

URBAN POOR'S WILLINGNESS TO PAY FOR WATER AND SANITATION SERVICES - CHETAN VAIDYA**Summary**

There has not been any rigorous analysis on the issue of cost recovery for basic urban services and poor in India. This paper presents findings of a study on Willingness To Pay (WTP) for water and sanitation in Baroda with special reference to the urban poor.

Percentage annual municipal and non-municipal expenditure on water to income for the poor in Baroda is less than the corresponding figure for non-poor households. However, if opportunity cost of time for water collection is included in total expenditure, then it works out to be 2% of income which is higher than the corresponding figure for non-poor households. A major proportion of the urban poor households are WTP for improved water system. The urban poor's WTP for water connection is three times the present municipal charges. Expressed WTP for improved sanitation service is low.

A number of community based low cost infrastructure finance systems have been adopted by the low income households. It is necessary to explore the possibility of replicating them.

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URBAN POOR'S WILLINGNESS TO PAY FOR WATER AND SANITATION SERVICES
: A CASE STUDY

- CHETAN VAIDYA

Inadequate access of basic services to the poor is one of the major problems of urban India. The Government has undertaken a number of initiatives to provide basic services to the poor. However, it is observed that the public sector agencies have not been able to provide the services. With the introduction of economic reforms in our country, there is a demand for improving cost recovery, increase in service charges and privatization in urban basic services. It is felt that these might price the poor out of the delivery system.

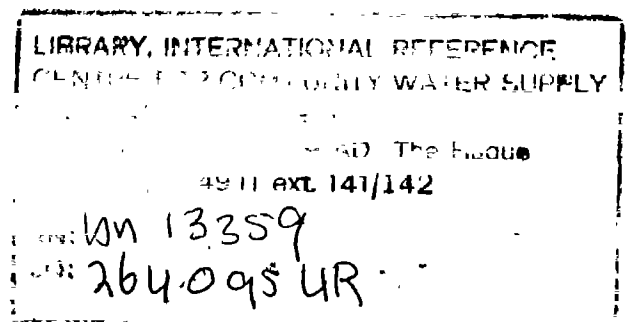
Many governments fear that fully recovering costs will hurt the poor, yet increasing prices to enable cost recovery in the delivery of services may actually help the poor (WDR, 1994). They often pay much higher prices per unit of water because they are not connected to public service networks that have lower unit costs, and because they do not benefit from subsidies to users of the public system - usually the better-off. Expansion of access benefits the poor by allowing them to rely on less costly sources of water.

The effect has been demonstrated most convincingly for water, where the concerns for the poor are properly strong. In the Brazilian city of Grande Victoria, Espirito Santo state, the willingness to pay for new water connections in 1993 was four times the cost of providing the service, while the willingness to pay for sewage collection and treatment was 2.3 times its cost. Without treatment before disposal, the willingness to pay falls to only 1.4 times the cost because untreated sewage creates health problems and reduces the recreational value of the waters into which it is discharged (WDR, 1994).

The willingness to pay for water is high for good reason. For the poor, easier access to water can free up time that can be used to pursue income-earning activities. In rural Pakistan, women with access to improved water supply spend nearly 1.5 fewer hours a day fetching water than do women without this access. Such savings are reflected in the value users attach to the services (ALTAF, 1993).

There has not been any rigorous analysis on the issue of cost recovery for the urban services and poor in India. The past policies for investment in water have failed to effectively capture the preferences and willingness to pay of the poor. This is a difficult task. However, recent methodological developments which use contingent valuation methods and measure compensating investments to and willingness to pay for such services, provide possibilities to analyze this issue (World Bank, 1993).

A study on willingness to pay (WTP) for water and sanitation was recently completed for Baroda (Vaidya, 1995). This paper has presented findings of the study with special reference to the urban poor.



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BACKGROUND AND METHODOLOGY

Baroda is a major metropolitan city in Gujarat with a population of one million in 1991. Baroda Municipal Corporation (BMC) has just completed a major water supply project. HUDCO has given a loan of Rs. 48 crores for this project. BMC has suggested revisions in water tariffs. In this background, HSMI sponsored the study to determine willingness to pay of households for water and sanitation.

The research team used both, indirect (revealed preference) and direct (contingent valuation) methods to study how households make their choices about water and sanitation services. The indirect approach used discrete choice technique and derived estimates of actual choices that households made. The direct approach involved asking people who did not have improved water source, whether they would use a new source if it was provided under specified conditions and how they would be willing to pay for access to different kinds of improved water systems. Survey was carried out in two phases.

The analysis of the existing situation was based on household survey (Phase I) through stratified sample based on zone and type of house. It was focussed on current service levels, expenditure on services and main preferences for improvements. The total sample size was of 550 households. About 17% of these households were urban poor (household income below Rs.1500 per month).

Based on the current levels and preferences identified in Phase I, hypothetical choices and related price ranges were worked out for each major user category. Using the approach of contingent valuation, the household responses to these hypothetical choices. A more indirect method using the revealed preferences of households through the actual choices and investments made by households in situations where no piped water is available and in others where it is not adequate. It covered aspects related to nature of capital investments made and the operation and maintenance costs incurred by the households. Contingent valuation studies for willingness to pay and compensating investments by households information was collected as part of Household Survey Phase II. The survey was conducted for a carefully chosen 200 sub-set households of original sample.

WATER SUPPLY

Source of Water

Existing sources of water reflects the condition of supply level. Many households in the city are forced to use more than one source. House connection is shared by more than one household, particularly in low income areas. Households with house connection also have to supplement their supply by using public source of water. Information was collected regarding different types of water sources.

The difference of access to water among urban poor and non-poor households is most evident in source of water supply (Table 1). Only 6% of urban poor households have access to individual house connections whereas, the corresponding figure for non-poor group is as high

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as 48%. The proportion of urban poor households using public source is 50% and this figure is only 6% for non-poor households. Most urban poor households have to use public or shared sources of water supply.

Table 1
Percentage Distribution of Households by Water Source - Baroda

Source	Urban Poor	Others	Total
1. House Connection			
a. Individual	6.2	47.7	40.8
b. Shared	31.3	11.1	14.5
2. Bore/Tubewell			
a. Municipal connection & bore/tubewell	-	19.3	16.0
b. Private bore/tubewell	-	3.7	3.0
3. Public Source			
a. House connection & public source	12.5	12.7	12.9
b. Handpump/stand post	50.0	5.5	12.9
	100.00	100.0	100.0

Source for Tables 1 to 15 : Vaidya, 1995

Satisfaction Level and Time Spent

Households were asked to express their level of satisfaction with municipal house connection water supply. Only 18% of households are satisfied with the existing system (Table 2). Percentage distribution of satisfied households by income groups, reveals in non-poor group, it is more than 23%. As expected, satisfaction level is very low among urban poor households (13%).

It is pertinent to note here that as many as 33% of households are spending time for collection of water. On an average, they spend about one hour everyday. Among urban poor, as many as 59% of households have to spend time for obtaining of water.



Table 2

Distribution of Households by Income, Time Spent on Water Collection and Satisfaction with Existing Water Supply - Baroda

Monthly Income Group (Rs.)	% To Total	% Of Households (In Each Class)	
		Satisfied	Spending Time On Water Collection
Upto 1500	17	12.5	59.3
1501	83	23.0	27.7
Total	100	18.0	33.3

Expenditure

Households are making expenditure on municipal water supply through one time connection charge and annual water tax/charge. Average connection charge and water charge among all households are Rs. 99 and Rs. 82 respectively (Table 3). Capital charge has been annualized assuming 15% interest and 10 years repayment period. Total annualized charge works out to be Rs. 102 per household. It is Rs. 43 per household, per year for urban and the corresponding figure for non-poor households is about three times this figure (Rs. 123).

