4.3
Isebo	5	6.9	8	11.11	5	6.9	11	15.3	13	18.1	14	19.4	14	17.4	2	2.8	72	24.0
Moniya	1	3.0	1	3.0	4	12.1	2	6.1	1	3.0	17	51.5	6	18.2	1	3.0	33	11.0
Mosfala	-	-	-	-	2	7.7	5	5.2	1	3.8	14	53.8	4	15.3	-	-	26	8.7
Olunloyo	-	-	3	9.1	2	6.1	4	12.12	3	9.1	11	33.3	10	30.4	-	-	33	11.0
State Hospital Area	-	-	12	14.3	2	2.4	21	25.0	8	9.5	33	39.3	7	8.3	1	1.2	84	28.0
Total	6	2.0	25	8.3	15	5.0	53	17.7	34	11.3	111	37.0	51	17.0	5	1.7	300	100.0

Source: Field Survey, July 1995

Table 3.7: Distribution of Respondents by Income

Study Area	None		N1 - N500		N501-N1,000		N1,001-N2,500		N2,501-N3,500		N3,501-N5,000		N5,000+		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Akobo	-	-	-	-	15	38.5	8	20.5	5	12.8	5	12.8	6	15.4	39	13.0
Apete	1	7.7	1	7.7	3	23.1	7	53.8	1	7.7	-	-	-	-	13	4.3
Isebo	13	18.1	7	9.7	15	20.8	18	25.0	10	13.9	9	12.5	-	-	72	24.0
Moniya	5	15.2	1	3.1	7	21.2	16	48.5	2	6.1	2	6.1	-	-	33	11.0
Mosfala	2	7.7	4	15.4	4	15.4	13	50.0	1	3.8	1	3.8	1	3.8	26	8.7
Olunloyo	6	18.2	5	15.2	11	33.3	18	24.2	1	3.0	1	3.0	1	3.0	33	11.0
State Hospital Area	14	16.7	10	11.9	13	15.5	32	38.1	8	9.5	3	3.6	4	4.8	84	28.0
Total	41	13.7	28	9.3	68	22.7	102	34.0	28	9.3	21	7.0	12	4.0	300	100.0

Source: Field Survey, July 1995

CHAPTER FOUR

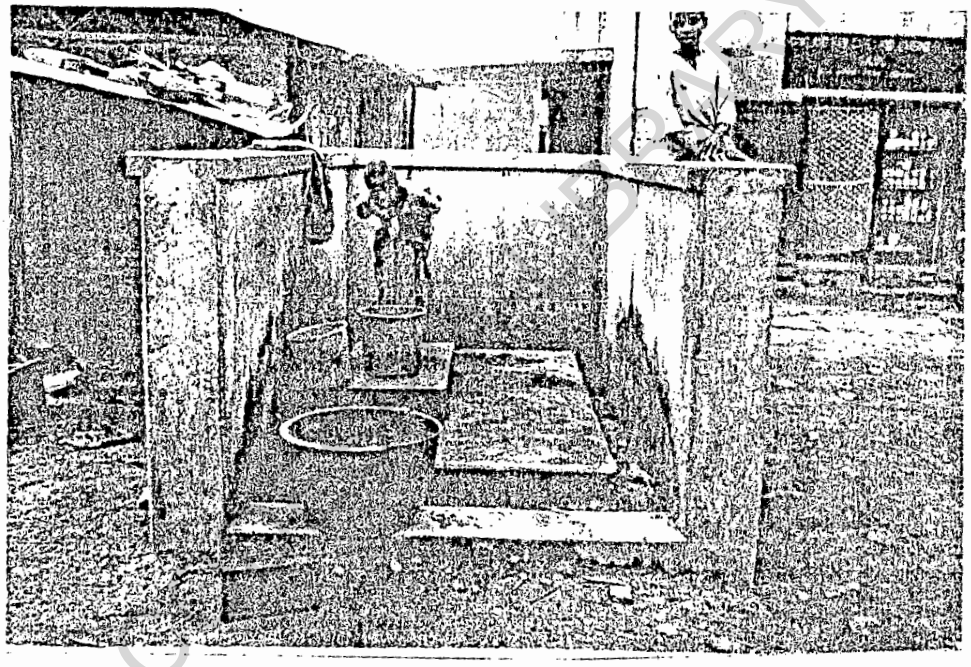
PERI-URBAN WATER SITUATION

This chapter discusses water situation in the fringe represented by the selected study areas. Among the issues discussed are water sources and their characteristics, water procurement characteristics, as well as steps taken to ameliorate problems of water supply and the associated costs. The last section of the chapter discusses socio-economic variables that are associated with choice of water sources as well as major factors determining choice of water sources.

4.1 WATER SOURCES AND THEIR CHARACTERISTICS

4.1.1 Type of Sources

There are variety of sources of water to peri-urban residents. Field observations revealed that water sources range from various types of wells, boreholes, water vendors to streams, and tap water. The situation is just as experienced by Hughes (1985) with the exception of treatment facilities observed by him. It is also as viewed by Whyte et al (1977) with the exception of adequate piped supply. The only study area where pipe water is available is Isebo. It was provided by the Nigerian Breweries as compensation to the residents for polluting their well water with industrial effluents. Plate 1 shows one of the two water faucets provided.



One of the two water faucets provided by the Nigerian Breweries for the residents of Isebo.

1: One of the two water faucets provided by the Nigerian Breweries for the residents of Ise

Though, households rely on more than one source of water, attempt was made to ascertain their most regular source of water. As indicated in Table 4.1 majority of the respondents (94.3 per cent) regarded well as their most regular source of water. A few of them, as was the case in Isebo, relied on tap while an equal proportion relied on water vendors.

As indicated in Table 4.2 well provides water for most domestic activities: drinking (80.0 per cent) cooking (91.0 per cent); washing (80.0 per cent); bathing (85.0 per cent) and flushing of toilet (86.0 per cent). This finding underscores the importance of well to peri-urban residents. Considering findings from other studies (Lee 1969 and Frankel et al 1973) it can be said that there are variations in the type of water used for different activities from region to region. Contary to the findings of this study, Lee (1969) found that the Bustees of Calcutta use tank water for washing but not for drinking while villagers in North East Thailand prefer rainwater for drinking (Frankel et al, 1973). The findings are also at variance with the conception of Wong (1987) that where there is no organised system of water supply, rainwater becomes a crucial source.

Table 4.1 Most Regular Source of Water

Type of Source	Proportion
Tap	2.3
Borehole	1.7
Well	94.3
Water Vendor	1.7
Total	100

Source: Field Survey, July 1995.

Table 4.2 Sources of Water for Domestic Activities

Domestic Activities	Proportion				
	Tap	Borehole	Well	Water Vendor	Nearby Stream
Drinking	10.3	4.3	80.0	5.3	-
Cooking	4.0	3.7	91.0	1.3	-
Washing	2.3	3.0	80.0	10.7	4.0
Bathing	2.3	3.0	85.0	7.0	2.7
Flushing Toilet	1.3	3.0	86.0	6.7	2.3

Source: Field Survey, July 1995.

4.1.2 Characteristics of the Sources

Though, well is the most patronised, there are various categories. Observations revealed that there are ringed (plate 2) and unringed wells (plates 3 and 4) while there are wells with water pumping machine (plate 5). The most common well in the study area is the unringed type. It is preferred by the majority (77.8 per cent) as indicated in Table 4.3. This is because it is relatively the cheapest.

