



Providing water at affordable cost in developing economies

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Introduction

Water supply in Oyo State is currently below any acceptable standard. Records from the Water Corporation indicate that 233,485m³ are generated daily by all water supply schemes but only about 55,080m³ are actually supplied daily. Statistics presented below show that statewide only 17.45% of households have piped water supply, but in Ibadan municipality 55% of households are linked to piped water supply. Thus over 56% of households in Oyo State have to obtain their water from unreliable sources. Problems identified include:

- Inadequate Infrastructure for water treatment and distribution
- Aging and corroded pipe network, booster stations, pumps, treatment plants
- Unplanned extensions and illegal connections
- Non-availability of maintenance and repair services
- Poor staffing and capacity building in the water supply sector.

Financing an efficient water supply scheme is often very cost intensive. According to Federal Ministry of Water Resources (1992) estimates, the minimum price for the development of piped water supply is about 100USD per capita. Applying this to Oyo State, this would imply that the state will require a total of 556.02 million USD for full development by the year 2010 or 461.49 million USD for development of the shortfall, if the existing 17.4% serviced households are deducted. It is doubtless that such funds are not available to the State, requiring that efficient and practicable solutions be developed to achieve the goal of water for all.

Water Resources Development

Existing total reservoir capacity in Oyo State is 630 million m³, of which the Ikerre Gorge Multi-Purpose Dam alone contributes 565 million m³. About 75% of the total volume of 55,080m³/d supplied in the state is consumed within the Ibadan municipality (Records of Oyo State Water Corporation). Oyo State is essentially rural, lacking in basic infrastructure. Surface water development is often expensive in such rural settings, making groundwater, where available, the obvious choice for public water supply. Over 60% of

the boreholes under the national borehole programme in Oyo State have yields of 0 – 5 m³/h, 22% have yields of 5 – 10m³/h while 18% have yields above 10m³/h. Thus groundwater could be successfully developed for rural supply.

The population estimates were based on an annual growth rate of 2.5% and a 2.5% shift in distribution between rural and urban populations was also assumed from year 2000 to 2010. Row 3 assumes fixed rate water demand based on current official planning levels of 301/p/d and 601/p/d, for rural and urban areas respectively. Row 4 assumes a doubling to 601/p/d and 1201/p/d for rural and urban areas respectively for the years 2005 onward. Assuming normal growth in demand due to improvement in general conditions and standards of living, the water demand will rise to 500,415m³/d by the year 2010. A further 2% increase to care for a sudden growth in industrial activities by the year 2010 will bring total water need in the state to 600,498m³/d. The existing reservoir capacity of about 60 million m³ in Oyo State and the large volume of available water resources mean that the state has sufficient water to meet its present and future developmental needs, but requires adequate plans and strategies to ensure proper harnessing. There must be equitable distribution among the competing demand groups – i.e. domestic, industrial and agricultural.

Management Options

Resources development

From above, one can deduce that most rural households in Oyo State obtain their supply from untreated sources (i.e. springs, rainwater, ponds, etc). Simple impoundment, treatment and protection techniques would make such sources suitable for use at relatively cheap cost. Rainwater harvesting is a viable supplement that can minimise the long journey to the stream in the rainy season.

In small peri-urban communities groundwater development via large diameter wells with overhead tank facilities and yard or public taps would achieve the water supply goal quicker and cheaper than any piped system would do.

In the rural areas groundwater extraction via improved dug-wells equipped with hand-pumps should be the best choice. It should focus on full community participation, especially for operation and maintenance, and draw experience from various WATSAN projects, both within and outside the State.

