Appraisal of Local Governments' Financial Capacity and Cost Recovery in Water Supply Projects

The Case of the Baroda Water Supply Project

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Contents

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1 INTRODUCTION

This paper was prepared under the Indian Human Settlements Programme as a reference in the Human Settlement Management Institute's courses on appraisal of urban development projects. The courses are designed mainly for appraisal officers of the Housing and Urban Development Corporation and officials of state agencies concerned with local governments' and other agencies' development programmes.

The paper focusses principally on methodological issues related to financial appraisal of a large scheme, and illustrates the discussion of the issues with materials drawn from the study of a real world example. The case chosen is the Baroda Water Supply project, for which HUDCO approved a loan of Rs 46 crore to finance 70 per cent of estimated development costs. At the time it was sanctioned, the loan was the largest HUDCO had ever made. Aside from the large absolute size, the more relevant indicator of size is relative. Relative to other projects undertaken by Baroda Municipal Corporation, this is among the largest, one of the first planned with direct financing by BMC and major credit financing instead of state grant financing.

Not unnaturally in such a large scheme there are a host of questions in one way or another related to finance. During the planning of the project in the early 1980s, two major design options were studied intensively. One phased the project's implementation in two stages over an eight-year period, and the other compressed it into a single stage of less than five years. Within both these there were questions about the long-run cost comparisons different types of pipes, the route of the transmission line that would bring water from the source outside the city, the design and location of storage facilities, and so on.

As well, during the early planning BMC was faced with an uncomfortable shift in the policy regarding its access to funds for development projects. Where previously it was eligible for state and, sometimes, central government grants, and it would have been able to present the BWS project to the government of Gujarat for approval on these terms, the state government had closed this option. The only other options open at the time involved borrowing large amounts of money from one of the central government's insurance companies and small amounts from government banks. Hence the original proposals studied preliminary options involving several combinations of the loan terms then on offer from these various sources.

The major question about financing sources and terms was settled when the central government gave HUDCO a major responsibility to finance ueban infrastructure development programmes, and BMC brought the project to HUDCO. By this time, in 1989, the major engineering questions about design options had been resolved. HUDCO still had some questions on these points; its appraisal led to some adjustments in the design and a shortening of the planned implementation period. The scheme far exceeded the preliminary loan ceiling of Rs 10 crore HUDCO had set tentatively, and there was some question about whether BMC qualified for a loan in HUDCO's low or

high interest rate category of infrastructure loans. In the event, answers to these questions were negotiated, and the loan (number 7072) was approved for implementation in a single stage over four years, with a lending period of three-and-a-half years, and part of the loan at the low interest rate with the rest at the high one.

The paper recounts part of the story without going into details on any point except a few that proved to be particularly troublesome in HUDCO's financial appraisal. For the financial picture of development cost, it starts with cost estimates in base prices, as finally approved by HUDCO. The major difficulties for appraisal were caused by uncertain and lacking estimates of post-implementation costs: the need for additional investments (distribution lines and customer connections) that will occur after the HUDCO-financed development package has been completed, and about costs of operation and maintenance (billing and collection for new customers, pumping and treatment costs, maintenance and replacement of lines and equipment).

Similarly troublesome were the assumptions made about the revenues the project would generate for BMC. At the most basic level, it was not entirely clear how the project was going to generate revenues. During appraisal, if the issue has not been dealt with already during planning, this has to be sorted out and estimates made. This part of the picture is as important as the estimates for the costs and phasing of pipes and electrical motors planned directly under HUDCO financing, or the HUDCO terms for disbursement and repayment of the loan. The complete picture with development costs, financing, costs of operation, and revenues is needed to consider the issues that proved most troublesome of all, in this case: Given all the elements that affect the project's financial burden on BMC, will BMC be able to afford the scheme? If BMC has to consider ways of raising more to meet the burden along with all its other responsibilities, is there scope for raising water charges?

BMC's Financial Capacity

Because of the project's size, there was a question whether BMC could afford it without making changes in its present financial plans. Several issues have to be examined here, corresponding to different periods of time on the calendar of implementation and operation.

During implementation, BMC has to finance a share of the development costs. Does the amount of money implied fit easily within BMC's budgets? If so, there is no problem. If not, the problem is that BMC will have to make difficult choices. It could cut spending on other planned development, to make room for the BWS project. It could raise its revenues to make room for all the plans, including the BWS project. It could decide to neither cut other spending plans nor raise revenues, but simply to stretch out implementation.

During operation, BMC has to pay for operation and HUDCO's loan. revenues from the project will help, but on present policies will not fully meet either set of outlays. The project will present an ongoing burden on the budgets of the Corporation; and the same question and decisions will face BMC for a long time in the operation period, as in the implementation period. Will the burden be affordable without any changes in financial policies? If not, BMC will have to decide about cutting other spending plans, postponing maintenance and replacement or not paying HUDCO, or raising its revenues.

Do Project Revenue's Cover Costs?

No deep analysis is required to answer this question--they will not unless BMC drastically raises water charges. BMC's present policy has always been to subsidize its water supply. This policy, in turn, was an extension of national and state government policies of making low charges possible by financing development mainly with grants to local governments and water boards. The local bodies were responsible for operation and maintenance, and could decide to set charges accordingly or raise local taxes. BMC has fairly reliably kept charges high enough to cover a large part of operating costs--this is its present policy. Obviously, without a change of this policy, this project's revenues cannot possibly cover its costs.

Analysis is needed to give a reasonable idea of the quantitative gap between revenues and costs, which BMC must know before it sorts out a change in policy. Will it raise water charges, or taxes, or both? Neither will be popular, and thus the size of the gap is a matter of some importance, politically. From the narrower financial point of view, both BMC and HUDCO are also concerned about when BMC will make these decisions, in relation to the project's financing burdens on the Corporation.

Outline of the Methodology

The two main issues are closely related, but they need to be analyzed separately for planning and policy-making purposes.

The methodology of analysis requires a base forecast of BMC's budgets. The "base" in the base forecasts refers to (i) the amounts of money BMC can expect to receive from its various sources, given its own present policies, and (ii) the amounts of money for which it has already made firm spending plans. Both these forecasts are made (iii) without the BWS project or as yet unapproved changes in financial policies.

The second step in the analysis adds the estimated financial consequences of implementing the project, again without at first considering any policy changes in water charges or in taxes. A comparison of this with the base forecasts of BMC's budgets shows quickly whether BMC has the financial capacity to implement the project, without changes in policy. This step, too, looks at the estimate of how much of costs will be covered by revenues, so that BMC's policies for setting water charges can be considered.

When the first two steps reveal problems in affordablity and possibly in pricing policy, the third step of the analysis involves studying several options for solving these problems.

2 PROJECT DESCRIPTION and JUSTIFICATION

The Baroda Water Supply project is designed to water for Baroda Municipal Corporation's municipal water supply from a Mahi River 27 km outside the city. In the city, two large storage tanks and a major distribution main, along with a certain number of other distribution lines will be built in three-and-a-half years during the 1989/90 to 1993/94 period. The additional water will be distributed to a existing and a small number of new customers through the Corporation's present distribution network, and to a large number of new customers in three fast-developing areas of the city where BMC presently has little or no capacity to supply water. To make full use of the project's capacity, BMC will have to lay additional distribution lines in the latter half of the 1990s; and to handle the expected increase in new customers that will be served, BMC will need to expand and possibly revise the administration of its present system of billing and collection.