Plate 2: A ringed well located too close to a toilet

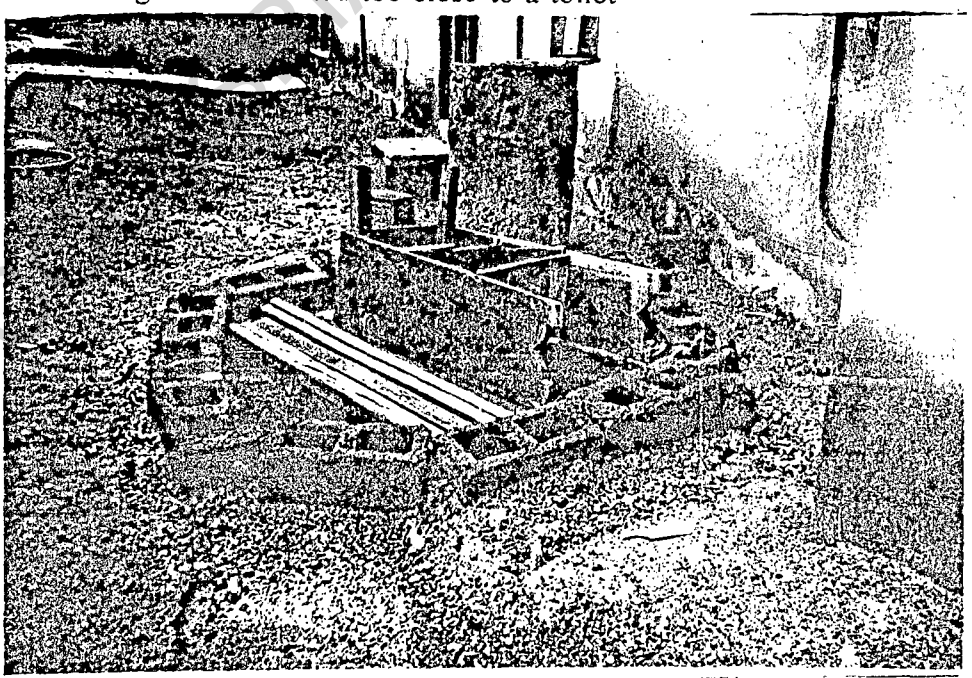


Plate 3: An unringed well

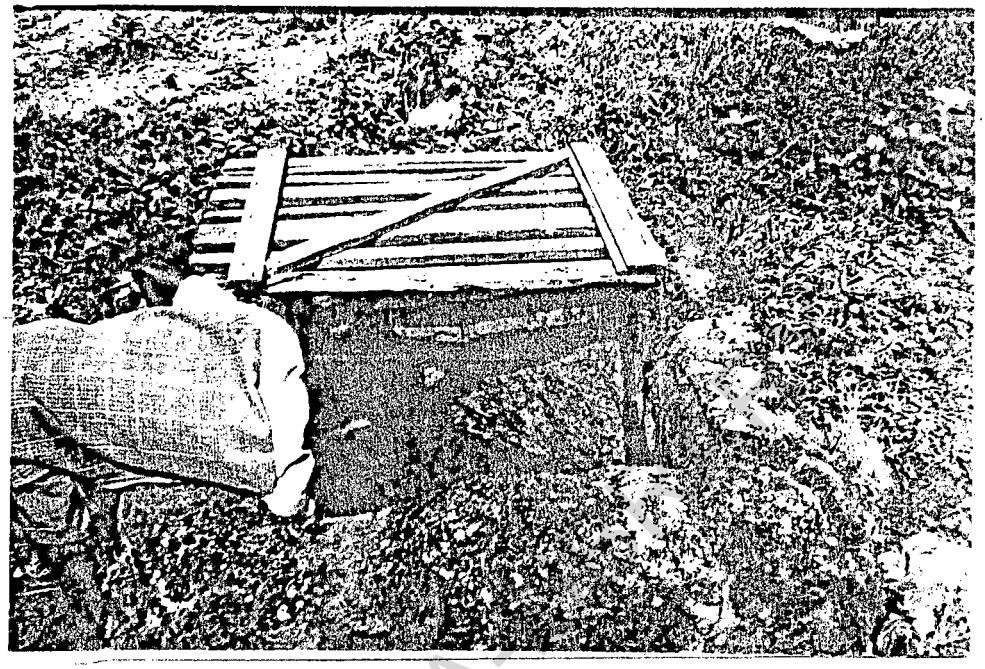


Plate 4: An unringed shallow well

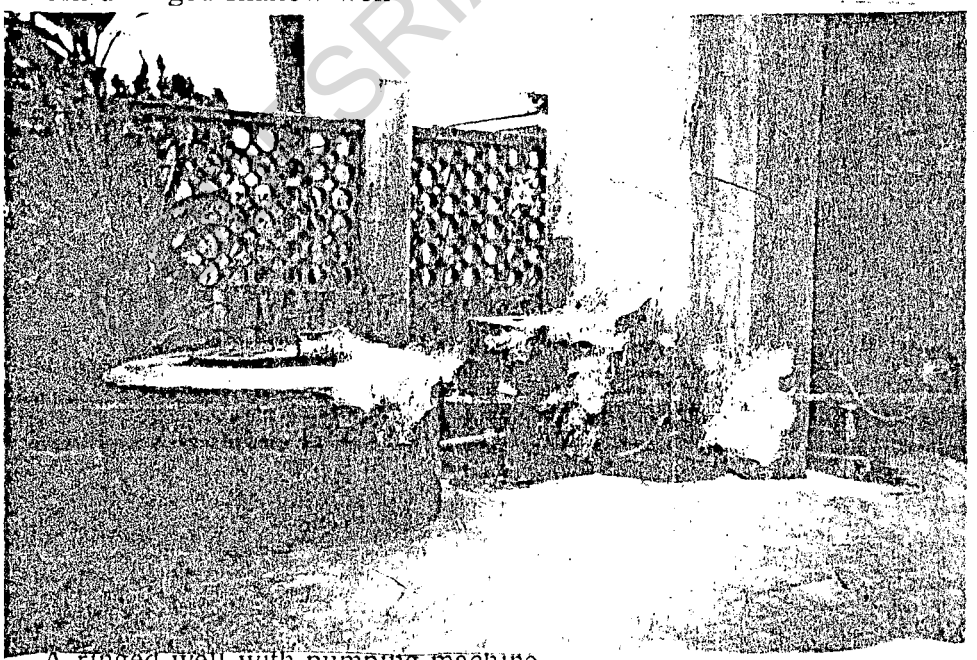


Plate 5: A ringed well with pumping machine

Table 4.3: Types of Well

Type	Proportion
Unringed well Ringed well Ringed well with pumping machine	77.8 20.2 2.0
Total	100.0

Source: Field Survey, July 1995.

The fact that most of these wells are not ringed means the quality of water sourced from them cannot be satisfactory. This conception is corroborated by the claims of most of the respondents (54.2 per cent) as indicated in Table 4.4, that water sourced is not clear, has sediments, bad taste or bad odour. Ironically, the situation is said to be more serious in the raining season. It is as observed by Whyte (1977) that people turn to more risky sources like rainwater, ditches, ponds, wells or streams in the wet season. Another reason is that because most of these wells are not ringed storm waters seep into them from all the sides of the well and since most of them are not properly covered and on low plain, sediments are washed into them.

Table 4.4: Complaints About Water

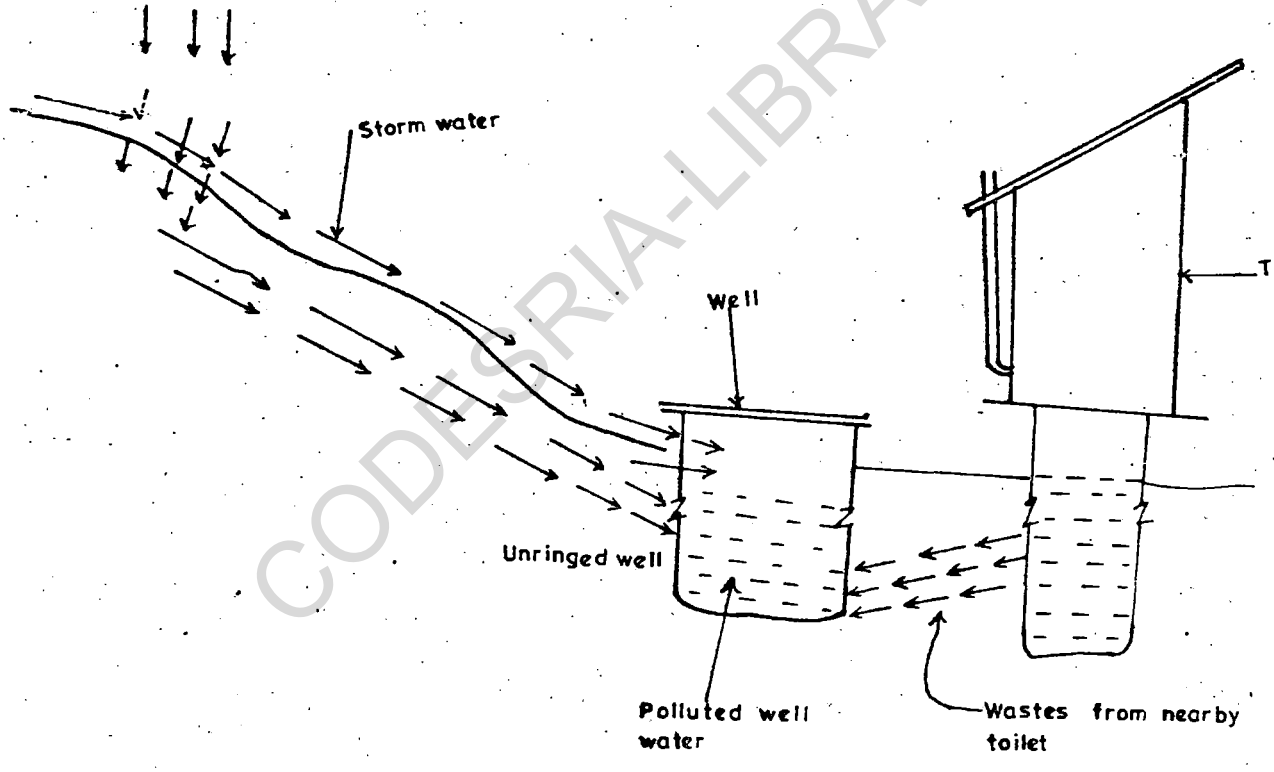
Complaint	Proportion
Water not clear	37.3
Water has sediments	10.3
Water has bad taste	5.3
Water has bad odour	1.3
None	45.7
Total	99.9

Source: Field Survey, July 1995.