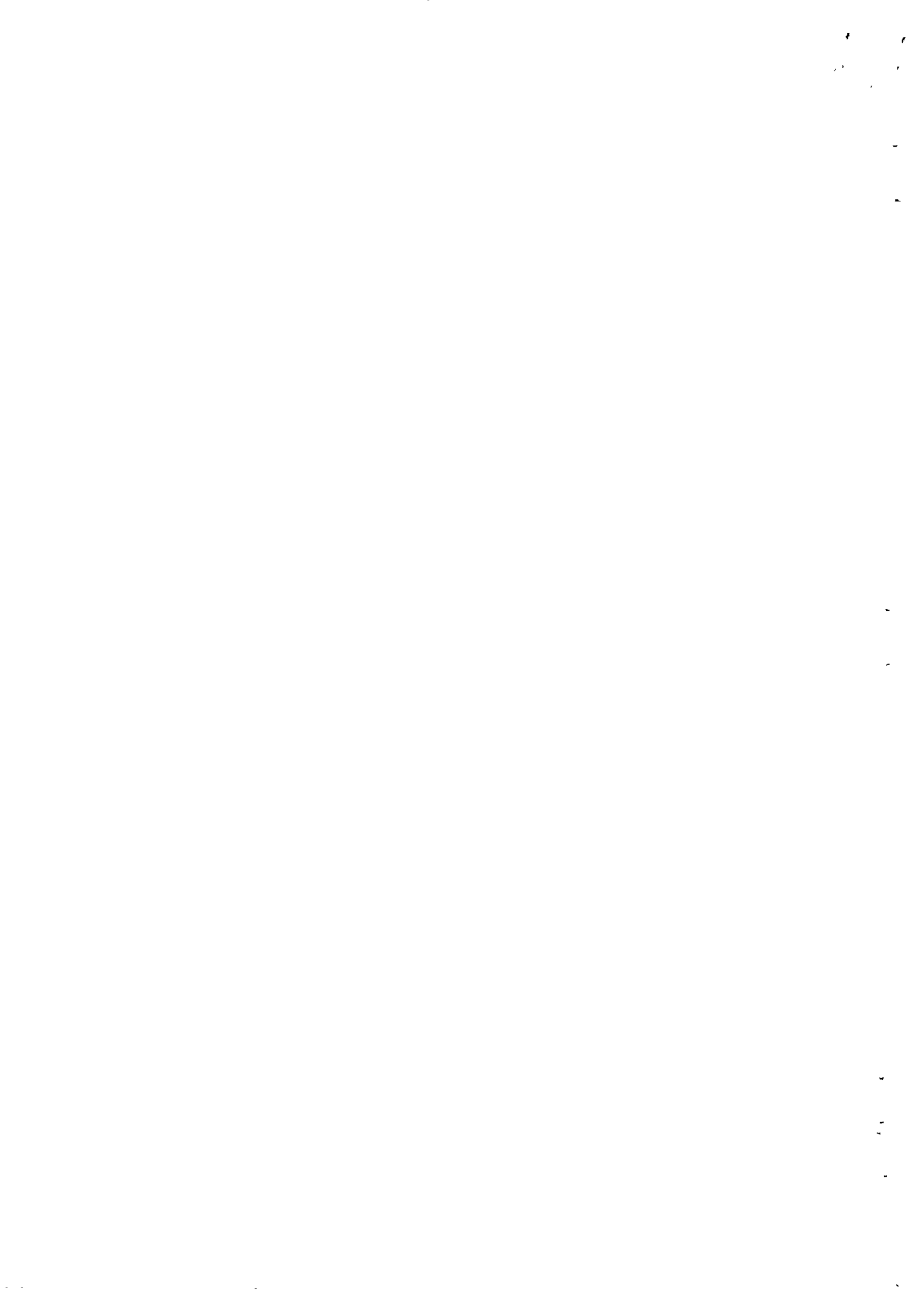
Table 3

Household Expenditure on Municipal Water by Household Income Groups - Baroda

Monthly Household Income Groups (Rs.)	% Households who are making expenditure		Capital cost	O & M (a)	Annualized Capital** (b)	Total annual (a) + (b)
	Connection charge (capital)	Water tax/charge (O & M)				
Upto 1500	18.8	43.8	37.3	35.4	7.5	42.9
1501	37.3	86.7	158.8	91.2	31.8	123.0
Total	56.1	130.5	196.1	126.6	39.3	165.9

* Among all households

** @ 15% interest rate with 10 years repayment period.



Non-municipal expenditure on water has been analyzed in terms of capital and maintenance cost. As many as 49% of total households have made capital expenditure on bore, handpump, filter and underground storage (Table 4). Most of the urban poor households have not made expenditure on non-municipal water system. Annual expenditure per household on non-municipal water for urban poor is Rs. 9 only whereas, it is Rs. 523 for non-poor households. Average total annual expenditure is Rs. 437 per household.

Table 4
Non-municipal expenditure on water by household income - Baroda

Monthly Income Household Group (Rs.)	% HH who have made expenditure		Expenditure per household* (Rs.)			
	Capital	O & M	Capital	Annual O & M	Annualized Capital**	Total Amount
Upto 1500	9.3	-	46.9	-	9.4	9.4
1500 +	54.2	40.9	1616.5	199.5	323.3	522.8
Total	48.5	33.5	1345.4	168.3	269.1	437.4

* Among all households

** @ 15% interest with 10 years repayment period

Opportunity Cost Of Time

As mentioned earlier, a large number of households are spending time for collection of water. Opportunity cost of time spent on obtained water is assumed as just Rs.1 per hour. This cost works out to be Rs. 137 per household, per year.

Distribution of annual municipal/non-municipal expenditure and opportunity cost of time spent by household income group is presented in Table 5. Total annual expenditure on water by households in the poor group is Rs. 300 and corresponding figure for households in above Rs. 1500 group is Rs. 761.

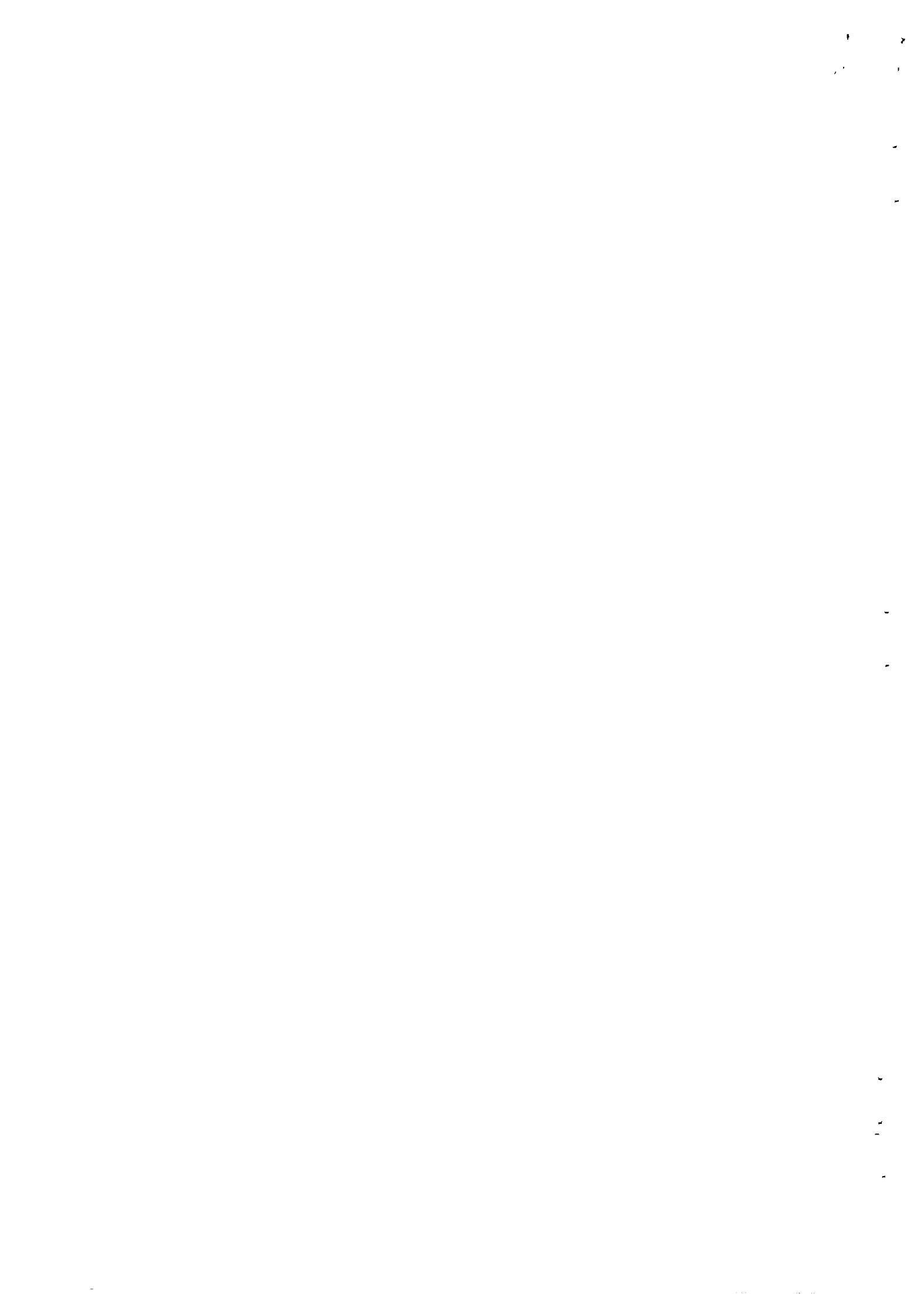


Table 5**Annual Municipal /Non-Municipal Expenditure and Opportunity Cost of Time Spent on Water by Household Income - Baroda**

