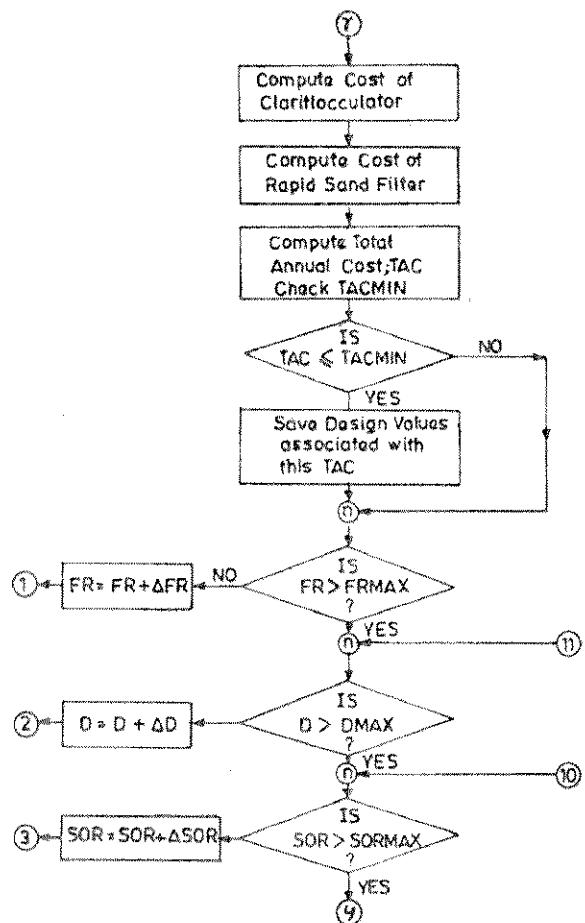
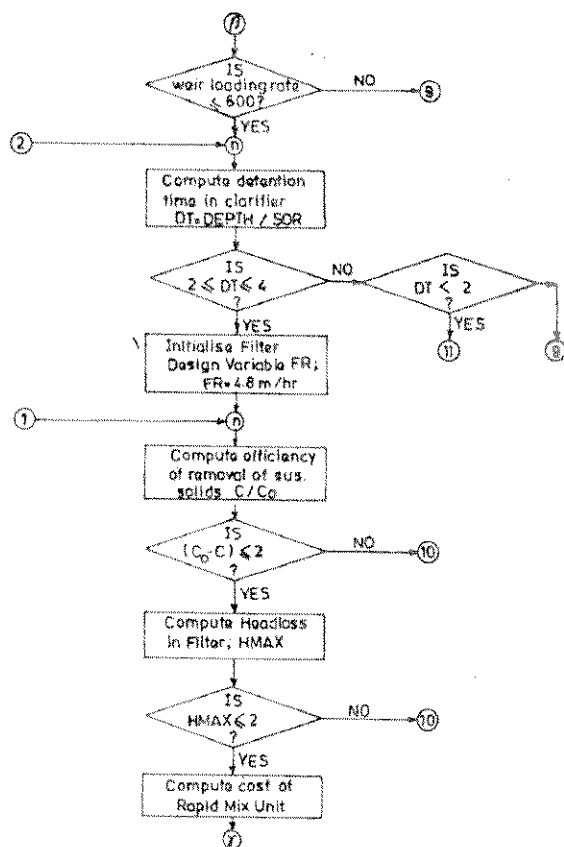
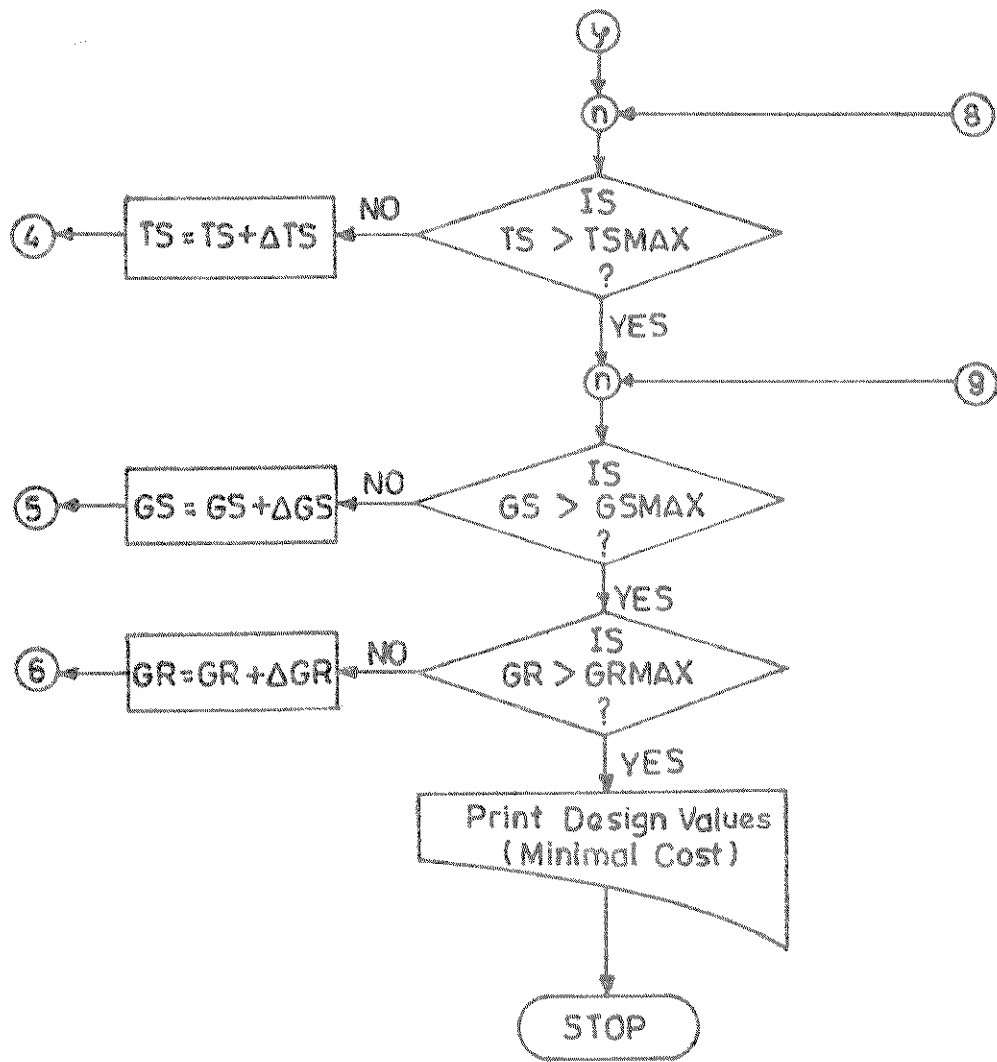