Another unsatisfactory aspect of these wells is their locational characteristic. Physical planning principles (Keeble 1969, Vagale et al (1971) stipulate that wells should be located at least 30 feet away from toilets and on the upper plain of the topography. However, observations in the study area revealed a contrary situation. The ringed well shown in plate 2 is located too close to the toilet and the septic tank while plate 6 shows a well located at a lower plain of the topography. This reveals that these physical planning provisions are not adhered to. The consequence of this is that water from these wells is polluted through seepage of waste and storm water from the nearby toilets and the upper plain respectively as illustrated in Figure 4.1.

Plate 6: A well located at the lower plain of the topography.

Fig. 4.1. An Illustration of Seepage of storm water and wastes into wells.



Source: Author, 1995

This will have adverse health impact on the users of such water. This problem is peculiar to households that use ringed and unringed wells. Those not affected are households that have ringed wells aided by pumping machines (plate 5) such wells are usually deep. Water is pumped from them to over-head tanks from where water is distributed through pipes to different supply outlets in the house. it is the most reliable source in terms of regularity of water and safety. However, it is very expensive and can only be afforded by a very few of the peri-urban residents. Only 2.0 per cent of the respondents in the study area had this facility as indicated in Table 4.3.

Those without access to this type of water source are exposed to health risks. Apart from the poor locations as earlier discussed, water from most of the other wells is exposed to pollution by animals (plate 7) and unhygienic conditions due to poor maintenance. Thus as observed by Petlane (1980), the greatest danger associated with drinking water (in the fringe) is that it may have become contaminated by sewage or by human excrement, even the dangers of animal pollution must not be overlooked. Petlane's observation was confirmed by the revelation made by some respondents that some members of their households had been treated for some types of water-borne diseases. Such as illustrated in Figure 4.2 include: Diarrhoea, dysentry, typhoid, and cholera.

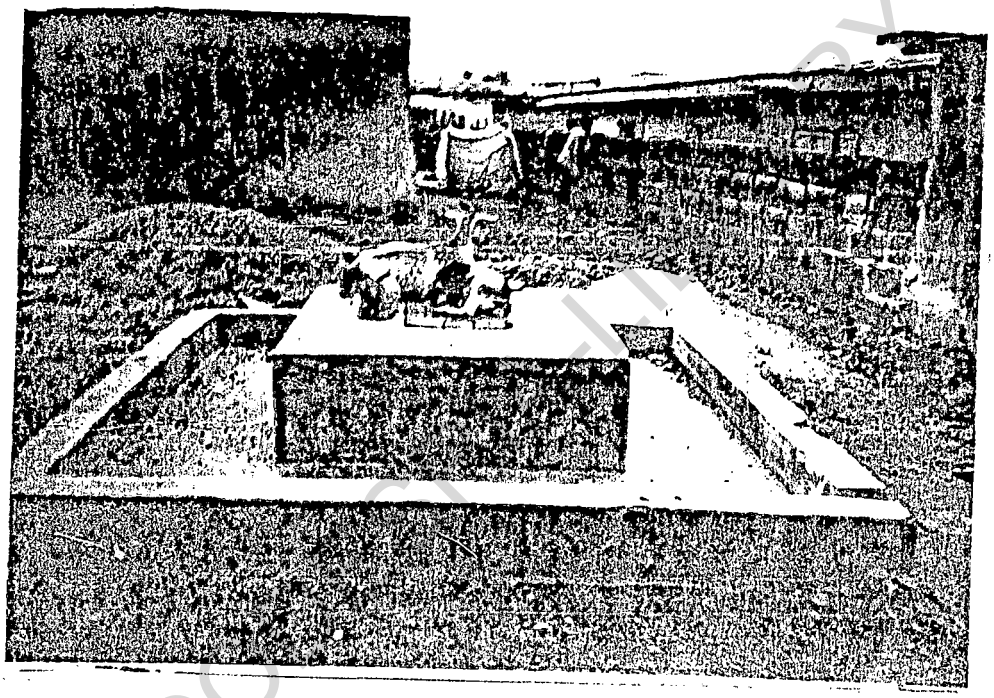
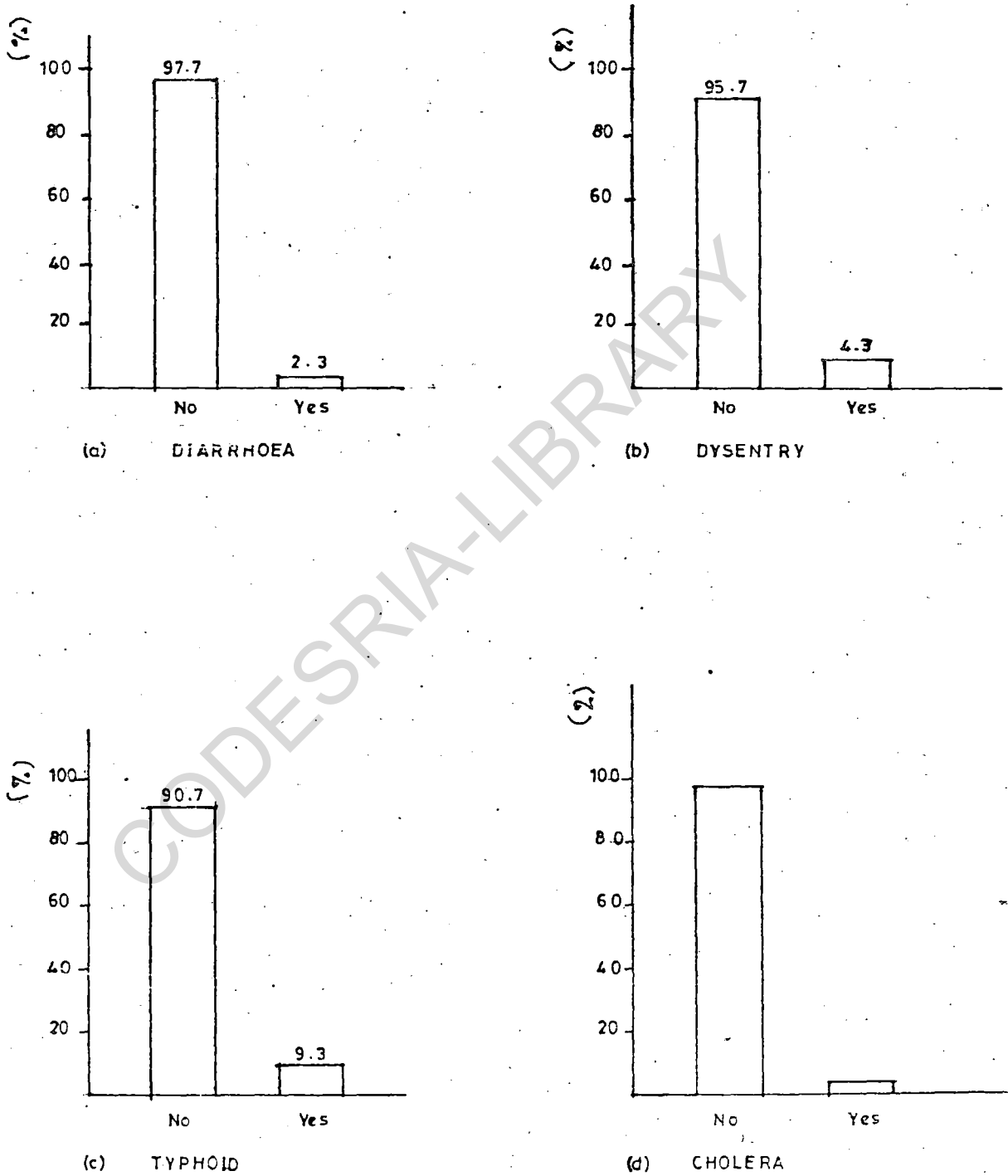


Plate 7: A well exposed to pollution by animals.