At the time the project was originally being planned, BMC's water system had a rated capacity to produce 48 million gallons a day. Actual capacity of the system varies naturally, because several of the existing sources are affected by periodic droughts common in this region of the country. Droughts can reduce actual capacity 5 to 10 mgd below the rated level, depending on their severity and duration. The BWS will add 25 mgd to the capacity, and this is expected to be reliable and unaffected by droughts because the river flow has been regulated as a result of an earlier regional project to build storage reservoirs in the tributary system of the Mahi, which can assure at least a steady minimum daily flow. BMC has been allocated a substantial portion of this water, and has already developed part. The BWS project will make use of the remaining allocation.

Implementation was planned to start during the last quarter of 1989/90 and be completed during the first quarter of 1993/94, and to cost Rs 66.17 crore, including outlays for resources, administrative charges, and HUDCO's interest charges during the implementation period. HUDCO will finance 70 per cent of these costs, Rs 46.56 crore, to be disbursed during 1990/91 to the first quarter of 1993/94. BMC will pay interest on the loan at the rate of 11.5 per cent a year for the first Rs 15 crore disbursed, and 15 per cent a year for the rest.

Baroda is a fast-growing city, and BMC's water supply system has reached the limits of its capacity. Indeed, because of the Corporation's limited capacity, a large part of the city's needs are met by other producers. Large government and private industries, as well as smaller businesses and households, have developed their own supplies; they are relying on BMC to supply only for a small part of their consumption, or in some cases none at all. During the late 1980s, BMC was able to satisfy only a small portion of requests for new connections, and without the project will not be in a position to meet the demands of major new areas of the city that are currently under development for new residential areas. During droughts affecting several of the municipal system's present sources, which occur with some severity on an irregular cycle averaging every ten or fifteen years, BMC has to resort to extreme measures of rationing its available water.

Aside from the problems that can be resolved only by increasing capacity, BMC is also preparing plans to solve serious problems of infrequent and low-pressure service even in normal years, owing to the patchwork nature of the connections in its present system of

storage facilities and distribution network, and perhaps to line losses in the older parts of its distribution network, which date back to the 1890s and early 1900s.

Table 1 Baroda Water Supply Project, Accrued Development Cost and Project Financing

	Rs crore
Spending on Resources	
Base Estimate	42.01
Escalation	9.82
Sub-Total	51.84
Administrative Charges, @8%	4.15
Hudco Interest	10.19
Total	66.17
To be Financed by	
Hudco Loan	46.56
BMC	19.61
Total	66.17

BMC's Supply Standards

To keep pace with its responsibilities for supplying water, BMC has traditionally assumed that it needs a minimum capacity to produce about 50 gallons a day per capita of the population in its service area. In the metric system, this standard translates to 230 lpcd for all customers. Of this its planners have adopted nationally conventional norms assuming roughly 70 per cent (160 lpcd) for domestic, commercial, and institutional customers, and 30 per cent for industrial customers. All these figures are figures for production capacity, including the water finally reaching customers and a 15 per cent allowance for water lost in distribution.between source and individual customers' connections.

Table 2 shows estimates of past capacity and projected future capacity without the BWS project in relation to the minimum targeted capacity required to meet the 230 lpcd level.

Table 2 Baroda Metropolitan Area, Capicity of Water Supply Systems 1951 to 2001

	1951	1961	1971	1981	1991	2001
Capacity million gallons a day						
BMC						
Ajwa Lake	6.0	10.0	10.0	10.0	10.0	10.0
Tube wells			6.0	6.0	6.0	6.0
Mahi River						
Vasad Well			10.0	10.0	10.0	10.0
Poiche Well					12.5	12.5
BWSP Wells						25.0
NON-BMC						
Industries						
Mahi River			50.0	50.0	56.0	72.0
Groundwater*	.5	1.0	3.0	3.0	4.0	4.0
Other Businesses & Institutions*	.3	.7	1.0	2.0	2.5	2.5
Families*	.2	.4	1.0	1.5	2.0	2.0
	7.0	12.1	81.0	82.5	103.0	144.0
Population, thousands	211	310	467	734	1,137	1,649
Actual Capacity Per Capita gallons a day						
Municipal System	28	32	56	35	34	39
Non-BMC Systems (est.)	5	7	118	77	57	49
Total, all systems						
Gallons a day	33	39	173	112	91	87
Litres a day	151	178	788	511	412	397

Sources: BMC's project proposal presented to HUDCO, and the Gujarat Water and Sewerage Board's original project proposal; * estimates based on partial data

In appraising the project and considering the merits of BMC's norms in relation to those used in other Indian urban areas, it is important to keep in mind that the Corporation's norms have been in use unchanged for planning purposes since before 1950, when the city might have been thought to have had a fairly typical list of water needs. Since 1950, several state and nationally owed industries have built large plants in Baroda with unusually large requirements for water. These include a heavy water production plant for the national nuclear power authority, petroleum processing, and fertilizer production plants of both central and state governments. Moreover, partly as a result of being favored by the national and state industrial development policies, average household incomes in Baroda are among the highest of India's major urban centres'. Thus, for non-industrial customers, BMC can expect to have to plan for somewhat higher needs reflecting higher economic demand.

Forecasts of Revenues and Costs

When BMC prepared the preliminary plans for the project it was concerned mainly about keeping its system's capacity ahead of the minimum norms it had adopted for planning purposes. Almost no attention was given to the revenues the project would generate. By the time of appraisal, however, this had become an increasingly important issue as the details of the HUDCO-financed components of the scheme were resolved. Revenues generated will depend on plans for the distribution of water the project produces to both existing customers and new customers. For this breakdown, BMC as yet has no detailed plans, and financial analysis has to be based on less firm preliminary plans and expectations. Revenues depend, also, on the charges BMC levies specifically from its customers. Later the paper will go into some details on this point, but right now a description of only the main features of the charges will suffice.

For existing customers, the ones BMC will serve regardless whether it implements the BWS project, the Corporation levies charges for connections and a flat rate per month in most cases. In a few cases, BMC levies a monthly charge based on metered consumption. The project will generate additional revenues from existing customers (above the water charges it will collect without the BWS scheme), only for the customers who are billed on their metered consumption

and who will consume additional water because of the scheme. This amount is expected to be negligible.

The project will generate additional revenues primarily by reaching new customers. Like the existing ones they will pay development and connection charges, and either a flat monthly charge or a monthly charge depending on their metered consumption. Thus the plans for distribution of main interest are the plans for serving new customers. The bulk of project revenues expected are a product of the existing charges applied to this base. As will be discussed in greater detail in part 4, these revenues start in 1993/94 at a small level. It is only then that the project will enable BMC to levy charges on the new customers it will reach only if it implements the project.

These revenues will grow fairly quickly during the later half of the 1990s, and then dip slightly before they are expected to rise steadily every year for an indefinite period. The dip is due to the end of the time when BMC will be able to connect new customers, and collect the corresponding development and connection charges, as a result of this project. Thereafter revenue increases will be mainly the result of the periodic increases in monthly charges BMC has always made in the past and expects to make in the future. The project's revenues projected from these expectations are summarized in table 3. When examining the figures in this table, remember they are designed to be directly comparable to the base estimates that we will be working with when we look at BMC's financial capacity; as such they assume no major changes in the Corporation's policies for setting charges. In future, they will go up more or less like they did in the past, and in the past they generally followed the trend in prices set by national rates of inflation.