Household Income Group (Rs.)	Annual Expenditure per HH* (Rs.)			Opportunity cost of time spent on water collection (Rs.)** (d)	Annual Total per HH (Rs.) (c + d)
	Municipal (a)	Non-Municipal (b)	Municipal & Non-Municipal (c)		
Upto 1500	42.9	9.4	52.3	248	300
1501 +	123.0	522.8	645.8	115	761
Total	102.0	437.4	539.4	137	676

* Among all households

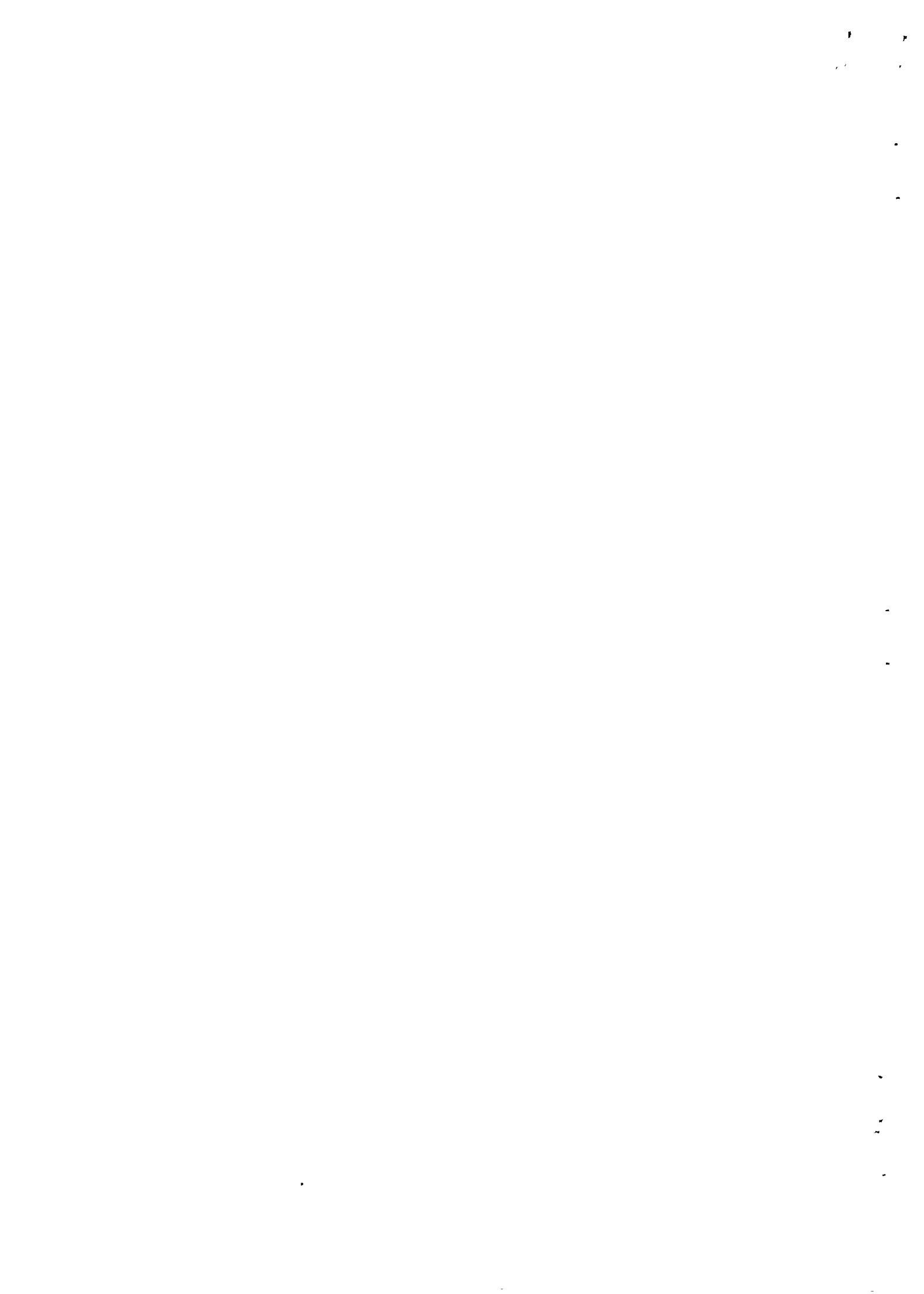
** Opportunity cost at Rs. one per hour for time spent on collection.

Expenditure And Income

Percentage annual total expenditure on water to household income is estimated to be 1.7% (Table 6). It is 1.36% for municipal/non-municipal expenditure. It is interesting to note here that percentage annual total expenditure of households in income group less than Rs. 1500 is 2%. This proportion is less for non-poor households.

Table 6**Distribution of Household Expenditure on Water by Income - Baroda**

HH Income Group (Rs.)	% Annual Expenditure to HH Income		
	Municipal	Municipal and Non-Municipal	Municipal, Non-Municipal and Opportunity Cost of time spent
Upto 1500	0.30	0.36	2.08
1501	0.27	1.44	1.68
Total	0.26	1.36	1.70



WTP For Water

To determine Willingness to Pay (WTP), for water in urban areas is a very complex process. Households, with house connection, may be willing to pay additional charge for improved pressure, quantity or quantity of water. Households without house connection may pay for improved public standpost or new house connection. In addition, the payments can be made in terms of one time house connection and monthly water charge. Information regarding WTP was collected in step by step manner.

Households without house connection account for 16% of total households. They were asked willingness to pay for improved public standpost and house connection. About 85% of the households have expressed willingness to pay for improved standpost (Table 7). Little over 56% are willing to pay Rs. 5 per month for public standpost. About 34% of households have expressed willingness to pay a connection charge. Most households are also ready to pay a monthly charge for the house connection (94%).