Fig. 4.2. Incidence of water borne diseases



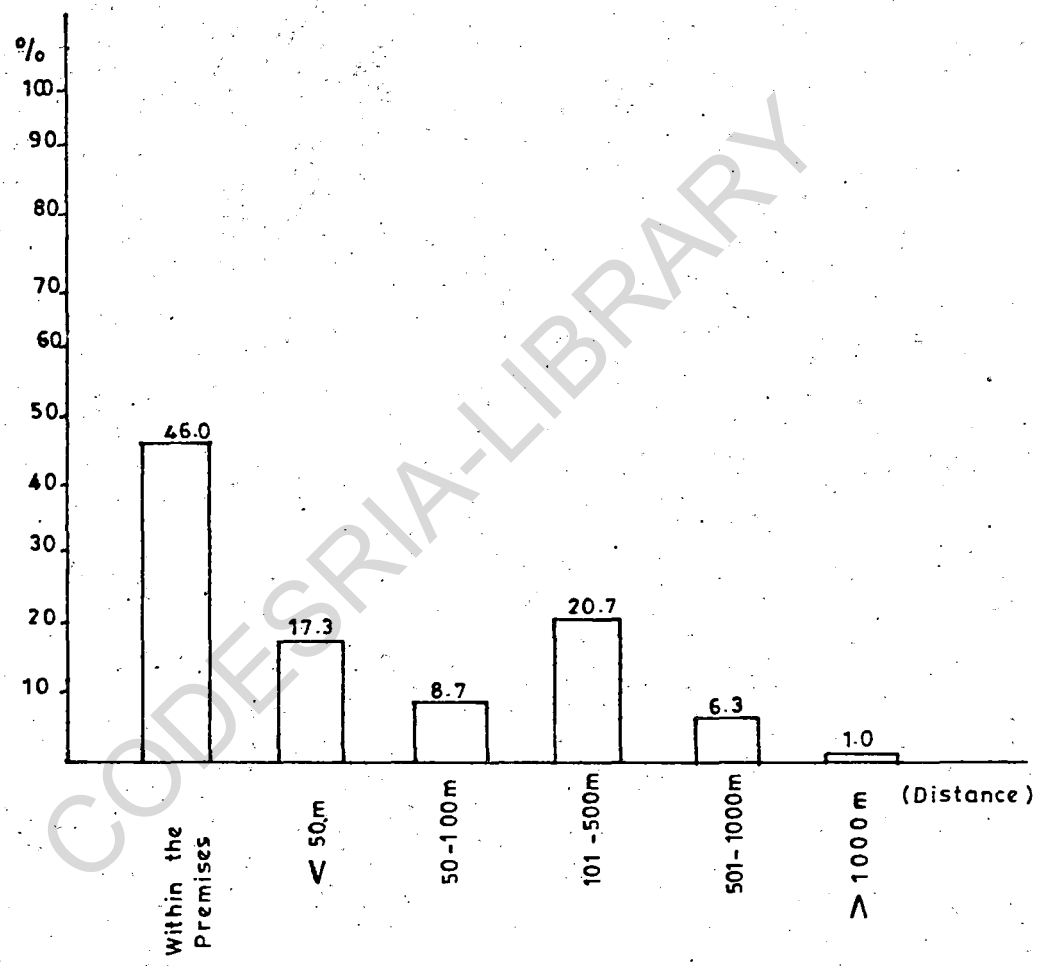
Source : Field survey July 1995

4.2 WATER PROCUREMENT CHARACTERISTICS

In searching for water, most of the residents do not go beyond 1 kilometre as indicated in Figure 4.3. This is because majority of the houses (46.0 per cent) have wells within their premises. For houses that are not in this category, residents trek less than 50 metres (17.3 per cent), 50 - 100 metres (8.7 per cent) and about half a kilometre (6.3 per cent). The reason for preference for this short distant source of water may be what is profered by Kendie (1977) that where time is short and distance to a hand pump (or better source) is great, water is likely to be collected from the nearest source regardless of safety. This is more so when it is realised that short period of time is spent procuring water as indicated in Table 4.5.

Water sourcing in the dry season is a very difficult exercise. As illustrated in Table 4.6, majority of the respondents (71.7 per cent) wake up very early in the morning to fetch water while some (16.0 per cent) even wake up at night in order to get water. Among the reasons adduced for fetching water at these periods are; the desire to get good quality water, the desire for adequate quantity of water and attempt to save time since it is expected that queues at water sources will be shorter at the periods.

Fig. 4.3. Distance to water source



Source : Fieldsurvey, 1995

Table 4.5 Time Spent on Water Procurement

Period of Time	Proportion
Less than 1 hour	67.3
1 hour - 2 hours	15.0
2 hours 1 second - 4 hours	15.7
Above 4 hours	2.0
Total	100.0

Source: Field Survey, July 1995.

Table 4.6 Period of Time Water is Fetched in the Dry Season

Period of Time	Proportion
At Night	16.0
Early in the Morning	71.7
Afternoon	0.7
Evening	0.3
Anytime	11.3
Total	100.0

Source: Field Survey, July 1995.

The situation in the raining season is different from that of the dry season. There are many sources available at this period (though more contaminated as observed by Kendie (1992). As indicated in Table 4.7, most of the respondents claimed they fetch water in the evening while a substantial proportion of them procure water anytime it is required.

Table 4.7 Period of Time Water is Fetched in the Raining Season

Period of Time	Proportion
At Night	1.0
Early in the morning	14.0
Later in the day (before noon)	3.7
Afternoon	12.0
Evening	41.7
Anytime	27.6
Total	100.0

Source: Field Survey, July 1995.

The main reason adduced for this is convenience. This is because with respect to quantity, there is no problem, since it is in the rainy season. However, they do not have their water needs met in term of quality. Furthermore, about 89.3 per cent of the respondents do not meet their water requirements in the dry season while in some cases quantity of water needed is neither met in the dry season nor in the rainy season. This is illustrated in Table 4.8. This development has adverse consequences on sanitation.

Table 4.8 Adequacy of Water

Period of Time	Proportion
Quantity met in the dry season	1.0
Quantity not met in the dry season	89.3
Quantity not met both in the dry & raining season	9.6
Total	100.0

Source: Field Survey, July 1995.

4.3 STEPS TAKEN TO AMELIORATE WATER PROBLEM AND THE ASSOCIATED COST

So far it has been realised that water situation in the fringe is unwholesome. One therefore expects the residents to profer measures and initiate programmes towards improving the unpleasant water situation in their respective communities. As indicated in Table 4.9, majority of them (69.3 per cent) embarked on sinking of wells while an insignificant proportion (1.3 per cent) could afford drilling of boreholes. A substantial proportion of 26.7 per cent could not afford to embark on any water projects. They rely on neighbours' wells or those provided by the local council where such exist.

With respect to the cost of these water projects Table 4.10 indicates that the costs of the project range from less than N500.00 to above N50,000.00. It must be said that those that cost less than N500 were projects executed as far back as 1986. Going by the current rate, those that cost above N50,000.00 are ringed wells with pumping machines. It was gathered from the field that a ringed well which is averagely suitable will cost between N20,000 and N25,000 with the current rate of prices. This explains why majority of the respondents make do with unringed wells.

Table 4.9 Steps Taken to Ameliorate Water Problem

Study Area	Sinking of water		Sinking of boreholes		Laying of pipes for tap water		None		No Idea		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Akobo	17	43.6	-	-	-	-	16	41.0	6	15.4	39	13.0
Apete	12	92.3	-	-	-	-	1	7.7	-	-	13	4.3
Isebo	40	55.6	2	2.8	-	-	30	41.7	-	-	72	24.0
Moniya	25	75.8	2	6.1	1	3.0	5	15.2	-	-	33	11.0
Mosfala	20	76.9	-	-	1	3.8	5	19.2	-	-	26	8.7
Olunloyo	25	75.8	-	-	-	-	8	24.2	-	-	33	11.0
State Hosp. Area	69	82.1	-	-	-	-	15	17.9	-	-	84	28.0
Total	208	69.3	4	1.3	2	0.7	80	26.7	6	2.0	300	100.0

Source: Field Survey, July, 1995.