Table 3 Baroda Water Supply Project, Forecast of Project Revenue in Rs crores

	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Project Revenue	.35	.92	1.18	1.50	1.86	2.29	2.20

For the corresponding amounts of money BMC will have to spend as result of implementing the project, again planners, policy makers, and the appraisal team working for HUDCO have to rely on fairly simple models filled in with reasonable estimates, because there are as yet no detailed plans for the late 1990s. As a model, BMC knows it will have to spend additional money to extend its distribution network and make all the additional connections necessary to reach new customers. Because of the number of new customers it will have to deal with, it knows that it will have to spend some money to expand the capacity of its billing and collection work. Finally, it knows it will have to pay for the maintenance of the infrastructure and for pumping and treating some 25 mgd of water produced, which costs will rise rapidly during the late 1990s and then move upward thereafter more or less in line with inflation. A forecast based on this model with unit rates for the various components derived wherever possible from BMC's actual budgets for recent years. (See appendix B for of the assumptions made in this paper.)

Table 4 Forecasts of Expected Investment and Operation and Maintenance Costs

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Added Production mgd of water		1	3	6	12	20	24	25
Value Estimates in 1989/90 Rupees								
Physical Works ,and O&M								
New Connections, networks		.16	.16	.16	.16	.16	.16	.02
Annually Recurring								
Electricity	.01	.08	.23	.45	.90	1.50	1.80	1.89
Chemicals		.01	.04	.07	.14	.24	.28	.29
Materials		.05	.10	.15	.18	.20	.30	.30
Staff	.20	.20	.20	.20	.20	.20	.20	.20
Major E&M						1.00		
Billing & Collection		.07	.07	.08	.09	.10	.11	.12
Total	.21	.56	.79	1.11	1.87	3.39	2.85	2.81
Value Estimates with Inflation after 1989/90								
Total	.32	.94	1.45	2.24	3.71	8.29	7.66	8.30

Finally for the purposes of describing the project's financial consequences for BMC, we will need to add together the revenues, the post-implementation costs, and the payments for the Hudco loan, which we combine with the figures for the implementation period and summarize in table 5.

Table 5 Baroda Water Supply Project, Sources and Application of Funds, in crores of rupees

	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
External Sources										
Hudco Loan	16.48	15.21	12.23	2.64						
Project Revenue					.35	.92	1.18	1.50	1.86	2.29
Total	16.48	15.21	12.23	2.64	.35	.92	1.18	1.50	1.86	2.29
Applications										
Operation				.32	.94	1.45	2.24	3.71	8.29	7.66
Implimentation	4.98 14.86	14.65	13.85	3.50						
Debt Service	.91	2.79	4.97	8.31	9.94	9.39	8.84	8.29	7.74	7.19
Total	4.98 15.78	17.44	18.82	12.12	10.88	10.84	11.08	12.00	16.03	14.85
Sources - Applications	(4.98) .70	(2.23)	(6.59)	(9.48)	(10.52)	(9.93)	(9.90)	(10.50)	(14.17)	(12.74)

3 BMC's FINANCIAL CAPACITY

The last line in table 5 indicates the BWS project will place substantial financial burdens on BMC throughout the 1990s. It is important, therefore, to compare this with some measure of BMC's financial capacity: Looking forward, does it seem likely BMC will be able to finance amounts of the magnitude indicated? This question can be answered with base forecasts of the Corporation's future budgets.[1]

In making the base forecasts, two general considerations have to be kept in mind. First, BMC will eventually decide on spending plans that will balance outlays with receipts. The result is enforced by state law, which requires the Corporation to keep spending low enough to be able to maintain prudent cash and bank balances. It is reinforced, also, by political considerations; BMC does not want to raise more taxes and service charges than it absolutely must, because both are unpopular. Where the state law would allow a local government to build up large cash savings in anticipation of financing future development projects, political considerations make this a difficult option because taxpayers would wonder why they should be paying taxes when the government has so much money in the bank.

Second, BMC has not yet made all the plans that will affect its future budgets. Its top staff and corporators have a definite idea about future spending they are likely to budget to keep on producing existing levels of services. They also have a clear idea about how much money they are likely to be receiving from the existing property tax, octroi, and their other own regular sources of funds. These expectations are the only elements that go into a base forecast of future budgets.

What does not go into a base forecast? The financial consequences of all the decisions that will be made after the base date of the forecast. When planning for the BWS project, for example, the project's financial consequences are not put into the base forecast. Similarly, if BMC needs or wants to consider some changes in tax policy, say raising property tax rates, the estimates of the effects of the higher rates would not be put in the base, either.

Because the base forecasts are deliberately designed not to reflect all the decisions that will eventually bring future budgets into the balance likely because of state law and political considerations, the base forecasts will not necessarily show a series of balanced budgets. Indeed, it would be unusual if they did. The forecasts will show a series of surpluses or deficits. These figures are sometime called potential surpluses, the "potential" meaning that if BMC were not to make any new spending plans or change in revenue plans, it would achieve a surplus roughly of the amount being forecast.

A series of large potential surpluses indicates BMC has substantial financial capacity to plan for increasing its production of services and improving their quality without having to consider changing its revenue raising policies or hunting around for additional grants from higher levels of government. Informally, it can be calledt a financially healthy or strong local government. When the potential surpluses are all small or negative (potential deficits), BMC would be financially weak. It would not have the

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[1] See appendix A for a formal definition of base forecasts of potential budget surpluses, worked out with a simplified example.

financial capacity to take on large new spending plans unless it cuts some of the spending it has already planned or raises additional revenues. Table 6 shows a base forecast of BMC's future budgets.[2] The table shows only the summary,

Table 6 BMC's Annual Budget Summaries, 1989, and Base Forecasts to 1999 in crores of rupees

	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
Revenue Account											
Receipts	47.42	55.48	64.91	75.95	88.86	103.97	121.64	142.32	166.51	194.82	227.94
Spending	41.19	47.37	54.47	62.64	72.04	82.84	95.27	109.56	126.00	144.90	166.63
Total	6.23	8.11	10.44	13.31	16.82	21.12	26.37	32.76	40.52	49.93	61.31
Loan Account											
Receipts	6.00	7.02	8.21	9.61	11.24	13.15	15.39	18.01	21.07	24.65	28.84
Spending	12.00	13.80	15.87	18.25	20.99	24.14	27.76	31.92	36.71	42.21	48.55
Total	(6.00)	(6.78)	(7.66)	(8.64)	(9.74)	(10.98)	(12.37)	(13.91)	(15.64)	(17.56)	(19.71)
Total, Both A/Cs	.23	1.33	2.79	4.67	7.08	10.14	14.00	18.84	24.88	32.36	41.61

using BMC's own main budget classifications and headings. Its revenue account is the same as what many other local governments call routine account, or current account. Its loan account resembles what some other local governments call the development or the capital account. It includes receipts from loans, presently with some loans from HUDCO for housing projects, a small number of loans from the state government, and several short- and medium-term loans from banks in Baroda. The loan account includes, also, certain state grants, receipts from sales of equipment, and certain revenues that elsewhere would be classified under the revenue account.

Of interest, here, is the total of all accounts regardless of how they happen to be organized for budgeting purposes in a particular case. The last line of the table shows moderate potential surpluses in the early 1990s, rising as time goes on. Informally, BMC appears to be neither very healthy nor particularly weak. Its capacity to carry out large additional spending programmes is certainly limited.