Table 7

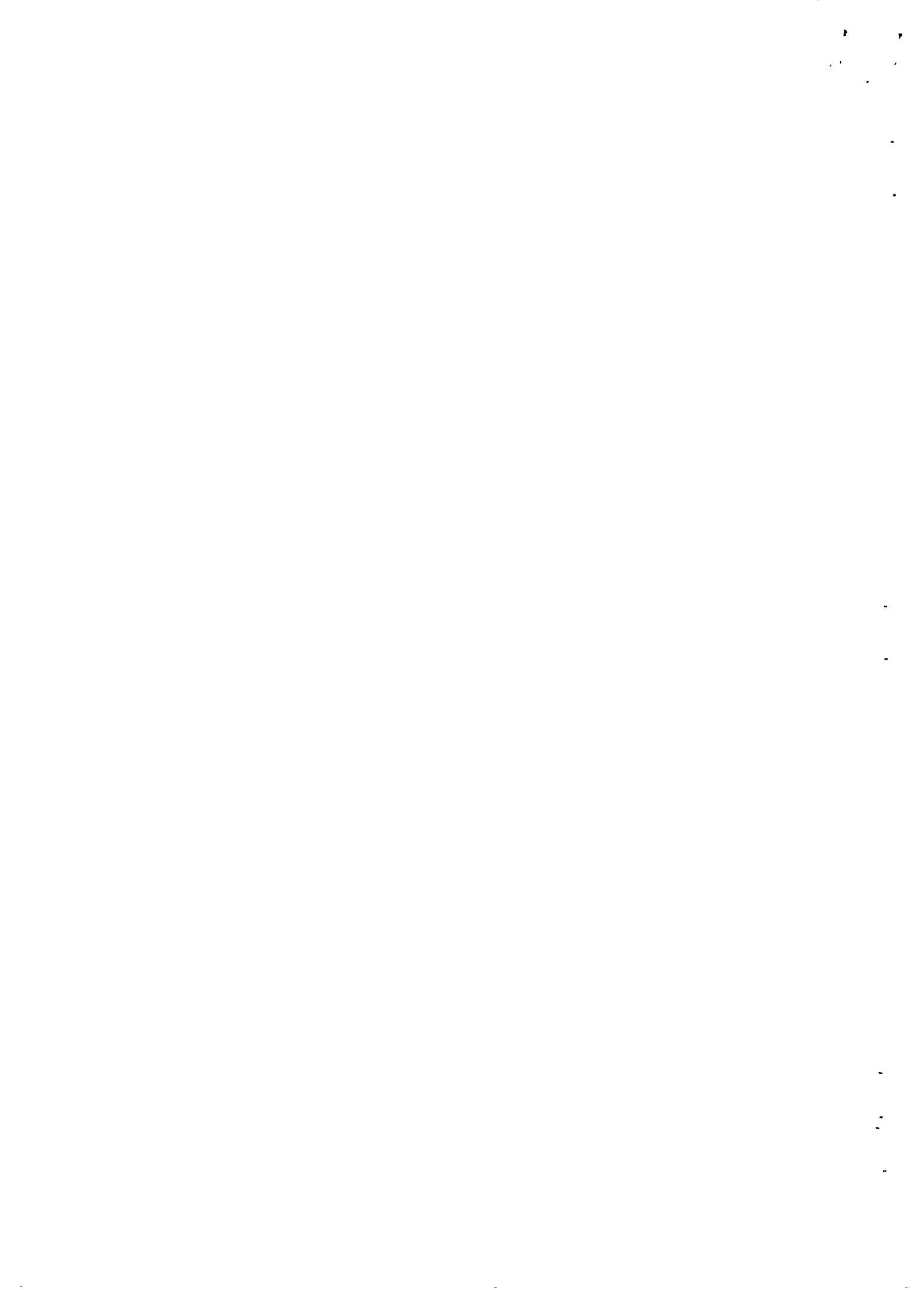
Willingness To Pay for Municipal Water Supply Among Households Without House Connection - Baroda

a. Public Standpost

Monthly Charge (Rs.)	% of Households
05	56.3
10	12.5
15	15.6
	84.4

b. House Connection

	Connection Charge	Monthly Charge (Rs.)
% of HH~	34.3	93.6



Households With House Connection

Willingness to pay additional water charge for improved pressure was asked to households with house connection. They account for 84% of the total households. As many as 63% are WTP for better pressure. WTP for improved pressure was analyzed in term household income (Table 8). Average monthly WTP for better pressure is Rs.25 household. It is Rs. 17 for urban poor households and corresponding figure for non poor households is Rs. 26

Table 8
Willingness To Pay for Improvement in Water Pressure - Baroda

Monthly HH Income (Rs.)	% Of Households Willing To Pay*	Monthly Charge Per Household** (Rs.)
Upto 1500	31.2	17.4
1501	68.9	25.5
Total	62.5	24.7

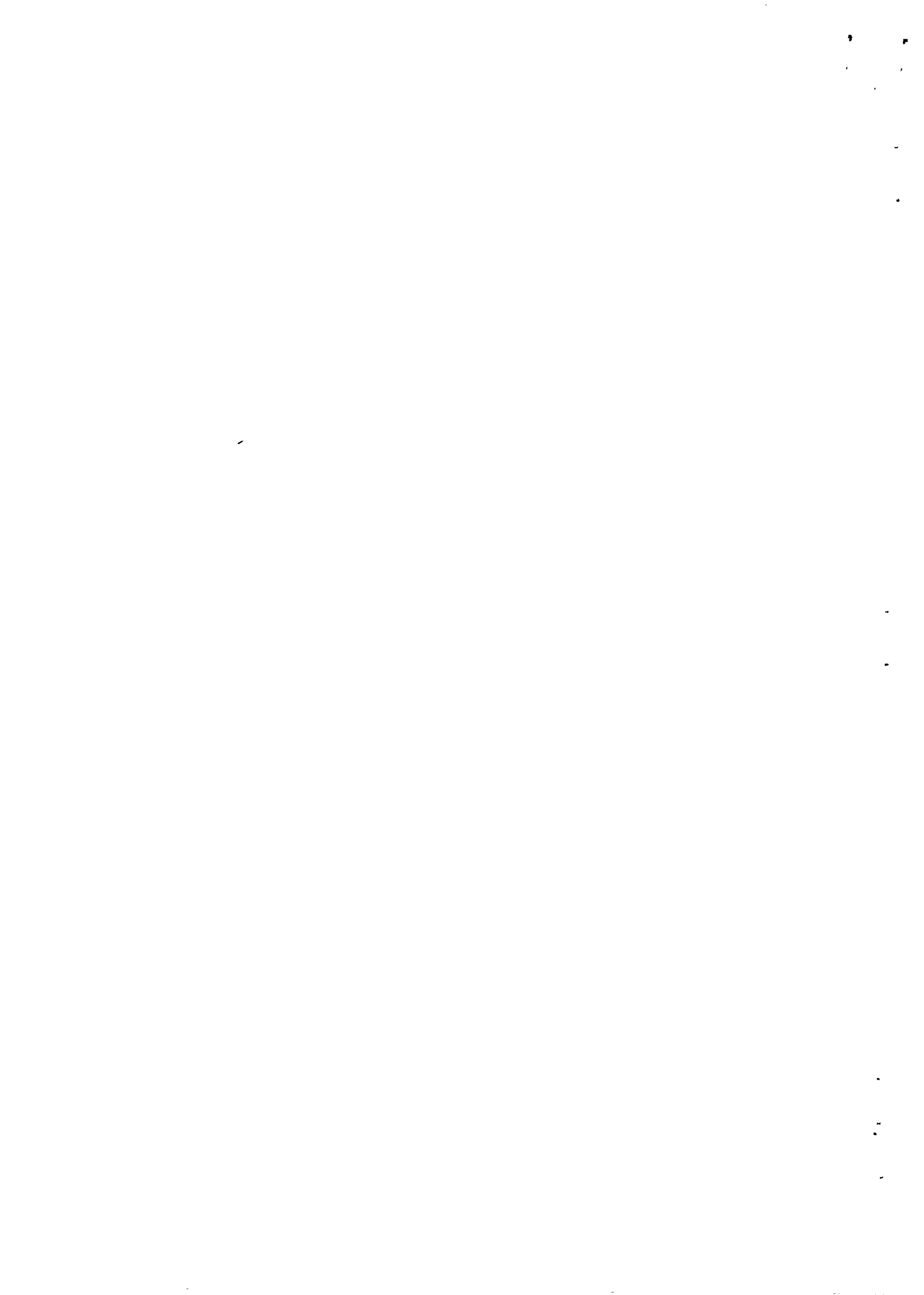
* Among households with individual / shared house connection

** Among households who are willing to pay

Willingness to pay for water by poor/non-poor groups is presented in Tables 9. As far as connection charge is concerned, 58% of households are willing to pay Rs. 726 per household. It is Rs.426 among urban poor group. About 96% of the households are willing to pay monthly water charge of Rs. 24 per household. Annual WTP has been estimated by taking 15% interest on capital investment (connection charge) and adding yearly water charge to it. Average annual WTP works out to be Rs. 339 per household. It is Rs. 275 for urban poor. It is pertinent to note here that annual WTP for non-poor is only Rs. 352 which is only 28% higher than the corresponding figure for the poor.

Table 9
Willingness To Pay (WTP) for Water by Poor/Non-Poor - Baroda

Income Group (Rs.)	Connection Charge*		Monthly Water Charge*		Total Annual WTP**
	%HH WTP (A)	Rs./HH (B)	%HH WTP (D)	Rs./HH (E)	
Upto 1500	62.5	266	93.8	19.6	275
1501 +	56.6	456	90.3	23.7	352
Total	58.0	421	95.5	23.0	339



* Among all households

** 15% interest on connection charge plus annual water charge

It is interesting to compare annual WTP with total expenditure on water. Non-poor households are willing to pay 3 times present municipal expenditure (Table 10). However, their WTP is only half of the present total expenditure on water. Whereas, in the case of urban poor, their WTP is almost equal to the present expenditure.

