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KERALA WATER AUTHORITY

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DRAFT FINAL REPORT

ON

COST AND REVENUE STUDY

VOLUME I

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

OCTOBER 1991

A.F.FERGUSON & CO.

MADRAS

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LIST OF ABBREVIATIONS

| | |
|------|--|
| AFF | A. F. Ferguson & Co. |
| AIC | Average Incremental Cost |
| BCMS | Billing & Collection Monitoring System |
| BWSS | Borewell Water Supply Scheme |
| GOK | Government Of Kerala |
| KL | Kilolitre |
| KWA | Kerala Water Authority |
| LIC | Life Insurance Corporation |
| MACE | Maintenance Charges |
| MIS | Management Information System |
| MLD | Million Litres Per Day |
| MLPA | Million Litres Per Annum |
| O&M | Operation & Maintenance |
| PHED | Public Health Engineering Department |
| PIC | Provisional Invoice Card |
| RWSS | Rural Water Supply Scheme |
| T&D | Transmission & Distribution |
| TWSS | Tubewell Water Supply Scheme |

DEFICITS OF TERMS USED

1. Income :

Represents total accrued income of KWA and includes the direct water supply charges, water supply charges from the local bodies, maintenance charges from the local bodies and miscellaneous income; Does not include revenue grants received from Government of Kerala.

2. Maintenance charges :

Represents amounts billed by KWA on the local bodies; Usually computed by KWA as total O & M costs of the scheme less the water supply charges directly collected from the consumers in the area.

3. Expenditure :

Represents accrued expenditure of KWA and includes both direct and indirect costs.

4. O & M Costs :

Represents operations and maintenance costs such as salaries/wages, power, chemicals and repairs and maintenance costs.

5. Direct costs :

Represents direct O & M costs as also scheme related depreciation and interest.

6. Indirect costs :

Represents overheads and indirect depreciation and interest (i.e. depreciation and interest not relating to the scheme).

7. Water produced :

Represents the total volume of water produced as measured at the production points.

8. Water distribution :

Represents water produced less transmission and distribution losses.

9. Water sold :

Represents water distributed less free allowance given to domestic connections and less free water distributed through public taps.

10. Domestic connections :

Represents water connections given to households for domestic purposes.

11. Non-domestic connections :

Represents water connections given to other users such as institutions (hospitals, educational institutions, offices etc.) and commercial establishments (hotels, restaurants, cinema theatres etc.).

12. Affordability to pay :

Represents a measure of an individual household/non-domestic user's ability to pay for water services. There are no definite guidelines for the level of affordability to pay. However, 2% of household income is considered as affordable.

13. Willingness to pay :

Represents the amounts a household/non-domestic user is willing to pay in a month towards water supply. Assessed as amounts unconnected households/non-domestic users are willing to pay for receiving desired quantity of water through their connection.

1. EXECUTIVE SUMMARY

BACKGROUND

1.1 Kerala Water Authority (KWA) an autonomous authority responsible for execution and maintenance of water supply and sewerage schemes in the State, has been able to provide piped water supply to only about 70% of the urban population and 35% of the rural population so far, due mainly to inadequate availability of funds. KWA is now in the process of substantial improvement of the water supply situation in the State through external funding.

1.2 As a part of the funding arrangements, KWA is improving its management process. The cost and revenue study being conducted by A.F.Ferguson & Co. (AFF) as a part of management improvement programme has focussed on obtaining and analysing information on the costs involved in different types of water supply schemes and potential for raising of additional revenues.

1.3 As a part of the study, water usage practices in the State have also been examined along with the affordability to pay for water by different categories of consumers. Computerised financial forecasting model was also developed to study alternative financial scenarios under differing assumptions, targets and policies.

FINANCIAL STATUS OF KWA

1.4 KWA earns its income through water charges levied directly on the consumers as also on the local bodies. In 1989-90, KWA's total income from these sources was only Rs.315 million for an estimated 500 million litres of water production per day. As against this, KWA spent Rs.467 million including Rs.126 million on depreciation and Rs.32 million on interest. This has resulted in an operating loss of Rs.152 million forcing KWA to receive revenue grants from Government of Kerala.

1.5 The situation in the earlier years has been no different from 1989-90. Even during 1991-92, KWA has budgeted for an operating deficit of Rs.384 million. Table 1.1 presents the summary of KWA's income and expenditure.

TABLE 1.1

SUMMARY INCOME-EXPENDITURE OF KWA
(Rs. mln.)

| | 1988-89 | 1989-90 |
|----------------------------|---------|---------|
| 1. Income | 164.4 | 315.6 |
| 2. Expenditure | 435.2 | 467.2 |
| 3. Operating Loss (1-2) | (270.8) | (151.6) |
| 4. GOK Grants | 250.5 | 235.0 |

1.6 The major reason for such operating losses are the low levels of tariff and the high level of costs that KWA has. Tariffs have not been revised for several years in most parts of Kerala. Also, KWA does not receive much revenues from any large cities. As the dependence of industries in Kerala on KWA water is not very significant, KWA's revenues from industrial sector is also very nominal.

1.7 On an overall basis, KWA has income of only Rs.1.73 per K.ltr of water produced while its cost are Rs.2.56 (1989-90). KWA does not sell all the water it produces. High transmission and distribution losses combined with substantial free allowance to domestic households and free water through public taps makes the volume of water sold much less than the volume of water produced (66%).

COST OF DIFFERENT TYPES OF SCHEMES

1.8 KWA has a very large number of schemes operating in the State (over 1300). These schemes range from large urban water supply schemes (Trivandrum and Cochin) to small tube well or bore well rural water supply schemes (the volumes handled in these schemes range from less than 0.1 mld to more than 50 mld). The operation and maintenance costs involved in these schemes also vary considerably. The variations depend on the size of the scheme, the type of the scheme and local conditions such as terrain, pump efficiency, labour deployment etc.

1.9 An analysis of a representative sample of 373 schemes revealed that direct costs of these schemes increase with decrease in the sizes of scheme. The smallest rural schemes have the highest operating cost per unit volume of water. There are several reasons for such a trend. An important reason is the high cost of labour in the small schemes arising out of improper deployment of pump operators at the field level. An analysis of 28 small rural schemes revealed that there were 64 operators in these schemes even though the total water volume handled by them was only 8 mld. (altogether). Even where the pumps were operated for 3 to 4 hours only, there were two operators or more in many of these schemes.

1.10 The revenues that KWA gets from the large urban schemes and from the small rural schemes also varies considerably. Due to small number of connections in the rural water supply schemes, KWA's revenues from such schemes is very low. While the large urban schemes and some of the medium sized schemes recover enough costs (on an overall basis), the small rural schemes are always in deficit taking the overall financial position of KWA into a deficit situation.

WATER USAGE PRACTICES

1.11 A field survey of 4200 households, 800 non-domestic water users and 75 medium/large industries revealed that KWA is a major source of water supply only in the domestic sector. Even among the households surveyed, a substantial number of them depend on other sources such as wells and canals. On an average, each person surveyed consumed 120 litres per day, of which, only 64 litres was from the piped water supply. The dependence on public taps was low among the rich and middle class people. Only those without having an own connection or those living in the rural areas used public taps to a significant extent.

1.12 An average household paid only Rs.9 per month towards piped water supply. Even the rich families paid an average of Rs.19 per month only. Most of the households reported that they considered the present charges as reasonable. Only those households not having a connection at present were willing to take new connections and pay a higher amount. The actual payments in many cities has been either very nominal (Re.1 per month in Trivandrum) or nothing at all (Cochin).

1.13 The 25 largest water consuming industries depend on KWA for less than 10% of their requirement (on an average). Only 7 of 25 surveyed industries depended on KWA as their main source (for more than 50% of their requirement).

BILLING PROCEDURES

1.14 The procedure for billing and collection in different parts of Kerala varies significantly from one place to another. In practice, the frequency of billing for domestic connections varies from 3 months to 6 months. Even for many of the non-domestic and industrial users the frequency of billing is not very regular at monthly intervals. A recently introduced experimental system of supplying domestic consumers with provisional invoice cards has succeeded very well in Trivandrum, increasing KWA's revenues substantially. The field survey of households in Trivandrum revealed that the households preferred the fixed monthly charge payment (PIC) system.

RECOMMENDATIONS

1.15 KWA has set for itself an objective of achieving financial self-sufficiency. For this purpose, it is recommended that KWA substantially revises its water tariff and arrives at a financial position doing away with dependence on Government of Kerala for any revenue grants. In addition, it is recommended that KWA takes certain cost containment measures, particularly in the areas of rational labour deployment, energy audit and minimisation of overhead costs.

1.16 The recommended tariff have been structured on the basis of slab tariff with rates increasing steeply from the lowest slabs to the highest slabs. Four slabs have been proposed for the domestic category. Two slabs have been proposed for the non-domestic category. In addition, it is recommended that KWA bills on the local bodies for water supplied through the standposts.

1.17 It is also recommended that the concept of free allowance be discontinued totally as it does not have any sound rationale. It is argued that the water tax that a consumer pays should really be treated as a payment made for services rendered by the local body to the general population and not to the specific consumer paying the tax. Water supplied through the pipe standposts to the poorer sections of the population is a service for which the connected consumer should pay the water tax. As the costs of supplying water through the public taps are borne by KWA, the local bodies should pay KWA out of water taxes collected by them. However, there should be no direct linkage between the public tap water charges and the water tax collections.

1.18 Using the computerised financial model, the implications of several alternative tariff structures were worked out to see if the financial self-sufficiency objectives are being met. KWA has proposed certain tariffs which are under consideration by Government of Kerala. However, these tariffs are not adequate for KWA to work without operating losses unless it continues to take grants from GOK (around Rs.160 mln per annum). The financial position of KWA under the recommended alternative does result in a situation where KWA can do away with GOK grants. The recommended tariff alternative also provides for automatic 15% tariff increase every year so as to achieve and retain financial self-sufficiency.

1.19 Affordability of payment of the recommended tariff was tested out for the poorest connected households whose income was estimated at a minimum of Rs.1000 per month. For these households, the water charges work out to Rs.15 or 1.5% of their income, which is considered affordable.

2. BACKGROUND TO THE STUDY AND SCOPE OF WORK

BACKGROUND OF KERALA WATER AUTHORITY

2.1 Kerala Water Authority (KWA) was established on April 1, 1984 as a autonomous authority by converting the erstwhile Public Health Engineering Department (PHED) of the Government of Kerala. KWA's responsibilities include all functions relating to development, operations and recommendations of water supply and sewerage disposal in the State of Kerala. Till recently, a few of the municipalities were operating their own water supply schemes constructed earlier by the erstwhile PHED. From April 1, 1991 all these have been completely handed over to KWA. KWA now has responsibility in the entire State for not only construction, operation and maintenance, but also billing and collections from different types of consumers.

2.2 KWA is managed by a Managing Director under the overall supervision of the Board of Directors. It is presently organised on a regional basis with 2 regions (North and South). A Chief Engineer is the head of each region to execute and maintain schemes within the region. Each of 36 divisions has a number of sub-divisions under it.

2.3 KWA's principal functions are to :

- (a) Plan and execute capital schemes relating to water supply and sewerage in the state
- (b) Maintain water sources, transmission and distribution lines and water treatment plants in the state
- (c) Undertake distribution of water and maintain sewerage schemes in the state.

2.4 Despite a large number of schemes that have been commissioned in the last few years, only about 70% of the urban population and 35% of the rural population has so far been covered by pipe water supply in Kerala. Many of the areas so far not covered have been identified and appropriate schemes have been designed for them. However, these have not been taken up for implementation due to various reasons. In addition, many of the urban areas have schemes which are totally inadequate. Substantial augmentation is required in these areas. One of the important reasons for non-execution of either new schemes or augmentation schemes is the lack of funds that KWA faces. In fact, KWA does not have adequate revenues to meet its operational costs and is dependent substantially on grants from Government of Kerala.

2.5 Under these circumstances, KWA has been approaching a number of external funding agencies and obtaining financial assistance for implementation of many schemes. As a part of KWA's augmentation projects, the World Bank has agreed to lend to Government of India for onward assistance to KWA certain amounts for capital investments and institutional improvements.

2.6 As a part of the institutional improvement component of these projects, KWA has agreed to examine in detail its costs and revenue potential. KWA has agreed with the World Bank that it will specifically carry out a 'Cost & Revenue' study, which will assess the costs that KWA incurs and revenue it obtains so as to evolve recommendations for improving the overall financial position of KWA.

2.7 With this background, KWA has retained A. F. Ferguson & Co. (AFF) to carry out the 'Cost & Revenue' study and evolve recommendations for improvement of KWA's financial status. AFF commenced this study in April '91 and presented an 'Inception Report' in May '91 detailing the work plan and the methodologies involved. AFF conducted various components of this study during April - September '91 and obtained relevant data for arriving at conclusions and recommendations. These have now been presented in this Volume and Volume II A-D for detailed discussions of conclusions and recommendations.

OBJECTIVES OF THE STUDY

2.8 KWA's objectives in commissioning the proposed study are to :

- (a) Assess the investment and cost of operation and maintenance of water supply and sewerage services
- (b) Assess the potential revenue that may be raised from users in the form of charges for services and taxes there as and grants from the Government
- (c) Explore the alternatives available for revenue generation
- (d) Analyse the scope for reducing the cost of providing the services
- (e) Arrive at methods to collect data on cost of services and revenues.

SCOPE OF WORK

2.9 The following are the scope of the work of the study :

- (a) Assembling and analysing the financial and economic cost of services
- (b) Presenting the annual cost of operation and maintenance and debt service for the provision of the service and the revenue to be generated to sustain such service
- (c) Surveying the water use pattern in the state
- (d) Assessing the potential for improving utilisation through discouragement of wastage
- (e) Evaluating the feasibility of meeting all or part of cost of capital expansion programme through internal generation
- (f) Investigating the administrative feasibility of alternative methods of charging the consumers
- (g) Preparing sensitivity to costs and revenue of possible changes in key assumptions.

2.10 The study essentially comprises of 4 interrelated components, namely

- (a) Study of costs
- (b) Study of water usage practices
- (c) Financial analysis and forecasting
- (d) Procedural matters on the billing and collection systems.

2.11 As can be understood from the objectives and the scope of the study, the focus of the study was on arriving at actual investment and O&M costs incurred by KWA and relate these to the actual levels of revenues that KWA obtains. The focus of the study was therefore on matching the cost and revenues using alternate systems/structure of tariffs and other revenue raising possibilities. In addition, focus was also on measures to contain costs. The study has also looked into proposals for introducing systems for routine collection and analysis of cost and revenue data in future.

2.12 This report (Volume I) documents the highlights of conclusions arrived at in each module, as also through integrated analysis of the 4 modules. This report also presents recommendations on a number of cost and revenue related issues for consideration by KWA and the Government of Kerala. However, this report is termed as the draft final report and will be finalised after obtaining detailed comments from KWA, Government of Kerala, Government of India and the World Bank.

2.13 Volume II- A to D are 4 separate volumes presenting the details of methodology, conclusions and in certain cases recommendations on the 4 components of the study. These are meant for those readers who are interested in the details of each component separately. For the policy makers, all the critical information, conclusions and recommendations have been presented in Volume I only.

ORGANISATION OF THE REPORTS

2.14 The next chapter presents the approach and methodology adopted for the study. Chapter 4 presents a discussion on KWA's overall financial status at present and in the past. This is followed by Chapter 5 which details the O&M cost of different types of schemes and how they vary with the size of schemes and the type of schemes. Chapter 6 presents the highlights of the field survey carried out by AFF on water usage practices and user perceptions. Chapter 7 presents a discussion on the procedural aspects of billing and collection in Kerala and a few other cities outside Kerala.

2.15 Recommendations on a number of resource mobilisation and cost control issues are presented in Chapter 8 along with the financial implications of the recommendations in Chapter 9.

3. APPROACH AND METHODOLOGY

3.1 This chapter briefly describes AFF's approach to the study and explains the operational details of the methodology adopted for the study. It also presents the critical considerations that underly the approach and methodology adopted.

COMPONENTS OF THE STUDY

3.2 An analysis of the scope of work and the objectives of the study described in the previous chapter indicates that the study can be broken down into 4 modules or components interrelated to each other and acting as inputs to each other. Breaking down the study into these 4 components also helped in operationalising the methodologies based on the approach adopted. The 4 components are:

- (a) Study of costs involved in operating and maintaining different types of schemes and schemes of different sizes (urban - rural schemes, big - small schemes).
- (b) Study of water usage practices among households, non-domestic users and industrial users with a view to understanding patterns of consumption, affordability to pay and the key parameters that determine the volumes of consumption and demand.
- (c) An examination of the present and past financial status of KWA and forecasting the possible future financial situations under alternative scenarios of tariffs, costs and water volume growths.
- (d) An assessment of the present procedures involved in revenue generation (billing and collection).

Each of these 4 components have been studied using appropriate methodologies so as to arrive at conclusions and recommendations for achieving the objectives mentioned in the earlier chapter.

APPROACH

3.3 Eventhough KWA has shifted over to an accrual accounting system and has substantially improved its own internal information systems to capture data on resources and costs, the existing situation is far from the desirable levels of information requirement. KWA has already put down for itself an important objective of moving towards financial self sufficiency. In the absence of detailed information on a number of aspects which determine KWA's costs and revenues, it becomes difficult for KWA to take appropriate decisions to move towards achievement of its objectives.

3.4 At this point in time, it is imperative that KWA understands its cost and resources in a manner that aids KWA in taking appropriate decisions. Under these circumstances, the approach adopted for the present study was one of making available quickly to KWA certain basic information on its costs and revenues as also designing appropriate tools for KWA to assess the future implications of any important decisions that KWA may take in the near future on its revenues and costs. The approach adopted was not one of obtaining absolutely accurate information on its costs and revenues. While such a state would be desirable, it must be understood and appreciated that obtaining accurate information is a very time consuming and costly proposition. Therefore, it is important to make a beginning with less than accurate information but installing certain systems and tools to obtain better quality information in future.

3.5 The approach adopted was to look at all the 4 above mentioned components as highly interrelated issues to be studied. Any conclusions that have been arrived at and recommendations made have been based on analysis of data obtained in all the 4 modules together. Recommendations have also considered certain broad economic aspects of costs and revenues that concern not only KWA but also the users and the State Government. For example, concepts such as equity, conservation of water through pricing mechanisms and cross-subsidisation in a fair manner have been considered while making the recommendations.

3.6 A number of technical or engineering related issues were thrown up during the course of arriving at the conclusions and recommendations. These have been presented not in the form of recommendations, but in the form of

issues to be made aware of and discussed. It is hoped that KWA's technical personnel and other relevant engineering personnel from outside KWA will examine these in greater detail and arrive at decisions and action plans that will help KWA and similar organisations to move towards their stated objectives.

3.7 In view of the above mentioned approach, it was decided to make the best use of the available information collected earlier by KWA or other consultants, but after understanding and explicitly stating the reliability of such information. A substantial amount of information was collected through field work during the course of the study also.

METHODOLOGY

3.8 The detailed methodology for each component of the study have been presented in Volume 2 under the relevant sections. These have been summarised in this chapter.

Cost of schemes

3.9 For obtaining the details on operation and maintenance costs of different types of schemes in existence, data available with KWA was first utilised to prepare a detailed checklist. The checklist covered information requirement on costs and physical details of schemes currently in operation. The checklists were first sent out to all the divisions and also followed by field visits to 13 divisions. Based on these field visits and detailed discussions held with the field engineering/accounting staff data on costs and physical details of 373 schemes (out of 1300) was obtained.

3.10 These 373 schemes represent the total schemes in operations in the State. Emphasis was on higher representation for medium and large schemes, with adequate coverage of small schemes. At the end of data collection, analysis of the schemes for which data was obtained was carried out to ensure that the sample chosen was adequately representative of the state as a whole. Table 3.1 presents the highlights of the schemes covered.

TABLE 3.1

HIGHLIGHTS OF SAMPLE SCHEMES ANALYSED

| | KWA (Estimated) | Data used for analysis |
|--|--------------------|---------------------------|
| (1) Population benefited (millions) | 9.6 | 3.0 |
| (2) Water production (mld) | 500-600 | 300 |
| (3) Connections (000's) | | |
| (a) Domestic | 267 | 181 |
| (b) Non-domestic | NA | 66 |
| (c) Industrial | 5 | 0.5 |
| (d) Standposts | 52 | 16 |

Field study

3.11 A household field study was carried out in 16 locations (including 4 rural locations) in the State covering approximately 4200 households. These locations were chosen after a careful consideration of number of parameters such as population, extent of water scarcity, extent of commercialisation, regional distribution etc.

3.12 In each location covered in the field study, a 1% coverage of the estimated number of occupied households was used as the guideline. Within each town, stratification was carried out by choosing 6 wards comprising of 2 from good, average and poor water availability. Within each ward, the sample was chosen at random to cover the entire spread of area paying special attention to households belonging to different economic strata, different house size etc.

3.13 A detailed pretested questionnaire in Malayalam was used for obtaining information from the 4200 households and about 800 non-domestic water users (separate questionnaire was used for non-domestic users). In addition about 75 medium/large industries provided information on a checklist mailed to them (of these, the 25 largest water users were contacted personally for obtaining information).

3.14 The results of the household and non-domestic/industrial survey were analysed on computerised data base to arrive at conclusions on their profile, water usage practices, water costs (payment, affordability to pay and willingness to take connection, if not having at present) etc. The details of the methodology, questionnaire and logistics of the survey have been presented in Volume 2-B.

Financial forecasting

3.15 For forecasting the financial situations of KWA under alternate scenarios and for analysis of past and present financial status of KWA, a Lotus 1-2-3 based financial model was designed, developed, tested and used. This model comprising of a number of interlinked work sheets begins with capturing and forecasting physical data such as the population benefited, water volume demanded and produced, wastages and number of connections in different user categories. The model also captures the past and present costs of operation and maintenance (O&M) for the existing schemes and forecasts future O & M costs based on the present cost and the forecast physical parameters.