On the present base (the present being at the time of planning and appraisal), it appears BMC does have the financial capacity to implement the BWS project, but not with a comfortable margin in the early years of implementation. This conclusion follows easily by comparing the last lines of tables 5 and 6. Where table 6 is without the BWS project, table 7 adds the project to see a forecast of budget totals with the project. Up to the mid 1990s, the project absorbs the potential surpluses. Formally of course, the budget forecast for 1990 in table 7 cannot happen in reality because by state law BMC has to keep its spending and receipts in balance or generate actual surpluses. If BMC is to try to implement the project, something will have to be changed this year at least.

Table 7 BMC's Budget Forecasts, with the Base Forecast and BWS Project Combined

	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99
Total											
Base Forecast	.23	1.33	2.79	4.67	7.08	10.14	14.00	18.84	24.88	32.36	41.61
BWS Project		(4.98)	.70	(2.23)	(6.59)	(9.48)	(10.52)	(9.93)	(9.90)	(10.50)	(14.17)
Total, with BWS	.23	(3.65)	3.49	2.44	.49	.66	3.48	8.91	14.98	21.86	27.44

[2] See appendix A for a discussion of this table and some general guidelines for preparing base forecasts for policy and planning purposes.

The point of the analysis at this stage is not that either BMC or HUDCO should look at the figures and decide for or against implementing the project. On general considerations, it is not a superfluous scheme. The people of Baroda cannot easily do without the additional water the project would produce for them.

At the same time, BMC will certainly want to have room for additional development projects in the early 1990s, some as important to the city as the BWS project. Two of these future projects are closely related to the BWS scheme. HUDCO asked BMC to prepare plans for upgrading and expanding the Corporation's sewerage treatment and disposal system, to be able to handle the sewage generated by the BWS scheme. BMC is also planning major investments in upgrading its water distribution network, to eliminate serious deficiencies in the frequency and pressure of service. With the project and no other changes in policy, some of the further new schemes would have to be shelved for several years.

Moreover, implementing the BWS project without making some changes in financial plans is risky. Cost overruns, for instance, could force BMC to stretch out project implementation. An appraisal team will want to look carefully at two aspects of the cost estimates besides the base of quantities and physical contingency allowance put into the engineering proposal. On the one hand, does BMC have the institutional capacity to manage implementation of schemes the size of BWSP? To answer this the team need to look not only at the Corporation's staff and administrative procedures in relation to the overall workload, but also at the performance in recent projects. The appraisal team needs to study the cost overruns in the recent schemes, and identify those caused by overloading the present staff or ineffective administrative procedures. On the other hand, has BMC made adequate provision for price contingencies, including both inflation and likely increases or decreases of prices relative to inflation? To answer this question the team needs the inflation forecasts HUDCO is making and a study of local price trends for the major resource components of the project.

On the basis of such studies, the point of the analysis at this stage is to identify the magnitude of changes that would enable BMC to implement the project, easily, with room to handle the financial risks and be able to plan for further development. Before turning to this subject, though, an appraisal team will want to look carefully at the base forecasts of potential surpluses, also.

Notice that the receipts have been forecast to increase 17 per cent a year, from Rs 53 crore in 1989 to Rs 257 crore in 1999. In their own thinking, BMC's financial planners point to similar growth in receipts over the past decade (see appendix C). They can note that the Corporation recently enlarged its boundaries to include large new areas with rapid residential and commercial developments, which will keep property tax and octroi tax collections growing rapidly even without any changes in the policies affecting these two sources. The planners can also point to past practices of regularly reviewing service charges and periodically adjusting them to keep them more or less in line with inflation. Though perhaps a bit optimistic, the planners do have good reasons to expect buoyant revenue growth. An appraisal team would want to go into more details, some of which are discussed in appendix A.

To be able to implement the project comfortably and plan for further urban development projects, though, BMC will need to start considering some changes in its financial future. The main theoretically possible options can be listed.for consideration.

- BMC can reduce spending plans reflected in the base forecasts. This may mean canceling some programmes, postponing some of the other approved development

spending, or finding and reducing wasteful spending in its operations without having to actually cut or postpone the delivery of services.

- Request additional grants from the state government, either for the BWS scheme or for some of its other activities.

- Look for some other source of loan finance for the BWS project, which would lend more money than HUDCO, and set payments on softer terms.

- Change revenue policies. First, tighten up administration of existing revenues. Find and reduce large gaps where the Corporation is billing taxpayers and services' customers less than is legally permissible. Find and reduce large gaps where actual collections are substantially less than 100 per cent of bills. Second, increase tax rates and service charges.

The next part of the paper will consider some of the more detailed options for increasing tax rates and service charges. BMC may wish to pursue some of the other possibilities, also. But it needs to keep in mind that some are unlikely to be practical without major changes in state or central government policies. The state government has recently reduced grants to municipal corporations, for instance. Reversing this would probably take several years of debate at state level. Regarding alternative sources of project loans, at present there are none with softer terms than HUDCO's that would be able or willing to lend to lend BMC Rs 60 or 70 crore.

4 OPTIONS FOR WATER CHARGES

When HUDCO approved the loan for the project, it attached several conditions. One, mentioned already, was that BMC prepare plans for upgrading and expanding its sewerage system. Several others deal with relatively minor details of the engineering design, and with the administration of project implementation. And one requires BMC to carry out a study of raising its water charges. HUDCO had a strong feeling that the revenues the BWS project will generate on present policies will fall far short of covering the project's costs, and might even fall short of covering operation costs. BMC had indicated that it was willing to consider substantial increases in charges, and even presented a tentative proposal that its corporators had under consideration. They, however, were unwilling to quickly approve one specific proposal without further justification than HUDCO's insistence on some upward change or considering the option of raising property tax rates instead of water charges.

The corporators' hesitation, of course, depends partly on the unpopularity of any increases in tax or service charges. They need to be shown the absolute necessity. The wish to consider both the tax and the service charge options because it may be easier for them to justify to their constituents a water surcharge on the property tax rate than increases in actual water charges. The reason: a property tax, compared to service charges, are perceived to shift revenue burdens to richer families, businesses, and industries who own expensive properties. Against this, are the concerns about economic efficiency, which require if possible to arrange charges so the customers of a service pay for its costs directly through specific charges related to service costs rather than indirectly through taxes they and non-customers pay alike. The other concern the corporators had was about how much charges or taxes need to be raised. At the time of appraisal, this was not at all clear. Hence, the need for a study, and HUDCO's condition that such a study be done to hasten the corporators' decisions.

A starting point for such a study can be found in the project itself. Revenue and cost estimates made to be able to forecast the project's financial consequences for the Corporation during the critical periods of project implementation and loan repayment provide the bulk of the data. Forecasts need to be extended further to include what will happen during the remainder of the useful life of the major infrastructure (in this case the wells, storage facilities, and transmission and distribution networks). With these estimates, there are several ways to summarize the mass of information assembled into more compact, easily understandable summary figures. Bankers, for instance, prefer to use a summary statistic called a project's financial internal rate of return, which they can compare with the ordinary interest rates they deal with every day. Another popular pair of statistics, which is more widely understandable, is the project's average revenues and costs relative to some particular base, as units of water.[3] With the estimates made for the BWS project, this calculation shows that the average cost works out to around Rs 1.94 a kilolitre, in 1989/90 rupees. The average revenue works out to Rs 0.19, The revenues do not even cover the project's operating costs, which average a little over half the total. Allowing for all the uncertainties clouding the data that enter into the calculation of these statistics, they are not surprising. The

[3] Appendix B discusses the method for calculating these statistics.

average cost figure is similar to average costs in projects planned elsewhere in India.