Table 10

Annual Expenditure and Willingness to Pay for Water by Poor/Non-Poor Groups - Baroda

HH Income Groups (Rs.)	Total Annual WTP (Rs./H/H) (A)	Annual Expenditure (Rs./HH)			Ratio A/D
		Municipal (B)	Municipal & Non-Municipal (C)	Municipal Non-Municipal And Time Spent (D)	
Upto 1500	275	43	52	300	0.92
1501-3000	375	123	523	761	0.46
Total	339	102	539	676	0.52

WTP And Household Income

Annual WTP per household is Rs. 339 and it is 0.85% of household income (Table 11). It is as high as 1.9% for households in urban-poor group. The percentage WTP to income is 0.78% for non-poor households. There are reasons to believe that the conventional method of estimating higher percentage of income as WTP for non-poor groups is perhaps not in consonance with the expressed WTP.

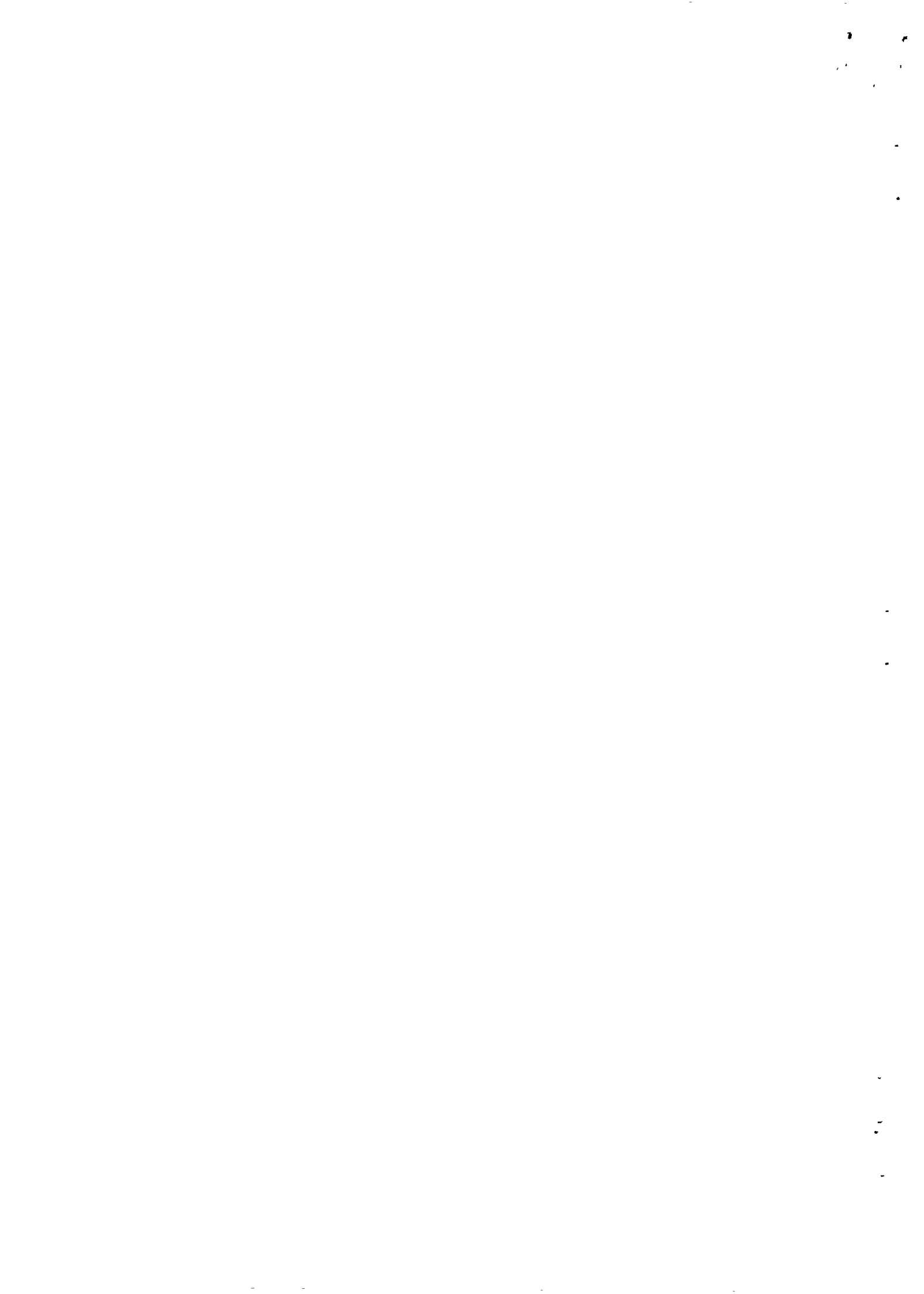


Table 11

Annual Expenditure and Willingness To Pay for Water as Percentage of Income - Baroda

HH Income Group (Rs.)	Total Annual WTP (Rs./HH)	WTP As % Of Household Income	% Expenditure To HH Income	
			Municipal & Non-Municipal	Municipal, Non-Municipal And Time Spent
Upto 1500	275	1.9	0.36	2.08
1501 +	352	0.78	1.44	1.68
Total	339	0.85	1.36	1.70

Annual WTP - 15% interest on connection charge plus water charge.

Response To Increase In Water Charges

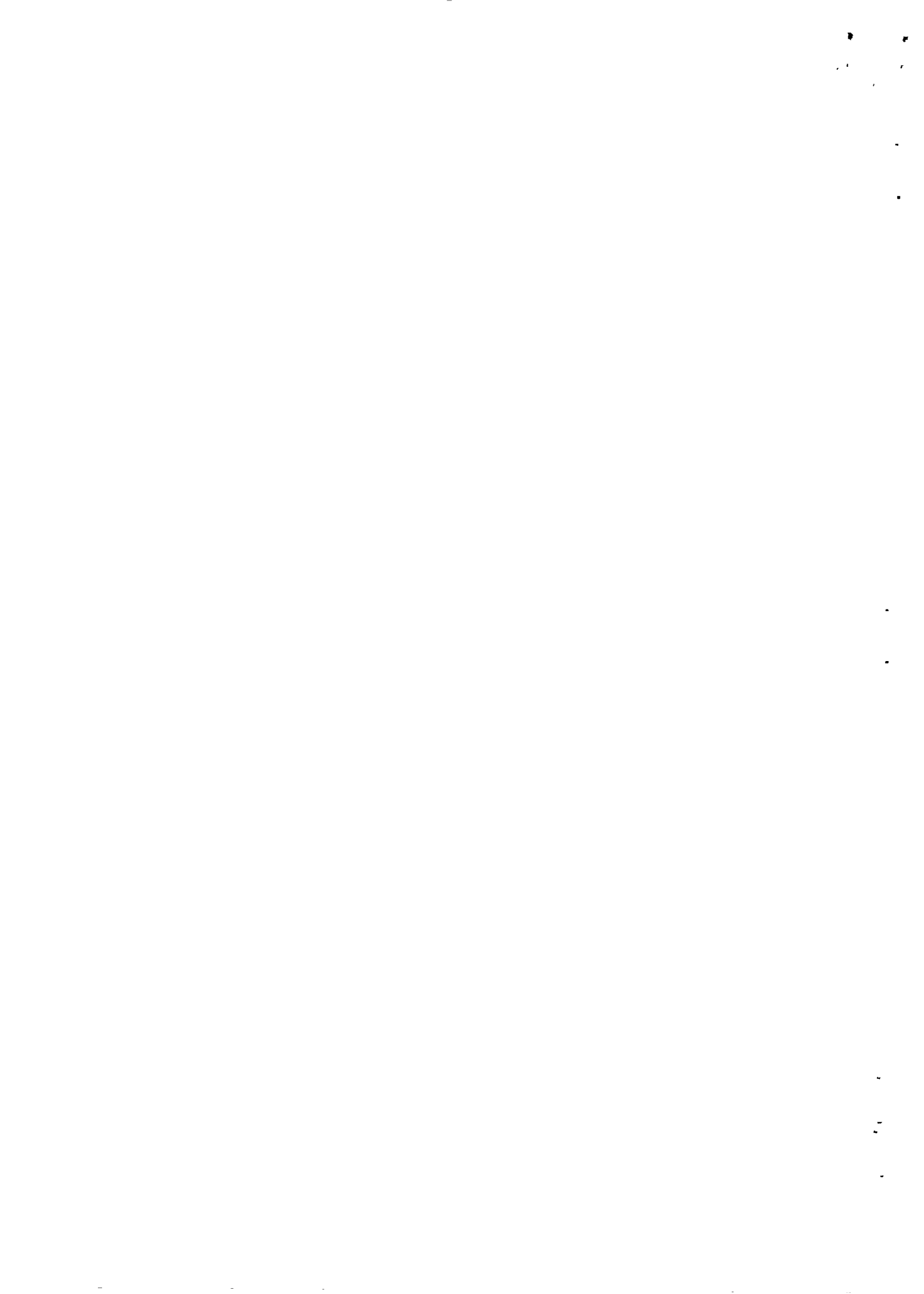
Households with house connection were asked how they will respond if monthly charges were increased without any increase in water supply level. As many as 79% of households have expressed that they would continue to use the house connection even if the monthly charge is increased from the present Rs.8 to Rs. 25 per household (Table 12). It is 75% among the poor group. It can be concluded that at present a very large proportion of the households are willing to pay 25 per month for house connection (80%). There is no major difference between poor and non-poor households on this aspect.