TABLE 1: Water Supply Situation and Distribution of Industries in Oyo State

S/N	Local Government Area	% Household With Well	% Household With Pipewater	%Household Others
1	Afijio	40	27	33
2	Akinyele	52	04	44
3	Atiba	32	26	42
4	Atisho	29	21	540
5	Egbeda	31	32	37
6	Ibadan North	35	53	12
7	Ibadan Northeast	32	52	16
8	Ibadan Northwest	18	60	12
9	Ibadan Southeast	21	51	28
10	Ibadan Southwest	20	62	18
11	Ibarapa	30	05	65
12	Barapa N	18	09	73
13	Ido	17	02	81
14	Ifedapo	28	12	60
15	Ifelaju	22	01	77
16	Irepo	22	19	59
17	Iseyin	18	12	70
18	Itesiwaju	12	02	80
19	Iwajowa	12	01	87
20	Olorunsogo	23	05	72
21	Kajola	24	02	74
22	Lagelu	33	12	55
23	Ogbomosho North	33	14	53
24	Ogbomosho South	35	16	49
25	Ogo Oluwa	21	01	78
26	Oluyole	22	08	70
27	Ona Ara	23	01	76
28	Oorelope	19	02	79
29	Orire	24	18	58
30	Oyo East	34	22	44
31	Oyo West	32	18	50
32	Saki Eat	22	02	76
33	Surulere	25	03	72
	Mean Values	26.5	17.4	56.1

(Source: Oyo State Environmental Action Plan Report, 1997)

In the more developed urban areas, where people are able and willing to pay for such services, piped water supply to individual households should be given priority. Here a regular cost/performance/satisfaction analysis is a must.

Operation and management (O & M)

The O & M style adopted affects the success or failure of any water supply scheme. Thus Oyo State should adopt separate strategies for resource development and supply due to the different socio-economic groupings in the state and their different developmental levels.

Areas with piped water supply should have an optimum pipe network management with appropriate leak detection and monitoring systems. Sufficient funding for proper maintenance, repair and replacement of defective equipment must be provided. An efficient costing and charging of water rates, adequate machinery for billing, bill distribution and collection, and for network policing to detect illegal connections and apprehend illegal water users must be put in place. Personnel training and welfare is a must for guaranteed effectiveness.

At the rural and peri-urban level emphasis must be on community participation in the operation and maintenance of installed facilities. An elected community water caretaker

committee should deal with matters relating to operation, repairs, maintenance and collection of water rates from users.

Further strategy for action

Oyo State has enough water of potable quality sufficient to meet its socio-economic requirements in the next decade. But there is need to develop proper strategies to guarantee the constancy and adequacy of supplies to all users. It must be borne in mind that surface water development via dams, beside its cost implications, also has some negative impact on the environment, especially with regard to public health hazard from the reservoir area, and permanent changes to the local hydrology. Groundwater of good quality is widely available in the State and adequate facilities for household use can be developed. Though slim boreholes are fast to construct and also provide clean water, they are costly. But improved dug wells, though slower to construct, are much cheaper, last longer and are easier to maintain by the rural populace. Such wells should be equipped with heavy covers and two or three hand pumps per well to improve hygiene standards. Going by these suggestions, the following projections can be made for capital requirement for water supply in Oyo State for the year 2005.

Financial Estimates for Water Supply in Oyo State (Alternative Approach I)

Assumptions

1. A rural population of 2,567,566
2. An urban population of 2,323,035 divided in 60:40 ratio between peri-urban and urban
 Peri-urban = 1,393,821 Urban = 929,214
3. UNICEF Cost estimates for water projects
 Rural – 40 USD per capita (wells/boreholes with hand pumps)
 Peri-urban – 100 USD per capita (mechanised boreholes, overhead tanks, stand pipes)
 Urban – 200 USD per capita (treatment plant, overhead tanks, piping, house connections)

Capital requirement

1. Rural: 40 x 2,567,566 = 102,702,640 USD
2. Peri-Urban: 100 X 1,393,821 = 139,382,100 USD
3. Urban: 200 x 929,214 = 185,842,800 USD
4. TOTAL 427,927,540 USD

Existing levels of achievement were not taken into consideration in these estimates. A more pragmatic approach is to estimate the cost of shortfall in supply based on the assumed average cost of 100 USD per capita as suggested by the Federal Ministry of Water Resources.