Regarding average revenues, the low figure may seem surprising. It reflects the base policies of the Corporation in 1989, which were set in relation to a long history when BMC had to plan on setting water charges to cover operating outlays and could plan on state grants to finance a large portion of development costs. On this account alone, one would expect revenues to fall short of fully covering costs. During the decade before 1989 BMC had managed to adjust water charges to roughly balance its outlays on pumping and treating to standard the water it produced. The other reason the revenues may appear surprisingly low is that, as can be seen in table 4, the estimates of additional costs include a major item, billing and collection costs, which BMC does not account in the water department's expenses, and, thus, does not include in its water charges.

Now that the old policies are coming under review because the Corporation faces much stiffer financial constraints, compared to the past. The fact that BMC has to borrow money to implement development costs and plan on paying for the loan at least partly from project revenues is a considerable difference from past (base 1989) policies of the national, state, and local governments in India. To adjust, do the corporators want to raise charges just to cover additional operating costs? Or to cover operating costs and the portion of development costs financed by the HUDCO loan? Or to fully cover costs? When discussing this issue, it is essential to have a quantitative estimate of the magnitude of higher charges required for each of the new policy options.

A second stage of analysis comes in when the corporators consider which charges to increase and by how much, and whether to introduce new charges or raise taxes. Should connection charges be increased? Or periodic charges? Should domestic, or other charges be raised?

When it began to consider these issues, the staff of BMC worked out a specific proposal, for discussion with both the corporators and HUDCO.

Table 8 BMC's Periodic Water Charges, 1983/84 to 1989/90 and Proposed Charges, to 1994/95

	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Tariffs and Rates							
Metered Connections							
Rupees a thousand litres							
Domestic	.2	.2	.2	.5	.6	.6	.6
Commercial	1.5	1.5	1.8	2.1	2.4	2.4	2.4
Institutional	.8	.8	1.2	1.5	1.8	1.8	1.8
Industrial	1.5	1.5	1.8	2.1	2.7	2.7	2.7
Unmetered Connections							
Rupees a year							
1/2"	24	24	24	48	60	60	60
3/4"	90	90	90	150	225	225	225
1"	150	150	150	300	450	450	450

	1990/91	1991/92	1992/93	1993/94	1994/95
	Proposal Presented to the Corporators and HUDCO				
Metered Connections					
Rupees a thousand litres					
Domestic	.8	.8	1	1	1.2
Commercial	2.7	2.7	3	3	4.8
Institutional	2	2	2.2	2.2	3.6
Industrial	3	3	3.3	3.3	5.4
Unmetered Connections					
Rupees a year					
1/2"	96	96	120	120	150
3/4"	225	225	360	360	450
1"	450	450	480	480	900

The proposed changes in monthly charges that BMC's planners submitted to its corporators and HUDCO, at the time, would have raised monthly

charges in stages. As we look at the financial consequences of the proposal, it is important to keep in mind exactly how the proposal would raise revenues.

First, it would raise BMC's revenues without the BWS project because the revised charges apply to all the Corporations's water customers. This component, remember, is related to the base forecasts, and does not directly enter into the BWS project's revenues. In the base, the assumption was made that BMC would periodically raise its charges to keep them in line with inflation. The timing could not be predicted with any confidence, hence the projection was made with a smooth trend. The assumption is justified by looking back at the past decade. Irregularly, BMC had made impressive increases in charges, which averaged out to about 12 per annually, almost the same as inflation. The proposal under consideration would effectively double the average charges in three stages over a five-year period, 1991 to 1995. Consequently, the projected increases built into the base forecasts on the basis of past policy was subtracted the expected effects of this specific proposal, and added on to the revenues in the and the potential surpluses base forecast.

Second, the proposal would increase the revenues of the BWS project. Because all the new customers reached by the project will pay more than the amounts shown in table 5 as revenues the BWS project is expected to generate without major changes in BMC's water pricing policy. Table 9 summarizes this forecast and summarizes the combined effect of raising the periodic charges according to BMC's specific proposal.

Table 9 Estimated Effects of Proposed Change in Charges, 1991 to 1999, Rs crore

	1990/91	1991/92	1992/93	1993/94	1994/95	1994/96	1996/97	1997/98	1998/99
Additional Revenues from									
Existing System	1.50	1.05	1.86	1.39	2.68	2.12	2.33	2.56	2.82
BWS Project					.09	.15	.31	.27	.60
	1.50	1.05	1.86	1.39	2.77	2.27	2.64	2.83	3.42

Other Options for Raising Water Charges

Table 9 shows that raising the periodic metered rates and flat rates would boost revenues substantially, but mainly by collecting a lot more money from BMC's existing customers in the 1990s. Other options would increase more money from the new costumers that the BWS project is designed to reach. The details of the options can be worked out in several ways. But they all raise the total of development and connection charges.

HUDCO has stressed looking at the development charges and connection fees as a main means of cost recovery in several of the water projects it has financed. In a project in Orissa, for example, local governments are introducing a registration charge for new customers. The charge is similar to the registration charges housing boards levy in HUDCO financed housing projects. The charge is paid by applicants for individual connections at the time of application. In housing projects, this ia a year or two before the actual sale of houses. In water supply schemes registration charges can be designed to bring in money three or four years in advance of accutal connections. If the authority, be it a housing board or a local government water authority does not make the connection in the specified time, the registration charge is refunded.

Where registration deposits in housing schemes are paid directly by the individuals who plan to buy a house, registration for water connections can be charged not only, or even mainly from individuals, but also to housing societies, developers of housing projects, community groups in the case of slums, and to developers of industrial and commercial projects. When the connection is made, the charge is credited to the downpayment, in the case of housing projects, or to the connection charge, in the case of water projects.

From the local governments' and HUDCO's point of view, the registration deposits serve two important purposes. They provide, first, an empirical test of planning assumptions about demand. Planners may have had good reasons for assuming there would be ample demand for a project, but if there are no people paying the registration charges the assumption is probably wrong. Second, registration charges help finance projects during the critical period of development.

With a water project, the financial consequence would show up in the early years. Without the registration charges, project revenues look like the figures shown in table 3 and table 9: no revenues during several years and then some revenues gradually rising as the consumption from the project increases more or less gradually. Connection charges start to bring in some revenues even during the implementation period. Then during the next four or five years, as the number of new customers is expected to be greatest, registration charges bring in substantial amounts of additional revenues.

BMC did not consider this option, and no one has made a detailed study of its feasibility for the BWS project. But supposing that an average registration deposit of Rs 500 a connection would be levied three years in advance of actual connections planned under the project, the project's revenues would show an estimated Rs 35 lakhs additional revenue starting in 1991/92, rather than nothing; and a crore or so more each year during the late 1990s. With higher charges, similar to those being set in Orissa, additional revenues would be around Rs 2 crore in the early years.