Table 4.10: Cost of Water Project Stated in Table 4.9

Study Area	< 500		N500-N1,000		N1,001-N5,000		N5,001-N10,000		N10,001-N20,000		N20,001-N50,000		Above N50,000		No idea		Total	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Akobo	4	10.3	4	10.3	3	7.7	-	-	4	10.3	9	23.1	-	-	15	38.5	39	13.0
Apete	5	38.5	3	23.1	1	7.7	1	7.7	-	-	-	-	-	-	3	23.1	13	4.3
Isebo	-	-	-	-	5	6.9	5	6.9	8	11.1	8	11.1	8	11.1	38	52.8	72	24.0
Moniya	3	9.1	2	6.1	6	18.2	-	-	1	3.0	-	-	-	-	21	63.6	33	11.0
Mosfala	4	15.4	4	15.4	4	15.4	3	11.5	4	15.4	-	-	-	-	7	26.9	26	8.7
Olunloyo	7	21.2	4	12.1	3	9.1	2	6.1	1	3.0	-	-	-	-	16	48.5	33	11.0
State Hospital Area	10	11.9	10	11.9	26	31.0	3	3.6	-	-	1	1.7	1	1.2	33	39.3	84	28.0
Total	33	11.0	27	9.0	48	16.0	14	4.7	18	6.0	18	6.0	9	3.0	133	44.3	300	100.0

Source: Field Survey, July 1995

4.4 FACTORS DETERMINING CHOICE OF SOURCE OF WATER TO HOUSEHOLD

The hypothesis tested in the study is that there is a significant relationship betweeen source of water and socio-economic status of households. Five socio-economic variables were used. They include income level, educational qualification, household size, amount spent on water and distance to source of water.

In testing the hypothesis, Multiple Regression Analysis was used using the Dummy Dependent Variable approach, the Dependent variable which is source of water has 6 options namely: tap water bore-hole, ringed well, ordinary well, well with pump, and water vendor. Each of the options was run against the independent variables in turn, keeping others constant. For instance, to run tap water against the independent variables, it was given a value of 1 while other sources were given 0. The same method was repeated for other sources of water.

Correlation Analysis

Table 4.11 gives the results of the correlation analysis. It shows the association between the socio-economic variables and sources of water.

The correlation table shows that generally there is positive association between source of water and socio-economic variables like income level, household size and distance to source of water. The association with distance to source of water is the strongest. This is not surprising because water drawers will want to minimise fatigue and energy expended on drawing water. Thus, they will prefer nearby sources of water.

Table 4.11 Correlation Matrix of Socio-Economic Variables and Source of Water

	Source of water	Tap water	Borehole	Ringed well	Ordinary well	Well with pump	Water vendor	Educa-tional level	Household size	Income	Distance to source of water	Amount spent on water
Source of water	1.000	-.830	-.289	-.137	.623	.321	.	-.167	.062	.060	.154	-.159
Tap water		1.000	-.090	-.133	-.538	-.096	.	.197	-.020	.059	-.080	-.128
Bore-hole			1.000	-.078	-.315	-.056	.	.082	-.028	-.017	-.011	-.062
Ringed well				1.000	-.466	-.083	.	.078	.031	.166	-.043	-.025
Ordinary well					1.000	-.336	.	-.342	-.105	-.471	-.002	.128
Well with pump						1.000	.	.222	.237	.660	.150	-.003
Water vendor							1.000	.	.	.	.	.
amount spent on water								1.000	-.210	.285	.134	043
House-hold size									1.000	.265	-.027	-.028
Educational level										1.000	.004	-.038
Distance to source of water											1.000	.231
Income												1.000

Specifically, the choice of tap water is positively associated with the level of education and income level but not with household size, distance to soruce and amount spent on water. Furthermore, the choice of borehole is positively associated with the level of education of the household while using water from ringed will has positive association with income level, educational level and household size in that order. Its strong association with income underscores the expensiveness of the ringed well. This applies to the use of well with pump which is strongly associated with the income level of the household.

Regression Analysis

Tables 4.12 and 4.13 show the results of the regression analysis between source of water and the five socio-economic variables.

Table 4.12 Overall Regression Co-efficient

Multiple R	.30398
R Square	.09240
Adjusted R Square	.07697
Standard Error	1.12
F value	5.98640

The value of R square is very low, it indicates that the five socio-economic variables account for only 9.0 per cent of the explanation for the choice of water source by a particular

household. This means other factors other than the socio-economic variables used account for 81 per cent of the reasons for the choice of a particular source of water. The reason for this is that the issue of choice is a difficult one that cannot be solely determined by socio-economic variables. Conventional water supply source (tap water) is scarce, there is limited choice, and priority will be to get adequate water irrespective of socio-economic background.

Table 4.13 shows the significance of each of the socio-economic variables.

Table 4.13: Regression Coefficients of Individual Socio-Economic Variables for Overall Source of Water

VARIABLES	B	STANDARD ERROR	BETA	T VALUE	SIG. T
Amount spent on water	5.223938E.03	2.15471-03	.13862	2.424	.0159
Household size	-3.42552E-03	.01318	-.01575	-.260	.7951
Educational Qualification	-.20748	.05411	-.23601	-3.834	.0002
Distance to Source of Water	5.697551E-04	2.14536E-04	.15300	2.656	.0083
Income	1.055930E-04	4.79148E-05	.13643	2.204	.0283
Constant	3.79315	.19374		19.578	.0000

Though the regression co-efficients are very low, indicating that other factors not accounted for in this test are significant in determining source of water, some variables have strong influence.

The first most important variable is distance to source of water. This means the nearer the source the more probable for households to choose the source and vice-versa (Kendie, 1992).

The second most important variable is the amount spent on water. It suggests that households would prefer cheaper source of water to more expensive ones. Hence the prominence of ordinary wells rather than wells with pump.

The third most important variable is the income level of the household. This determines whether the household can afford trips to the city centre where tap water is available or sink borehole or provide for its use, a well with pump.

Further analysis was carried out concerning the significance of the socio-economic variables in determining the choice of each of the water sources. The results of the anlysis are as contained in Table 4.14 and 4.15.

Table 4.14: Regression Coefficients for each of the sources of water

Source of water	Multiple R	R Square	Adjusted R Square	Standard Error	F-value
Tap water	.25353	.06428	.04836	.33217	4.03919
Borehole	.11502	.01323	.00355	.21870	.78838
Ringed Well	.17608	.03100	.01452	.30268	1.88134
Ordinary Well	.53499	.28621	.27407	.40616	23.57743
Well with pump	.68124	.46409	.45497	.17097	50.91902

The table simply indicates that the socio-economic variables account for 46 per cent and 28 per cent explanations for the choice of well with pump or ordinary well as sources of water respectively. The percentage of explanation offered for the choice of borehole, ringed well and tap water is low meaning other factors not included in this study are also responsible.

Further analysis was carried out concerning the significance of each of the socio-economic variables in determining the choice of each of the water sources. The results are as contained in Table 4.15.

Table 4.15 indicates that the most significant socio-economic variable in determining the use of tap and borehole as sources of water is the educational background of the household. As for the choice of ringed well and well with pump, the most significant determinant is the income level. The next most important significant socio-economic variables for the choice of well with pump include distance to source of water, household size and educational level in that order. As for ordinary well the most significant socio-economic variable is the amount that households spend on water.

Table 4.15: Regression Coefficients for Socio-Economic Variables and Individual Source of Water

Water Source	Variable	B	Standard Error	Beta	T-Value	Sig. T
Tap	Amount Spent on water	-1.30070E-03	6.37166E-04	-0.11851	-2.041	0.0421
	Household Size	1.57939E-03	3.89709E-03	0.02494	0.405	0.6856
	Educational Qualification	0.05708	0.01600	0.22296	3.567	0.0004
	Distance to source of water	-8.83729E-05	6.34401E-05	-0.08148	-1.393	0.1647
	Income	-3.35030E-06	1.41688E-05	-0.01486	-0.236	0.8132
Borehole	Amount Spent on water	-4.63194E-04	4.19506E-04	-0.6583	-1.104	0.2704
	Household Size	1.603577E-04	2.56582E-03	3.9498E-03	0.062	0.9502
	Educational Qualification	0.01663	0.01054	0.10128	1.578	0.1156
	Distance to source of water	-6.43228E-06	4.17686E-05	-9.250E-03	-0.154	0.8777
	Income	-7.10675E-06	9.32868E-06	-0.04918	-0.762	0.4468
Ringed Well	Amount Spent on water	-9.88872E-05	5.80605E-04	-0.01006	-0.170	0.8649
	Household Size	-1.94377E-04	3.55114E-03	-3.428E-03	-0.055	0.9564
	Educational Qualification	9.099555E-03	0.01458	0.03969	0.624	0.5331
	Distance to source of water	-4.56488E-05	5.78085E-05	-0.04700	-0.790	0.4304
	Income	3.132290E-05	1.29111E-05	0.15519	2.426	0.0159
Ordinary Well	Amount Spent on water	1.877758E-03	7.79098E-04	0.12221	2.410	0.0166
	Household Size	-4.70668E-03	4.76518E-03	-0.05309	-0.988	0.3241
	Educational Qualification	-0.08990	0.01957	-0.25081	-4.595	0.0000
	Distance to source of water	4.534796E-06	7.75716E-05	2.9866E-03	0.058	0.9534
	Income	1.20081E-04	1.73250E-05	-0.38053	-6.931	0.0000
Well with Pump	Amount Spent on water	-9.28692E-05	3.27965E-04	-0.01244	-0.283	0.7772
	Household Size	3.591887E-03	2.00593E-03	0.08340	1.791	0.0744
	Educational Qualification	7.334454E-03	8.23638E-03	0.04212	0.890	0.3739
	Distance to source of water	1.083682E-04	3.26542E-05	0.14691	3.319	0.0010
	Income	9.585585E-05	7.29306E-06	0.62526	13.143	0.0000

CHAPTER FIVE

INSTITUTIONAL DIMENSION IN PERI-URBAN WATER SUPPLY

This chapter discusses the activities of Community Based Organisations, activities of Local Government Authorities and those of the State Water Corporation with respect to water provision.