Table 12

Response to Increase in Monthly Water Charges / Taxes - Baroda

Monthly Household Income Group (Rs.)	Per Household Present Charge/Tax (Rs./M)	% Households Who Would Continue To Use If It Is Increased To (In Each Class)*		
		RS./M 25	RS./M 40	RS./M 60
Upto 1500	6.7	75.0	6.0	6.2
1501 +	8.5	80.8	41.1	9.5
Total	8.2	79.8	35.1	8.9

*Among households with connection



SANITATION

Type of Service

Access to sanitation service to the households has been analyzed in terms of individual sewer, shared septic tank/soak pit and public toilets (Table 13). A very large proportion of the poor households don't have access to sewer toilets (84%). About 13% use shared toilets. Little over 31% of households in the poor group have no access to sanitation facility and 28% of them have constructed their own soak pits. Access to sanitation service for the poor is far from satisfactory.

Table 13
Distribution of Households by Sanitation System and Income - Baroda

Monthly HH Income Group (Rs.)	% Of Households				
	Individual Sewered Toilet	Shared Toilet	Septic Tank/ Soak Pit	Public Toilet	Nil
Upto 1500	15.6	12.5	28.1	9.9	31.3
1501 +	72.7	14.9	11.1	1.0	0.9
Total	63.0	14.5	14.0	2.5	6.0

WTP FOR SANITATION

WTP for sanitation has been estimated in terms of one time connection charge and annual drainage tax. Only 28% are WTP connection charge and the amount per household is Rs. 597 (Table 14). Most of the households are WTP annual drainage tax (94%) and it works out to be Rs. 254 per household. Annual WTP is estimated to be Rs.144 among all households.

WTP for sanitation has been analyzed in terms of poor and non-poor households. It is Rs. 115 per poor household. Among households with monthly income below Rs.1500. 72% are ready to pay connection whereas, the corresponding figure is 22% for households with monthly income above Rs. 1500. This is because the non-poor group already has access to sewer toilet facility (73%).

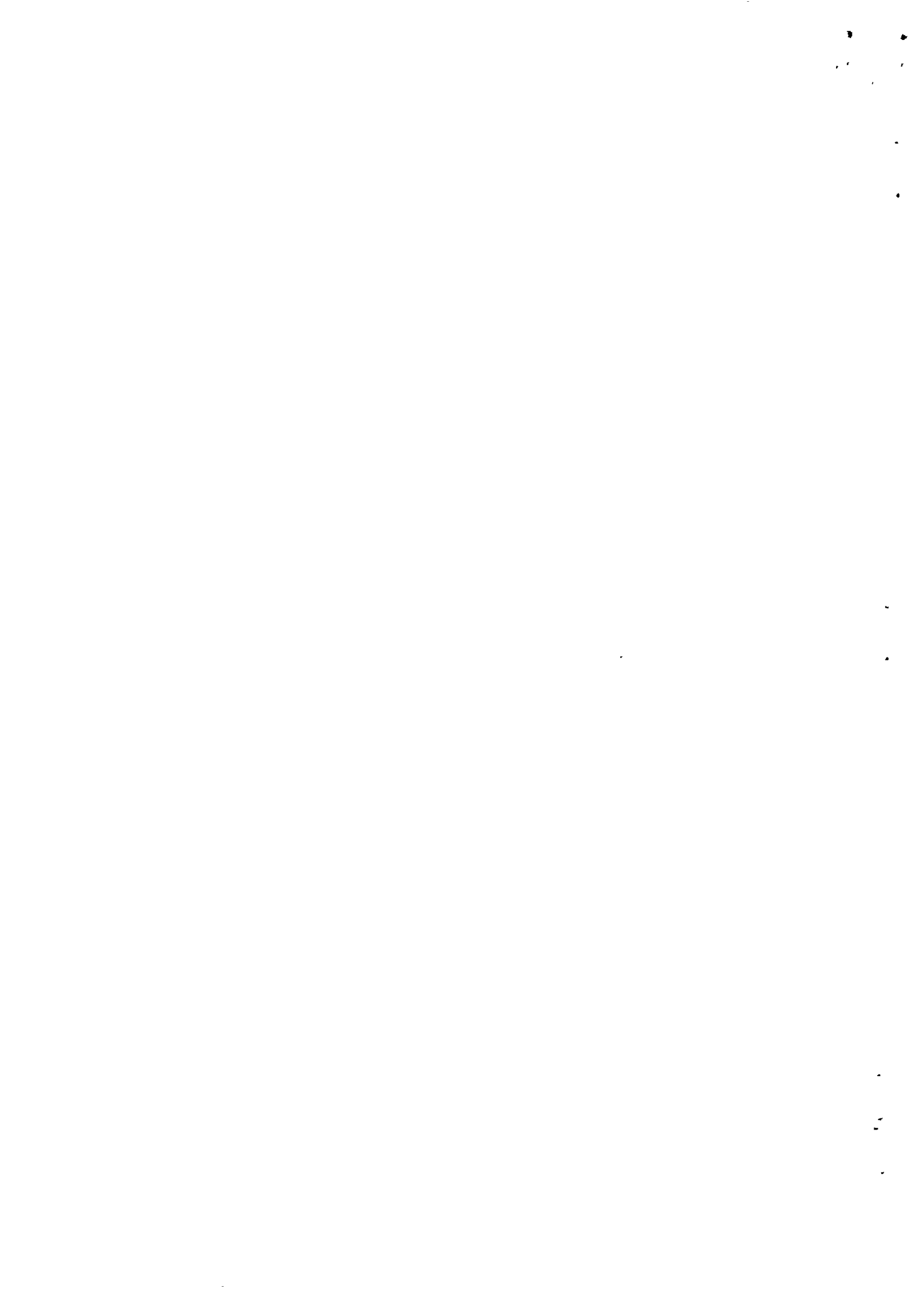


Table 14**Willingness to Pay (WTP) for Sanitation Sector by Household Income Group - Baroda**

HH Income Group (Rs.)	Connection Charge*		Annual Drainage Tax*		Total Annual Charge Rs./HH**	% HH With Sewerage Connection
Upto 1500	71.8	289	96.9	72	115	15.6
1501 +	21.6	136	93.4	130	150	72.7
Total	27.15	161	94.0	120	144	63.0