Along the same line as the registration charges, development charges could be raised. BMC has thought about adopting a regular set of development charges, in the past. At present BMC does levy development charges, but only in special circumstances. The past considerations were cast in a framework of a development tax or betterment tax designed to capture part of the economic value of local governments' services that otherwise would accrue as profit to private developers and property owners. Regular development charges in the case of BMC are particularly interesting, in the context of the BWS project. Its planned to add a reliable supply of 25 mgd, mainly to accommodate population growth of some 5,00,000 people. Many of these people are going to live in new developments that BMC will authorize under normal planning permission, and most will live in private developments where BMC can levy a development charge on the developer at the time of planning permission--three to six years before the developers' project actually starts using water. In this case the added revenues would begin to show up not in 1995/96 with the policy or 1994/95 with the policy of connection charges, but it 1992/93 or 1991/92, as BMC routinely issues planning permissions for private developments to be completed, with normal municipal services, three to six years later.

BMC might also reconsider its policy of charging for water in slums. At present, it provides standposts in a few slums and tanker supplies in several others. For the standpost supply, usually it levies a small charge for each household, paid to BMC through a community-appointed water committee. The charge is negligible, and the amount of revenue from this source is negligible, however.

Worse, from BMC's point of view, the present standpost system wastes a lot of water becasue taps are left open and water runs freely for large parts of the day. Putting meters on the standposts and either licensing them to vendors or to a community group would help solve both problems. Metered charges could be levied at a rate high enough to encourage the conservation of water without making it unaffordable, and this rate would certainly bring in more money than the present flat rates of Rs 1 or 2 a house a year. The net result would be a greater ability on the part of the Corporation to meet slum demand, as a result of less waste--more water available for final consumption--and a greater financial incentive to pay attention to slum needs as much as others.

The idea of a metered community supply appropriate for slums, where individual connections are not always feasible, and where individual billing and collection by the Corporation is impractical, can be extended to higher income areas, too. In Baroda, like in all major Indian cities, housing cooperatives play a major role in middle income development. Ideally, water would be supplied though individual meters and billed individually, in these areas. But the system seldom works well. Meters are costly, and can be costly to maintain. When they fail, as they often do in Baroda, the Corporation's periodic charges revert to some sort of flat rate. The metered system, also, is open to maladministration and petty corruption leading to revenue losses for the Corporation. These problems could be solved by a single-metered supply to the housing cooperative as a whole, leaving the cooperative to decide for itself how to apportion the water bill among its members.

Finally, BMC's corporators wanted to consider local tax options. The specific option that interested them most was raising property taxes by adding a special water surcharge on to the property tax. In Baroda the property tax is already divided into the property tax according to the property tax law and rent control acts, plus surcharges for school building and drainage. For BMC, this is attractive financially because BMC expects its property tax receipts will increase anyway, without increasing tax rates above the total set by existing property tax law, rent control acts, and the Corporation's old enactments authorizing an education and a drainage surcharge. A new enactment attaching a water surcharge could generate a lot of revenue from the property tax.

Without a water cess, BMC expects is property tax receipts to grow by over 20 per cent a year during the 1990s. The rapid growth is explained partly by the fast pace of property development in the city, and partly by the effects of the rent control act on valuations of property for purposes of taxation. The base of previously valued properties does not increase in relation to current market rents, which will, however, affect the valuations of new properties. Thus for several more years, a small surcharge on the tax, would yield substantial and rapidly growing revenues.

5 APPRAISAL and RESEARCH

In addition to the basic appraisal issues discussed so far, there are a number of others that merit close attention in a project the size and importance of the Baroda Water Supply scheme. Many are not mainly issues of finance, but all have a bearing on the results of financial appraisal.

Regional Competition for Water

The BWS project's success depends crucially on the reliability of the Mahi River's flow for several decades to come, and BMC is not the only major user of the river water. The Corporation is in direct

competition with upstream agriculture and industry, both of which are expected to grow and demand more water in the future. This issue was fully appreciated in the 1960s, already. At that time, BMC, the state government, several industries, and other user groups created a regional association to allocate and regulate use of the rivers' water. Under the association, BMC has a specific, agreed allocation. In relation to this, an appraisal team should look into the prospects that the agreement might become unenforceable in future. This is not a question for final appraisal, of course, but for preliminary appraisal and study during the project planning period.

BMC, like many other local governments and state or metropolitan water authorities sells part of its water outside the municipal jurisdiction, where the setting of charges is the legal responsibility of another local authority. This is not now a serious issue in the case of Baroda, because the Corporation's recent boundary extension. It has been a major issue in several of HUDCO's other water projects, most notably the Guwahati scheme, and it will be an issue that HUDCO will haves to deal with frequently in the 1990s. Again, it is not an issue to start to look at during final appraisal. In some states, existing legislation provides for relatively easy resolution of the issue by local covenants or assignment of priority in pricing policy to the supplier. In other states, laws are unclear or discourage the use of local covenants. Thus, this regional issue is one that needs to be dealt with by HUDCO, at the state level.

The large investments in water supply made by major industries in Baroda (see table 2) raise the possibility that industries might have excess capacity they do not plan on using during the early 1990s. If so, there is potentially an opportunity for BMC to buy water from them. At the very earliest stage of planning, when this opportunity is first identified, an appraisal team should consider (a) whether this would be cheaper than rushing to implement the BWS scheme right away, and (b) the delicate institutional questions such an arrangement would entail. Industries temporarily selling water to BMC might make excellent financial and economic sense in an ideal world, but maybe not in "Baroda." In "Baroda," the industries perhaps are worried that an agreed contract to sell the municipal corporation 10 mgd for five years would be manipulated into a permanent obligation they cannot escape for the next three decades.

City and Project Issues

To stress again some of the issues that have been discussed in previous sections: How much of the water the BWS scheme produces over the next twenty or thirty years will be sold to existing customers? How much to new customers BMC will not be able to serve if the scheme is not implemented? Who are the new customers? Clearer answers to these questions are needed to put firm forecasts of project revenues in place of the sort of ad hoc, preliminary forecasts that had to be used to appraise the BWS project.

How much of the water will pass through BMC's old distribution mains? The answer affects how much of water produced will actually reach customers. Once the project reaches capacity production of 25 mgd in the late 1990s or first decade of the next century, the answer to the question critically influences revenues. Up to the time of capacity production, the answer affects the magnitude of operating costs. For obvious reasons the project's operating costs during the late 1990s will be relatively high if most of the water passes though old mains, and relatively low otherwise.

Sorting out major risks that project costs will be higher than forecast in the plan and project revenues will be lower. What is the probability and potential magnitude of major cost overruns? At the time of appraisal, a major overrun means larger than allowed for in

the project's physical and price contingency budgets. One substantial overrun in relation to the base estimate of development costs has occurred already in the BMC case because one of the wells in the Mahi river had to be relocated. Another has occurred because the Mahi flooded in 1990, and destroyed the work sites that had been built for project implementation. Better planning might or might not have avoided the first contingency, but not the second. The appraisal question is whether adequate provision has been made for both sorts of physical contingencies.

During planning and appraisal, both BMC and HUDCO persistently underestimated price contingencies. BMC had put a lump-sum 15 cent price contingency allowance into its proposed budget, just like it does routinely for the housing projects and small development schemes it carries out. HUDCO accepted this allowance, and the resulting project cost estimate of Rs 63 crore based on it. The optimistic forecast of inflation at 10 per cent a year, used in this paper, leads to a project cost of Rs 67 crore. A pessimistic, and in the event more realistic, forecast leads to a project cost nearer Rs 73 crore. Because of the underestimation of inflation, BMC is now stuck with having to finance up to Rs 10 crore more spending from its own sources than it had planned to. Whether it has the financial capacity to do this is an open question. If not, either the project's implementation will be delayed or some other service will be cut back.