5.1 ACTIVITIES OF COMMUNITY BASED ORGANIZATIONS AND CONSTRAINTS

Community Based Organizations have been identified as effective agents of grassroot development (CASSAD 1993). This is based on their ability to identify local needs and mobilize for supports in terms of manpower and finance to execute projects of utmost importance to their communities. However, as findings from this study indicate, not much has been done in the area of water provision. For instance, Table 5.1 indicates that 52.0 per cent of the respondents were aware of the existence of community Based Associations. It was later found out that they are mainly Landlord associations. Discussions with key officers of these associations established the fact that water provision is not their priority. Preference is given to electricity and incessant cases of robbery. As for water provision, they claimed satisfaction with existing water facilities - wells. Some of them however, intended to connect their communities with the main supply network but they are constrained by lack of fund.

Table 5.1: Existence of Community Associations

Study Area	Yes		No		Total	
	No	%	No	%	No	%
Akobo	28	71.8	11	28.2	39	13.0
Apete	9	69.2	4	30.8	13	4.3
Isebo	56	77.8	16	22.2	72	24.0
Moniya	2	6.1	31	93.9	33	11.0
Mosfala	22	84.6	4	15.4	26	8.7
Olunloyo	16	48.5	17	57.5	33	11.0
State Hospital Area	11	13.1	73	86.9	84	28.0
Total	144	48.0	156	52.0	300	100.0

Source: Field Survey, July 1995.

It must be stressed that for effective and efficient water supply, the role of the community cannot be over-emphasised. According to Faechem (1977 p. 78) "active community participation and support are fundamental and engineers with experience in developing countries will appreciate water supply, water treatment and sanitation schemes failing, owing to lack of community support".

5.2 ACTIVITIES OF LOCAL GOVERNMENT COUNCILS

The Local Government Council is the closest government to the grassroot. They undertake water projects to enhance provision of water to communities within their areas of jurisdiction. For instance, majority of the respondents (61.0 per cent) as indicated in Table 5.2,

claimed awareness of Local Government efforts at ameliorating water problems in their communities.

Table 5.2: Awareness of Local Government Efforts at Ameliorating Water Problem

Study Area	Yes		No		Total	
	No	%	No	%	No	%
Akobo	26	66.7	13	33.3	39	13.0
Apete	4	30.8	9	69.2	13	4.3
Isebo	50	69.4	22	30.6	72	24.0
Moniya	29	87.9	4	12.1	33	11.0
Mosfala	19	73.1	7	26.9	26	8.7
Olunloyo	20	60.6	13	39.4	33	11.0
State Hospital Area	35	41.7	49	58.3	84	28.0
Total	183	61.0	117	39.0	300	

Source: Field Survey, July 1995.

Information collected from the concerned Local Government Councils is summarised in Table 5.3. It can be inferred from the table that respective Local Government councils are doing their best within their financial capability to provide water for communities within their area of jurisdiction. However, inspite of their efforts, the supposed beneficiaries are not yet satisfied with the outcome of their efforts. A pointer to this is reflected in Table 5.4. It shows that majority of the respondents (57.0 per cent) were not satisfied with the water projects executed by the respective Local Government Councils.

Table 5.3 Activities of the Local Government Councils

LGA	Executed Project	Location	Year & Quantity	Cost	Future Projects	Location	Estimated Cost	Role of the Community	Constraints
Egbeda LGA	Deep wells	Throughout the wards in the LGA	1993 (30) 1994 (23) 1995 (15)	N9,000/unit N15,000/unit N30,000/unit	More deep wells	Erunmu Ayede Alugbo Owobale Oloba etc	Can't say	Provision of site for sinking of wells	Finance
Ibadan South West LGA	Deep wells	Wards within Ibadan S.W. L.G.A	1992/93 1994 1995	N8,000/unit N11,500/unit N34,130/unit	More deep wells	Within the LGA	To be determined by the prevailing market price	Monitoring of the construction of the wells within their wards	Improper (difficult) site for sinking of wells
Akinyele LGA	Deep wells Borehole	250 communities 38 communities	1990-95	N9,000-25,000/unit N70,000/unit	Dam	Ikereku	-	Provision of site for the project co-operation with LG officials	Fund

Source: Field Survey, July 1995.

This arises from poor execution. A few factors may be responsible for this. Location is a very important one as gathered from the field. Though, in their response to the question on the criteria for choice of location of water projects, officials of the Local Government Councils claimed establishment of need, evidence of self-help efforts on the part of the beneficiaries and suitability of soil as regard the water level, however, experience has shown contrary considerations.

Table 5.4 Satisfaction with Local Government Efforts

Study Area	Very Satisfied		Just Satisfied		Not Satisfied		Very Satisfied		Total	
	No	%	No	%	No	%	No	%	No	%
Akobo	10	25.6	12	30.8	17	43.6	-	-	39	13.0
Apete	1	7.7	4	30.8	8	61.5	-	-	13	4.3
Isebo	14	19.4	14	19.4	27	37.5	17	23.6	72	24.0
Moniya	6	18.2	14	42.4	5	15.2	8	24.2	33	11.0
Mosfala	2	7.7	10	38.5	9	34.6	5	19.2	26	8.7
Olunloyo	7	21.4	4	12.1	13	39.4	9	27.3	33	11.0
State Hospital Area	19	22.6	13	15.5	35	41.7	17	20.2	84	28.0
Total	59	19.7	71	23.7	114	38.0	56	18.7	300	100.0

Source: Field Survey, July 1995.

Choice of location is often a factor of loyalty to the ruling party during the civilian regime. The situation is a bit better in the military era but there is still element of favouritism whereby influential resident in a particular ward may have the project located in front of his house. Thus, the issue of centrality (christaller, 1933) minimum distance to facilities (Keeble,

Vagale et al 1971) are not observed. In this wise, cognizance is not taken of the physical characteristics of the location in respect of slope, soil properties and nearness to pollutants like toilets and sewers.

Another factor is related to the role of the community. In most cases members of the community are not involved. Their involvement, if any, does not go beyond provision of site as indicated in Table 5.3. The issue of maintenance thus becomes a problem. This is one of the reasons why most of the water projects executed by Local Government Councils have not been satisfactory to the people. It is also another reason why most of them have not met with success (Faechem, 1977). Future water situation may be worse for peri-urban residents. For instance as indicated in table 5.3, future attention will be on rural areas as most of the locations stated for future water projects are mainly rural.

5.3 ACTIVITIES OF THE STATE WATER CORPORATION

The Oyo State Water Corporation is responsible for provision of water to the inhabitants of the state. A look at the locations of the existing pumping stations and the communities served as contained in Table 5.5, reveals that peri-urban communities are not covered. Besides, as can be gleaned from the table, most of the booster stations are not in good condition which suggests that rather than embarking on extention of water supply network to areas not yet covered, efforts may be intensified to get deteriorating booster stations rehabilitated.