At the present supply level of 55,080,2671/d, and projected total demand of 216,409,0801/d by the year 2005, there would be a shortfall of 161,328,813 1/d that must be

Table 2: Estimates of water demand in Oyo state from 1995 to 2010

Pop. Distribution	Rural: Urban 1995	Rural: Urban 2000	Rural: Urban 2005	Rural: Urban 2010
1 Total Population	3,783,639	4,301,659	4,890,601	5,560,174
2 a. Total Rural Pop	2,081,001	2,365,912	2,567,566	2,780,087
b. Total Urban Pop.	1,703,638	1,935,747	2,323,035	2,780,087
3 Fixed Rate Water Demand				
a. Rural (30l/p/d)	62,430,030	70,977,360	77,026,980	83,402,610
b. Urban (60l/p/d)	102,158,280	116,144,820	139,383,100	166,805,220
c. Total (1/d)	164,588,310	187,122,180	216,409,080	250,207,830
4 Variable Rate Demand	Rural 30 Urban 60	Rural 30 Urban 60	Rural 60 Urban 120	Rural 60 Urban 120
a. Rural (1/d)	62,430,030	70,977,360	154,053,960	166,805,220
b. Urban (1/d)	102,158,280	116,144,820	278,764,200	333,610,440
c. Total (1/d)	164,588,310	187,122,180	432,818,160	500,415,660

financed to bridge the shortfall. Allowing an average of 45 l/p/d for the whole state, this would imply an unserved population of 3,585,085, or about 73% of the total for the year 2005. At the rate of 100 USD per capita about 358 million USD to finance the shortfall in supply is needed.

A full conversion and supply of the present generation capacity of 233,920,800 l/d is sufficient to meet projected total demand up to the year 2005, at an even higher consumption average of 90 l/p/d. The cost implication of this alternative needs to be fully investigated, but it would be more attractive than developing new schemes. A decidedly better and more realistic approach, especially for the rural and peri-urban areas is to assume the following:

Financial Estimates for Water Supply in Oyo State (Preferred Approach)

Rural Area

An improved dug well with hand-pumps at a total cost of about USD 500 to serve 5 households of ten persons each. This implies 50 persons per well and a per capita development cost of USD 10.

Peri-Urban Area

A mechanized improved dug well with overhead tank and piping with public taps at a total cost of about USD 1000 to serve also 5 household of 10 persons each, and yielding a per capita cost of USD 20.

Based on expected population figures earlier calculated for the year 2005, this would imply a cost of:

USD 25,675,660 for rural water
27,876,420 for peri-urban water

USD 53,552,080

Some Cost-Benefit Implications of the Proposed Preferred Approach

The cost-benefit implications of this approach, as a measure

of the acceptability or otherwise, are presented here.

- Pay Less but Serve More: Wider Service Coverage is Achieved at a Lower Cost.
- Improved Affordability for All Social Levels, thus Improved Access to Wholesome Water for All.
- Reduced Time Spent Getting Water: More Time Available For Other Important Household Chores.
- Enhanced Health Benefits: Better Quality of Life
- Improved School Attendance for the Girl-Child: Better Future For the Society

Conclusion

The goal of water for all remains elusive. This study has shown that improvements can be made when appropriate measures are taken and strictly adhered to. Cost calculations undertaken in the study show that per capita expenditure in bringing wholesome water to the people could be brought to as low as USD 10 and USD 20 for rural and peri-urban dwellers respectively. When this cost is spread over an amortisation period of as low as 5 years, the average annual cost of provision of water amounts to USD 2 and USD 4 respectively, an amount that is readily affordable by even the poorest of the poor. This makes the approach quite sustainable and worthy of adoption.

References

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