3.16 Thereafter, the model forecasts the revenues based on projected physical parameters and suggested/assumed tariff structures so as to arrive at the critical financial status of income - expenditure, fund flows and balance sheet of KWA. The details of design of model and assumptions underlying the model, operating instructions to use the model etc. have been presented in Volume 2-C.

Procedural aspects

3.17 To obtain an understanding of the procedural aspects of billing and collections, a separate questionnaire was designed and sent to all the revenue accounting units of KWA. This was followed up by holding detailed discussions with many of these divisions to obtain a first hand understanding of the varied practices that exist in different parts of Kerala. Certain experimental procedures that KWA has adopted in Trivandrum were also independently assessed. Procedures on billing and collection prevailing in certain other cities such as Madras and Hyderabad was also reviewed to arrive at recommendations for the billing and collection procedures that KWA should adopt. The details of this component of the study have been presented in Volume 2-D.

3.18 After obtaining the relevant data through discussions and field studies, analysis was carried out in an integrated manner to arrive at tentative recommendations. These were presented to audience of KWA Management and certain external agencies such as representatives of the Government of Kerala, Government of India and the World Bank to obtain their preliminary comments. Based on the preliminary comments received, certain modifications were made to the conclusions arrived at and therefore the recommendations.

4. KWA'S PRESENT FINANCIAL STATUS

4.1 This chapter presents the overall analysis of KWA's past and present financial situation. Discussion on KWA's operating and other income, O & M costs, depreciation and financial costs, as also the fund flows and balance sheet indicators are presented in this chapter.

INCOME

4.2 KWA earns its Income through the following 3 major components :

- (a) Water charges levied and collected from domestic, non-domestic and industrial users directly by KWA
- (b) Water charges levied and collected from local bodies (Panchayats/Municipalities/Corporations)
- (c) Maintenance charges levied and collected from local bodies.

4.3 In addition, KWA has minor income from investments and advances (interest income), supervision charges etc.

4.4 The Government of Kerala (GOK) provides every year to KWA substantial amounts as Revenue Grants' essentially to meet the operating deficits. Table 4.1 provides a summary of KWA income over the last 4 years and includes the GOK grants as part of the income.

TABLE 4.1

ACCRUED INCOME OF KERALA WATER AUTHORITY

(Rs. mln)

| I T E M | 1988-89 | 1989-90 | 1990-91 | 1991-92 |
|-------------------------|-----------------|---------|---------|---------|
| | --- ACTUALS --- | | RE | BE |
| 1. WATER SUPPLY | | | | |
| (a) Domestic | 21.7 | 33.5 | 42.1 | 47.1 |
| (b) Non-domestic | 22.0 | 38.3 | 35.4 | 48.0 |
| (c) Industrial | 3.7 | 6.3 | 16.1 | 16.7 |
| Sub Total (1) | 47.4 | 78.1 | 93.6 | 111.8 |
| 2. SEWERAGE | Neg | Neg | Neg | Neg |
| 3. LOCAL BODIES | | | | |
| (a) Water supply | * | * | 15.1 | 9.6 |
| (b) Maintenance charges | * | * | 58.8 | 52.9 |
| Sub Total (3) | 108.7 | 226.8 | 73.9 | 62.5 |
| 4. Other income | 8.3 | 10.7 | 15.3 | 12.1 |
| 5. GOK Grants | 250.5 | 235.0 | 258.5 | 284.3 |
| TOTAL | 414.9 | 550.6 | 441.3 | 410.7 |

Source : KWA Accounts and Budgets

(RE - Revised Budget Estimates ; BE - Budget Estimates)

(* Break up not available)

4.5 KWA Works on commercial accounting principles. The income figures mentioned in the table are on accrual basis'. The actual collection of some of these components is far below the amounts accrued (or demanded). However, GOK grants shown above are actuals for the past years (1990-91 and earlier) and budgeted figures for the current year (1991-92). There is no concept of any demand' for GOK grants.

4.6 The level of 'Receivables' from consumers and local bodies was fairly high Rs. 262 million at the end of 1989 and an estimated Rs.433.5 million at the end of 1990. However, this comprises of certain outstandings (Rs.221 mln) that were taken over by KWA at the time of formation in 1984.

4.7 This does not include the receivables from different types of consumers which will become due to KWA with effect from April 1, 1991 from those municipalities where the distribution has been taken over by KWA on that date. No estimates are available on the extent of receivables that KWA will take over. The likelihood of collection of these arrears from the large number of consumers for whom detailed and updated consumer ledgers have not been properly maintained by the municipalities is very low. KWA may have to carry out a one time exercise of 'Initialising' these arrears so as to work on a smooth basis with acceptable arrears in future. If required, KWA may have to write off certain amounts as a one time exercise.

4.8 KWA does not have a highly systematic billing mechanism. In the absence of adequate and regular monitoring information, one cannot definitely conclude that KWA carries out 100% billing. The extent of billing on a regular basis cannot be estimated.

4.9 Any discussion on collection efficiency performance of KWA has to be carried out with caution as substantial amount of KWA revenues accrue from local bodies. For example, direct demand by KWA on domestic, non-domestic and industrial users was only Rs.78.1 million in 1989-90 compared to Rs.226.8 million that KWA received from local bodies directly and through the Government of Kerala.

O&M COSTS OF KWA

4.10 Table 4.2 presents the overall Operation and Maintenance costs of KWA. While analysing these costs, it must be noted that till 31st March 1991, KWA was not handling distribution of water in all the cities in Kerala. Some medium and large cities were obtaining water produced by KWA and carrying on the activities of distribution and billing/collection on their own.

TABLE 4.2
O&M COSTS OF KWA

(Rs.mln)

| | 1988-89 | 1989-90 | 1990-91 | 1991-92 |
|--------------------------|-----------------|--------------|--------------|--------------|
| | --- ACTUALS --- | | RE | BE |
| 1. Salaries & Wages * | 120.6 | 121.7 | 195.8 | 139.1 |
| 2. Power | 64.8 | 95.5 | 74.0 | 94.3 |
| 3. Chemicals | 6.6 | 9.1 | 18.5 | 20.6 |
| 4. Repairs & Maintenance | 68.8 | 68.5 | 88.4 | 94.1 |
| 5. Admin. Overheads | 17.2 | 14.3 | 27.0 | 28.6 |
| TOTAL | 278.0 | 309.1 | 403.7 | 376.7 |

(* Figures indicated are salaries charged to O&M head. Total salaries/wages are at a higher level).

4.11 KWA charges out a portion of the total salaries to the capital account as many of the KWA staff are engaged in capital related activities. Based on an earlier exercise done (in 1982/83 by KWA) the charge out is computed at 22% of the capital works executed (except Bilateral schemes where the charge out is 10%).

4.12 Table 4.3 presents the total salary bill and charge out values (KWA actually reduces the overall O&M costs by the charge out amount and not the salary costs. However, as the charge out relates to only the salaries, it has been presented in comparison to total salary costs).

TABLE 4.3

TOTAL SALARIES/WAGES AND CHARGE OUT TO CAPITAL ACCOUNT

(Rs.mln)

| | 1988-89 | 1989-90 | 1990-91 | 1991-92 |
|--------------------------|-----------------|---------|---------|---------|
| | --- ACTUALS --- | | RE | BE |
| Total salaries/ wages | 171.0 | 203.9 | 277.2 | 276.1 |
| Charge out | 50.4 | 82.2 | 81.4 | 137.0 |

4.13 As can be observed from table 4.3, salaries (even after charging out) form the most important component of O&M costs (ranging from 39 to 48% of O&M costs). In fact, the variation in the percentage and the differing level of charge out amounts from year to year lead to an important issue of the rationale and methodology of computing the charge out amounts.

4.14 Based on the analysis of the data available, it can be concluded that there is a need to design and install a more scientific and rational system of computation for these charge out amounts. Discussions with some of the engineering personnel from KWA revealed that, if appropriately computed, the actual charge out amount may be much higher.

OTHER COSTS

4.15 In addition to O & M cost, depreciation and interest are the other major cost components for KWA. KWA has a detailed schedule of depreciation rates for different types of assets. Depreciation is calculated on the straight line basis at appropriate percentages which depend on the estimated life of the asset. KWA has recently revalued its fixed assets and as a consequence the fixed assets value has increased more than three fold. KWA's depreciation is based on the revalued asset figures.

4.16 After the formation of KWA, Government of Kerala has lent several amounts to KWA for capital investments. These form part of GOK's funding. Generally, GOK has provided amounts to KWA as 50% loan and 50% grant. These loans have been at 14.5% interest.

4.17 The total amount borrowed by KWA from inception till 31.3.91 amounts to Rs.1169 million. Till 31.3.91, amounts totalling Rs.282 million have become due for repayment along with interests of Rs.393 mln. However, KWA has not repaid back the GOK loans and interest that have become due in the last 5 years. KWA has requested Government of Kerala to convert the existing loans into grants/equity so as to minimise the financial burden. No decision has been taken so far.

4.18 Under these circumstances, the interest figures indicated by KWA in their accounts relate only to those interest due to other agencies from whom KWA has borrowed.

SUMMARY OF INCOME & COSTS

4.19 Table 4.4 presents a summarised version of KWA's Income and costs. KWA has made operating losses which have been to a significant extent, reimbursed by GOK's revenue grants.

TABLE 4.4

INCOME & EXPENDITURE OF KWA*

(Rs.mln)

| | 1988-89 | 1989-90 | 1990-91 | 1991-92 |
|--------------------------|-----------------|----------------|----------------|----------------|
| | --- ACTUALS --- | | RE | BE |
| 1. INCOME | | | | |
| (a) Consumers | 47.4 | 78.1 | 93.6 | 111.8 |
| (b) Local bodies | 108.7 | 226.8 | 73.9 | 62.5 |
| (c) Other misc. | 8.3 | 10.7 | 15.3 | 12.1 |
| Sub total (1) | 164.4 | 315.6 | 182.8 | 186.4 |
| 2. EXPENDITURE | | | | |
| (a) O&M | 278.0 | 309.1 | 403.7 | 376.7 |
| (b) Depn. | 126.1 | 126.5 | 126.5 | 126.5 |
| (c) Interest | 31.1 | 31.6 | 60.3 | 67.0 |
| Sub total (2) | 435.2 | 467.2 | 590.5 | 570.2 |
| 3. Operating loss | (270.8) | (151.6) | (407.7) | (383.8) |
| 4. GOK grants | 250.5 | 235.0 | 258.5 | 284.3 |
| 5. Net loss | (20.3) | 83.4 | (149.2) | (99.5) |

* Expenditure is same as costs.

Source : KWA Accounts and Budgets

4.20 As can be observed from the above table, KWA has significant operating losses. Even for 1991-92, KWA has budgeted for an operating loss of Rs.383.8 million (operating loss here is defined as KWA's expected or actual income less expected or actual expenditure including depreciation and interest. Grants received by KWA from GOK for operational purposes have not been included as income for defining the operating loss. The two terms 'Cost' and 'Expenditure' are used interchangeably).

4.21 The major reason for such operating losses are the low levels of tariffs and the high levels of costs that KWA has. In addition, as can be observed from the mix of incomes from different types of consumers, KWA has very little scope of recovering higher charges from any categories of consumers. For instance, KWA received only Rs.6.3 million directly from industrial consumers from the whole State. This is partly because of the very low dependence industries have on KWA's water.

4.22 Exhibit 4.1 on next page presents the broad breakup of KWA's income and expenditure components, while Exhibit 4.2 presents the extent of KWA's dependence on GOK subsidies. From Exhibit 4.1, it is clear that the amounts that KWA realises directly from consumers and local bodies is adequate only for a part of its overall operational costs. In fact, the entire portion of its establishment costs (salaries and wages) is left uncovered. In a way, KWA's establishment costs are really met by GOK's subsidies.

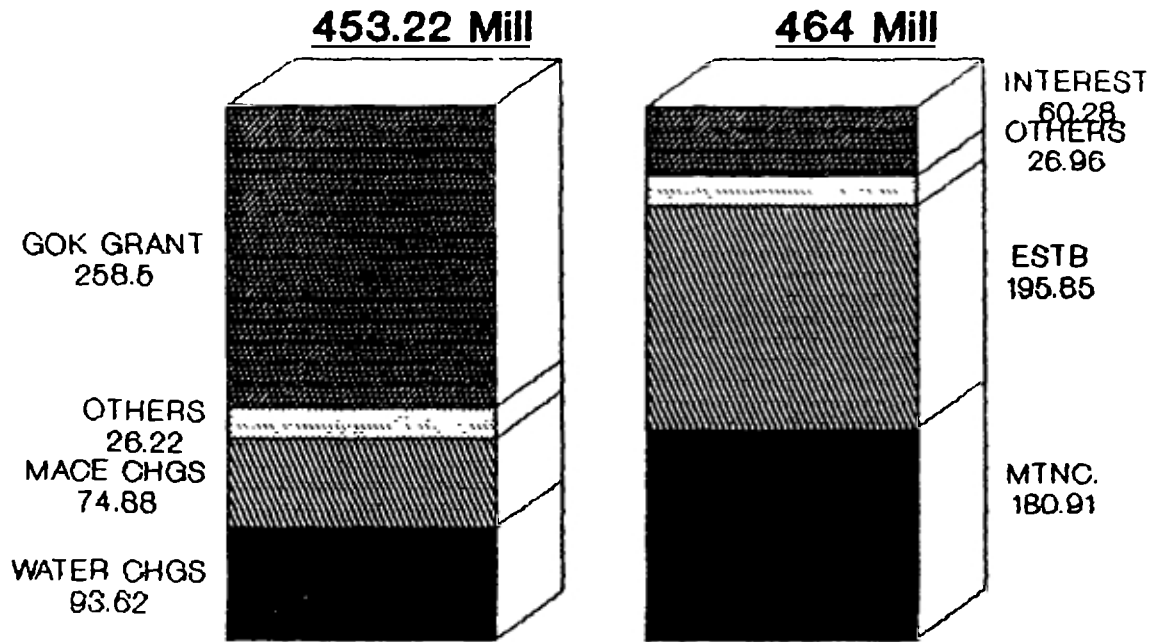
MOVEMENT OF FUNDS

4.23 Table 4.5 presents fund flows of KWA for the years 1988-89 to 1991-92 which has been prepared for the first time based on actual/provisional/budgeted loans and grants received, internal generations, capital investments and changes in working capital. As can be observed from the table, the cash balance at the end of each year has been positive only because of the revenue grants that KWA has received during these years.

4.24 Capital investments have been generally made out of loans and grants received from GOK or routed through GOK. As mentioned earlier, KWA has not made any loan repayment or interest payment to GOK during this period which has helped in its favourable fund flows. As the depreciation amount has not been kept aside and is substantial (Rs.126.5 million), this has also helped KWA in retaining positive cash balances. Despite added back depreciation, the total internal generation have been negative, except in 1989-90 during which year KWA received substantial amount of money from local bodies through the Government of Kerala.

EXHIBIT 4.1

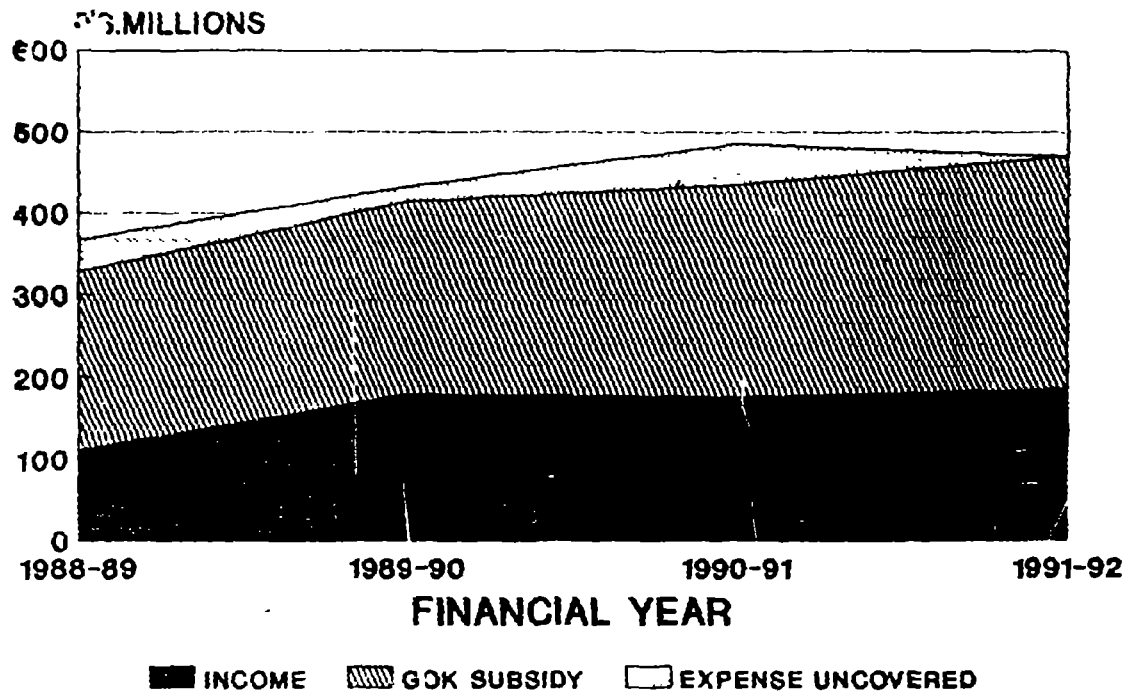
REVENUE RECEIPT AND EXPENDITURE (1990-91) Budget



***MACE & Water chgs. barely cover Mtn. costs
GOK Grant essentially for Estb. costs***

EXHIBIT 4.2

GOK SUBSIDY



SOURCE: KWA BUDGET

TABLE 4.5
FUND FLOWS SUMMARY

(Rs. mln)

| | 88/89 ----- Actuals ----- | 89/90 | 90/91 Provi- sional | 91/92 Budgeted |
|--|------------------------------|--------|---------------------------|-------------------|
| A. SOURCES OF FUNDS | | | | |
| 1. INTERNAL GENERTN. | | | | |
| (a) Internal profits (pre-int post depn; excl Revn grants) | -239.7 | -120.8 | -346.4 | -315.3 |
| (b) Add depreciation | 126.1 | 126.5 | 126.5 | 126.5 |
| (c) Internal genrtn (a+b) | -113.6 | 5.6 | -219.9 | -188.8 |
| 2. GOK GRANTS | | | | |
| (a) W.B. new projects | 0.0 | 0.0 | 0.0 | 41.1 |
| (b) Extg./other new proj | 174.3 | 305.4 | 329.2 | 347.6 |
| (c) Revenue grants | 250.5 | 235.0 | 258.5 | 284.3 |
| SUB TOTAL (2) | 424.8 | 540.4 | 587.7 | 673.1 |
| 3. LOAN DRAWN | | | | |
| (a) W.B. new projects | 0.0 | 0.0 | 0.0 | 41.1 |
| (b) Extg./other new proj | 214.2 | 174.6 | 217.6 | 347.6 |
| SUB TOTAL (3) | 214.2 | 174.6 | 217.6 | 388.8 |
| 4. TOTAL SOURCES (1 to 3) | 525.5 | 720.6 | 585.4 | 873.1 |

TABLE 4.5 (CONTD.)

(Rs. ml)

| | 88/89 ----- Actuals ----- | 89/90 | 90/91 Provi- sional | 91/92 Budgete |
|--------------------------------|------------------------------|-------|---------------------------|------------------|
| B. APPLICATION OF FUNDS | | | | |
| 5. CAPITAL INVESTMENTS | | | | |
| (a) W.B. new projects | 0.0 | 0.0 | 0.0 | 82.3 |
| (b) Extg./other new proj | 557.1 | 391.3 | 323.7 | 695.3 |
| SUB TOTAL (5) | 557.1 | 391.3 | 323.7 | 777.5 |
| 6. LOAN REPAYMENTS | | | | |
| (a) W.B. new projects | 0.0 | 0.0 | 0.0 | 0.0 |
| (b) Other new projects | 0.0 | 0.0 | 0.0 | 0.0 |
| (c) Existing loans | 25.9 | 26.6 | 27.6 | 27.6 |
| SUB TOTAL (6) | 25.9 | 26.6 | 27.6 | 27.6 |
| 7. INTEREST REPAYMENTS | | | | |
| (a) W.B. new projects | 0.0 | 0.0 | 0.0 | 0.0 |
| (b) Other new projects | 0.0 | 0.0 | 0.0 | 0.0 |
| (c) Existing loans | 41.5 | 48.1 | 55.8 | 67.0 |
| SUB TOTAL (7) | 41.5 | 48.1 | 55.8 | 67.0 |
| 8. TOTAL DEBT SERVICE (6+7) | 67.5 | 74.7 | 83.4 | 94.6 |
| 9. INCREASE IN WORKING CAPITAL | -147.2 | 318.9 | 149.4 | -2.0 |
| 10. TOTAL APPLC. (5+8+9) | 477.3 | 784.9 | 556.5 | 870.0 |
| 11. CASH GENERATED (4-10) | 48.2 | -64.2 | 28.9 | 3.0 |
| 12. ADD OPENING BALANCE | 197.1 | 245.3 | 181.0 | 210.0 |
| 13. CLOSING BALANCE (11+12) | 245.3 | 181.0 | 210.0 | 212.9 |

ASSETS & LIABILITIES

4.25 KWA appears to have had a fairly high level of net block at Rs.3942.2 million as on 31.3.90. In addition, it had Rs. 2137.7 million of capital works-in-progress. However, it must be remembered that these figures (of net block) relate to revised fixed asset figures and not to the original costs of assets.

4.26 The total current assets of KWA excluding cash balance are fairly high (Rs.1323.5 million as on 31.3.90). This comprises of a very high Rs.764.5 million of sundry debtors (including Rs.434 mln receivables from consumers) and Rs.295 million of inventory (of which more than 98% is capital inventories). KWA has also lent or advanced Rs.274.3 million (as on 31.3.90) to various parties including its employees and sundry creditors. (See Table 4.6 for a Summary of KWA balance sheet).