APPENDIX A

Local Governments' Financial Capacity Base Forecasts, A Simplified Illustration

In 1985, the financial planners of ABC Municipal Corporaton applied to HUDCO for a loan to finance the ABC water supply project. ABCMC proposed to implement the scheme in 1987, and HUDCO wanted to know whether ABCMC would have the financial capacity to implement the project and pay for the loan. At the time, HUDCO and ABCMC did not know that ABCMC's future budgets would be exactly the figures in the following table of actual receipts and spending. Consequently, to assess the financial capcity, planners had to work with base forecasts of the future budgets. Using this hypothetical example, where everything works out exactly according to plans, this appendix illustrates the concept of base forecasts of local governments' financial capacity.

ABCMC's Annual Budgets for	1986	1987	1988
Rs crore			
Receipts from all sources	15.00	18.00	22.00
Spending for all purposes	15.00	18.00	22.00
Surplus (Deficit)	0	0	0

As planned, the water supply project was approved in 1986, implemented in 1987, and operated successfully in 1988. The complete table analyzing the financial consequences of the project on ABCMC's annual budgets (corresponding to table 5 in the BMC case)

ABCWS Project's Sources and Applications of Funds			
Rs crore	1986	1987	1988
SOURCES			
Hudco Loan		.70	
Project Revenue			.40
APPLICATIONS			
Project Cost			
Development		1.00	
Operation			.30
Debt Service			.81
Surplus (Deficit)		(.30)	(.71)

The deficits in this table indicate when and how much money ABCMC will have to finance from other sources than the HUDCO loan and project's revenues if the project is to be implemented. Notice that ABCMC has planned to set water charges so that revenues cover all the project's operating costs plus a small amount of development costs. Notice, also, that ABCMC has to plan to directly finance 30 per cent of the project's development costs.

The question about the Corporation's financial capacity to handle these project deficits is quite specific. Because HUDCO lends money to finance only 70 per cent of development costs, ABCMC has to find Rs 30 lakh elsewhere in 1987. Can it do this? If so, and all goes according to plan, ABCMC has to find Rs 71 lakh along with the Rs 40 lakh it will charge the project's customers to be able to pay for the HUDCO loan and the costs of the project's operation. Can ABCMC do this, too? Of course it can, we can see because the project deficits ABCMC has to finance are relatively small compared to the total budgets for 1987 and 1988.

The problem is that back in 1985 planners could not predict the exact figures for ABCMC's 1987 and 1988 budgets, and thus had to demonstrate financial capacity using base forecasts of potential surpluses for the years in question. The base forecasts show the amounts of money BMC expects to receive without the water supply project or any other new projects or major policy changes it was considering in 1985. The forecasts show, also, the amounts ABCMC was planning to spend without new projects.

To illustrate the concept of base forecasts of potential surpluses, all we have to do is trace the steps between the base forecasts and the actual budgets of ABCMC. The steps include the approval and implementation of the water supply project, decided in 1986; an increase in property tax rates, decided in 1987; and an increase of the community services department's budget for 1988, decided in 1987. Aside from these three decisions taken after the base date of planning for the water supply project, all the other elements of the 1986 to 1988 budgets were known in 1985. Hence, the base forecasts are simply the actual budgets less the financial consequences of the decisions taken after the base date.

The financial consequence of increasing the community services department's 1988 budget was an additional outlay of Rs 1 crore. The consequence of increasing the property tax rate was an additional receipt of Rs 0.5 crore in 1988. The consequences of the water supply project have been described in detail, already. Subtracting all these consequences from the actual budgets gives the base forecasts of potential surpluses that planners should have made in 1985 base forecasts of total receipts and spending close to the figures at the bottom of the following table.

ABCMC's Annual Budgets for	1986	1987	1988
Rs crore			
Receipts from all sources	15.00	18.00	22.00
Spending for all purposes	15.00	18.00	22.00
Surplus (Deficit)	0	0	0
Base Forecast in 1985			
Actual less the consequences of the			
Water supply project		(.30)	(.71)
Community services project			(1.00)
Property tax rate increase			.50
Total Forecast Receipts	15.00	17.30	21.10
Total Forecast Spending	15.00	17.00	19.89
Potential Surpluses	0	.30	1.21

Compare the last three lines of the ideal forecast of ABCMC's potential surpluses with the actual forecasts for BMC's potential surpluses during the 1990s, in table 6 in the texts

The total receipts forecast contains, for example, the receipts from the local government's proporty tax, but not from the 1988 increase in propoerty tax rates. Forecast receipts contain water reveneues, but not the additional revenues of the water project or the receipts of the HUDCO loan to finance the project. This is why receipts forecast are less than receipts that will actually be received. On the spending line, spending forecast in the base does not include the water supply project's development and operation costs or payments for the HUDCO loan, or the increase in the community services department's budget. Without all these future decisions, the base forecast for ABCMC, and for BMC, shows substantial potential surpluses. These indicate that the local governments have a financial capacity to take on new shemes in addition to the base of what they already are planning to do.

The last line of the table shows the target that forecasts aim to achieve. In practice they build up the estimates in components. On the receipts side, seperate forecasts should be made at least for

1 Regular grants a local government can count on receiving furing the forecasting period
2 Any loans for projects that have been approved already, at the date the forecast is being made
3 Local taxes, itemized with the few most important ones, as the property tax and octroi, and all others
4 Local service charges, distinguishing at least the water charges and all others

On the receipts side, seperate forecasts are needed for

1 General establishment charges
2 Departmental budgets for the major services, with the details for the water department or service
3 Spending on development projects that have already been approved but not yet completed, again with details for the water service
4 Debt service, the payments of interest and principal that the local government has already contracted

The Baroda Forecasts

The project proposal and subsequent appraisal reports prepared by consultants in the BWS case did not contain the figures to assess BMC's financial capacity--essentially the figures to fill in table 6 and the assumptions behind them. This was one of the more glaring shortcomings of the planning and appraisal process in this case. It meant that HUDCO was finally faced with deciding about sanctioning the loan with only a vague, qualitative idea on this point.

The figures in table 6 were assembled for purposes of illustration, in this paper. For this purpose they are all right. They do represent the implications of assurances and assumptions BMC was using, and did communicated to HUDCO in conversation and correspondence during appraisal. But they by no means are the figures that best professional practice would produce. They are, rather the sort of figures that might have been produced as a preliminary forecast fo use in early stages of project planning.

For a project the size of the BWS one, with such major financial consequences for BMC, an appraisal team ideally needs the more detailed forecasts built up from the major components of receipts and spending. The team would look at the forecast for each

component (e.g., property tax receipts, water charges receipts, establishment costs, water department spending, debt service). The question can never be whether the forecasts are perfect predictions of the future, but whether there is any good reason to believe the forecasts are unrealistic. Had BMC forecast no growth in property tax receipts, for instance, this would have been unrealistic. Similarly unrealistic would have been a base (without the BWS project and as yet unapproved changes in charges) forecast of water receipts growing by 20 per cent a year.