* Among all households

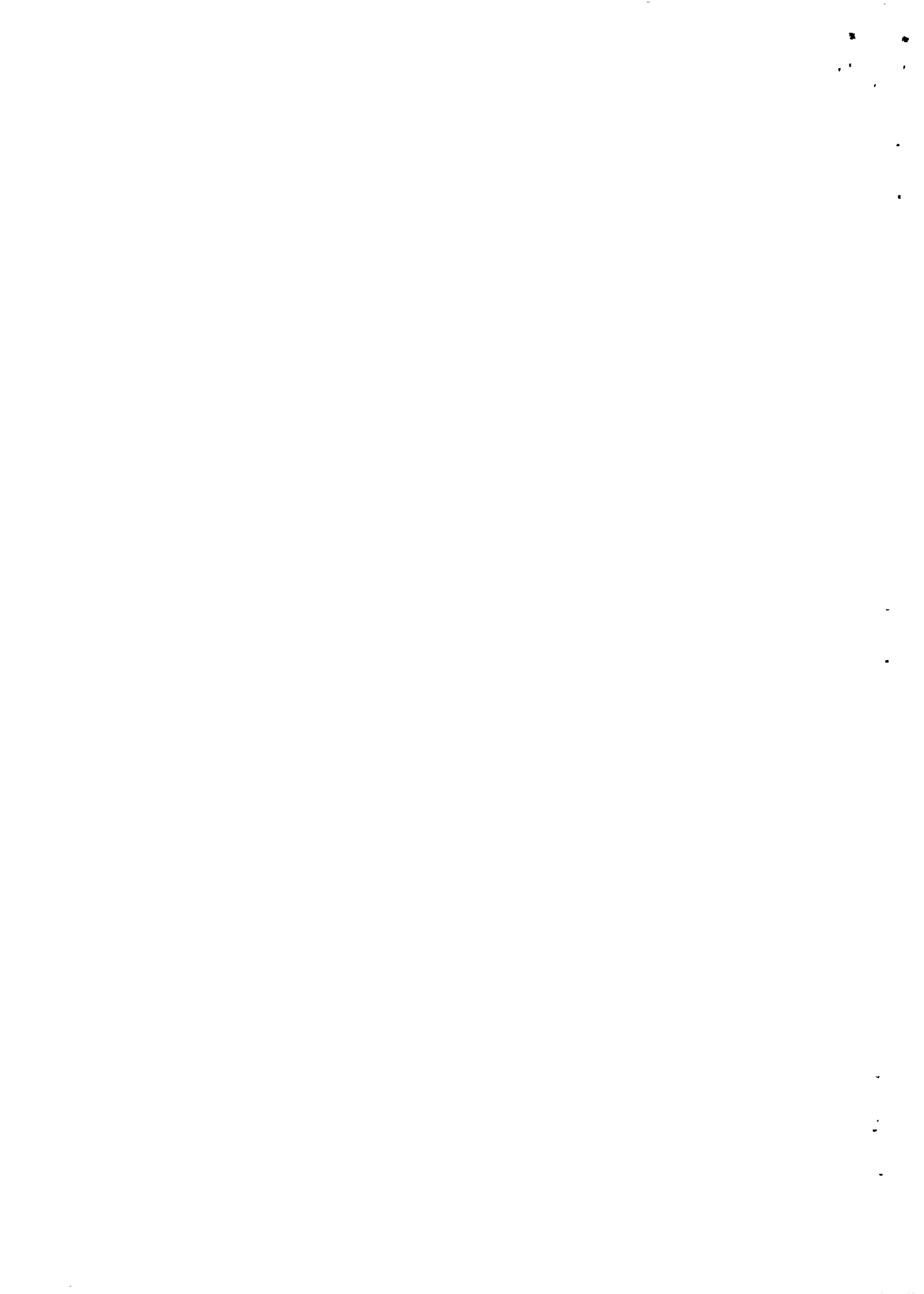
** 15% of connection charge plus drainage tax.

WTP And Household Income

WTP for sanitation as percentage of household income is 0.36 (Table 15). It is very low. Study of percentage WTP to income for poor/non-poor groups reveals that it decreases with increase in income. Percentage WTP for sanitation and water supply is 1.21 of household income. It is high (2.7%) for households for with low monthly income below Rs.1500 and only 1.11% for non-poor households. Monthly WTP for water and sanitation is Rs. 32 per household for poor and Rs. 42 for non-poor households.

Table 15**Willingness To Pay for Water and Sanitation by Household Income**

Household Income Group (Rs.)	WTP As Percentage Of Income			Monthly WTP For Water And Sanitation Rs./HH
	Water	Sanitation	Total	
Upto 1500	1.90	0.80	2.70	32
1501 +	0.78	0.33	1.11	42
Total	0.85	0.36	1.21	40



COMMUNITY BASED APPROACH

Previous sections provide quantitative data regarding urban poor's WTP. In this section, some community based approaches for accessing basic services in low income areas of Baroda have been documented.

Bore

Jawaharnagar is a quasi-legal row housing society constructed on an urban land ceiling act land established 15 years ago. Original owner had divided his farm into small plots and sold it illegally. Ten years ago, electricity was extended in this colony. Water supply was a major problem. All 38 plot holders contributed Rs. 600 each and constructed a bore and distribution system. The community bore is managed by a committee of five persons. Monthly electricity bill of Rs. 300 is shared by different households (Rs. 10 to 15 per households).

The community has also contributed for two paid public standposts. Most houses have constructed their own soak pits for the toilets. It cost them between Rs. 1200 to Rs. 2000 per house.

This community is willing to pay for individual water supply connection. They are not able to obtain the necessary permission as it is an unauthorized colony. Collector's office is not issuing the No Objection Certificate. They are WTP Rs. 250 as connection charge and Rs. 25 monthly charge for house connection.

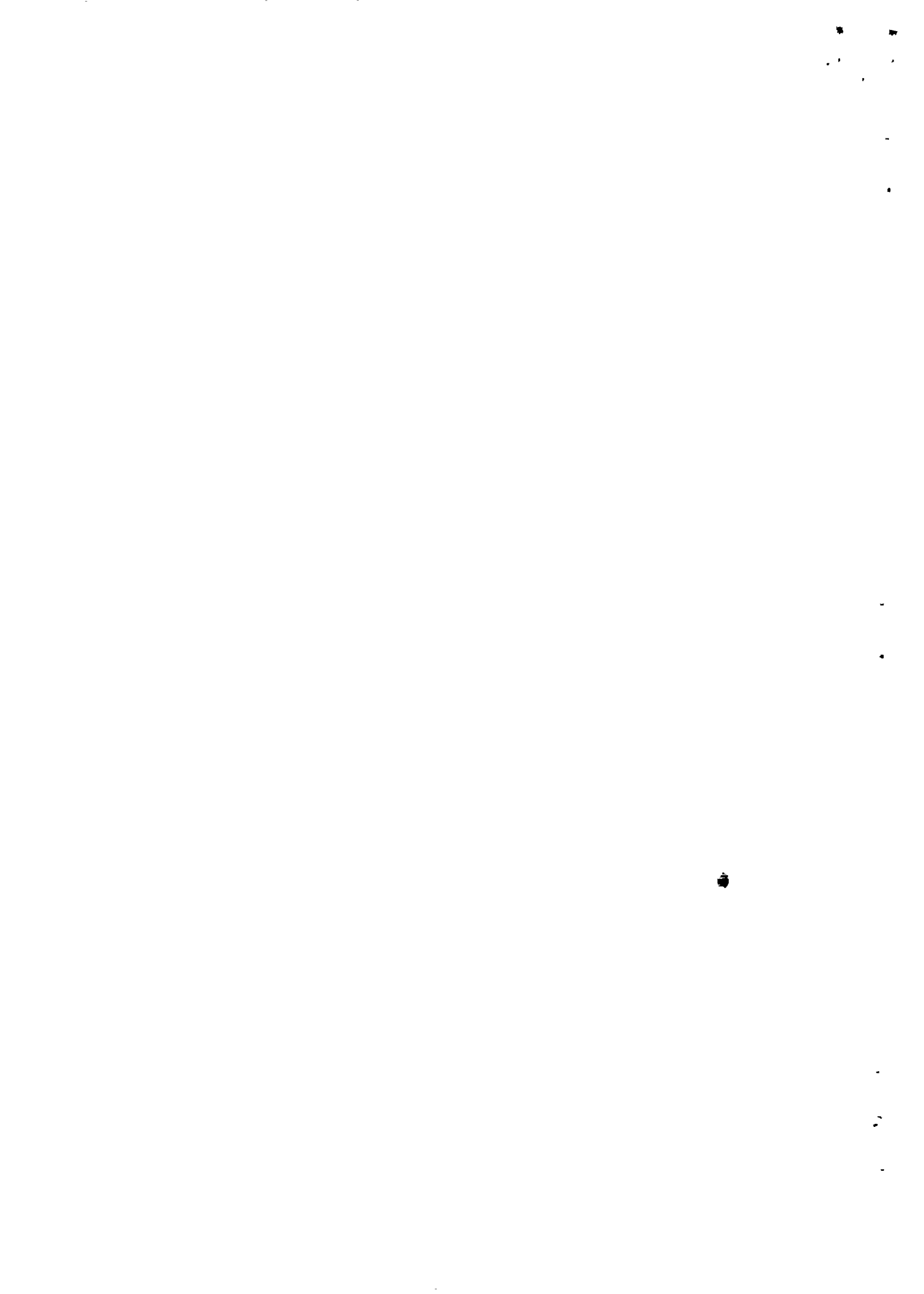
Paid Standposts

It is often believed that public standpost are free of cost. However, BMC charges for new standposts. Many slum dwellers have paid for the standposts. Navinagar Slum near Tandalja Village have eight standposts. There is one standpost between every 15 - 18 households in one mohalla of 15 houses, paid Rs. 480 to BMC for the standpost. They also contributed Rs. 2000 for construction of chokdi and soak pits near the standpost. Each family contributed Rs. 160 or so. They pay Rs. 180 per year to BMC for the standpost.