4.27 At the time of formation of KWA, certain amount of GOK contributions from earlier periods (Rs.426 mln) and net PHED assets (Rs.4355 mln) were worked out and transferred to KWA. These form major portions of KWA's present capital (alongwith GOK grants during 1984-91).

4.28 KWA has substantial outstanding loans from GOK, as also other organisations such as LIC. The total loans outstanding as on 31.3.90 are Rs.1495 million. As mentioned earlier, KWA has now represented to GOK to convert the loans taken between 1984 and 1991 into grants/equity so as to reduce their debt burden.

4.29 Compared to current assets of KWA, the current liabilities are at a much lower level (Rs.388 million as on 31.3.90) comprising of deposits received from outside agencies, bills pending payment to suppliers and contractors and pending statutory employee deduction.

4.30 On an overall basis, KWA's financial status now or in the past few years cannot be determined as anywhere near a healthy status. Operating costs have been going up steeply and KWA's volume of capital activities has increased substantially over the last 5 years. However, there has been no corresponding improvements in revenues resulting in KWA's dependence on GOK for substantial operational grants.

TABLE 4.6
BALANCE SHEET SUMMARY

(Rs. mln)

| | 88/89 ---- Actuals ---- | 89/90 | 90/91 Provi- sional | 91/92 Budgeted |
|----------------------------|----------------------------|-------|---------------------------|-------------------|
| A. ASSETS | | | | |
| 1. FIXED ASSETS | | | | |
| (a) Opening balance | 6080 | 6091 | 6098 | 6200 |
| (b) Added during year | 10 | 7 | 102 | 438 |
| (c) Less actual Deprcn. | 2029 | 2156 | 2282 | 2409 |
| (d) NET FIXED ASSETS | 4061 | 3942 | 3918 | 4229 |
| 2. CAPITAL W-I-P | | | | |
| (a) Added during year | | | | 778 |
| (b) Net balance | 1538 | 2138 | 2211 | 2551 |
| 3. CURRENT ASSETS | | | | |
| (a) Inventory | 253 | 295 | 321 | 332 |
| (b) Sundry debtors | 596 | 765 | 803 | 803 |
| (c) Inter office bal. | 62 | -10 | 0 | 0 |
| (d) Loans/advances | 135 | 274 | 277 | 280 |
| (e) Cash balance | 245 | 181 | 210 | 213 |
| SUB TOTAL (3) | 1290 | 1505 | 1610 | 1627 |
| 4. ACCUM LOSSES | 929 | 846 | 994 | 1092 |
| TOTAL ASSETS/LOSSES | 7819 | 8431 | 8733 | 9499 |

TABLE 4.6 (CONTD.)

(Rs. mln)

| | 88/89 ---- Actuals ---- | 89/90 | 90/91 Provi- sional | 91/92 Budgeted |
|------------------------------------|----------------------------|-------|---------------------------|-------------------|
| B. EQUITY & LIABILITIES | | | | |
| 1. EQUITY | | | | |
| (a) Orign. PHED equity | 4355 | 4355 | 4355 | 4355 |
| (b) GOK contributions | 1636 | 1916 | 2008 | 2490 |
| (c) Other cap contrib. | 166 | 276 | 276 | 276 |
| SUB TOTAL (1) | 6158 | 6548 | 6640 | 7121 |
| 2. L. T. LOANS | | | | |
| (a) LIC/other Loans | 456 | 604 | 794 | 766 |
| (b) GOK Loans | | | | |
| - WB new projects | 0 | 0 | 92 | 41 |
| - Other new projects | 0 | 0 | 0 | 348 |
| - Existing | 777 | 891 | 891 | 891 |
| Sub Total (b) | 777 | 891 | 983 | 1280 |
| SUB TOTAL (2) | 1233 | 1495 | 1777 | 2046 |
| 3. CURRENT LIABILITIES | | | | |
| (a) Deposits | 58 | 146 | 154 | 161 |
| (b) Sundry creditors | 145 | 147 | 155 | 162 |
| (c) Provisions | 5 | 7 | 7 | 8 |
| (d) Suspense a/c | 220 | 88 | 0 | 0 |
| SUB TOTAL (3) | 428 | 388 | 315 | 331 |
| TOTAL EQUITY+LIABs | 7819 | 8431 | 8733 | 9499 |

4.31 Under the Kerala Water Supply & Sewerage Act, 1986 governing the finances of KWA, it has been clearly stated that KWA shall not carry on its operation at a loss. In fact, the Act provides for KWA to take such action as may be necessary to meet its O&M costs and debt service. However, in the past few years KWA has not moved towards this status and continues to depend on GOK grants.

5. COST OF SCHEMES

5.1 In the previous chapter, KWA's overall financial status was examined. In this chapter, an analysis of the O&M cost of different types and sizes of schemes has been presented. In addition, a comparison has been made between the unit costs (cost per KL) of water and income that KWA earns per unit volume of water, which are then used as inputs for recommendations on tariff structure presented later in this report. A detailed analysis of these aspects have been presented in Volume 2-A along with the information collected from a representative sample of 373 schemes from different parts of Kerala.

INCOME PER UNIT VOLUME OF WATER

5.2 The total water volume produced or distributed by KWA is not known with accuracy or high degree of reliability. Therefore, to arrive at unit income and costs an estimation exercise was carried out. The information available from KWA and collected during the field visits was utilised fully. The gaps that remained were filled in using estimation of water consumption on a 'norm' basis. The norms used were different for urban and rural.

5.3 Overall, the water production volumes are in the range of 500-600 mld. All discussion hereafter is based on conservative 500 mld estimate. However, growth in water volumes over the past few years is also not known. Therefore, no analysis could be presented on trends of incomes or costs.

5.4 The total income (on accrual basis) per KL of water is presented in Table 5.1. The three columns of the table indicate the income per unit of

- (a) Water produced
- (b) Water distributed
- (c) Water sold.

TABLE 5.1

INCOME PER UNIT OF WATER

(Rs./KL)

| 1989-90 | PRODUCED | DISTRIBUTED | SOLD |
|---------------------------------|----------|-------------|------|
| Income (excluding grants) | 1.73 | 2.31 | 2.61 |

5.5 'Water produced' less water lost in transmission and distribution (T&D) is termed as 'Water distributed'. There are no accurate figures available for T&D losses. Based on discussions with several technical personnel of KWA, the T&D losses have been taken at 25% of production volumes. 'Water sold' volumes are even less than the water distributed volumes due to a substantial volume of water given out as 'Free allowance' and water flows through the public standposts.

5.6 Here again, there are no factual data on actual volumes of free allowance and standpost supply. These have also been estimated on a per connection or per standpost basis and aggregated for the state as a whole. (assumption made here is a free allowance of 5000 ltrs per connection per month and 20,000 ltrs per public tap per month).

5.7 Thus it can be seen that even though KWA has an income of Rs.2.61 per 1000 litre of water it sells, the income per unit of water produced is far less at Rs.1.73.

5.8 It has not been possible to obtain accurate information on income of KWA separately from the 'urban' and 'rural' schemes on an overall basis. However, the Income of KWA from rural house connection and rural local bodies (panchayats) can be considered as total rural income. On this basis, and on the assumption of an income of Rs.7 per rural domestic connection (most optimistic estimate) the total KWA rural income comes to only Rs.28.5 mln. When this figure is converted to an income per unit volume of water, the picture that emerges for urban and rural areas clearly shows that substantial differences exist between the two (Table 5.2).

TABLE 5.3

COST OF WATER (1989-90)

(Rs/KL)

| | Cost per KL of water | | |
|-----------------------------------|----------------------|-------------|------|
| | Produced | Distributed | Sold |
| 1. (a) Salaries | 0.67 | 0.89 | 1.01 |
| (b) Power | 0.52 | 0.69 | 0.78 |
| (c) Chemicals | 0.05 | 0.07 | 0.08 |
| (d) Repairs | 0.37 | 0.49 | 0.56 |
| (e) Admin. | 0.08 | 0.11 | 0.12 |
| Sub Total (1) | 1.69 | 2.25 | 2.55 |
| 2. (a) Depreciation & Interest | 0.87 | 1.16 | 1.31 |
| 3. Total (1 + 2) | 2.56 | 3.41 | 3.86 |

5.11 The trends in costs per KL of water have not been presented due to lack of information of total volume of water in earlier years.

5.12 A detailed analysis of costs per KL of water has been carried out for a representative sample of schemes for which data was obtained during the course of this study. This is presented in the next few paragraphs.

O&M Costs - of schemes

5.13 Table 5.4 outlines the direct cost per KL of water comprising of direct salaries/wages, power, chemicals and scheme maintenance and repairs. Direct costs also included scheme related depreciation and interest. As in earlier cases, the unit costs have been worked out for a total water volume of 500 mld, 25% T&D losses and free allowances/public tap water volumes as described earlier.

TABLE 5.4

DIRECT COSTS/KL OF WATER - SAMPLE SCHEMES (1990-91)

(Rs. per KL)

| | ON PRODUCTION | ON DISTRIBUTION | ON SALE |
|-------------------------------|------------------|--------------------|-------------|
| Salary | 0.30 | 0.40 | 0.51 |
| Power | 0.25 | 0.33 | 0.42 |
| Chemical | 0.22 | 0.29 | 0.37 |
| Repairs & Maintenance | 0.04 | 0.05 | 0.07 |
| Depreciation | 0.60 | 0.80 | 1.02 |
| TOTAL DIRECT COSTS | 1.41 | 1.76 | 2.39 |

5.14 The data presented in Table 5.4 relates to the 373 schemes sample for 1990-91. What is significant from the table is the high cost of power and chemicals which is substantially higher than the normal engineering estimates that KWA prepares at the time of project report preparation. The depreciation figures are high but are based on the revalued fixed assets.

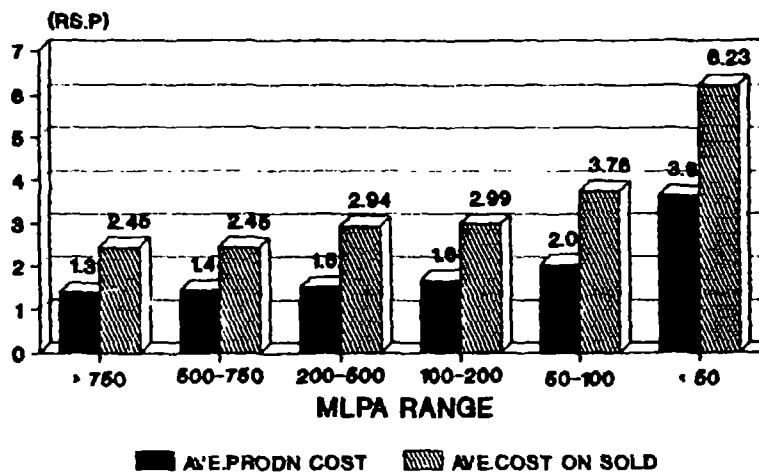
5.15 The high differences between the costs per KL of water produced and sold is due to the substantial free allowance and standpost water volumes. As the exact quantum of free allowance or the standpost water volumes are not known with accuracy, a sensitivity exercise was carried out with changing the free allowance to 10,000 litres per month per domestic connection. This increased the direct costs per KL of water sold from Rs.2.39 (as shown in Table 5.4) to Rs.2.82 per KL. This shows that the quantum of free allowance has an important bearing on costs.

O&M Costs by Production ranges

5.16 Exhibit 5.1 outlines the Direct costs analysed by production ranges. Various volume ranges have been adopted to aid in-depth analysis on costs. Costs have been analysed on schemes with production ranges from 2 mld to 0.2 mld. (50 to 750 mlpa) The assumption on free allowance is 10,000 litres per connection per month.

EXHIBIT 5.1

TOTAL DIRECT COST /KLTR (@ 10000 FREE ALLOWANCE)



SOURCE: DIVISION DATA

The exhibit reflects that the unit costs vary inversely to scheme size (ie) costs are higher at small schemes. Moreover, the cost difference between production and sale widens as the scheme size comes down indicating significant free water in smaller schemes and/or significant standpost connections in these schemes.

5.17 Table 5.5 indicates the "break-even" levels at various income options.

TABLE 5.5
"BREAK-EVEN" LEVELS BY PRODUCTION RANGES

| Income/kltr | (MLPA range) | | |
|-------------|--------------|--------------|----------------|
| | Full cost | Direct costs | All cash costs |
| Rs.2 | None | 500 - 750 | 100 - 200 |
| Rs.3 | 500 - 750 | 100 - 200 | 50 - 100 |
| Rs.4 | 50 - 100 | 50 - 100 | 50 |

5.18 It is observed that the existing average income of Rs.1.73/KL even if doubled would not be sufficient to cover the full costs (ie) Direct & Indirect costs for all schemes. However, the major schemes (ie. schemes over 1.5 mld production) would recover their direct costs. At existing levels of costs, a 3 fold increase in income is necessary to recover all costs for all schemes.

O&M Costs by scheme type

5.19 The costs also differ depending on the type of schemes. For this purpose, the schemes were classified as under :

- (a) Major Water Supply Schemes (WSS)
- (b) Major Rural Water Supply Schemes (RWSS)
- (c) Tubewell & borewell schemes.

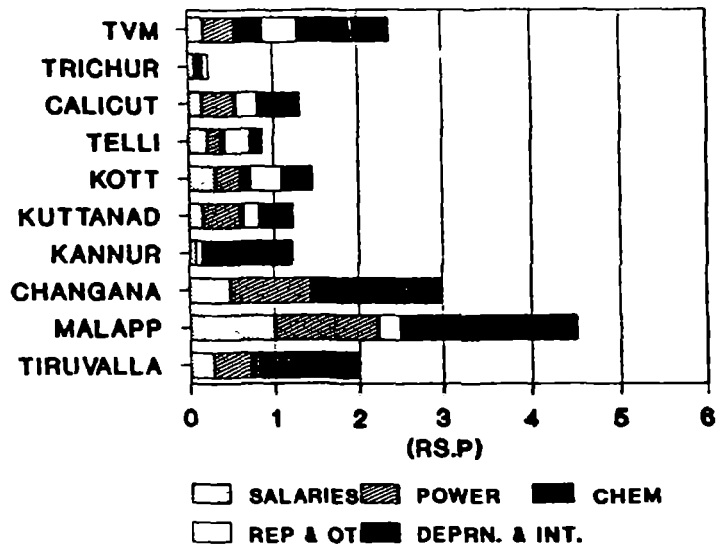
5.20 Exhibits 5.2 and 5.3 give a comparison of O&M costs by scheme type. It will be observed that though the production costs of RWSS are comparable to urban schemes, in terms of costs on water sold the RWSS costs are 50% more. Following are the average O&M costs per kltr of water volumes produced.

| | Rs./KL |
|-------------|--------|
| Major WSS | 1.87 |
| Major RWSS | 2.33 |
| TWSS & BWSS | 1.78 |

EXHIBIT 5.2

COST /KLTR

MAJOR WSS SCHEMES

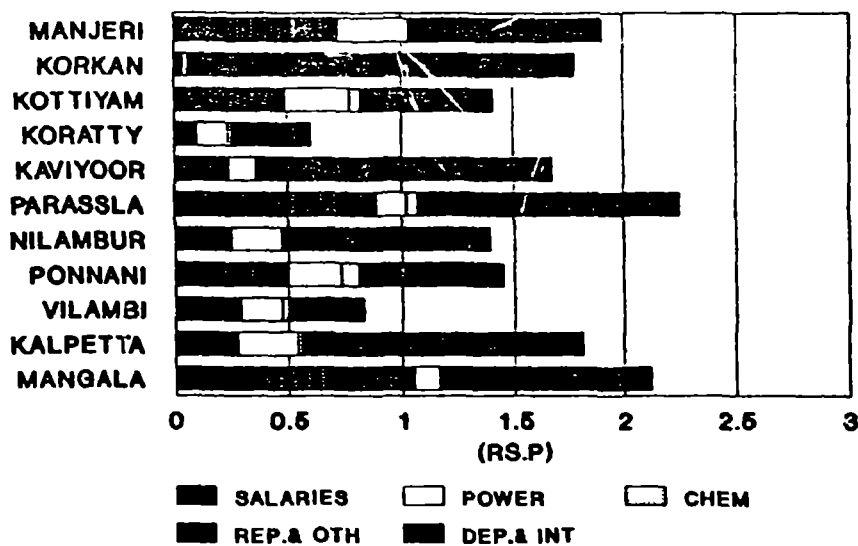


SOURCE : DIVISION DATA

EXHIBIT 5.3

COST /KLTR

MAJOR RWSS



SOURCE:DIVISION DATA

5.21 Review of these RWSS costs reveal that nearly 50% of the O&M costs are spent on salaries of pump operators. Based on discussion with the divisions, it is understood that the pumps are normally operated for 3-5 hours in a day in the northern districts and 6-7 hours a day in Southern districts. An exclusive operator for these schemes leads to underutilisation of labour as well as posing a major cost burden.

O&M Cost by Components

5.22 The analysis of the sample data showed that the variations in O&M costs under each O&M component from one scheme to another is very high. For example the salary costs varied from negligible amounts to Rs.5 per KL in some rural schemes.

5.23 Power costs also varied significantly from one scheme to another and were generally high in many of the rural schemes (going upto Rs.2.15 per KL).

5.24 Repairs and maintenance cost varied from very nominal to Rs.1.45 per KL in some rural schemes. Schemes which have been completed prior to 1975 showed very high repair cost indicating need for appropriate review by KWA.

O&M Cost by Local Body categories

5.25 Analysis of costs of schemes was also carried out for different types and sizes of local bodies. This is relevant as the revenue potential from different local bodies may be different. Table 5.6 presents the cost per KL of water produced and sold by different types of local body categories.

TABLE 5.6

COST/KILOLITRE OF WATER PRODUCED & SOLD BY LOCAL BODY
CATEGORIES

(Rs/KL)

| LOCAL BODIES | PRODUCED | SOLD |
|---|----------|------|
| (1) Corporations | 1.05 | 1.49 |
| (2) Major municipalities | 0.61 | 0.84 |
| (3) Other municipality & spl. grade panchayats | 0.82 | 1.20 |
| (4) Medium sized panchayats | 0.96 | 1.44 |
| (5) Smaller panchayats | 1.82 | 2.93 |

NOTE : Costs exclude depreciation

5.26 The figures presented in the above table are averages of different local bodies within each of the categories mentioned above. For instance, Corporations comprise of 3 corporations in the State. Major municipalities comprise of 9 municipalities etc. (Further details of this analysis are presented in Volume 2-A).

5.27 Even within each local body category, the cost varies substantially from one local body to another. For example, in Calicut, it is estimated that the O&M costs are Rs.1.1 per KL while in Trivandrum, it is Rs.1.86 per KL. In the major municipalities, the cost varies widely from Rs.0.23 per KL in Trichur to 1.29 per KL in Palai. In the other municipalities, the cost varies widely again ranging from Rs.0.65 per KL to Rs.2.62 per KL.

5.28 As mentioned earlier, the cost per KL are generally high in the rural areas coming under the rural water supply schemes. For understanding the O&M costs better in rural areas, information was collected through field visits from 28 rural water supply schemes for the last 3 years. The data was then analysed componentwise. Table 5.7 presents the data in these schemes. When direct depreciation and interest is added on to these direct O&M cost shown in table, the unit costs of these sample rural schemes becomes much higher than similar costs of urban schemes.

DEFICITS PER KL OF WATER

5.29 Comparison of income per unit volume and costs per unit volume clearly shows that there are substantial deficits. These deficits when translated to the overall volume of water that KWA handles result in large operational losses which have been met by GOK subsidy.

5.30 In a subsequent chapter, the cost and the income per unit volume of water in future have been forecasted and recommendations have been made for both cost containment and revenue enhancement. Table 5.8 presents the deficits in unit and overall terms.

TABLE 5.8

DEFICITS - PER UNIT VOLUME OF WATER AND OVERALL

| | 1989-90 |
|--|---------|
| 1. Income (RS/KL)* | 1.73 |
| 2. Expenditure (RS/KL)* (including depreciation, interest) | 2.56 |
| 3. Deficits (Rs/KL) | 0.83 |
| 4. Deficit (RS.MLM/YR) | 151.60 |

* Per KL of water produced.

6. WATER USAGE PRACTICES

6.1 As a part of the cost and revenue study, an extensive field study was carried out covering 4200 households, 800 non-domestic water users and 75 medium/large industrial units to obtain an idea of the water usage practices and water related costs/payment prevailing in different parts of Kerala. The survey covered 12 urban locations and 4 rural locations. A detailed discussion on data obtained during the field study is presented in Volume 2-B. In this chapter, the findings from the survey are summarised.

PROFILE OF SURVEYED CONSUMERS

6.2 Through a process of multistage stratified random sampling, the survey covered households and non-domestic users of different profiles. For example, the surveyed families lived in RCC roofed houses (47.4%), tiled roofed houses (46.8%) and thatched houses (4.2%). The sizes of houses varied from less than 500 sq.ft. to more than 1500 sq.ft. The surveyed houses had 8% houses with no bath rooms and 13% houses with more than 2 bathrooms. The literacy level in the surveyed households varied from those having Post Graduate education to those having only the minimum reading/writing ability as the highest level of learning in the house.

6.3 From an economic point of view, the survey covered a wide range of incomes and assets with about 6% of the houses having less than Rs.500 household income per month to 3% of the houses having more than Rs.7,000 per month. The average income was Rs.2620 per month.

SOURCES OF WATER

6.4 The survey clearly revealed that a significant proportion of households have multiple sources of water. Even those having pipe connection do depend on other sources of water during certain periods or for certain purposes. Table 6.1 presents the dependence of households on different sources of water.