Table 5.5 Pumping and Booster Stations

No.	Pumping and Booster Station	Year of Construction	Areas Served	Condition
1	Agodi Pumping Station	1972	New Ife road, New Gbagi Market, Old Ife road, Iwo road, Monatan, Basorun, Odogbo Army Cantonment, Onipasan, Agugu, Bodija, Kongi, Akingbola, Agbowo, Ojoo, Olorunsogo etc.	The whole station is in a stage of disrepair. Pump No. 1 not working due to technical failures, pumps No. 2 and no. 3 are working but the shafts are outwarn and badly leaking. The generator can carry only one pump.
2	Mokola Booster Station	1973	Premier Hotel, Shobande Area, Cocacola Area, Oke-Itunu Area, Mokola, Army Barracks and Mokola Surroundings	Pump No. 1 - working. Pump No. 2 - electric motor removed, stand-by generator - not working
3	Sango Booster Station	1973	Polytechnic Road, Up Loco Sango, Down Loco Sango, Obasa, Samonda, Old Airport road, Oremeji, Oke-Itunu, Opposite Police Barrack, Sango.	Both pumps and motors are in good condition
4	Bere Booster Station	1974	Arere Hill, Sapati Hill, Catholic Mission Premises, Mapo Hill, Ososami	Pump No. 1 - working Pump No. 2 - removed, Stand-by generator - not working
5	Hammock Booster Station	1974	Reservoir No. 11, Government House and majority of the official quarters in Agodi Reservation Area (GRA)	Pump No. 1 - working Pump No. 2 - removed, Stand-by generator - not working
6	Ososami Booster Station	1974	Ososami	Both pumps and motors are in good condition

Source: Adapted from GKW Consult (1992)

The State Water Corporation is faced with myriad of problems. They range from shortage of manpower and equipment, bureaucracy, to poor revenue base. The crucial one which has adverse impact on the fringe is the poor revenue base which leads to lack of fund for extension projects.

Though, the corporation is responsible for the payment of salaries and other expenses, it is not allowed to commercialise because the status accorded water is that of a social or public good (Carathers 1977, Spencer 1985, Case and Fair 1989). In this regard, low water rate is charged consumers. This makes water a consumer surplus (Case and Fair, 1989).

It was gathered that only big consumers like manufacturing industries settle their bills regularly while domestic consumers are very difficult to handle. They cannot be penalised due to what Case and Fair (1989) regard as "Free-rider problem" whereby people can enjoy the benefits of public goods whether or not they pay for them. Since water service is usually costly and the level of its provision does not depend on whether or not any single person pays ("drop in the market problem", Case and Fair, 1989), most of the available funds are expended on water treatment and supply such that initiation of new projects is crippled by lack of fund. This makes extension of water supply to peri-urban communities a serious problem. However, with the two externally funded on-going projects, there is hope for a better situation.

5.3.1 On-Going Water Projects

The State Water Corporation, as earlier mentioned, is financially constrained with respect to execution of new water projects. However, with external aids, two projects are being executed presently. The first is the African Development Bank assisted water expansion project. This project was commenced in 1992 with the aim of expanding the existing supply network

capacity so that other areas not presently covered can be served. The second one is the world Bank assisted Rehabilitation project which is nationwide. It was commenced in 1993 with the aim of rehabilitating existing water schemes. it is hoped that on the completion of these projects, especially the first one, the lots of peri-urban residents will improve in respect of pipe-borne water supply.

CHAPTER SIX

SUMMARY OF FINDINGS AND CONCLUSION

6.1 SUMMARY OF FINDINGS

The main source of water to peri-urban residents is well. Most common are the unringed type which are often improperly located and poorly maintained. Most residents do not go beyond 1 kilometre to fetch water but they wake up very early in the morning or at night to fetch water in the dry season in order to get adequate quantity and good quality water. There were cases of water-borne diseases as claimed by a few respondents.

Testing the hypothesis, the correlation analysis shows positive relationship between household's source of water and socio-economic variables like income, household size and distance to source of water, the variable with the strongest relationship being distance to source of water. The results of the multiple regression analysis gives a very low regression coefficients which suggests that the socio-economic variables used account for only 9 per cent explanation for the choice of source of water. This means there are more important factors considered before a particular source of water is chosen.

It has also been revealed that activities of Community Based Organizations are not pronounced in peri-urban communities as far as provision of water is concerned. The most common is the Landlord Association which is pre-occupied with solving the problem of armed

robbery and that of electricity. A few that are interested in water projects claimed finance as their major constraint.

Local Government Councils are very active in the provision of water especially sinking of wells for communities in their areas of jurisdiction. However, most of the residents are not satisfied due to poor project implementation and lack of proper arrangement for maintenance.

The State Water Corporation has no impact in most peri-urban communities. Most residents are not satisfied with this. On closer examination, it was revealed that the Water Corporation is also bedevilled with 4 myriad of problems which include inadequacy of skilled manpower, civil service bureaucracy which creates problem in the area of decision making, erratic power supply from NEP Plc, high cost of diesel which makes it difficult to use generating plants, depreciation of treatment plants and general maintenance problems.

However, with external assistance, there are two on-going projects aimed at improving the water supply situation in the city. These are the African Development Bank assisted water expansion project and the World Bank assisted water rehabilitation scheme.

6.2 IMPLICATIONS FOR PLANNING

It is one of the prime principles of physical planning to ensure the convenience of the target population in any planning exercise especially settlement planning. It also strives to ensure economy and safety in the various activities that are carried out. As can be learnt from the findings of this study, all these principles have not been adhered to.

For instance, the fact that most peri-urban communities lack the conventional tap water provision points to lack of efficient planning. Otherwise, provisions would have been made at the planning stage for the initial resident population while projections would have been made to take care of the future population. All these would have been based on adequate statistics in respect of reliable population figure, quantity of water consumed per day etc.

Apart from the afore-mentioned, the fact that wells provided by the respective local government councils are not satisfactory reflects lack of adherence to physical planning principles. This is in respect of the number provided per a particular population and location with respect to accessibility and site suitability. Physical planning has standards on facility/population ratio, minimum distance to households and appropriate location with respect to comprehensive site analysis. Locating wells on lower part of the topography and very close to toilets and sewage tanks constitutes total negation of planning principles. Furthermore, the fact that the communities are not often carried along means that ideal of planning in respect of "planning with people" is never observed.

At this stage of development, the Local Government Council and the State Water Corporation are expected to have master plans on expansion of water schemes in phases to serve more population. The fact that this is far from the case makes nonsense of planning ideals.

Furthermore, the Oyo State Water Corporation has no physical planner in its employ while the Local Government Councils that have physical planners in their respective local planning authorities never request for their professional advice in the area of executing water projects.

Considering the foregoing, it has been established that the planners have a vital role in utility provision. This will be given credence by the implementation of the new Urban and Regional Planning Law of 1992.

6.3 RECOMMENDATIONS

having ascertained the situation of peri-urban water characteristics and having estabished the need for improvement, recommendations are hereby made and directed at the State Water Corporation, the Local Government Council and the community.

6.3.1 The Oyo State Water Corporation

The long term measure to be taken is for government to grant the State Water Corporation autonomy as a parastatal. This will enhance rapid decision making and speed up the rate at which problems are analysed and solved. Furthermore, as part of the long term measure, the water corporation should be given the freedom to charge economic rates (especially for manufacturing companies), if this will enhance their efficiency and effectiveness. In addition, a blue print or master plan should be prepared to guide and give directions to decisions relevant to water provision. Based on the present situation, long term projections should be

made as to future water requirements of the people while expansion of supply network spatially should be phased. There is now the need for the State Water Corporation to employ professional planners who will be responsible for decision making with respect to spatial expansion of water schemes.

As a short term measure, all the existing water schemes should be rehabilitated in the on-going rehabilitation scheme while adequate measures should be taken to ensure that maintenance is given consideration. Moreover more laboratories should be provided in addition to the central one at Asejire. This will ensure optimal utilization of staff and chemicals. All these will ensure improvement in the quality of water supplied to the people.

6.3.2 The Local Government Councils

The Local Government Councils are already doing their best to ensure that people have access to potable water. The problem they have is that of poor implementation.

As a long term measure, there should be created a section in the department of works. This section should be responsible for provision of utilities. The section should have as staff, professional town planners and engineers. Their working together will enhance efficient spatial distribution of water projects. Moreover provision of water projects should be done by direct labour. This will reduce cost and enhance monitoring. The maintenance aspect will be taken care of by the staff of the utilities section of the Department of Works.

As a short term measure, an inventory of all the existing water projects should be taken. Their present condition should be assessed and those in need of repairs should be rehabilitated while regular maintenance should be observed. To enhance this, the staff of the utilities section should ensure regular monitoring of all the water projects within the jurisdiction of the local government council. All these have financial implication. A way out is to execute water projects in such a way that the volume of water supplied by these water projects will be adequate such that user charges can be introduced. If these projects are attractive and produce adequate quantity for the need of the people, arrangement can be made whereby Local government officials are stationed at such project sites to collect charges from the users. This will further improve the revenue situation of the Local Councils.

6.3.3 The Community

The prevailing economic situation is so unfavourable that people can no longer rely on government for everything. People have to help themselves. This is the essence of establishing Community Based Organizations which have been identified as an effective instrument of grassroot development.