About 80 per cent of the households in Navinagari slum have electric house connection. Four years ago, the Community paid Rs. 5400 to Gujarat Electricity Board for obtaining electricity. Each family contributed Rs. 600 for electricity. Thus, slum people can pay and do pay for basic urban services.

Low Cost Infrastructure Financing

Low income households find it difficult to obtain finance for shelter repairs and infrastructure improvements. Therefore, Baroda Citizens Council has set up Community Savings and Loan Association (CSLA) in twenty slums of Baroda. It provides loans upto Rs. 1500 for construction of low cost toilets and community handpumps. About 4000 persons are members of CSLA and 1600 of them have obtained loans. Households of Ramdevnagar Slum, Gotri have decided to obtain a loan of Rs. 2500 per household from CSLA and obtained house connection and



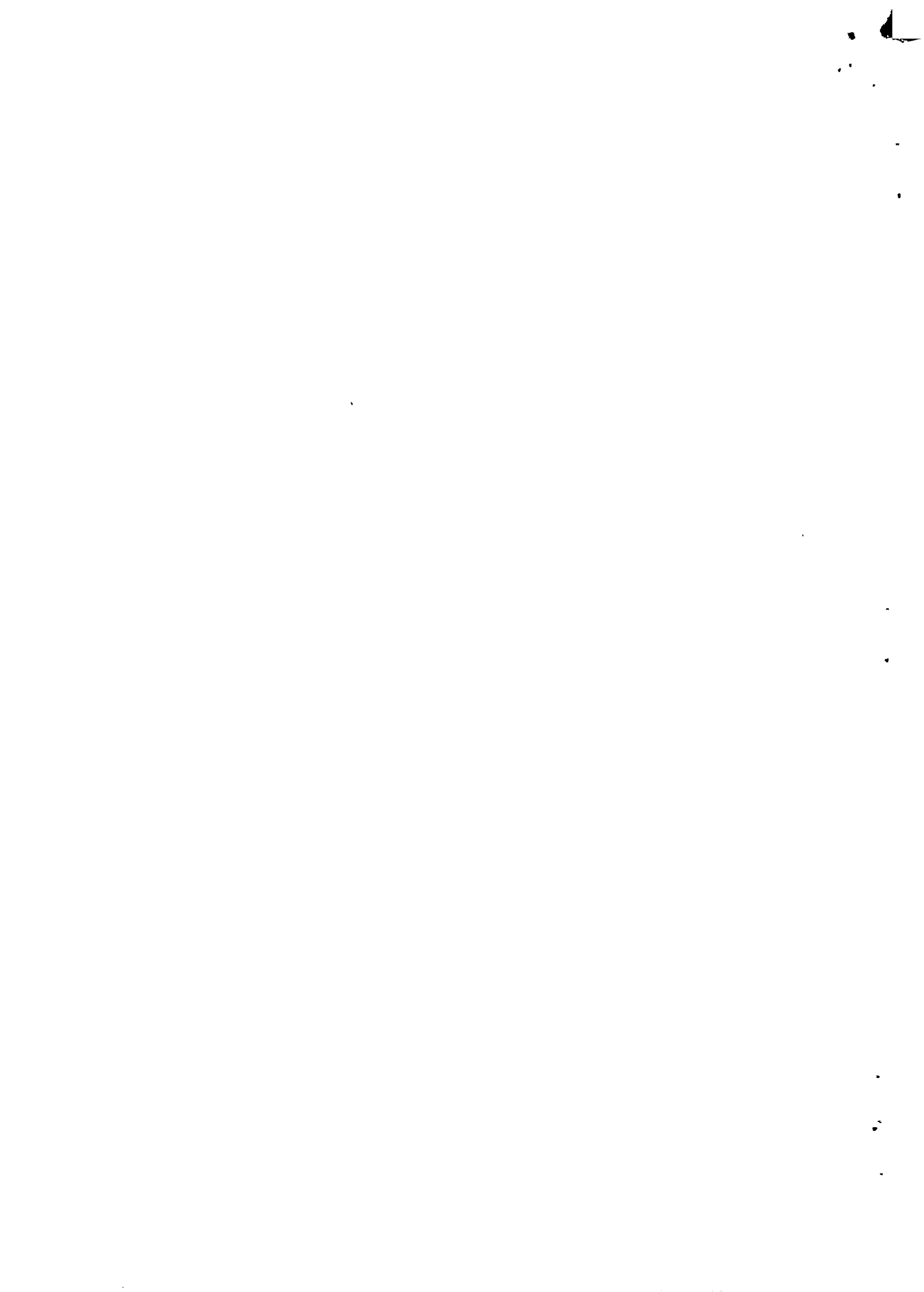
sewerage system in their area.

These case studies show that urban poor households are WTP and paying for the basic services.

FINDINGS AND POLICY IMPLICATIONS

- a. Percentage annual municipal and non-municipal expenditure on water to income for the poor is estimated to 0.36% which is less than the corresponding figure for non-poor households (1.44%). However, poor households are spending a lot of time for collection of water. Women and children are generally involved in the collection. If opportunity cost of time spent for water is included in the total expenditure, then it works out to be 2.08% of income which is higher than the comparable figure for the non-poor households (1.68%). Emphasis of the program to improve accessibility to the urban services for the poor should be on decreasing time for water collection and appropriate utilization of the time saved.
- b. Major proportion of the urban poor households are WTP for improved standpost (85%). Urban poor's WTP for house connection is Rs. 275 and it is three times the present of municipal water charges. Expressed WTP is 1.9% of the household income.

Ratio of annual WTP to total expenditure is higher for the poor households compared to the non-poor group. Urban poor are WTP for improved access to water supply.
- c. Urban poor households are also WTP for improved sanitation. However, expressed annual WTP for this service is only Rs. 115 per household, which is very low.
- d. A number of community based low cost infrastructure systems have been adopted by the low income households in the city. Baroda Citizens Council has introduced a very innovative scheme of community based infrastructure financing scheme. It is necessary to learn from these experiences and explore the possibility of replicating them.



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FINANCIAL INSTITUTIONS REFORM AND EXPANSION PROJECT
DEBT/INFRASTRUCTURE COMPONENT

A Joint Program of the United States and India
Funded by the U.S. Agency for International Development

November 06, 1995

Dr. Ineke Van Hoff
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Dear Dr. Hoff,

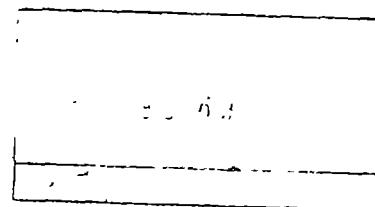
I am working on, Financial Institutions Reform and Expansion Program, Debt Market Component (FIRE) supported by USAID as a consultant. One of the objectives of the program is to improve financial efficiency of urban water supply, sanitation and solid waste services through accessing capital markets. A brief note on the project is enclosed for your information.

I have recently completed a study on Willingness to Pay for Water Supply and Sanitation in Baroda. Two papers based on this study are enclosed for your comments. The study was sponsored by HUDCO and the Institute of Housing Studies, Netherlands.

Kindly send us some background information regarding your center.

Sincerely,

Chetan Valdia
Chetan Valdia
Urban Management Advisor



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Library

*Kumar, Jitendra Singh
and Supriya*

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