TABLE 6.1

DEPENDENCE OF HOUSEHOLDS ON SOURCE OF WATER

(%)

| Sub-group | Pipe Conn. | O N L Y Own well /bore | Public Tap | Pipe & Well | Pipe & extnl | Owell & othrs | Pub.tap & othrs. |
|------------|------------|---------------------------|------------|-------------|--------------|---------------|------------------|
| Corporn | 53.5 | 9.5 | 8.0 | 19.2 | 7.6 | 1.4 | 0.8 |
| Municip | 23.9 | 24.4 | 7.3 | 25.1 | 12.5 | 4.7 | 2.1 |
| Panchayats | 9.9 | 46.1 | 14.9 | 5.7 | 12.8 | 8.5 | 2.1 |
| Totals | 43.7 | 15.0 | 8.0 | 20.4 | 9.1 | 2.6 | 1.2 |
| Rich | 38.7 | 12.9 | | 45.2 | 3.2 | | |
| Middle | 58.9 | 9.5 | 1.2 | 24.7 | 5.1 | 0.4 | 0.3 |
| Poor | 35.8 | 18.1 | 12.2 | 17.7 | 11.0 | 3.7 | 1.6 |
| Totals | 44.1 | 15.0 | 8.2 | 20.4 | 8.8 | 2.5 | 1.1 |

6.5 Sources of water varied with availability of own well/borewell water/water from nearby rivers and canals. The usage of different sources for different purposes also varied with economic status of the household. In the Corporations, dependence on pipe connection is much more than in the municipalities. Usage of public taps is much more in rural panchayats than in the corporations and municipalities.

CONSUMPTION VOLUMES

6.6 Table 6.2 presents the average consumption of water in litres per capita per day. The richer household consumed more water (165 litres per person) compared to the poorer (110 litres per day) However, not much of differences were observed across corporations and municipalities. The survey conclusion on a slightly higher consumption in Panchayat areas needs to be noted with care as the sample size in panchayats was very limited and not representative of all the panchayats in the State (a more detailed discussion of why the sample was so designed is presented in Volume 2-B under Sample Design.)

TABLE 6.2
AVERAGE CONSUMPTION OF HOUSEHOLDS BY SOURCE
(In litres per person per day)

| Sub-group | Pipe Conn. | Own well /bore | Outside well | Public Tap | Total |
|-------------|------------|----------------|--------------|------------|-------|
| Corporn | 73 | 31 | 4 | 10 | 118 |
| Municip | 48 | 55 | 8 | 12 | 112 |
| Panchayats | 15 | 86 | 12 | 19 | 132 |
| Wtd Average | 64 | 40 | 5 | 11 | 120 |
| Rich | 90 | 74 | - | 1 | 165 |
| Middle | 90 | 35 | 2 | 3 | 130 |
| Poor | 49 | 42 | 7 | 15 | 113 |
| Wtd Average | 64 | 40 | 5 | 11 | 120 |

6.7 A significant number of households (45%) did not complain of shortages. Even those who did mention water shortage indicated that the shortages were felt only on some occasions. It was generally found that households with storage facilities reported lesser shortages. On an average, an additional 45 litres per capita per day was indicated as the requirement of households for a comfortable living.

COSTS AND PAYMENT

6.8 Table 6.3 presents the average payment made by the surveyed households towards water. The number of households paying for water is much smaller than the total surveyed households. A significant number of households particularly in cities such as Cochin and Trivandrum, do not make any payment or make only very nominal payments (Re.1 per month).

TABLE 6.3

PAYMENT FOR WATER - BY CLASS OF TOWN AND ECONOMIC CLASS

(Rs./month)

| | Average | Maximum | Minimum |
|-------------------|---------|---------|---------|
| 1. Corporations | 8 | 54 | 1 |
| 2. Municipalities | 11 | 67 | 1 |
| 3. Panchayats | 12 | 33 | 2 |
| ALL (1898) | 9 | 67 | 1 |
| 1. Rich | 19 | 50 | 3 |
| 2. Middle | 10 | 67 | 1 |
| 3. Poor | 8 | 50 | 1 |
| ALL (1821) | 9 | 67 | 1 |

(Figures in parenthesis indicates the number of households responding to this question).

6.9 When the households were asked on the reasonableness of water charges, most of them reported that they considered the prevailing (low) water charges as reasonable. In fact, most of the remaining households felt that the charges were higher than reasonable.

Willingness to pay for water

6.10 In a survey of this nature wherein information is obtained through asking questions from the households, it is difficult to assess the willingness to pay for water in an appropriate fashion. The willingness to pay also varies widely from one household to another and from one location to another depending on whether or not the household has an own connection and depending on whether or not the location is a water scarcity area.

6.11 Often, willingness to pay can be assessed through an understanding of the actual amounts that households are paying for obtaining water from alternate source. An idea of willingness to pay can also be obtained by an examination of actual amounts paid by households with existing connections for the piped water supply. Direct questioning does not necessarily produce reliable information for willingness to pay.

6.12 However, a question was asked during the survey on the reasonableness of the current water charges as perceived by the households with piped connections. Also, those having piped connections were asked the amount they are willing to pay, if adequate quantity of water is made available to them. For those households who are willing to take new connections, a similar question on the monthly water charges they are willing to pay was asked.

6.13 323 households (with existing pipe connections) answered this question. In addition, 457 households who were willing to take new connections also answered the question. The results of these questions are shown in Table 6.4.

TABLE 6.4
AMOUNT OF WATER CHARGES (WILLING TO PAY)

| | | (Rs./KL) | | |
|----|---------------------------|----------|--------|------|
| | | Rich | Middle | Poor |
| 1. | With existing connections | 1.54 | 0.90 | 0.82 |
| 2. | With new connections | 1.46 | 0.79 | 0.65 |

(Figures above have been arrived at after conversion to Rs.per KL)

6.14 In some locations, the actual payments have been so low, that any charge is looked upon by the households as very high. For instance, in Cochin, many households do not pay any amount, as their consumption level is less than the 'Free allowance' level. In Trivandrum, many households pay only Re.1 per month as their meters are not working and no earlier readings are available.

Willingness for new connection

6.15 About 48% of the households not presently having a connection responded positively for taking new house connections among about 1200 who responded. Connection charges considered reasonable varied from Rs.5000 to as low as Rs.5 with an average of about Rs.850 per connection. Connection charges in the range of Rs.800 to 1200 are acceptable to a large number of such respondents (over 60%).

FINDINGS FROM NON-DOMESTIC SECTOR

6.16 The survey covered about 800 non-domestic water users as listed in Table 6.5. Their profile varied significantly within each category in terms of size, complexity and nature of work.

TABLE 6.5

MIX OF NON-DOMESTIC USERS SURVEYED

| | |
|------------------------|-----|
| Offices | 108 |
| Hotels/Restaurants | 316 |
| Schools/Colleges | 54 |
| Small scale industries | 70 |
| Lodges | 33 |
| Others | 214 |
| T O T A L | 795 |

6.17 Average consumption of water by these non-domestic users draw their water are presented in Table 6.6. However, it must be noted that there are very wide variations from one user to another and averages indicated are only meant for giving a very broad idea of water volumes consumed.

TABLE 6.6
AVERAGE WATER CONSUMPTION AMONG SURVEYED
NON-DOMESTIC USERS

| CATEGORY | AVG. VOLUME PER DAY (LITRES) |
|-------------------|---------------------------------|
| Offices | 787 |
| Hotel/Restaurants | 2700 |
| Schools/Colleges | 1700 |
| Lodges | 2885 |

6.18 Table 6.7 indicates the average payment towards water by different categories of non-domestic users. Here again, the averages are only indicative and vary widely from one user to another. However, what is significant is the fact that water costs form a very small percentage of the total costs. This indicates that potential for raising additional revenues from these users exists.

TABLE 6.7
AVERAGE WATER RELATED PAYMENTS AMONG SURVEYED
NON-DOMESTIC USERS

| CATEGORY | AVG. PAYMENT (RS./MONTH) |
|-------------------|-----------------------------|
| Offices | 15 |
| Hotel/Restaurants | 93 |
| Schools/Colleges | 42 |
| Lodges | 73 |

WATER USAGE PRACTICES AMONG INDUSTRIAL USERS

6.19 There are about 400 medium/large industrial units in Kerala. All these industrial units were contacted through mailed questionnaire. Of these, information could be obtained from about 75 industrial units including the 25 largest water users, who were contacted personally.

6.20 The survey revealed that KWA is not a major source of water for a very large number of industries in Kerala. This is either because KWA does not have an operating water scheme at all near the industrial unit, or because of existence of a large river, lake or canal nearby. Among the largest water consuming 25 industries, the dependence on KWA is less than 10% by volume. In fact, only 7 of these 25 indicated that they depend on KWA for more than 50% of their requirement. Compared to this, 10 industrial units among the large 25 reported that they depend on nearby rivers and lakes for more than 50% of their requirement.

6.21 It was interesting to observe from the survey that even among the top 25 industrial consumers, KWA does not have a very frequent billing schedule. Of the 14 industrial units which furnished information on this aspect, only 8 reported that they received monthly bills. Three of them reported receiving half yearly bills. However, most of the industrial units preferred a monthly billing frequency.

6.22 While all industrial units should ideally be charged on the basis of a metered consumption if the supplies are from KWA, only 13 indicated that their bills are based on metered readings 4 of them reported billing on a flat rate basis.

6.23 It was difficult to establish whether the industrial units in Kerala will be able to absorb the water costs if the tariffs were to be revised substantially. At the moment, water costs (on an average) are not significant proportion of the total cost of the industrial units surveyed. In fact, water costs as percentage of total costs for the top 25 units works out to only 0.13% (for KWA supplies) and 3.8% for those dependant on water transported through the tankers.

7. REVIEW OF EXISTING BILLING AND COLLECTION PROCEDURES

7.1 This chapter reviews the existing procedural aspects of billing and collection of water charges from different types of consumers in different parts of Kerala. It also discusses recommendations for improvement. A more detailed presentation of the existing procedures and systems in Kerala, as also comparison with procedures in a few other select cities in the country has been presented in Volume 2-B.

DATA COLLECTION METHODOLOGY

7.2 For obtaining an understanding of the existing procedures in different parts of Kerala, pretested questionnaires were first mailed to all the revenue accounting units of KWA. In addition, a separate questionnaire was also mailed to all the municipalities and panchayats in the State. This approach was taken due to the fact that procedures differ in different divisions of KWA, as also from one local body to another where billing and collection is carried out by the local body. The takeover of responsibilities of billing and collection from local bodies by KWA has been completed only by April 1991 and therefore, it was necessary to understand the prevalent practices in all local bodies also.

7.3 The mailed questionnaires were followed up by personal visits and discussions with several field people. The data obtained was then analysed on a computerised data base, separately for the KWA divisions and local bodies.

7.4 The discussion in the next few paragraphs is based on this analysis, as also the discussions held with the KWA head office personnel. In addition, information available about the procedural aspects of revenue and billing in other parts of the country was utilised for analysis of the Kerala data.

EXISTING PROCEDURES

7.5 All consumers coming directly under the KWA fold for the purposes of billing and collection, are billed by KWA revenue accounting staff at the section level. The

procedures to be adopted have been laid down in the rules to the Kerala Water Supply & Sewerage Act 1996. As per the existing rules, all domestic and other categories of consumers should be billed on a monthly cycle based on metered water volumes of consumption and the applicable tariff rates.

7.6 However, in practice this procedure is not strictly adhered to. Frequency of billing for domestic connections varies from 3 months to 6 months. In a significant number of cases, the meters are not in working condition and therefore, the method of charging is based on estimated previous averages.

7.7 As the consumers are expected to pay only after receipt of the bill and within the time provided, the collections are significantly lower than the billing. In actual practice, the punitive action taken on the non-paying consumers is very nominal, if any thing at all. Therefore, there is no incentive for the consumer to make the payment on time.

7.8 In the areas which were under the control of the municipalities till April 1991, the procedures vary from one place to another depending on the rules made by the municipalities. However, the situation is not very different in terms of billing frequencies and collection efficiencies. In fact, a large number of consumers in many of the municipalities/corporations do not pay any amount at all. This is either because they are not provided with a bill on a frequent basis, or because their water consumption is below the free allowance levels. Similarly, in many other cities, the payment by the consumer is only a nominal Re.1 per month. This is due to the fact that their meters are not working for a long time and no previous averages are available.

7.9 At the moment, as per the Act and Rules, the water meter ownership rests with the Kerala Water Authority. Consumers are expected to pay only a meter rent and installation charges. Since there are no punitive measures taken for non-working meters, it is generally in the interest of the consumer to keep the meters non-working. When the meters are not working, and if the consumer complains to KWA, the procedure and time involved in KWA arranging to repair the meter and reinstalling it is very long.

7.10 In some of the large cities, such as Cochin, where KWA has taken over the distribution, billing and collection recently, there are no proper consumer registers. KWA will have to put in substantial efforts in these areas to prepare an exhaustive consumer register for such areas along with the detailed addresses, arrears and meter readings.

PROVISIONAL INVOICE CARD SYSTEM

7.11 KWA has introduced a new system recently called the Provisional Invoice Card system (PIC) in Trivandrum. In this system, a fixed amount is calculated initially on the basis of the previous 6 months to one year actual available meter reading. If such information is not available, a minimum charge of Rs.10 per month is fixed. A Provisional Invoice Card is then issued to the consumer indicating that he should pay this amount every month without any formal demand being raised.

7.12 This fixed amount can then be paid by the consumers at KWA office counters or at banks. The meter readings are taken by KWA staff once in 6 months. Water charges as per the meter reading and the prevailing tariff is then computed. If the amount payable is more than the amount paid as per PIC, the arrears amount is separately demanded and a revised fixed amount is worked out. The PIC card is reissued indicating the arrears amount and the revised fixed amount.

7.13 The PIC system has inherent advantages in practice. KWA receives monthly collections without any formal billing. The requirement of meter readers is much less compared to the system in other areas. Since the minimum amount is fixed at Rs.10, the total collections of KWA in Trivandrum have gone up substantially.

7.14 During the study, all the KWA field staff in other divisions, as also all the consumers surveyed in Trivandrum city were asked about their opinion on the PIC system. A majority of both the KWA staff and the consumers preferred this system as it has clear guidelines and simple procedures.

MIS RELATING TO BILLING AND COLLECTIONS

7.15 At the moment, KWA does not have adequate and continuous monitoring information on its billing and collection in different parts of the State. KWA has recently introduced a computerised BCMS (Bill and Collection Monitoring System) at its head quarters. However, the BCMS has been designed to collect data at the division level only. The data collected does not look for detailed consumerwise data. In fact, KWA is not in a position at the moment to carry out either an ABC analysis, or aging analysis of its billings and collections.

7.16 It will be necessary for KWA to design a detailed analytical billing and collection system with strong underlying systems to capture both detailed and overall data. This system needs to be a computerised system so as to aid in quick analysis and appropriate querying. The design of this system should start with an analysis of the MIS requirements of the senior management of KWA on billings and collection and proceed downwards to the revenue accounting units for designing and developing the required underlying systems.

RECOMMENDED PROCEDURES

7.17 Based on the analysis of the data and discussions, it is recommended that the PIC system be extended to the entire State. After a few months of extending this system and after the system stabilises, KWA can consider computerisation of data obtained from the PIC system. - Keeping computerisation at a later point in mind, the new PIC can be a slightly modified version of the existing PIC.

7.18 Because of introduction of PIC system, KWA will have to consider redeployment of its meter readers into other areas of accounts and administration, as the total number of meter readers required under the PIC system will be less than the existing staff strength.

7.19 However, the procedure for the non-domestic and industrial consumers will not be on the PIC system. Such consumers will be billed on the actual meter readings on an individual basis at monthly intervals. Computerisation of such a system can also be taken up as a separate exercise in the larger cities.

8. RECOMMENDATIONS

8.1 This chapter presents and discusses a number of recommendations on decision/actions to be taken by KWA. The recommendations presented here can be broadly classified into 3 groups, namely :

- (a) Cost containment/control measures
- (b) Resource improvement measures
- (c) Improvement of systems and procedures.

These cover the following :

- (a) Measures for cost control/containment such as optimal labour deployment, energy audit etc.
- (b) Metering
- (c) Tariff and related issues such as structuring of tariffs, consumer classification, slab tariffs, free allowance, charging of local bodies, etc. and
- (d) Systems for better financial management.

8.2 The above mentioned recommendations are based on conclusions arrived at and described earlier from the study and a number of 'considerations'. These underlying considerations have been briefly presented first before discussing the recommendations.

UNDERLYING CONSIDERATIONS

8.3 While recommending improvements in any water organisation, it is necessary to first agree on a number of considerations that can form the foundation for the recommendations. These cover the following concepts :

- (a) Equity : Any decision/action taken by KWA on metering, tariffs etc. should not result in 'inequitable' implications on the users of KWA's service. The implications can be financial or physical (Eg. new connections, location of public taps, volume of water distributed etc.). Here, we are more concerned about the financial implications (Eg. charging in proportion to volume of consumption).
- (b) Financial Self Sufficiency : KWA is a service utility and is to function as a 'not-for-profit' organisation. However, KWA should achieve financial self sufficiency' through cost containment and enhanced revenues, so as to be in a position to act independent of any external bodies and invest in its growth and service improvement. Recommendations made here are such as to make KWA move towards achievement of financial self-sufficiency' objective.
- (c) Water Conservation : Water as a resource is scarce and expensive. Every person should be provided with a certain minimum desirable volume of water for a comfortable and healthy living. However, no person or water user should be encouraged or allowed to waste water. Hence the recommendations attempt to induce in the users steps to conserve water.
- (d) Administrative Ease : Any improvements/changes/action recommended should be easy to implement and should have in-built ease of administration. Many times even conceptually correct or sound recommendations/systems do not yield results if they are very complex to administer.

TABLE 8.1.

NUMBER OF PUMP OPERATORS DEPLOYED IN SELECT RURAL SCHEMES

| NAME OF THE R.W.S.S | NOS. |
|---------------------|------|
| Ajanur | 1 |
| Nileswar | 2 |
| Kayyur | 1 |
| Padanna | 2 |
| Kaithakkad | 1 |
| Burma | 2 |
| Meenangadi | 2 |
| Vythiri | 1 |
| Kariyambadi | 1 |
| Kaniyambetta | 1 |
| Padinharathara | 1 |
| Kelpetta | 4 |
| Aroor | 2 |
| Ezhupunna | 2 |
| Mararikulam N | 3 |
| Mararikulam S | 3 |
| Thanneermukkam | 2 |
| Vayalur | 3 |
| Kanadanad M | 2 |
| Chottanikkara K | 1 |
| Karikode | 1 |
| Poothotta | 1 |
| Pothencode | 3 |
| Pachellur | 7 |
| Thiruvallam | 9 |
| Muttakkad | 3 |
| Total | 64 |

8.6 Under these circumstances it becomes necessary to optimise the labour cost particularly in the smaller schemes through innovative methods of managing the operations and maintenance of these schemes.

8.7 'Voluntarisation' of operation and maintenance of the small rural scheme is one possible solution. Either local persons from the village or persons from good voluntary organisations active in/near the village need to be identified and trained by KWA in operation and maintenance. As the work involved will not be a full time 8 hour job for these persons, costs incurred on them will be far less than what KWA will spend on its own full time pump operators. In fact, the local bodies benefiting from the scheme can be made responsible for the operation and maintenance as well as payments to such persons. KWA should only be available as a 'referral point' for major repair and maintenance problems.

8.8 Similarly, the local body or these voluntary persons should be made responsible for the collection of charges from the house connections which are generally very small in number in the villages. The charges collected may be then handed over to KWA after deducting a small service fee. This will reduce KWA's costs of collection and also ensure that better revenues are realised.

Energy costs

8.9 After the salary costs, power costs are the most important cost component. As mentioned before, KWA spent Rs.95.5 mln (in 1989-90) on power equivalent to Re.0.52 per KL of water produced. Large variations on power cost per KL of water from one scheme to another are not necessarily due to differing physical requirements (such as distance over which water is pumped, pumping vs gravity flow etc.). In several schemes, high power costs are because the pumps are inefficient and uneconomical to run. In some schemes, the power costs are high because of the applicability of minimum charges even for very low usage of pump (for a few hours only).

8.10 KWA does not have a centralised data base on power consumption, pump history and power costs. Therefore, it is recommended first that KWA designs and installs a system to monitor the performance of each scheme from power consumption and cost view point. The monitoring system should provide exceptional reports on high power cost schemes which can trigger off 'energy audit' of such schemes. And wherever uneconomical pumps are identified, such schemes should be considered for pump replacement.

Overheads

8.11 The overheads cost (administration) of KWA are also quite high (Rs.27 mln in 1990-91 provisional excluding indirect salaries). At the moment there are no proper systems to budget, monitor or contain these expenses. As the organisation grows in size and complexity, these expenses will grow and generally at a higher rate. It is therefore recommended that the major components of overheads are examined in detail and a 'zero based budgeting' system be instituted for control on these expenses.

METERING

8.12 In any water distribution system, 'equity' can be brought about by introducing measurement of water consumption at the consuming point and then charging by the volumes. Universal metering is the ideal solution for such situation. Whether the consumer belongs to the domestic, institutional or industrial category, metering is the most desirable solution.

8.13 Apart from equity, the advantages of metering are :

- (a) Scope for introduction of differential slabwise tariffs so as to induce water conservation and bring in an element of cross subsidisation.
- (b) Scope for identification of local/regional leaks and losses.
- (c) Scope for study of water volume usage patterns which will help in future designing of water distribution systems.

8.14 However, in practice, universal metering has not succeeded in many developing countries. There are a number of critical parameters that determine the success of metering programme. These are :

- (a) Adequate and continuous water pressure in the pipes at the meter point, lack of which will result in a high probability of meter failure or incorrect meter reading.
- (b) Adequate infrastructure and quick response time for meter repairs and replacements.
- (c) Appropriate clarity on ownership of meters and responsibility of meter maintenance.
- (d) Appropriate pricing mechanism which induces the customers and water authority to keep the meters in good working condition.
- (e) Availability of appropriate quality of meters.

8.15 In Kerala, as in many other places, one or more of these criteria are not satisfied resulting in lack of metering. And in many locations, the % of non-working meters are significant.