Given reasonably forecasts for the components, and thus a resonable forecast for potential surpluses, the base forecast is used in appraisal by combining the base forecast and the expected financial consequences of the project. In the text of the paper, this step means adding table 6 to table 5, producing table 7. The result can be any of three possibilities.

1 There is likely to be no serious problem, because the borrower has a large financial capacity in relation to the project. All the entries in the final line of table 7 are positive and large.

2 There is a serious problem. All or many of the entries are negative, and the borrower should not try to implement the project without making some major policy changes.

3 The boarderline case, similar to BMC's: There are likely to be some problems, but not necessarily critical ones than cannot be resolved with possibly minor adjustments in policies.

HUDCO's board needs this picture before it makes a sanction decision. In case 1, there is no reason to reject an application on grounds the borrower cannot afford the project. In case 2, the board mau wish to approve a loan only if the borrower accepts stiff conditions to review and quickly change its policies. In case 3, the board may wish to sanction a loan with mild, but clearly specified, conditions, just like happened in the case of the BWS project.

APPENDIX B

Average Costs and Revenues
Calculations and Assumptions Used
in the BMC Case Study

The method for calculating average costs and revenues is called the method of average incremental values, and its use is practical for realistic problems only if a computer is used for calculation. But the principle is straightforward, and can be illustrated with very simple examples.

Suppose a project is designed to produce water for only two years. In the first year, it will serve two customers, and in the second year four. We distinguish A customers who use 2,19,000 litres a year (600 a day, 120 litres a day per capita), and B customers who use 3,65,000 litres a year. The customers pay connection charges and annual tariffs, shown in the following table

Charges for Water	A	B
Connection Charges	200	500
Annual Charges		
Metered, Rs/1,000 litres	-	3.00
Flat Rate, Rs/year	360	-

To calculate average revenues, first we need the total revenues for each year the project is in operation.

Calculation of Project Revenues

Year	0	1	2
Revenues, Rs	700	2,155	2,910
Calculations			
Data			
Number of new customers			
A	1	1	
B	1	1	
Annual Consumption, cubic metres			
A		219	438
B		365	730
Receipts from Connection Charges			
A	200	200	0
B	500	500	0
Receipts from Annual Charges			
A	0	360	720
B	0	1,095	2,190

Date 0 V(revenues) = 5,391.84

The present value of the project's revenues at date 0 is calculated by discounting interest from each year's revenues after date zero and adding together all the discounted annual revenues. In this example, there is no inflation and the real interest rate used in discounting is 5 per cent a year.

Similarly, the project's total costs are shown in a table with the total costs for each year.

Costs of Implementation and Operation

Year	-1	0	1	2
Development Costs	2,000	1,746		
Operation Costs		100	500	1,068
Total Costs	2,000	1,846	500	1,068

Date 0 V(costs) = 5,390.90

In this case the present value at date 0 is calculated by discounting the costs for the two years of operation and compounding the costs of development before date 0. Notice that the water charges have been set so that revenues just barely cover the project's total costs.

To find average cost, for example the average cost per cubic metre, it is necessary to calculate the present quantity of water from the annual totals, using the same real interest rate used in the calculation of present values. The result of discounting 5,84,000 litres for year 1 and 11,68,000 litres for year 2 works out to the present quantity Q(water) = 16.2 lakh litres. Dividing the present value of revenues by the present quantity of water gives the average revenue.

V(revenue)/Q(water) = Rs 5390.90/16,15,600 litres
= Rs 3.34 per cubic metre

The main advantage of looking at the results in terms of averages, such as V/Q, rather than total revenues and costs is that the averages are more readily comprehensible in terms of everyday experience.

The average cost also provides a convenient point of reference for discussion of setting water charges. If a producer metered all customers' use of water and charged each customer the same amount per unit of water, the charge would have to be Rs 3.34 per cubic metre to fully cover costs. This result can be confirmed by using another method of calculation. It imagines that the project is financed by a loan, and the loan is repaid entirely from the project's revenues.

Year	-1	0	1	2
Revenues, Rs		700	2,155	2,910
Costs, Rs	2,000	1,846	500	1,068
Net Cash Flow	(2,000)	(1,146)	1,655	1,842

Then to finance the project, money is borrowed the first two years and repaid with interest the second two years. On the loan account, we have

Dates	-1	0	1	2
Previous Balance		2,000.00	3,246.00	1,753.30
Interest Charge		100.00	162.30	87.67
Borrow	2,000.00	1,146.00	-	
Pay	-	-	1,655.00	1,840.97
New Balance	2,000.00	3,246.00	1,753.30	0

The amounts "borrowed" come from the project's net cash flow in the years when net cash flow is negative, and the amounts "paid" for the loan come from the years when the cash flow is positive. Interest charges are added on each year until the loan is repaid. When the average charges are set to fully cover costs, as in this example, the "loan" can always be repaid from the project's revenues. This is the definition of full cost recovery, charges set to equal all costs, on average. including interest costs.

Estimates for the BWS Project

The base cost estimates for the BWS project's implementation were taken from the project proposal and final plan for implementation in the loan agreement. Estimates for further costs during the operation period and for revenues were made roughly, based on information in BMC's accounts and discussions with its staff. The following on the following page summarizes the key assumptions underlying the estimates.

Assumptions for Revenue and Cost Estimates During the Operation Period

Value Estimates in 1989/90 Rupees

Number of New Connections with the Project	48,000	Combined Development and Connection Charges, Rs/connection average
Metered		2,800
Domestic		
Commercial	900	
Institutional	90	
Industrial	10	
Unmetered		100
1/2"	46,000	
3/4"	990	
1"	10	

Operation Costs		
Physical Works O&M Period Unit Rates		
New Connections and network costs	.16	Rs crore a year
Annually Recurring		
Electricity	2,058	Rs/Mg
Chemicals	322	Rs/Mg
Major E&M	1.00	Rs crore, recurring every 10 years

Assumptions regarding inflation up to 2001 are shown in text tables. After then, recurring values are projected to increase in line with inflation.
For purposes of present value calculations, HUDCO's 15 per cent lending rate was used for all values in current rupees, and the corresponding corresponding real rate used for values in constant rupees and for quantities.

	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Value Estimates in 1989/90 Rupees							
Number of New Connections Annually with the Project							
Metered							
Domestic							
Commercial	150	150	150	150	150	150	
Institutional	15	15	15	15	15	15	
Industrial	1	1	2	2	2	2	
Unmetered							
1/2"	7,500	7,500	7,500	7,500	7,500	7,500	1,000
3/4"	165	165	165	165	165	165	
1"	1	1	2	2	2	2	
Added Production Million Gallons Daily	1	3	6	12	20	24	25

APPENDIX C

BMC's Annual Budget Summaries
1984/85 to 1988/89

Rs crore

	1984/85	1985/86	1986/87	1987/88	1988/89
Revenue Account					
Receipts	22.81	26.82	29.73	35.03	47.42
Spending	23.86	26.61	29.27	33.47	41.19
Total	(1.05)	.21	.45	1.57	6.23
Loan Account					
Receipts	6.00	3.80	5.52	6.30	6.00
Spending	5.26	3.26	6.11	7.20	12.00
Total	.74	.54	(.59)	(.90)	(6.00)
Total	(.31)	.75	(.14)	.67	.23

Receipts on the loan account include only loans and grants BMC received, not the amounts tranferred from the revenue account. Spending includes all outlays on resources and debt service.