Community Based Organizations should be established to undertake special projects that will serve the need of the people in the community. These include water provision. Individual households can be levied for the provision of standard wells, boreholes or even tap water.

Token fee can then be charged afterwards to take care of maintenance and at times project replication.

Furthermore, community members must ensure that water projects provided either by the local councils or the state government are judiciously utilized and well maintained to enhance longevity.

6.3.4 General

The problem of poor provision of utilities has been in exitence for quite some time. it is compounded by the fact that actors in urban and rural development work independently without any strong inter-relationship with utility providing agencies. The Water Corporation, National Electric Power Plc, Ministry of Lands and Housing, Ministry of Works, Housing Corporations, Local Planning Authorities, carry out their activities which inter-relate in space and which are inter-dependent without proper co-ordination.

A way out of this is to create a forum that will enhance cross-fertilization of ideas and co-ordination of activities. This aspect has already been taken care of by the new Urban and Regional Planning Law of 1992. The law provides for the establishment of an Urban and Regional Planning Board in the State which will have as its members representatives of all the relevant ministries, parastatals and non-governmental organizations whose activities bear very much on urban and regional development. In this wise, it is pertinent now to solicit for the implementation of the law.

Besides, the housing corporation, urban development boards, and other planning authorities and agencies should ensure that before physical development is carried out on any scheme provision of utilities like water is ensured. This can be achieved by carrying the relevant agencies like the water corporation along.

6.4 CONCLUSION

Water is a necessity without which man can hardly survive. The findings of this study have established the fact that the situation in the peri-urban communities is quite unwholesome. The fundamental causative factor is the fact that various actors in urban development have not been working in a co-ordinated manner. In settlement planning, it must be acknowledged that various elements are inter-dependent. Thus an attempt to treat one without consideration for others will lead to chaos - ineffectiveness and inefficiency.

Water is a prime human need. the fact that settlements are allowed to develop and grow without ensuring that present and future water needs will be met is a great omission of the actors in this venture of settlement planning and development. The unpleasant consequences are quite enormous. In fact, it will be realised in the final analysis that the cost of providing water for the people at the initial state is much less than the cost of arresting the confusion and restoring the losses which are the consequences of non-provision.

In the light of this, it is essential that adequate attention is paid to the issue of water provision. A right step towards that is by according due consideration to the recommended measures.

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APPENDIX I

PERI-URBAN WATER SITUATION IN IBADAN

HOUSEHOLD QUESTIONNAIRE

Serial No:_____ (001 - 300)

1. Community:
   (1) Akobo
   (2) Apete
   (3) Isebo
   (4) Moniya
   (5) Mosfala
   (6) Olunloyo
   (7) State Hospital area (Ring Road)

A. SOCIO-ECONOMIC

2. Sex: (1) Male ( )
   (2) Female ( )

3. Age: _____ years

4. Marital Status:
   (1) Single ( )
   (2) Married ( )
   (3) Divorced/Separated ( )
   (4) Widowed ( )

5. Religion:
   (1) Muslim ( )
   (2) Christian ( )
   (3) Traditional ( )
   (4) Others (specify) _____

6. Nationality:
   (1) Nigerian native ( )
   (2) Nigerian non-native ( )
   (3) Foreigner ( )

7. Highest educational qualification

(1)	No education	( )
(2)	Primary education	( )
(3)	Adult education	( )
(4)	Secondary/Technical education	( )
(5)	Post secondary/University education	( )

8. (a) Household size: _____ (01 - 99)

(b) No of households in the house: _____ (01 - 99)

9. Occupation: _____

10. Income per month: ₦_____

B. WATER

11. Source(s) of water:

(1)	Tap	( )
(2)	Boreholes	( )
(3)	Wells	( )
(4)	Water vendors	( )
(5)	Ponds	( )
(6)	Rain harvesting	( )
(7)	Nearby stream	( )
(8)	Others (specify) _____	

_____

12. Most regular source(s) of water:

(1)	Tap	( )	(5)	Ponds	( )
(2)	Boreholes	( )	(6)	Rain harvesting	( )
(3)	Wells	( )	(7)	Nearby stream	( )
(4)	Water vendor	( )	(8)	Others (specify)____	

_____

13. Which of the sources above is/are the most regular and reliable?

_____

14. What is the average distance between the source(s) and your residence?

_____

15. What is the average time spent daily on water collection?

_____

16. What period of the day do you normally fetch water?

(1) In the night ( )
(2) Very early in the morning ( )
(3) Later in the day before noon ( )
(4) In the afternoon ( )
(5) In the evening ( )

17. Why do you prefer fetching water in this period of the day?

(1) To get good quality water ( )
(2) To safe time because of low patronage at the time ( )
(3) To get enough quantity of water ( )
(4) It is the most convenient time ( )
(5) Others (specify) _____

18. On the average, how much do you spend daily on water procurement?

_____

19. Do you consider fetching water a times wasting exercise?

Yes ( ) No ( )

20. Do you suffer any physical body pains as a result of fetching water?

Yes ( ) No ( )

21. What are the complaints about the water fetched?

(1) Water not clear ( )
(2) Water has sediments ( )
(3) Water has bad taste ( )
(4) Water has bad odour ( )
(5) None ( )
(6) Others (specify)_____

22. How many members of your household have been treated for the following diseases in the last six month?

(1) Diarrhea _____
(2) Dysentery _____
(3) Typhoid _____
(4) Cholera _____
(5) Guinea worm _____

23. Please state quantity of water needs per day and the quantity met?

Quantity needed _____ buckets

Quantity met _____ buckets

24. If quantity met is inadequate, how do you cope?

_____

25. What steps have you taken to ameliorate water problems in this neighbourhood?

(1) Sinking of wells: Cost ₦_____
(2) Sinking of boreholes: Cost ₦_____
(3) Laying of pipes to connect tap water supply: Cost ₦_____
(4) Rain harvesting: Cost ₦_____

26. Please indicate the source(s) of water for the activities in the table below:

Activity	Water Source	Adequate/Not adequate
(1) Drinking		
(2) Cooking		
(3) Washing of Clothes		
(4) Bathing		
(5) Flushing of toilets		
(6) Others (specify)		

27. What constraints do you have as an individual in solving water problems?

_____

_____

C. COMMUNAL ACTIVITIES

28. Is there a Community Based Organization in the neighbourhood?

Yes ( ) No ( )

29. If Yes, are you an active member? Yes ( ) No ( )

30. If Yes, how many projects of relevance to water suply have been implemented? State the projects as indicated in the table below:

Project	Period Initiated	State	Cost	Constraints

31. What are the constraints militating against the performance of the association?

_____

_____

_____

D. PERCEPTION OF GOVERNMENTS' EFFORTS

32. Are you aware of any efforts by the state government to alleviate water problems in this community?

Yes ( ) No ( )

33. If Yes, what is the nature of the efforts?

_____

_____

_____

34. How satisfactory are the efforts to you?

(1) Very satisfactory ( )
(2) Just satisfactory ( )
(3) Not satisfactory ( )
(4) Very unsatisfactory ( )

5. Are you awar of any local government efforts to alleviate water problems in this community?

Yes ( ) No ( )

36. If Yes, what is the nature of the efforts?

_____

_____

_____

37. How satisfactory are the efforts to you?

(1) Very satisfactory ( )
(2) Just satisfactory ( )
(3) Not satisfactory ( )
(4) Very unsatisfactory ( )

38. Suggestions on how water problems can be ameliorated in this community?

APPENDIX II

PERI-URBAN WATER SITUATION

LOCAL GOVERNMENT OFFICIALS

1. Official designation:

2. Local Government Area:

3. Water projects executed in the past 5 years:

Project	Location	Year Executed	Cost

4. Criteria used for choice of location of water projects

5. Procedure for planning and implementation of water projects

6. Role of the community in water project planning and implementation

7. Efforts made to get areas without tap water linked with the existing supply main

. Future water projects to be implemented

Project	Location	Cost

). Constraints against efforts to improve water situation

APPENDIX III

PERI-URBAN WATER SITUATION IN IBADAN

OYO STATE WATER CORPORATION

1. Official designation:_____

2. Inventory of Resources

Dept/Unit	Manpower	Shortfall	Equipments	Shortfall

3. Pumping stations and locations

Name	Location	Capacity	Year of Construction	Present Condition

4. Estimated population currently being served?_____

. Programmes or plans to connect areas outside the existing network capacity?

Project	Year Started/to start	Year to be completed	Cost	Existing status	Estimated Population to serve

6. Source of funds for projects:_____

7. Role of the community:_____

8. What are the major constraints?_____

9. Suggestions for improvement:

_____
_____
_____
_____