8.16 Considering the pros and cons of introducing universal metering in Kerala, the recommendation on metering is as follows :

- (a) On technical grounds, all areas in Kerala must be divided into 2 areas - one where technically meters can work or can be made to work and the other where metering will not work, at least for some more years (due to low pressures).
- (b) Universal metering is recommended for the first category areas where appropriate quality meters should be installed (if not already available).
- (c) Charging on an un-metered basis in the second category areas (discussed in detail later); specific and time based action plans should be drawn up to make these un-metered areas into 'technically-fit-for-metering' areas.
- (d) Charging for metered consumers, in a manner that induces proper upkeep of meters (more details on this in later paragraphs).

TARIFFS AND RELATED ISSUES

8.17 Since April 1, 1991 water distribution, charging and collection in the entire Kerala state have come under KWA. KWA has thus inherited existing tariff structures from different local bodies and is maintaining them along with its own tariff structures. There are wide variations in the rates charged and the structure of tariffs in the existing system (see Table 8.2 on next page for existing tariff structures).

TABLE 8.2

EXISTING WATER TARIFFS IN SELECT CITIES IN KERALA
(Rate per 1,000 litres)

| Municipality | Free Allowance Litres/ month | Municipality | |
|--------------|------------------------------------|---|--------------|
| | | Domestic | Non-Domestic |
| Trivandrum | 700/day 750/day | Rs.0.75 | Rs.2.00 |
| Neyyantikara | Nil | Rs.0.75 | Rs.2.00 |
| Attingal | 3,500 | Rs.0.60 | Rs.1.20 |
| Quilon | Nil | Rs.0.75 | Rs.1 - 2.00 |
| Mevellkkara | Nil | Rs.1.00 | Rs.2.00 |
| Kottayam | 2,500 | Rs.0.40 | Rs.0.80 |
| Cochin | 1,200 | Rs.0.75 | Rs.1.75 |
| Parur | 1,000 | Rs.0.60 | Rs.1.20 |
| Trichur | 5,000 | 0.25 up to 10,000 lit 0.4 above 10,000 lit | Rs.0.80 |
| Kasargod | 3,000 | Rs.1.00 | Rs.2.00 |
| Kanhangad | 7,000 to 12,000 | Rs.0.50 | Rs.1.00 |
| Cannanore | 3,000 | Rs.0.45 | Rs.0.90 |
| Tellicherry | 3,000 | Rs.0.40 | Rs.0.80 |
| Calicut | | Rs.0.75 | Rs.1.75 |
| Tirur | 3,000 | Rs.0.80 | Rs.2.00 |
| Palghat | 3,000 | Rs.0.50 | Rs.1.00 |
| Irinjalakuda | 3,000 | Rs.0.50 | Rs.1.00 |
| Chalakydy | 5,000 | Rs.0.70 | Rs.2.00 |

8.18 However, when KWA's actual income is analysed in relation to the water volumes handled by KWA, the average tariff that KWA realises comes to only Rs.1.73 per KL water produced. This compares to its costs of Rs.2.56 per KL resulting in an overall deficit of Rs.152 mln (in 1989-90) which had to be met by GOK revenue grants.

8.19 There is therefore no doubt that KWA needs to substantially raise its average tariffs so as to move towards financial self-sufficiency. The question that arises is how soon. It is desirable that KWA stops taking GOK revenue grants and raises enough resources to cover its cash requirements (all cash costs plus debt servicing) from 1992-93 itself.

8.20 Not only should KWA attempt to meet its cash requirements of today but it should also plan for its future. And ideally, it should attempt keeping aside some amounts towards part of its capital investments.

Recommended tariff structure and levels

8.21 The recommendation therefore is :

"KWA should structure its tariffs in a such a manner and at such levels as to meet its entire cash requirements from 1992-93 onwards, with no GOK grants".

8.22 This recommendation was translated back into operational terms through the financial forecasting model to arrive at one set of tariff structure (See Table 8.3 on next page) as the recommended tariff structure. These rates are somewhat higher than the rates proposed by KWA which are presently under consideration by GOK (see Table 8.4 for KWA proposed rates).

8.23 The rates recommended have been compared with the tariffs prevailing in select major cities in the country. The recommended rates are very comparable to the rates prevailing in these cities. Annexure 2 presents the details of the water tariffs in select cities such as Hyderabad, Madras, Bangalore and Visakhapatnam.

TABLE 8.3
RECOMMENDED TARIFFS FOR 1991

DOMESTIC

- | | |
|------------------------|--|
| 1. Upto 10000 litres | Rs.15.00 per month minimum charges |
| 2. 10000-30000 litres | Rs.20.00 plus Rs.2.00 per 1000 litres in excess of 10000 litres |
| 3. 30000-50000 litres | Rs.60.00 plus Rs.3.00 per 1000 litres in excess of 30000 litres |
| 4. Above 100000 litres | Rs.120.00 plus Rs.4.00 per 1000 litres in excess of 50000 litres |

NON-DOMESTIC

- | | |
|-----------------------|--|
| 1. Upto 50000 litres | Rs.4.00 per 1000 litres Rs.50.00 minimum charges |
| 2. Above 50000 litres | Rs.150.00 plus Rs.6.00 per 1000 litres in excess of 50000 litres |

INDUSTRIAL

| | |
|------------------------|--|
| For entire consumption | Rs.6.00 per 1000 litres Rs.100.00 minimum charges |
|------------------------|--|

| | |
|--------------|----------------------|
| LOCAL BODIES | Re.1 per 1000 litres |
|--------------|----------------------|

For standpost water

CONNECTION CHARGES (Rs./Connection)

| | |
|--------------|---------|
| Domestic | Rs. 250 |
| Non-domestic | Rs. 500 |
| Industrial | Rs.1000 |

The above recommended tariffs are recommended to be automatically revised by 15% every year.

TABLE 8.4

TARIFFS PROPOSED BY KWA

| CONSUMPTION PER MONTH | RATE OF WATER CHARGES |
|------------------------|--|
| DOMESTIC | |
| 1. Upto 10000 litres | Rs.10.00 per month minimum charges |
| 2. 10000-30000 litres | Rs.10.00 plus Rs.1.50 per 1000 litres in excess of 10000 litres |
| 3. 30000-50000 litres | Rs.40.00 plus Rs.2.00 per 1000 litres in excess of 30000 litres |
| 4. Above 100000 litres | Rs.80.00 plus Rs.3.00 per 1000 litres in excess of 50000 litres |
| NON-DOMESTIC | |
| 1. Upto 50000 litres | Rs.3.00 per 1000 litres Rs.50.00 minimum charges |
| 2. Above 50000 litres | Rs.150.00 plus Rs.4.00 per 1000 litres in excess of 50000 litres |
| INDUSTRIAL | |
| For entire consumption | Rs.4.00 per 1000 litres Rs.100.00 minimum charges |

8.24 The above financial objective can be met by a number of tariff structure combinations. The one recommended is based on the following considerations :

- (a) No free allowance of water to any category of users.
- (b) No direct charge to the users of public standposts; instead, the local bodies will be charged at the rate of Re.1 per 1000 litres on a standard consumption per standpost (at this rate, each local body will have to pay Rs.875 per public tap per year if consumption is 2400 litres per day through each tap).
- (c) Continuation of the existing consumer categories
- (d) A slab system with differential higher rates for different slabs of consumption; For the domestic users, there will be 4 consumption slabs with the recommended tariff increasing steeply from the lowest slab to the highest slab.
- (e) A similar slab tariff for the non-domestic categories with the minimum slab tariff being same as the highest slab tariff for the domestic categories. However, only 2 slabs for the non-domestic categories with the first range going upto 50000 litres. A minimum charge of Rs.50 per month for all non-domestic consumers.
- (f) The highest of the non-domestic slab rate is also the recommended rate for industrial users (Rs.6 per KL)
- (g) Introduction of a monthly minimum charge for upto a 'minimum desirable level' of consumption - 10,000 ltrs per household per month (equivalent to 65 litres per person per day)
- (h) Affordability to pay is one of the main considerations for recommended levels of tariff.

- (i) Annual increases in tariff levels with the same structure
- (j) The financial implication of the recommended tariff towards achieving the objective of KWA to reach self-sufficiency quickly is another critical consideration for fixation of high levels of tariffs (high compared to the present levels).

Free allowance

8.25 It is recommended that 'free allowance' be totally discontinued in all areas and for all categories of consumers. Free allowance as a concept is not an acceptable concept as there is no sound rationale supporting the concept. Historically, free allowance has been introduced or carried on as a compensation for the water tax that the consumer pays. In fact, in many local bodies, free allowance is computed on the basis of the annual rental value of the house and since annual rental value is used as the basis for computing water (or property tax), one can assume that free allowance is directly linked to the payment of tax.

8.26 However, the payment of water tax directly or as a part of the property tax should really be treated as a payment made by the consumer for services rendered by the local body to the overall population and not to the specific consumer paying the tax. Water supplied through the public standposts to the poorer sections of the population or those who are not provided with the house connection is a common service rendered by the local body. Therefore, the water tax paid by the consumer is essentially meant to compensate the local body for this service rendered. The consumer cannot ask for a compensation to himself in the form of free allowance in lieu of the water tax

Charging to local bodies

8.27 All local bodies are expected to provide the service of supplying water through the public taps to the general population who do not have house connections or cannot afford house connections. To meet the cost of water supply through the public taps, the local bodies are expected to collect the water tax directly or as part of the

property tax. However, in Kerala, the cost of providing water through the public taps are borne by KWA and therefore, it is appropriate that KWA bills on the local bodies for the water supplied through the standposts. In turn, the local bodies should collect the water tax towards meeting the charges that they will pay to KWA. As far as KWA is concerned, the local bodies should pay KWA an amount as fixed by KWA, on a per tap or per KL basis.

8.28 Therefore, it becomes important to examine the affordability of local bodies to pay KWA at rates fixed by it. An analysis of the water tax amounts collected by the local bodies in Kerala directly or as part of property tax reveals that, on an overall macro level, the amounts collected are adequate to meet KWA charges (at the recommended levels of Re.1 per KL equivalent to Rs.875 per annum per tap). This issue has also been discussed between KWA and GOK.

Consumer classification

8.29 The tariff structure recommended has not made any changes to the existing classification of consumers. KWA should continue to maintain the existing classification as it is administratively easy to maintain and operate. While it is possible to define the classification into more categories, it will lead to administrative inconvenience and arbitrariness in deciding on the categories. For instance, it will be possible to divide the non-domestic categories into institutional and commercial (institutional will be those such as hospitals, educational institutions, offices etc. and commercial would be restaurants, hotels, cinema theatres etc.). However, in today's context in Kerala, such a classification would lead to inequity as many of the institutions are operating on commercial lines as profitable institutions.

8.30 Similarly, it will be possible to introduce additional categories such as domestic-cum-commercial, as there will invariably be some connections which cater to both domestic and commercial establishments. This again will lead to providing discretion to the field staff on the fixation of categories and may result in arbitrary decision making at that level. Therefore, it is recommended that such connections should also be treated as non-domestic connections as it exists now.

8.31 On overall considerations, it is advisable to retain the existing classification than make it sophisticated or more refined, as it will lead to implementation related difficulties.

Slab tariffs

8.32 The tariff structure recommended has been designed around the concept of a slabs tariff with higher rates for the higher slabs of water consumption volumes. The purpose of doing so is to introduce an element of water conservation beyond the minimum comfortable needs of water volumes. For the domestic categories, it is considered that 10000 litres per month is the minimum required level per household. Therefore, the cutoff point for the lowest slab is 10000 litres where the water rate is also the lowest.

8.33 Beyond 10000 litres level, the tariff is increased so that only those who prefer to use such volumes despite the higher cost will come into this category. Under any circumstances, 30000 litres per month per house is considered as an extremely good volume for consumption. (equivalent to 200 ltrs per person per day) Beyond 30000 litres will definitely be a luxurious consumption for which a very high rate can and should be charged.

8.34 Arriving at the cutoff point for slabs for non-domestic consumers is a very difficult exercise, as there are a variety of non-domestic consumers whose minimum requirement will depend on the nature of their work and size of their operations. Non-domestic consumers have therefore been provided with only 2 slabs - one upto 50000 litres per month and one above. The results of the field survey indicated that a large number of non-domestic consumers are coming under the first slab. Only the largest of the non-domestic consumers and those with luxurious consumption will come under the upper slab. It is recommended that KWA carries out an analysis of actual water volumes consumed by users in non-domestic category over the next 2/3 years and then review its decision on the 50000 litres cutoff level.

Other considerations

8.35 The other considerations mentioned in para 8.22 such as the affordability-to-pay, annual increases in tariffs and the financial self-sufficiency criteria are

8.40 This concept needs to be modified further for the non-domestic and industrial consumers. For such consumers, water connection cut-off should be imposed, if the meter continues to be not working beyond 3 months. Otherwise, there is an element of risk involved to KWA, if the previous consumption average are manipulated.

CHARGING FOR UN-METERED CONSUMERS

8.41 In those areas where metering is technically difficult to implement, KWA should charge on a different basis. It can be reasonably assumed that in such places, the water pressure will not be high and water supply will not be continuous or for long hours. The per household consumption is therefore likely to be less.

8.42 In such locations, all domestic users should be charged the minimum rate of Rs.15 per month. This should be irrespective of the size of the house and number of taps/bathrooms.

8.43 For the non-domestic users, KWA should estimate the water supply volume and compute monthly flat rates based on equivalent metered rates.

LEGISLATIVE ISSUES

8.44 The functioning of KWA is governed by the Kerala Water Supply and Sewerage Act, 1986 and the rules made as per the provisions of the Act. The Act gives adequate provision to KWA to fix tariffs (clause 14 iv) on its own in accordance with the general principles for the Authority's finance (clause 23). Under clause 31 also, KWA can fix the cost of water and cost to be charged. Thus there is no need for any changes in the Act to implement the recommendations made.

8.45 KWA has already drafted a new set of Rules relating to the procedures for water billing and collections. These are comprehensive and adequate to implement the recommendations on billing procedures and tariffs. Only two changes need to be made to the draft rules. They relate to :

- 9
- (a) Revised connection costs as given in Table 8.3 instead of the figures mentioned in the rules
 - (b) Ownership of the meter will be with the consumer rather than KWA.

In the Act also, clause 33 on 'meter rent' needs to be amended to make the meters the assets of the consumers.

9. FINANCIAL IMPLICATIONS OF DIFFERENT TARIFF LEVELS

RECOMMENDED TARIFFS

9.1 Based on the tariffs recommended, (See table 8.3), one set of future financial statements were prepared using the financial model. The summary of the income/expenditure and the fund flows based on the recommended tariffs is presented in Table 9.1. The detailed statements, as also the work sheets are presented in Annexure 1.

9.2 As can be seen from summary tables, KWA's future financial position indicates that it will have net positive cash balances at the end of each year without any revenue grants from GOK in future. However, the closing cash balances are not at very high levels indicating that even small reductions from the recommended tariff will result in KWA requiring outside funds or GOK revenue grants to remain with positive cash balances.

KWA PROPOSED TARIFFS

9.3 The tariffs recommended in Table 8.3 are significantly higher than what KWA has proposed to the Government of Kerala (Table 8.4). Using the financial model and the KWA recommended tariffs, an alternative set of financial statements were produced. The summary of these are presented in Table 9.2. As can be observed from this table, KWA will end up with continuous negative closing cash balances in all the years from 1993-94 onwards if it does not receive any GOK revenue grants. In other words, KWA will have to be provided with GOK revenue grants in all the years (at an average level of Rs.166 million over the next 10 years). While this situation is better than the current financial situation of KWA, it is certainly not adequate for making KWA move towards its financial self-sufficiency objective.

LOWER ANNUAL INCREASES IN TARIFFS

9.4 As indicated earlier, the tariff recommended for 1992-93 need to be increased each year at 15% per annum to arrive at complete financial self-sufficiency status. If for some reason KWA is not able to implement annual increases of 15% and instead implements only 10% per annum increases, the financial situation of KWA deteriorates substantially even with the recommended tariff as per Table 8.3. In fact, KWA's closing cash balances turn negative from 1996-97 onwards because of the lower annual increases in the tariff. Table 9.3 presents the summary of future financial status of KWA under the alternative of tariff as recommended in Table 8.3 with annual increases of 10% per annum. Under this scenario, KWA will require approximately Rs.130 million per annum as revenue grants from GOK during the next 10 years.

UNIFORMITY IN TARIFFS

9.5 The discussions on tariff structure and levels so far have been on the assumption that there will be only one set of uniform tariff throughout the State. It is possible to conceive of differential tariff for different regions or different types of locations. One alternative would be to look at one set of tariffs for the larger cities (Corporations), a second set of tariff for the municipalities and a third set of tariffs for the rural panchayats. The argument in favour of such a structure would be the higher affordability-to-pay by the consumers located in larger cities.

9.6 However, - from the field survey and also secondary literature available on the socio-economic profile of households in different types of Kerala cities/villages, it can be concluded that the argument of differential affordability-to-pay is not quite correct. The households which have pipe connection in the rural areas are by no means poorer than households in the urban areas. Even though the overall level of income in rural areas is less than that of urban areas, the issue for consideration is not the overall income level but the income level of the connected households only.

TABLE 9.3

SUMMARY INCOME EXPENDITURE AND FUND FLOWS -
RECOMMENDED TARIFF ALTERNATIVE WITH 10% ANNUAL INCREASE

(Rs. mln.)

| | 92/93 | 95/96 | 98/99 | 01/02 |
|-------------------------|-------|-------|-------|--------|
| A. 1. Income | 519 | 817 | 1133 | 1570 |
| 2. GOK Grants | - | - | - | - |
| Sub Total (A) | 519 | 817 | 1133 | 1570 |
| B. 1. O&M Costs | 407 | 683 | 908 | 1198 |
| 2. Other Costs | 244 | 427 | 508 | 564 |
| Sub Total (B) | 651 | 1110 | 1416 | 1762 |
| C. Net Profits | (132) | (294) | (283) | 192 |
| D. SOURCES | | | | |
| 1. Intl. generation | (189) | 91 | 169 | 301 |
| 2. Loans | 420 | 230 | 230 | 230 |
| 3. Grants | 420 | 230 | 230 | 230 |
| Sub Total (D) | 919 | 551 | 629 | 761 |
| E. USES | | | | |
| 1. Capital Works | 841 | 460 | 460 | 460 |
| 2. Debt Servicing | 92 | 287 | 391 | 466 |
| 3. Increase in W C | (187) | (180) | 18 | 28 |
| Sub Total (E) | 746 | 567 | 869 | 954 |
| F. Cash generated (D-E) | 172 | (16) | (240) | (193) |
| G. Closing balance | 385 | 38 | (672) | (1318) |

9.7 On considerations of equity, it is necessary to look at the costs involved in the rural schemes and urban schemes and then relate the tariffs to the costs, if found desirable. On this score also, it will not be possible to conclude that rural areas should be charged less. This is because, as explained earlier, the cost of maintaining the rural schemes is higher than that of the urban schemes.

9.8 Having differential tariffs also brings in an element of administrative inconvenience. It will be easier to administer uniform tariff throughout the State. Also, from a political angle, it will be difficult to implement differential tariffs, especially if they are to be linked to either the size of town or the cost of operation of the schemes.

9.9 Considering all the merits and demerits, it has been recommended that KWA adopts only one set of uniform tariffs.

AFFORDABILITY OF TARIFFS

Domestic Households

9.10 Any tariffs recommended will have to be checked out for the affordability to pay by the consumer. For the purpose of testing the affordability, it will be necessary to examine the income distribution of the connected households in different parts of the State. No recent data is available on the distribution of household income in different parts of Kerala. The latest data available from the field relates to National Sample Survey Organisation Data of 1983 only. Data relating to more recent periods are either based on very small sample micro studies, or are derived data from other secondary sources.

9.20 However, on an overall basis, industries surveyed have indicated that water costs are less than 0.5% of their total costs (for KWA supplies). Therefore, a threefold increase can be considered to be affordable on an overall basis.

COMPARISON OF TARIFFS WITH AVERAGE INCREMENTAL COSTS

9.21 If one of the objectives of Government of Kerala is to allocate efficiently the real resources available to the State and to KWA, the price paid for water should ideally reflect the value of additional resources required for supplying additional water. This is based on the presumption that, if the price which a consumer is willing to pay for another unit of a good (water) exceeds the value of the resources required to produce it, then the allocation of resources will be improved if that is produced.

9.22 It can be assumed that the long run marginal cost approximates to the average incremental cost (AIC). AIC computations were, therefore, carried out and have been presented in Table 9.5. AIC has been calculated at different discount rates. Theoretically, the discount rate to be used should reflect the opportunity cost of capital.

TABLE 9.5

AVERAGE INCREMENTAL COSTS

| Discount rate | AIC (Rs./KL of water produced) |
|---------------|--------------------------------|
| 8% | 4.39 |
| 10% | 4.71 |
| 12% | 5.01 |
| 15% | 5.41 |

NOTE : AIC is computed based on Incremental costs and Incremental capital investments at constant 1991 prices; and incremental Water due to these investments.

9.22 Ideally, the average tariff should be same as AIC. However, considering other issues such as affordability and difficulty in implementation, it is not always possible to match the two.

9.23 As against the AIC figures mentioned above, the recommended tariff levels result in an weighted average tariff of Rs.2.43 per KL of water produced (in 1992) going upto Rs.5.86 per KL by the year 2001-02. However, Rs.5.86 rate is in current prices of 2001-02 and when discounted back to 1992 prices comes to only Rs.2.48 (at 10% factor).

ANNEXURES

28-SEP-90
 File Name: INEXFFBS
 ALTERNATIVE 1
 PROJECTED INCOME & EXPENDITURE STATEMENT (Rs MLN)
 (Total for KWA operation)

| | 88/89 | 89/90 | 90/91 | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|------------------------------------|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | (---Actuals---) | Provsnal | (Budget) | (Budget) | (Budget) | (Budget) | (Budget) | (Budget) | (Budget) | (Budget) | (Budget) | (Budget) | (Budget) | (Budget) |
| | -----Projected----- | | | | | | | | | | | | | |
| I. INCOME | | | | | | | | | | | | | | |
| 1. WATER SUPPLY | 156.2 | 304.0 | 167.5 | 174.3 | 474.6 | 570.1 | 775.0 | 900.9 | 1047.6 | 1210.2 | 1416.6 | 1647.4 | 1915.0 | 2227.9 |
| 2. SEWERAGE | 0.0 | 0.0 | 1.0 | 1.5 | 1.7 | 1.9 | 2.0 | 2.3 | 2.5 | 2.7 | 3.0 | 3.3 | 3.6 | 4.0 |
| 3. OTHER -OP INCOME | 0.9 | 0.0 | 1.7 | 3.2 | 32.4 | 8.4 | 40.3 | 7.6 | 0.6 | 9.7 | 10.0 | 12.2 | 13.7 | 15.3 |
| 4. total opertg inc | 157.1 | 305.6 | 170.2 | 179.0 | 508.7 | 580.4 | 817.4 | 910.0 | 1050.7 | 1230.6 | 1430.5 | 1662.0 | 1933.0 | 2247.3 |
| 5. INTEREST INCOME | 2.6 | 3.4 | 7.2 | 2.1 | 2.3 | 2.5 | 2.0 | 3.0 | 3.4 | 3.7 | 4.1 | 4.5 | 4.9 | 5.4 |
| 6. OTHER-MON OP INC | 4.0 | 5.7 | 6.4 | 6.0 | 7.5 | 0.3 | 9.1 | 10.0 | 11.0 | 12.1 | 13.3 | 14.6 | 16.1 | 17.7 |
| 7. GRANTS FROM GOV | 250.5 | 235.0 | 250.5 | 284.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 8. TOTL INCOME(4to7) | 415.0 | 549.7 | 442.4 | 472.2 | 518.5 | 591.1 | 829.3 | 923.9 | 1073.1 | 1246.4 | 1447.0 | 1681.9 | 1954.0 | 2270.4 |
| II. EXPENDITURE | | | | | | | | | | | | | | |
| 9. SALARIES & WAGES | | | | | | | | | | | | | | |
| 1. Existg/other new Schemes | 171.0 | 203.9 | 277.2 | 276.1 | 298.2 | 322.0 | 347.8 | 375.6 | 405.7 | 430.1 | 473.2 | 511.0 | 551.9 | 596.1 |
| 2. New NB Schemes | 0.0 | 0.0 | 0.0 | 0.0 | 3.9 | 4.2 | 12.4 | 13.4 | 14.4 | 15.6 | 16.0 | 10.2 | 19.6 | 21.2 |
| SUBTOTAL (9) | 171.0 | 203.9 | 277.2 | 276.1 | 302.1 | 326.2 | 360.2 | 389.0 | 420.1 | 453.7 | 490.0 | 529.2 | 571.5 | 617.3 |
| 10. POWER | | | | | | | | | | | | | | |
| 1. Existg/other new Schemes | 64.9 | 95.5 | 74.0 | 94.3 | 99.9 | 117.7 | 146.6 | 159.1 | 172.7 | 107.4 | 203.3 | 220.5 | 239.1 | 259.3 |
| 2. New NB Schemes | 0.0 | 0.0 | 0.0 | 0.0 | 5.6 | 5.9 | 13.0 | 13.9 | 14.8 | 15.0 | 16.9 | 10.0 | 19.3 | 20.6 |
| SUBTOTAL (10) | 64.9 | 95.5 | 74.0 | 94.3 | 105.5 | 123.7 | 159.6 | 173.0 | 187.5 | 203.2 | 220.2 | 230.6 | 258.4 | 279.9 |
| 11. CHEMICALS | | | | | | | | | | | | | | |
| 1. Existg/other new Schemes | 6.6 | 9.1 | 10.5 | 20.6 | 22.2 | 26.7 | 33.9 | 37.4 | 41.4 | 45.0 | 50.6 | 55.9 | 61.0 | 60.3 |
| 2. New NB Schemes | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.4 | 1.6 | 1.7 | 1.9 | 2.1 | 2.3 | 2.5 | 2.7 | 3.0 |
| SUBTOTAL (11) | 6.6 | 9.1 | 10.5 | 20.6 | 22.6 | 27.1 | 35.5 | 39.2 | 43.3 | 47.9 | 52.9 | 58.4 | 64.5 | 71.3 |
| 12. REPAIRS & MAINT | | | | | | | | | | | | | | |
| 1. Existg/other new Schemes | 60.0 | 60.5 | 00.4 | 94.1 | 101.7 | 122.1 | 154.9 | 171.3 | 189.4 | 209.4 | 231.4 | 255.7 | 282.6 | 312.2 |
| 2. New NB Schemes | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | 5.2 | 10.7 | 11.6 | 12.5 | 13.5 | 14.6 | 15.0 | 17.0 | 18.4 |
| SUBTOTAL (12) | 60.0 | 60.5 | 00.4 | 94.1 | 106.5 | 127.2 | 165.6 | 182.0 | 201.9 | 222.9 | 246.0 | 271.5 | 299.6 | 330.6 |
| 13. less charged to Capital a/c | 50.4 | 02.2 | 01.4 | 137.0 | 129.2 | 112.7 | 06.3 | 101.2 | 101.2 | 101.2 | 101.2 | 101.2 | 101.2 | 101.2 |
| 14. Opertg Costs (9 to 12 less 13) | 260.0 | 294.0 | 376.0 | 340.1 | 407.4 | 491.4 | 634.6 | 602.0 | 751.6 | 826.5 | 907.9 | 996.5 | 1092.9 | 1197.0 |
| 15. ADMIN OVERHEADS | 17.2 | 14.3 | 27.0 | 20.6 | 30.9 | 33.4 | 36.1 | 39.0 | 42.1 | 45.4 | 49.1 | 53.0 | 57.2 | 61.0 |
| 16. INTEREST CHARGES | | | | | | | | | | | | | | |
| 1. On Extg/new other | 31.1 | 31.6 | 60.3 | 67.0 | 50.4 | 07.9 | 115.0 | 131.2 | 148.7 | 162.9 | 173.7 | 101.2 | 105.3 | 106.1 |
| 2. On new NB Schemes | 0.0 | 0.0 | 0.0 | 0.0 | 2.9 | 14.9 | 21.7 | 19.4 | 17.0 | 14.7 | 12.3 | 9.9 | 7.6 | 5.2 |
| 17. DEPRECIATION | 126.1 | 126.5 | 126.5 | 126.5 | 157.1 | 104.0 | 200.7 | 220.0 | 230.7 | 242.2 | 253.7 | 265.2 | 276.7 | 200.2 |
| 1. On Extg/new other | 126.1 | 126.5 | 126.5 | 126.5 | 157.1 | 104.0 | 200.7 | 220.0 | 230.7 | 242.2 | 253.7 | 265.2 | 276.7 | 200.2 |
| 2. On new NB Schemes | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 |
| 18. BAD DEBTS | 0.0 | 0.0 | 0.0 | 0.0 | 2.2 | 3.2 | 4.5 | 5.4 | 6.4 | 7.5 | 0.7 | 10.2 | 11.9 | 13.9 |
| 19. TOTAL ALL COSTS | 435.2 | 467.1 | 590.5 | 570.2 | 651.0 | 014.0 | 1034.1 | 1110.5 | 1209.2 | 1311.0 | 1410.1 | 1520.7 | 1644.3 | 1765.0 |
| 20. Operating profit/ | | | | | | | | | | | | | | |

ALTERNATIVE 1
28-Sep-91
File Name: INEIFFBS

KERALA WATER AUTHORITY
PROJECTED FUND FLOWS - TOTAL KWA SUMMARY

(Rs MLN)

| | 88/89 | 89/90 | 90/91 | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|--|----------------|--------------|----------------|-------------------|---------------|---------------|--------------|---------------|--------------|---------------|---------------|---------------|---------------|---------------|
| | Actuals | | | Provsnal (Budget) | | | Projected | | | | | | | |
| A. SOURCES OF FUNDS | | | | | | | | | | | | | | |
| 1. INTERNAL GENERATION | | | | | | | | | | | | | | |
| (a) Internal profits (pre-int post deproj) Revn grants | -239.7 | -120.8 | -346.4 | -315.3 | -79.2 | -120.9 | -67.3 | -36.1 | 29.5 | 112.1 | 215.7 | 344.3 | 582.6 | 696.0 |
| (b) Add depreciation | 126.1 | 126.5 | 126.5 | 126.5 | 157.1 | 184.0 | 221.4 | 232.7 | 243.4 | 254.9 | 266.4 | 277.9 | 289.4 | 300.9 |
| (c) Introl gear (a+b) | -113.6 | 5.6 | -219.9 | -188.8 | 77.9 | 63.1 | 154.1 | 196.6 | 272.9 | 367.0 | 482.1 | 622.2 | 792.0 | 996.9 |
| 2. GOV GRANTS | | | | | | | | | | | | | | |
| (a) W.B new projects | 0.0 | 0.0 | 0.0 | 41.1 | 126.8 | 180.0 | 0.0 | | | | | | | |
| (b) Extg/othnew proj | 174.3 | 305.4 | 329.2 | 347.6 | 293.5 | 256.2 | 196.1 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 |
| (c) REVENUE GRANTS | 250.5 | 235.0 | 250.5 | 284.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUBTOTAL (2) | 424.8 | 540.4 | 587.7 | 673.1 | 420.4 | 356.2 | 196.1 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 |
| 3. LOAN DRAWDOWN | | | | | | | | | | | | | | |
| (a) W.B new projects | 0.0 | 0.0 | 0.0 | 41.1 | 126.8 | 180.0 | 0.0 | | | | | | | |
| (b) Extg/othnew proj | 214.2 | 174.6 | 217.6 | 347.6 | 293.5 | 256.2 | 196.1 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 |
| SUBTOTAL (3) | 214.2 | 174.6 | 217.6 | 388.8 | 420.4 | 356.2 | 196.1 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 | 230.0 |
| 4. TOTAL SOURCES (1 to 3) | 525.5 | 720.6 | 585.4 | 873.1 | 910.7 | 775.6 | 546.3 | 656.6 | 732.9 | 827.0 | 942.1 | 1082.2 | 1252.0 | 1456.9 |
| B. APPLICATION OF FUNDS | | | | | | | | | | | | | | |
| 5. CAPITAL INVESTMENTS | | | | | | | | | | | | | | |
| (a) W.B new projects | 0.0 | 0.0 | 0.0 | 82.3 | 253.7 | 280.0 | | | | | | | | |
| (b) Extg/othnew proj | 557.1 | 391.3 | 323.7 | 695.3 | 587.1 | 512.5 | 392.2 | 460.0 | 460.0 | 460.0 | 460.0 | 460.0 | 460.0 | 460.0 |
| SUBTOTAL (5) | 557.1 | 391.3 | 323.7 | 777.5 | 840.8 | 712.4 | 392.2 | 460.0 | 460.0 | 460.0 | 460.0 | 460.0 | 460.0 | 460.0 |
| 6. LOAN REPAYMENTS | | | | | | | | | | | | | | |
| (a) W.B new projects | 0.0 | 0.0 | 0.0 | 0.0 | 4.1 | 16.0 | 26.8 | 24.8 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| (b) Other new proj | 0.0 | 0.0 | 0.0 | 0.0 | 34.0 | 64.1 | 89.7 | 109.4 | 132.4 | 155.4 | 178.4 | 201.4 | 224.4 | 247.4 |
| (c) Existing loans | 25.9 | 26.6 | 27.6 | 27.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUBTOTAL (6) | 25.9 | 26.6 | 27.6 | 27.6 | 38.9 | 80.9 | 116.5 | 136.1 | 159.1 | 182.1 | 205.1 | 228.1 | 251.1 | 274.1 |
| 7. INTEREST REPAYMENTS | | | | | | | | | | | | | | |
| (a) W.B new projects | 0.0 | 0.0 | 0.0 | 0.0 | 2.9 | 14.9 | 21.7 | 19.4 | 17.0 | 14.7 | 12.3 | 9.9 | 7.6 | 5.2 |
| (b) Other new proj | 0.0 | 0.0 | 0.0 | 0.0 | 50.4 | 87.9 | 115.8 | 131.2 | 148.7 | 162.9 | 173.7 | 181.2 | 185.3 | 186.1 |
| (c) Existing loans | 41.5 | 48.1 | 55.0 | 67.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUBTOTAL (7) | 41.5 | 48.1 | 55.0 | 67.0 | 53.3 | 102.8 | 137.5 | 150.6 | 165.7 | 177.5 | 186.0 | 191.1 | 192.9 | 191.4 |
| 8. TOTAL DEBT SERVICE (6+7) | 67.5 | 74.7 | 83.4 | 94.6 | 92.2 | 183.7 | 254.2 | 286.7 | 324.9 | 359.7 | 391.1 | 419.3 | 444.1 | 465.5 |
| 9. INCREASE IN WORKING CAPITAL | -147.2 | 318.9 | 149.4 | -2.0 | -186.8 | 45.2 | -7.0 | -166.5 | 31.9 | 40.9 | 43.2 | 52.3 | 63.2 | 76.1 |
| 10. TOTL APPLC (5+8+9) | 477.3 | 784.9 | 556.5 | 870.1 | 746.2 | 941.4 | 639.3 | 580.2 | 916.7 | 860.5 | 894.3 | 931.6 | 967.3 | 1001.6 |
| 11. CASH GENERATED (4-10) | 48.2 | -64.2 | 28.9 | 3.0 | 172.5 | -165.8 | -92.9 | 76.5 | -83.8 | -33.5 | 47.8 | 150.6 | 284.8 | 455.3 |
| 12. Add OPENING BALANCE | 197.1 | 245.3 | 181.0 | 210.0 | 212.9 | 385.4 | 219.6 | 126.6 | 283.1 | 119.3 | 85.7 | 133.6 | 284.2 | 569.0 |
| 13. CLOSING BALC (11+12) | 245.3 | 181.0 | 210.0 | 212.9 | 385.4 | 219.6 | 126.6 | 283.1 | 119.3 | 85.7 | 133.6 | 284.2 | 569.0 | 1024.2 |
| Debt Serv Covg Ratio (11/8) | -108.2% | 7.6% | -263.7% | -199.5% | 84.5% | 34.4% | 68.7% | 68.6% | 84.8% | 102.8% | 123.3% | 146.4% | 179.4% | 214.1% |

ALTERNATIVE 1

28-Sep-91

File Name: INEKF85

KERALA WATER AUTHORITY
PROJECTED BALANCE SHEET - TOTAL KWA SUMMARY

(Rs MLN)

(as on 31st March)

| | 88/89 | 89/90 | 90/91 | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|------------------------------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | Provisional | | | Budgeted | | | | | | | | | | |
| | Actuals | | | Projected | | | | | | | | | | |
| A. ASSETS | | | | | | | | | | | | | | |
| 1. FIXED ASSETS | | | | | | | | | | | | | | |
| (a) Opening balance | 5838.1 | 6898.6 | 6897.8 | 6199.6 | 6537.1 | 7422.2 | 8500.9 | 10288.9 | 13661.7 | 11087.4 | 11547.4 | 12287.4 | 12467.4 | 12927.4 |
| (b) Added during Yr | 18.5 | 7.2 | 181.8 | 437.5 | 785.1 | 1078.7 | 1788.8 | 452.3 | 426.1 | 462.8 | 462.8 | 462.8 | 462.8 | 462.8 |
| (c) Less accu Deprcn | 2829.1 | 2155.6 | 2282.1 | 2488.6 | 2565.6 | 2749.7 | 2971.1 | 3233.8 | 3447.2 | 3722.1 | 3968.5 | 4246.4 | 4535.9 | 4826.7 |
| (d) NET FID ASSETS | 4861.5 | 3942.2 | 3917.5 | 4228.5 | 4856.6 | 5751.2 | 7237.3 | 7457.4 | 7642.1 | 7845.2 | 8238.8 | 8228.9 | 8391.6 | 8558.7 |
| 2. CAPITAL & I-P | | | | | | | | | | | | | | |
| (a) added during Yr | | | | 777.5 | 948.3 | 712.4 | 392.2 | 468.8 | 468.8 | 468.8 | 468.8 | 468.8 | 468.8 | 468.8 |
| (b) net balance | 1538.2 | 2137.7 | 2212.8 | 2558.8 | 2686.5 | 2248.2 | 924.4 | 932.1 | 966.8 | 966.8 | 966.8 | 966.8 | 966.8 | 966.8 |
| 3. CURRENT ASSETS | | | | | | | | | | | | | | |
| (a) inventory | 252.5 | 295.8 | 328.7 | 331.6 | 382.6 | 391.8 | 336.8 | 138.7 | 139.8 | 144.9 | 144.9 | 144.9 | 144.9 | 144.9 |
| (b) sundry debtors | 595.7 | 764.5 | 882.7 | 882.7 | 578.7 | 638.2 | 693.5 | 748.7 | 788.6 | 842.6 | 985.8 | 977.6 | 1062.3 | 1161.8 |
| (c) inter office bal | 62.2 | -18.3 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| (d) loans/advances | 134.5 | 274.3 | 277.1 | 279.8 | 282.6 | 285.5 | 288.3 | 291.2 | 294.1 | 297.8 | 308.8 | 383.8 | 386.1 | 389.1 |
| (e) cash balance | 245.3 | 181.8 | 218.8 | 212.9 | 385.4 | 219.6 | 126.6 | 283.1 | 119.3 | 85.7 | 133.6 | 284.2 | 569.8 | 1024.2 |
| SUBTOTAL (3) | 1298.3 | 1584.5 | 1618.4 | 1627.1 | 1629.4 | 1526.2 | 1444.5 | 1373.6 | 1341.8 | 1378.3 | 1483.5 | 1789.7 | 2882.2 | 2639.2 |
| 4. ACCUM LOSSES | | | | | | | | | | | | | | |
| | 928.7 | 846.1 | 994.3 | 1092.2 | 1224.7 | 1448.4 | 1653.2 | 1839.9 | 1976.1 | 2041.5 | 2011.7 | 1858.5 | 1548.8 | 1844.2 |
| TOTAL ASSETS/LOSSES | 7818.7 | 8438.6 | 8733.8 | 9498.7 | 10317.1 | 10966.8 | 11268.8 | 11683.8 | 11924.8 | 12223.8 | 12588.8 | 12755.2 | 12988.5 | 13288.8 |
| B. EQUITY & LIABILITIES | | | | | | | | | | | | | | |
| 1. EQUITY | | | | | | | | | | | | | | |
| (a) ORIG PHED EQUITY | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 | 4355.3 |
| (b) GOV CONTR:IBUTIONS | 1636.4 | 1916.8 | 2888.4 | 2489.6 | 2918.8 | 3266.2 | 3462.3 | 3592.3 | 3922.3 | 4152.3 | 4382.3 | 4612.3 | 4842.3 | 5072.3 |
| (c) OTHER CAP CONTRIB | 166.8 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 | 276.4 |
| SUBTOTAL (1) | 6157.7 | 6547.7 | 6648.1 | 7121.3 | 7541.6 | 7897.9 | 8094.8 | 8324.5 | 8554.8 | 8784.8 | 9014.8 | 9244.8 | 9474.8 | 9784.8 |
| 2. L.T LOANS | | | | | | | | | | | | | | |
| (a) LIC/other Loans | 455.9 | 683.9 | 793.9 | 766.3 | 766.3 | 766.3 | 766.3 | 766.3 | 766.3 | 766.3 | 766.3 | 766.3 | 766.3 | 766.3 |
| (b) GOV Loans | | | | | | | | | | | | | | |
| -WB new projs | 8.8 | 8.8 | 92.4 | 41.1 | 163.9 | 247.8 | 228.2 | 193.4 | 166.7 | 139.9 | 113.1 | 86.3 | 59.5 | 32.7 |
| -Other new projs | 8.8 | 8.8 | 8.8 | 347.6 | 586.4 | 798.5 | 984.9 | 1225.5 | 1122.2 | 1197.8 | 1249.5 | 1278.1 | 1283.8 | 1268.4 |
| -existing | 776.6 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 | 891.8 |
| subtotal (b) | 776.6 | 891.8 | 983.4 | 1279.8 | 1661.3 | 1936.6 | 2816.2 | 2118.8 | 2188.9 | 2228.7 | 2253.6 | 2255.4 | 2234.3 | 2198.1 |
| SUBTOTAL (2) | 1232.5 | 1495.8 | 1777.4 | 2046.1 | 2427.6 | 2782.9 | 2762.5 | 2876.4 | 2947.2 | 2995.1 | 3219.9 | 3021.8 | 3088.6 | 2956.5 |
| 3. CURRENT LIABILITIES | | | | | | | | | | | | | | |
| (a) deposits | 57.7 | 146.4 | 153.7 | 161.4 | 169.5 | 178.8 | 186.8 | 196.2 | 206.8 | 216.3 | 227.1 | 238.5 | 258.4 | 262.9 |
| (b) sundry creditors | 145.1 | 147.2 | 154.6 | 162.3 | 170.4 | 179.8 | 187.9 | 197.3 | 207.2 | 217.5 | 228.4 | 239.8 | 251.8 | 264.4 |
| (c) provisions | 5.5 | 6.8 | 7.2 | 7.5 | 7.9 | 8.3 | 8.7 | 9.1 | 9.6 | 10.1 | 10.6 | 11.1 | 11.6 | 12.2 |
| (d) suspense a/c | 228.2 | 87.5 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 | 8.8 |
| SUBTOTAL (3) | 428.4 | 388.8 | 315.5 | 331.2 | 347.8 | 365.2 | 383.4 | 402.6 | 422.7 | 443.9 | 466.1 | 489.4 | 513.9 | 539.5 |
| TOTAL EQUITY+LIABs | 7818.6 | 8438.6 | 8732.9 | 9498.6 | 10317.1 | 10966.8 | 11259.9 | 11682.9 | 11923.9 | 12222.9 | 12588.8 | 12755.1 | 12988.4 | 13288.8 |

28-Sep-91
File Name:REVTOTAL

KERALA WATER AUTHORITY
PROJECTED REVENUES -TOTAL KWA SUMMARY

ALTERNATIVE 1
(Rs MLN)

| | 88/89 | 89/90 | 90/91 | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 |
|-------------------------------|----------------|--------------|--------------|-------------------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|
| | <---Actuals--- | | | >Provsnal <Budgetd><--- | | | -Projected- | | | | | |
| A. WATER SUPPLY | | | | | | | | | | | | |
| 1.Domestic | 21.7 | 33.5 | 42.1 | 47.1 | 169.5 | 198.6 | 276.3 | 318.4 | 367.1 | 423.2 | 487.9 | 562.4 |
| 2.Non-domestic | 22.0 | 38.3 | 35.4 | 48.0 | 185.6 | 217.4 | 288.6 | 332.4 | 383.1 | 441.5 | 508.7 | 586.2 |
| 3.Industrial | 3.7 | 6.3 | 15.1 | 16.7 | 67.4 | 77.7 | 101.2 | 116.6 | 134.3 | 154.8 | 179.3 | 205.5 |
| 4.Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5.Standposts | 0.0 | 0.0 | 0.0 | 0.0 | 52.1 | 76.5 | 109.0 | 133.5 | 163.1 | 198.8 | 241.7 | 293.2 |
| 6.Local body-MTCE | 108.7 | 226.8 | 58.8 | 52.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 7.Local body-MS | 0.0 | 0.0 | 15.1 | 9.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| SUBTOTAL (A) | 156.2 | 304.8 | 167.5 | 174.3 | 474.6 | 570.1 | 775.0 | 900.9 | 1047.6 | 1218.2 | 1416.6 | 1647.4 |
| B. SEWERAGE | | | | | | | | | | | | |
| 1.Domestic | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 |
| 2.Non-domestic | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 3.Industrial | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 4.Local body-SWEMTCE | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5.Local body-SWGCNGS | 0.0 | 0.0 | 1.0 | 1.5 | 1.7 | 1.8 | 2.0 | 2.2 | 2.4 | 2.7 | 2.9 | 3.2 |
| SUBTOTAL (B) | 0.0 | 0.0 | 1.0 | 1.5 | 1.7 | 1.9 | 2.0 | 2.3 | 2.5 | 2.7 | 3.0 | 3.3 |
| C. OTHER -OP INCOME | | | | | | | | | | | | |
| 1.Centage Charges | 0.0 | 0.0 | 0.9 | 1.7 | 1.8 | 2.0 | 2.2 | 2.4 | 2.7 | 2.9 | 3.2 | 3.5 |
| 2.Connection Charge | 0.0 | 0.0 | 0.0 | 0.0 | 20.8 | 4.5 | 36.0 | 2.9 | 3.4 | 3.9 | 4.5 | 5.2 |
| 3.Supvsn Charges | 0.4 | 0.0 | 0.5 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.6 | 1.7 | 1.9 | 2.1 |
| 4.Misc Recoveries | 0.5 | 0.1 | 0.3 | 0.6 | 0.7 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 |
| SUBTOTAL (C) | 0.9 | 0.0 | 1.7 | 3.2 | 32.4 | 8.4 | 48.3 | 7.6 | 8.6 | 9.7 | 10.8 | 12.2 |
| D. INTEREST INCOME | | | | | | | | | | | | |
| 1.On Loans/Advances | 0.0 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| 2.On Deposits | 2.6 | 3.4 | 7.1 | 2.1 | 2.3 | 2.5 | 2.7 | 3.0 | 3.3 | 3.6 | 4.0 | 4.4 |
| SUBTOTAL (D) | 2.6 | 3.4 | 7.2 | 2.1 | 2.3 | 2.5 | 2.8 | 3.0 | 3.4 | 3.7 | 4.1 | 4.5 |
| E. OTHER-NON OP INC | | | | | | | | | | | | |
| 1.Recoveries/Claims | 1.1 | 1.5 | 1.0 | 1.2 | 1.3 | 1.5 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 |
| 2.Miscellaneous | 3.7 | 4.1 | 5.5 | 5.6 | 6.2 | 6.8 | 7.4 | 8.2 | 9.0 | 9.9 | 10.9 | 12.0 |
| SUBTOTAL (E) | 4.8 | 5.7 | 6.4 | 6.8 | 7.5 | 8.3 | 9.1 | 10.0 | 11.0 | 12.1 | 13.3 | 14.6 |
| F. TOTL REVNUES (At+E) | 164.5 | 314.7 | 183.9 | 187.9 | 518.5 | 591.1 | 829.3 | 923.9 | 1073.1 | 1246.4 | 1447.8 | 1681.9 |
| G. GRANTS FROM GOK | 250.5 | 235.0 | 250.5 | 284.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

28-Sep-91

KERALA WATER AUTHORITY

File Name:DNMTOTAL

PROJECTED O & M AND OTHER COSTS-KWA TOTAL

(Rs ML)

| | 88/89 | 89/90 | 90/91 | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 |
|--------------------------------------|---------|-------|-------|----------|-------|-------|---------|--------|--------|-----------|--------|--------|
| | Actuals | | | Provsnal | | | Budgetd | | | Projected | | |
| A. EXISTING SCHEMES | | | | | | | | | | | | |
| 1.Salaries & Wages | 171.0 | 203.9 | 277.2 | 276.1 | 298.2 | 322.0 | 347.8 | 375.6 | 405.7 | 438.1 | 473.2 | 511.0 |
| 2.Power | 64.8 | 95.5 | 74.0 | 94.3 | 99.9 | 117.7 | 146.6 | 159.1 | 172.7 | 187.4 | 203.3 | 227.0 |
| 3.Chemicals | 6.6 | 9.1 | 18.5 | 20.6 | 22.2 | 26.7 | 33.9 | 37.4 | 41.4 | 45.8 | 50.6 | 55.0 |
| 4.Rep & Maint | 68.8 | 68.5 | 88.4 | 94.1 | 101.7 | 122.1 | 154.9 | 171.3 | 189.4 | 209.4 | 231.4 | 257.0 |
| SUBTOTAL (A) | 311.2 | 376.9 | 458.2 | 485.1 | 522.0 | 588.5 | 683.1 | 743.5 | 809.2 | 880.7 | 958.5 | 1047.0 |
| B. NEW W.B SCHEMES | | | | | | | | | | | | |
| 1.Salaries & Wages | | | | | 3.9 | 4.2 | 12.4 | 13.4 | 14.4 | 15.6 | 16.8 | 18.0 |
| 2.Power | | | | | 5.6 | 5.9 | 13.8 | 13.9 | 14.8 | 15.8 | 16.9 | 18.0 |
| 3.Chemicals | | | | | 0.3 | 0.4 | 1.6 | 1.7 | 1.9 | 2.1 | 2.3 | 2.4 |
| 4.Rep & Maint | | | | | 4.8 | 5.2 | 10.7 | 11.6 | 12.5 | 13.5 | 14.6 | 15.6 |
| SUBTOTAL (B) | 0.0 | 0.0 | 0.0 | 0.0 | 14.6 | 15.6 | 37.7 | 40.5 | 43.7 | 47.0 | 50.6 | 53.6 |
| C. less charge to Capital a/c | | | | | | | | | | | | |
| | 50.4 | 82.2 | 81.4 | 137.0 | 129.2 | 112.7 | 86.3 | 101.2 | 101.2 | 101.2 | 101.2 | 101.2 |
| D.TOT OP COSTS(AtoB) | 260.8 | 294.0 | 376.8 | 348.1 | 407.4 | 491.4 | 634.6 | 682.8 | 751.6 | 826.5 | 907.9 | 995.4 |
| E. ADMIN OVERHEADS | | | | | | | | | | | | |
| | 17.2 | 14.3 | 27.0 | 28.6 | 30.9 | 33.4 | 36.1 | 39.0 | 42.1 | 45.4 | 49.1 | 52.7 |
| F. INTEREST CHARGES | | | | | | | | | | | | |
| 1.On Existing loans | 31.1 | 31.6 | 60.3 | 67.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2.On new W.B loans | | | | | 2.9 | 14.9 | 21.7 | 19.4 | 17.0 | 14.7 | 12.3 | 10.0 |
| 3.On oth new loans | | | | | 50.4 | 87.9 | 115.8 | 131.2 | 148.7 | 162.9 | 173.7 | 186.0 |
| SUBTOTAL (F) | 31.1 | 31.6 | 60.3 | 67.0 | 53.3 | 102.8 | 137.5 | 150.6 | 165.7 | 177.5 | 186.0 | 196.0 |
| G. DEPRECIATION | | | | | | | | | | | | |
| 1.On Exsting assets | 126.1 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 | 126.5 |
| 2.On new W.B assets | | | | | 0.0 | 0.0 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 | 12.7 |
| 3.On oth new assets | | | | | 30.6 | 57.5 | 82.2 | 93.5 | 104.2 | 115.7 | 127.2 | 138.8 |
| SUBTOTAL (G) | 126.1 | 126.5 | 126.5 | 126.5 | 157.1 | 184.0 | 221.4 | 232.7 | 243.4 | 254.9 | 266.4 | 278.0 |
| H. TOTAL ALL COSTS (D+E+F+G) | | | | | | | | | | | | |
| | 435.2 | 467.1 | 590.5 | 570.2 | 640.7 | 811.6 | 1029.6 | 1105.1 | 1202.0 | 1304.3 | 1409.3 | 1519.4 |

28-Sep-91

KERALA WATER AUTHORITY
PROJECTED WATER VOLUMES, REVENUES & COSTS
(Existing Schemes)

(Values in Rs MLN)
(Water volumes in MLD)

File Name:EXISTING
ALTERNATIVE 1

| | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|---------------------------------------|---------------------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| | -----Projected----- | | | | | | | | | | |
| I. Population Served (000) | 11255 | 11480 | 11789 | 11943 | 12182 | 12426 | 12675 | 12928 | 13187 | 13450 | 13719 |
| II. Water demand (MLD) (@ 70 lpcd) | 787.8 | 803.6 | 819.7 | 836.0 | 852.8 | 869.8 | 887.2 | 905.8 | 923.1 | 941.5 | 960.4 |
| A. WATER PRODCTN (MLD) | | | | | | | | | | | |
| 1. Existing scheme | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 |
| SUBTOTAL (A) | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 | 579.8 |
| B. WASTAGE/ | | | | | | | | | | | |
| 1. Percentage (%) | 25.8 | 25.8 | 25.8 | 25.8 | 25.8 | 25.8 | 25.8 | 25.8 | 25.8 | 25.8 | 25.8 |
| 2. Volume (MLD) | 144.9 | 144.9 | 144.9 | 144.9 | 144.9 | 144.9 | 144.9 | 144.9 | 144.9 | 144.9 | 144.9 |
| C. DISTRIBUTION (MLD) | | | | | | | | | | | |
| 1. Domestic | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 |
| 2. Non-domestic | 189.0 | 189.0 | 189.0 | 189.0 | 189.0 | 189.0 | 189.0 | 189.0 | 189.0 | 189.0 | 189.0 |
| 3. Industrial | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.9 | 124.8 | 124.8 | 124.8 |
| SUBTOTAL (C) | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 |
| D. REVENUES DEMANDED | | | | | | | | | | | |
| 1. Domestic | na | 140.6 | 161.7 | 185.9 | 213.8 | 245.9 | 282.8 | 325.2 | 374.0 | 430.0 | 494.6 |
| 2. Non-domestic | na | 171.4 | 197.1 | 226.6 | 260.6 | 299.7 | 344.7 | 395.4 | 455.8 | 524.2 | 602.9 |
| 3. Industrial | na | 55.1 | 63.3 | 72.8 | 83.8 | 96.3 | 110.8 | 127.4 | 146.5 | 168.5 | 193.9 |
| 4. Special/bulk user | na | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | na | 45.6 | 52.4 | 60.2 | 69.3 | 79.7 | 91.6 | 105.4 | 121.2 | 139.3 | 160.2 |
| SUBTOTAL (D) | na | 412.6 | 474.5 | 545.6 | 627.5 | 721.6 | 829.9 | 954.3 | 1097.5 | 1262.1 | 1451.4 |
| E. REVENUES COLLECTED | | | | | | | | | | | |
| 1. Domestic | | 98.4 | 142.7 | 173.0 | 201.6 | 232.6 | 267.7 | 307.9 | 354.2 | 407.3 | 468.4 |
| 2. Non-domestic | | 137.1 | 185.1 | 218.3 | 252.2 | 290.2 | 333.8 | 383.9 | 441.5 | 507.7 | 583.8 |
| 3. Industrial | | 49.6 | 62.0 | 71.8 | 82.6 | 95.0 | 109.2 | 125.6 | 144.4 | 166.1 | 191.0 |
| 4. Special/bulk user | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | | 31.9 | 46.2 | 56.0 | 65.3 | 75.4 | 86.7 | 99.8 | 114.8 | 132.0 | 151.8 |
| SUBTOTAL (E) | | 317.0 | 436.0 | 519.1 | 601.6 | 693.1 | 797.5 | 917.2 | 1054.8 | 1213.0 | 1395.0 |
| F. BALANCE OUTSTANDING | | | | | | | | | | | |
| 1. Domestic | | 42.2 | 61.2 | 74.1 | 86.4 | 99.7 | 114.7 | 132.0 | 151.8 | 174.5 | 200.7 |
| 2. Non-domestic | | 34.3 | 46.3 | 54.6 | 63.0 | 72.6 | 83.4 | 96.0 | 110.4 | 126.9 | 146.0 |
| 3. Industrial | | 5.5 | 6.9 | 8.0 | 9.2 | 10.6 | 12.1 | 14.0 | 16.0 | 18.5 | 21.2 |
| 4. Special/bulk user | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | | 13.7 | 19.8 | 24.8 | 28.0 | 32.3 | 37.2 | 42.8 | 49.2 | 56.6 | 65.0 |
| SUBTOTAL (F) | | 95.6 | 134.1 | 160.7 | 186.6 | 215.1 | 247.5 | 284.7 | 327.4 | 376.5 | 433.0 |

File Name:EXISTING
ALTERNATIVE 1

PROJECTED CONNECTIONS, WATER DISTRIBUTION,
TARIFFS & REVENUES
(by consumption slabs)

(Values in Rs MLN)

(Water volumes in MLD)

| | 91/92 | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|------------------------------------|-----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | ←-----Projected-----→ | | | | | | | | | | |
| A. NO. OF CONNECTIONS | | | | | | | | | | | |
| 1. DOMESTIC | | | | | | | | | | | |
| (a) 0-10000 ltrs pa | 80149 | 88951 | 81760 | 82578 | 83404 | 84238 | 85080 | 85931 | 86798 | 87658 | 88535 |
| (b) 10-30000 ltrs pa | 160298 | 161901 | 163520 | 165156 | 166807 | 168475 | 170160 | 171862 | 173580 | 175316 | 177069 |
| (c) 30-50000 ltrs pa | 28037 | 28238 | 28440 | 28644 | 28851 | 29059 | 29270 | 29483 | 29698 | 29914 | 22134 |
| (d) > 50000 ltrs pa | 6679 | 6746 | 6813 | 6881 | 6950 | 7020 | 7090 | 7161 | 7233 | 7305 | 7378 |
| SUBTOTAL (1) | 267164 | 269836 | 272534 | 275259 | 278012 | 280792 | 283600 | 286436 | 289300 | 292193 | 295115 |
| 2. NON-DOMESTIC | | | | | | | | | | | |
| (a) 0-50000 ltrs pa | 30183 | 30484 | 30789 | 31097 | 31408 | 31722 | 32039 | 32360 | 32683 | 33010 | 33340 |
| (b) 50-100000 ltrs pa | 15091 | 15242 | 15395 | 15549 | 15704 | 15861 | 16020 | 16180 | 16342 | 16505 | 16670 |
| (c) > 100000 ltrs pa | 5030 | 5081 | 5132 | 5183 | 5235 | 5287 | 5340 | 5393 | 5447 | 5502 | 5557 |
| SUBTOTAL (2) | 50304 | 50807 | 51315 | 51828 | 52347 | 52870 | 53399 | 53933 | 54472 | 55017 | 55567 |
| 3. INDUSTRIAL | 5030 | 5081 | 5132 | 5183 | 5235 | 5287 | 5340 | 5393 | 5447 | 5502 | 5557 |
| 4. SPECIAL/BULK USER | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5. STANDPOSTS | 52000 | 52520 | 53045 | 53576 | 54111 | 54653 | 55199 | 55751 | 56309 | 56872 | 57440 |
| TOTL CONNECTNS (1to5) | 374499 | 378244 | 382026 | 385846 | 389705 | 393602 | 397538 | 401513 | 405528 | 409584 | 413679 |
| B. WATER DISTRIBUTION (MLD) | | | | | | | | | | | |
| 1. DOMESTIC | | | | | | | | | | | |
| (a) 0-10000 ltrs pa | 20.8 | 20.8 | 20.8 | 20.8 | 20.8 | 20.8 | 20.8 | 20.8 | 20.8 | 20.8 | 20.8 |
| (b) 10-30000 ltrs pa | 106.9 | 106.9 | 106.9 | 106.9 | 106.9 | 106.9 | 106.9 | 106.9 | 106.9 | 106.9 | 106.9 |
| (c) 30-50000 ltrs pa | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 | 26.7 |
| (d) > 50000 ltrs pa | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 | 22.3 |
| SUBTOTAL (1) | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 | 175.9 |
| 2. NON-DOMESTIC | | | | | | | | | | | |
| (a) 0-50000 ltrs pa | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 |
| (b) 50-100000 ltrs pa | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 | 37.7 |
| (c) > 100000 ltrs pa | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 | 33.5 |
| SUBTOTAL (2) | 109.0 | 109.0 | 109.0 | 109.0 | 109.0 | 109.0 | 109.0 | 109.0 | 109.0 | 109.0 | 109.0 |
| 3. INDUSTRIAL | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 | 25.2 |
| 4. SPECIAL/BULK USER | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. STANDPOSTS | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 | 124.8 |
| TOTAL WATER (1to5) | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 | 434.8 |

28-Sep-91

File Name: OTHNEW
ALTERNATIVE 1KERALA WATER AUTHORITY
PROJECTED WATER VOLUMES, REVENUES & COSTS
(Other Non-WB new Scheme incl ongoing WB)(Values in Rs MLN)
(Water volumes in MLD)

| | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|------------------------------------|----------------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | ←-----Projected----- | | | | | | | | | |
| I. Population Served (000) | 324.1 | 1500.5 | 3306.6 | 3722.1 | 4144.8 | 4572.5 | 5007.7 | 5449.7 | 5898.6 | 6354.4 |
| II. Water demand (MLD) (@ 70 lpcd) | 22.7 | 105.0 | 231.5 | 260.5 | 290.1 | 320.1 | 350.5 | 381.5 | 412.9 | 444.0 |
| A. WATER PRODUCTION (MLD) | | | | | | | | | | |
| 1. Existing prodn | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2. From New Scheme | 16.7 | 83.3 | 199.1 | 217.9 | 236.9 | 256.2 | 275.8 | 295.7 | 315.9 | 336.5 |
| SUBTOTAL (A) | 16.7 | 83.3 | 199.1 | 217.9 | 236.9 | 256.2 | 275.8 | 295.7 | 315.9 | 336.5 |
| B. WASTAGE | | | | | | | | | | |
| 1. Percentage (%) | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 |
| 2. Volume (MLD) | 4.2 | 20.8 | 49.8 | 54.5 | 59.2 | 64.0 | 68.9 | 73.9 | 79.0 | 84.1 |
| C. DISTRIBUTION (MLD) | | | | | | | | | | |
| 1. Domestic | 1.7 | 8.8 | 40.8 | 42.6 | 44.4 | 46.3 | 48.2 | 50.2 | 52.2 | 54.2 |
| 2. Non-domestic | 0.7 | 3.6 | 16.2 | 16.9 | 17.7 | 18.5 | 19.3 | 20.1 | 20.9 | 21.8 |
| 3. Industrial | 0.0 | 0.1 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 11.2 | 51.0 | 88.3 | 103.1 | 110.1 | 133.4 | 148.8 | 164.6 | 180.5 | 196.7 |
| SUBTOTAL (C) | 13.7 | 63.5 | 145.9 | 163.3 | 180.9 | 190.9 | 217.1 | 235.6 | 254.4 | 273.5 |
| D. REVENUES DEMANDED | | | | | | | | | | |
| 1. Domestic | 0.9 | 4.7 | 21.3 | 24.6 | 28.3 | 32.7 | 37.6 | 43.4 | 49.9 | 57.5 |
| 2. Non-domestic | 1.0 | 5.0 | 22.5 | 26.0 | 30.1 | 34.7 | 40.1 | 46.3 | 53.5 | 61.7 |
| 3. Industrial | 0.0 | 0.2 | 1.0 | 1.1 | 1.3 | 1.5 | 1.8 | 2.1 | 2.4 | 2.8 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 4.1 | 21.3 | 42.0 | 56.5 | 74.4 | 96.7 | 124.1 | 157.9 | 199.2 | 249.7 |
| SUBTOTAL (D) | 6.0 | 31.2 | 86.7 | 108.1 | 134.1 | 165.6 | 203.7 | 249.6 | 305.0 | 371.6 |
| E. REVENUES COLLECTED | | | | | | | | | | |
| 1. Domestic | 0.6 | 3.5 | 15.9 | 22.0 | 26.4 | 30.8 | 35.6 | 41.0 | 47.3 | 54.4 |
| 2. Non-domestic | 0.0 | 4.2 | 18.8 | 24.6 | 29.0 | 33.6 | 38.0 | 44.8 | 51.7 | 59.7 |
| 3. Industrial | 0.0 | 0.2 | 0.9 | 1.1 | 1.3 | 1.5 | 1.7 | 2.0 | 2.4 | 2.8 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 2.9 | 15.8 | 34.1 | 49.8 | 67.0 | 87.8 | 113.2 | 144.5 | 182.8 | 229.6 |
| SUBTOTAL (E) | 4.3 | 23.6 | 69.8 | 97.4 | 123.7 | 153.7 | 189.4 | 232.4 | 284.2 | 346.5 |
| F. BALANCE OUTSTANDING | | | | | | | | | | |
| 1. Domestic | 0.3 | 1.5 | 6.8 | 9.4 | 11.3 | 13.2 | 15.3 | 17.6 | 20.3 | 23.3 |
| 2. Non-domestic | 0.2 | 1.0 | 4.7 | 6.1 | 7.2 | 8.4 | 9.7 | 11.2 | 12.9 | 14.9 |
| 3. Industrial | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 1.2 | 6.8 | 14.6 | 21.3 | 28.7 | 37.6 | 48.5 | 61.9 | 78.3 | 98.4 |
| SUBTOTAL (F) | 1.7 | 9.3 | 26.3 | 37.0 | 47.4 | 59.4 | 73.7 | 90.9 | 111.8 | 137.0 |

File Name: OTHNEW
ALTERNATIVE 1

PROJECTED CONNECTIONS, WATER DISTRIBUTION,
TARIFFS & REVENUES (rural schemes)
(by consumption slabs)

(Values in Rs MLN)

(Water volumes in MLD)

| | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|------------------------------------|-----------------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | ←-----Projected-----→ | | | | | | | | | |
| A. NO. OF CONNECTIONS | | | | | | | | | | |
| 1. DOMESTIC | | | | | | | | | | |
| (a) 0-10000 ltrs pa | 166 | 756 | 1290 | 1501 | 1724 | 1951 | 2181 | 2415 | 2652 | 2893 |
| (b) 10-30000 ltrs pa | 97 | 441 | 747 | 875 | 1006 | 1138 | 1272 | 1409 | 1547 | 1688 |
| (c) 30-50000 ltrs pa | 14 | 63 | 107 | 125 | 144 | 163 | 182 | 201 | 221 | 241 |
| (d) > 50000 ltrs pa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SUBTOTAL (1) | 277 | 1260 | 2134 | 2501 | 2874 | 3252 | 3635 | 4025 | 4420 | 4822 |
| 2. NON-DOMESTIC | | | | | | | | | | |
| (a) 0-50000 ltrs pa | 69 | 315 | 534 | 625 | 718 | 813 | 909 | 1006 | 1105 | 1205 |
| (b) 50-100000 ltrs pa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (c) > 100000 ltrs pa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SUBTOTAL (2) | 69 | 315 | 534 | 625 | 718 | 813 | 909 | 1006 | 1105 | 1205 |
| 3. INDUSTRIAL | 3 | 13 | 21 | 25 | 29 | 33 | 36 | 40 | 44 | 48 |
| 4. SPECIAL/BULK USER | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5. STANDPOSTS | 1109 | 5038 | 8536 | 10004 | 11494 | 13007 | 14542 | 16100 | 17681 | 19287 |
| TOTAL CONNECTIONS (1to5) | 1459 | 6625 | 11225 | 13155 | 15115 | 17104 | 19122 | 21171 | 23251 | 25362 |
| B. WATER DISTRIBUTION (MLD) | | | | | | | | | | |
| 1. DOMESTIC | | | | | | | | | | |
| (a) 0-10000 ltrs pa | 0.04 | 0.19 | 0.32 | 0.38 | 0.43 | 0.49 | 0.55 | 0.60 | 0.66 | 0.72 |
| (b) 10-30000 ltrs pa | 0.06 | 0.29 | 0.50 | 0.58 | 0.67 | 0.76 | 0.85 | 0.94 | 1.03 | 1.13 |
| (c) 30-50000 ltrs pa | 0.02 | 0.08 | 0.14 | 0.17 | 0.19 | 0.22 | 0.24 | 0.27 | 0.29 | 0.32 |
| (d) > 50000 ltrs pa | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SUBTOTAL (1) | 0.12 | 0.57 | 0.96 | 1.13 | 1.29 | 1.46 | 1.64 | 1.81 | 1.99 | 2.17 |
| 2. NON-DOMESTIC | | | | | | | | | | |
| (a) 0-50000 ltrs pa | 0.09 | 0.39 | 0.67 | 0.78 | 0.90 | 1.02 | 1.14 | 1.26 | 1.38 | 1.51 |
| (b) 50-100000 ltrs pa | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| (c) > 100000 ltrs pa | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SUBTOTAL (2) | 0.09 | 0.39 | 0.67 | 0.78 | 0.90 | 1.02 | 1.14 | 1.26 | 1.38 | 1.51 |
| 3. INDUSTRIAL | 0.00 | 0.02 | 0.04 | 0.04 | 0.05 | 0.05 | 0.06 | 0.07 | 0.07 | 0.08 |
| 4. SPECIAL/BULK USER | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5. STANDPOSTS | 11.09 | 50.38 | 85.36 | 100.04 | 114.94 | 130.07 | 145.42 | 161.00 | 176.81 | 192.87 |
| TOTAL WATER (1to5) | 11.31 | 51.36 | 87.02 | 101.99 | 117.18 | 132.60 | 148.25 | 164.13 | 180.26 | 196.62 |

File Name: OTRNEW
ALTERNATIVE 1

PROJECTED CONNECTIONS, WATER DISTRIBUTION,
TARIFFS & REVENUES (urban schemes)
(by consumption slabs)

(Values in Rs MLN)
(Water volumes in MLD)

| | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|------------------------------------|-----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | (-----Projected-----) | | | | | | | | | |
| A. NO. OF CONNECTIONS | | | | | | | | | | |
| 1. DOMESTIC | | | | | | | | | | |
| (a) 0-10000 ltrs pa | 585 | 3813 | 14657 | 15263 | 15881 | 16511 | 17154 | 17889 | 18478 | 19160 |
| (b) 10-30000 ltrs pa | 1520 | 7833 | 38109 | 39684 | 41290 | 42929 | 44608 | 46304 | 48043 | 49816 |
| (c) 30-50000 ltrs pa | 175 | 984 | 4397 | 4579 | 4764 | 4953 | 5146 | 5343 | 5543 | 5748 |
| (d) > 50000 ltrs pa | 58 | 381 | 1466 | 1526 | 1588 | 1651 | 1715 | 1781 | 1848 | 1916 |
| SUBTOTAL (1) | 2338 | 12851 | 58630 | 61052 | 63523 | 66044 | 68615 | 71237 | 73912 | 76640 |
| 2. NON-DOMESTIC | | | | | | | | | | |
| (a) 0-50000 ltrs pa | 129 | 663 | 3225 | 3358 | 3494 | 3632 | 3774 | 3918 | 4065 | 4215 |
| (b) 50-100000 ltrs pa | 58 | 381 | 1466 | 1526 | 1588 | 1651 | 1715 | 1781 | 1848 | 1916 |
| (c) > 100000 ltrs pa | 47 | 241 | 1173 | 1221 | 1270 | 1321 | 1372 | 1425 | 1478 | 1533 |
| SUBTOTAL (2) | 234 | 1285 | 5863 | 6105 | 6352 | 6604 | 6861 | 7124 | 7391 | 7664 |
| 3. INDUSTRIAL | 5 | 24 | 117 | 122 | 127 | 132 | 137 | 142 | 148 | 153 |
| 4. SPECIAL/BULK USER | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5. STANDPOSTS | 23 | 121 | 586 | 611 | 635 | 660 | 686 | 712 | 739 | 766 |
| TOTAL CONNECTIONS (1to5) | 2600 | 13480 | 65196 | 67898 | 70638 | 73441 | 76380 | 79216 | 82190 | 85224 |
| B. WATER DISTRIBUTION (MLD) | | | | | | | | | | |
| 1. DOMESTIC | | | | | | | | | | |
| (a) 0-10000 ltrs pa | 0.1 | 0.8 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | 4.5 | 4.6 | 4.8 |
| (b) 10-30000 ltrs pa | 1.0 | 5.2 | 25.4 | 26.5 | 27.5 | 28.6 | 29.7 | 30.9 | 32.0 | 33.2 |
| (c) 30-50000 ltrs pa | 0.2 | 1.2 | 5.9 | 6.1 | 6.4 | 6.6 | 6.9 | 7.1 | 7.4 | 7.7 |
| (d) > 50000 ltrs pa | 0.2 | 1.0 | 4.9 | 5.1 | 5.3 | 5.5 | 5.7 | 5.9 | 6.2 | 6.4 |
| SUBTOTAL (1) | 1.6 | 8.2 | 39.8 | 41.5 | 43.1 | 44.9 | 46.6 | 48.4 | 50.2 | 52.1 |
| 2. NON-DOMESTIC | | | | | | | | | | |
| (a) 0-50000 ltrs pa | 0.2 | 0.8 | 4.0 | 4.2 | 4.4 | 4.5 | 4.7 | 4.9 | 5.1 | 5.3 |
| (b) 50-100000 ltrs pa | 0.1 | 0.8 | 3.7 | 3.8 | 4.0 | 4.1 | 4.3 | 4.5 | 4.6 | 4.8 |
| (c) > 100000 ltrs pa | 0.3 | 1.6 | 7.8 | 8.1 | 8.5 | 8.8 | 9.1 | 9.5 | 9.9 | 10.2 |
| SUBTOTAL (2) | 0.6 | 3.2 | 15.5 | 16.2 | 16.8 | 17.5 | 18.2 | 18.8 | 19.6 | 20.3 |
| 3. INDUSTRIAL | 0.0 | 0.1 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 |
| 4. SPECIAL/BULK USER | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. STANDPOSTS | 0.1 | 0.6 | 2.9 | 3.1 | 3.2 | 3.3 | 3.4 | 3.6 | 3.7 | 3.8 |
| TOTAL WATER (1to5) | 2.3 | 12.1 | 58.8 | 61.3 | 63.8 | 66.3 | 68.9 | 71.5 | 74.2 | 76.9 |

01-Jan-88

File Name: ALLWBS

ALTERNATIVE 1

KERALA WATER AUTHORITY
PROJECTED WATER VOLUMES, REVENUES & COSTS
(All World Bank Restructured Schemes)

(Values in Rs MLN)

(Water volumes in MLD)

| | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|----------------------------------|-------------------------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| | ←----- Projected -----> | | | | | | | | | |
| I. Population Served (000) | 938.2 | 948.8 | 967.8 | 987.2 | 1006.9 | 1027.1 | 1047.6 | 1068.6 | 1089.9 | 1111.7 |
| II. Water demand (MLD) | 138.3 | 132.8 | 135.5 | 138.2 | 141.8 | 143.8 | 146.7 | 149.6 | 152.6 | 155.6 |
| A. WATER PRODUCTION (MLD) | | | | | | | | | | |
| 1. Existing prodn | 67.9 | 67.9 | 67.9 | 67.9 | 67.9 | 67.9 | 67.9 | 67.9 | 67.9 | 67.9 |
| 2. From New Scheme | 0.0 | 0.0 | 66.8 | 67.6 | 69.2 | 70.2 | 71.4 | 72.9 | 74.1 | 75.7 |
| SUBTOTAL (A) | 67.9 | 67.9 | 134.7 | 135.5 | 137.1 | 138.1 | 139.3 | 140.8 | 142.0 | 143.5 |
| B. WASTAGE | | | | | | | | | | |
| 1. Percentage (%) | | | | | | | | | | |
| 2. Volume (MLD) | 13.6 | 13.6 | 26.9 | 27.1 | 27.4 | 27.6 | 27.9 | 28.2 | 28.4 | 28.7 |
| C. DISTRIBUTION (MLD) | | | | | | | | | | |
| 1. Domestic | 35.2 | 35.2 | 66.2 | 66.6 | 67.2 | 67.8 | 68.4 | 69.1 | 69.7 | 70.3 |
| 2. Non-domestic | 8.1 | 8.1 | 18.2 | 18.3 | 18.6 | 18.8 | 19.0 | 19.2 | 19.5 | 19.7 |
| 3. Industrial | 5.6 | 5.6 | 9.5 | 9.5 | 9.6 | 9.6 | 9.7 | 9.8 | 9.8 | 9.9 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 6.7 | 6.7 | 13.9 | 14.0 | 14.2 | 14.3 | 14.5 | 14.6 | 14.8 | 14.9 |
| SUBTOTAL (C) | 55.6 | 55.6 | 107.7 | 108.5 | 109.5 | 110.6 | 111.6 | 112.7 | 113.8 | 114.9 |
| D. REVENUES DEMANDED | | | | | | | | | | |
| 1. Domestic | 28.0 | 32.2 | 69.1 | 80.0 | 92.9 | 107.8 | 125.0 | 145.1 | 168.4 | 195.5 |
| 2. Non-domestic | 13.3 | 15.3 | 39.5 | 45.8 | 53.3 | 62.0 | 72.2 | 84.1 | 97.8 | 113.9 |
| 3. Industrial | 12.3 | 14.1 | 27.4 | 31.7 | 36.7 | 42.5 | 49.1 | 56.9 | 65.9 | 76.3 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 2.4 | 2.8 | 6.7 | 7.0 | 9.0 | 10.5 | 12.2 | 14.2 | 16.5 | 19.2 |
| SUBTOTAL (D) | 56.0 | 64.4 | 142.7 | 165.3 | 191.9 | 222.8 | 258.6 | 300.2 | 348.6 | 404.9 |
| E. REVENUES COLLECTED | | | | | | | | | | |
| 1. Domestic | 19.6 | 28.4 | 56.9 | 73.1 | 86.9 | 101.5 | 118.0 | 137.0 | 159.0 | 184.5 |
| 2. Non-domestic | 10.6 | 14.4 | 34.4 | 43.5 | 51.4 | 59.9 | 69.7 | 81.2 | 94.5 | 110.0 |
| 3. Industrial | 11.0 | 13.8 | 26.0 | 31.1 | 36.1 | 41.8 | 48.4 | 56.0 | 64.9 | 75.1 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 1.7 | 2.5 | 5.4 | 7.1 | 8.4 | 9.9 | 11.5 | 13.4 | 15.6 | 18.1 |
| SUBTOTAL (E) | 43.0 | 59.1 | 122.8 | 154.8 | 182.9 | 213.1 | 247.7 | 287.6 | 334.0 | 387.8 |
| F. BALANCE OUTSTANDING | | | | | | | | | | |
| 1. Domestic | 8.4 | 12.2 | 24.4 | 31.3 | 37.3 | 43.5 | 50.6 | 58.7 | 68.1 | 79.1 |
| 2. Non-domestic | 2.7 | 3.6 | 8.6 | 10.9 | 12.8 | 15.0 | 17.4 | 20.3 | 23.6 | 27.5 |
| 3. Industrial | 1.2 | 1.5 | 2.9 | 3.5 | 4.0 | 4.6 | 5.4 | 6.2 | 7.2 | 8.3 |
| 4. Special/bulk user | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. Standposts | 0.7 | 1.1 | 2.3 | 3.0 | 3.6 | 4.2 | 4.9 | 5.7 | 6.7 | 7.8 |
| SUBTOTAL (F) | 13.0 | 18.4 | 38.2 | 48.7 | 57.7 | 67.4 | 78.3 | 91.0 | 105.6 | 122.7 |

File Name: ALLMDS

ALTERNATIVE 1

PROJECTED CONNECTIONS, WATER DISTRIBUTION,
TARIFFS & REVENUES
(by consumption slabs)

(Values in Rs MLN)

(Water volumes in MLD)

| | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | 98/99 | 99/00 | 00/01 | 01/02 |
|------------------------------------|-----------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | ←-----Projected-----> | | | | | | | | | |
| A. NO. OF CONNECTIONS | | | | | | | | | | |
| 1. DOMESTIC | | | | | | | | | | |
| (a) 0-10000 ltrs pm | 19446 | 19446 | 37495 | 37765 | 38893 | 38427 | 38768 | 39115 | 39478 | 39831 |
| (b) 10-30000 ltrs pm | 30382 | 30382 | 58856 | 58481 | 58996 | 59521 | 60056 | 60602 | 61159 | 61728 |
| (c) 30-50000 ltrs pm | 4444 | 4444 | 8569 | 8631 | 8706 | 8782 | 8868 | 8948 | 9021 | 9103 |
| (d) > 50000 ltrs pm | 1239 | 1239 | 1995 | 2011 | 2030 | 2049 | 2068 | 2088 | 2108 | 2129 |
| SUBTOTAL (1) | 55512 | 55512 | 106115 | 106888 | 107824 | 108778 | 109752 | 110745 | 111758 | 112791 |
| 2. NON-DOMESTIC | | | | | | | | | | |
| (a) 0-50000 ltrs pm | 1635 | 1635 | 3571 | 3683 | 3646 | 3689 | 3733 | 3778 | 3824 | 3871 |
| (b) 50-100000 ltrs pm | 826 | 926 | 1865 | 1883 | 1906 | 1929 | 1953 | 1977 | 2002 | 2027 |
| (c) > 100000 ltrs pm | 600 | 600 | 1358 | 1378 | 1396 | 1413 | 1430 | 1437 | 1455 | 1473 |
| SUBTOTAL (2) | 3061 | 3061 | 6794 | 6857 | 6938 | 7022 | 7106 | 7193 | 7281 | 7371 |
| 3. INDUSTRIAL | 1119 | 1119 | 1892 | 1903 | 1915 | 1928 | 1940 | 1953 | 1966 | 1980 |
| 4. SPECIAL/BULK USER | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5. STANDPOSTS | 1337 | 1337 | 2781 | 2800 | 2830 | 2861 | 2892 | 2924 | 2956 | 2989 |
| TOTAL CONNECTNS (1to5) | 61030 | 61030 | 117582 | 118449 | 119308 | 120188 | 121091 | 122015 | 122962 | 123931 |
| B. WATER DISTRIBUTION (MLD) | | | | | | | | | | |
| 1. DOMESTIC | | | | | | | | | | |
| (a) 0-10000 ltrs pm | 4.9 | 4.9 | 9.4 | 9.4 | 9.5 | 9.6 | 9.7 | 9.8 | 9.9 | 10.0 |
| (b) 10-30000 ltrs pm | 28.3 | 28.3 | 38.7 | 39.0 | 39.3 | 39.7 | 40.0 | 40.4 | 40.8 | 41.2 |
| (c) 30-50000 ltrs pm | 5.9 | 5.9 | 11.4 | 11.5 | 11.6 | 11.7 | 11.8 | 11.9 | 12.0 | 12.1 |
| (d) > 50000 ltrs pm | 4.1 | 4.1 | 6.7 | 6.7 | 6.8 | 6.8 | 6.9 | 7.0 | 7.0 | 7.1 |
| SUBTOTAL (1) | 33.2 | 33.2 | 66.2 | 66.6 | 67.2 | 67.8 | 68.4 | 69.1 | 69.7 | 70.3 |
| 2. NON-DOMESTIC | | | | | | | | | | |
| (a) 0-50000 ltrs pm | 2.0 | 2.0 | 4.5 | 4.5 | 4.6 | 4.6 | 4.7 | 4.7 | 4.8 | 4.8 |
| (b) 50-100000 ltrs pm | 2.1 | 2.1 | 4.7 | 4.7 | 4.8 | 4.8 | 4.9 | 4.9 | 5.0 | 5.1 |
| (c) > 100000 ltrs pm | 4.0 | 4.0 | 9.1 | 9.1 | 9.2 | 9.4 | 9.5 | 9.6 | 9.7 | 9.8 |
| SUBTOTAL (2) | 8.1 | 8.1 | 18.2 | 18.3 | 18.6 | 18.8 | 19.0 | 19.2 | 19.5 | 19.7 |
| 3. INDUSTRIAL | 5.6 | 5.6 | 9.5 | 9.5 | 9.6 | 9.6 | 9.7 | 9.8 | 9.8 | 9.9 |
| 4. SPECIAL/BULK USER | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 5. STANDPOSTS | 6.7 | 6.7 | 13.9 | 14.0 | 14.2 | 14.3 | 14.5 | 14.6 | 14.8 | 14.9 |
| TOTAL WATER (1to5) | 55.6 | 55.6 | 107.7 | 108.5 | 109.5 | 110.6 | 111.6 | 112.7 | 113.8 | 114.9 |

WATER TARIFF IN SELECT CITIES OUTSIDE KERALA

| SL. NO. | NAME OF CITY | DOMESTIC TARIFF PER 1 KL/MONTH | COMMERCIAL TARIFF PER 1 KL/MONTH | INDUSTRIES TARIFF PER 1 KL/MONTH |
|---------|--------------------------------------|---|-------------------------------------|--|
| 1. | Hyderabad | Metered : | | |
| | | Upto 25000 ltrs. 2.50 | Upto 50 KL 5.00 Above 50 KL 7.00 | Upto 500 KL 7.50 Above 500 KL 10.00 |
| | | Above 25000 3.00 | | |
| | | Minimum charges Rs.30 p.m. | | |
| | | Unmetered : | | |
| | | Flat charges Rs.60 p.m. | | |
| | | 20% of the water charges demand is collected as sewerage cess | | |
| 2. | Hyderabad (adjoining Municipalities) | Rs.30/- p.m. Rs.15/- p.m. | Rs.50/- p.m. | Rs.50/- p.m. |
| | a) Kukatpally | | | |
| | b) Uppal | | | |
| | c) Malkajgiri | | | |
| | d) Kapra | | | |
| | e) Kuthbullapur | | | |
| 3. | Vishakapatnam | Domestic : | | |
| | | 1st tap Rs.10/- | | |
| | | 2nd tap Rs.8/- | | |
| | | 3rd tap Rs.6/- | | |

| SL. NO. | NAME OF CITY | DOMESTIC TARIFF PER 1 KL/MONTH | COMMERCIAL TARIFF PER 1 KL/MONTH | INDUSTRIES TARIFF PER 1 KL/MONTH |
|---------|--------------|---|----------------------------------|----------------------------------|
| | | Multistoried buildings = Rs.5.00 | Above 2 lakhs ltrs. Rs.12 | |
| | | Village Panchayats & Municipalities = Rs.2.50 | | |
| 5. | Madras | | <u>Metered</u> | |
| | | | Upto 50,000 litres Rs.3/- | Rs.7/- |
| | | | 50,000 to 1 lakh litres Rs.4/- | |
| | | | Above 1 lakh litres Rs.5/- | |
| | | | <u>Unmetered</u> | |
| | | | Flat charge Rs.12 per month | |
| 6. | | | Rs.7.00 (other than Hill areas) | Rs.7.00 (other than Hill areas) |
| | | | Rs.9.00 (Hill areas) | Rs.9.00 (Hill areas) |