FIGURE 16.4: ALGORITHM FOR COMPUTER AIDED FUNCTIONAL AND MINIMAL COST DESIGN OF CONVENTIONAL WATER TREATMENT SYSTEM





CHAPTER 17

FINANCING AND MANAGEMENT OF WATER SUPPLY PROJECTS

17.1 WATER SUPPLY FINANCING

The aim of any water supply undertaking should be to provide safe and adequate supplies of potable water at the lowest practicable cost. This demands in addition to the knowledge of water works planning, design, construction and administration, a sound understanding of the elements of financial policy, viz.,

- (i) The equitable spreading of the cost of water supply by means of appropriate scales of charges and a potable water rate; and
- (ii) The economic aspects of development and execution of the schemes, the methods of providing the capital needed to finance such schemes and the manner of providing for the repayment of such capital.

Apart from the above, financing in the water supply sector requires consideration of expanding requirements of this natural resource due to increase in population, changes in living habits and also increasing requirements due to technological advancements in agriculture, industry, etc.

17.1.1 SCOPE

The salient features of water supply financing are:

- ◆ Methods of raising capital for the installation of the system and provision for repayment of loans where needed;
- ◆ Methods of raising revenue to meet the annual expenses of water supply including the determination of tariffs as well as the collection/recovery of charges;
- ◆ The application of revenue derived from water charges;
- ◆ The formation and use of reserve and contingency funds;
- ◆ Accounting in connections with income and expenditure;
- ◆ Wages, store and cost accounting; and
- ◆ Financial organisation and control such as ordering of goods, authorisation of payments, internal audit, budgeting, insurance etc.

Note:

1. The possible need for expansion of the system with reference to requirements for drinking purposes and also for sewage disposal should be considered.
2. In the rural sector, the methodology of raising capital should be with reference to change level of service, i.e. replacement of handpump schemes/power pump schemes with point distribution/public standposts by piped water supply with house service connections for domestic purpose and metering which should be the ultimate aim.

17.2 CAPITAL AND REVENUE

The transactions of any water undertaking fall into two broad classes as under:

(a) Capital

Capital from an economical and engineering point of view means the amount invested by an agency from the beginning to the time the works are placed in operation. It includes:

- (i) the purchase of property and rights of way;
- (ii) payments for the structures equipment and the engineering services.

(b) Revenue

Revenue denotes income sources such as from water charges and government grants. The revenue account is a summary of the expenditure and income of the undertaking during a financial year. Revenue expenditure includes the cost of operating and maintaining the undertaking as well as other charges (loan charges) which have to be met from the income of the undertaking.

17.3 SOURCES FOR RAISING CAPITAL

The various sources available for raising capital are:

- (i) Accumulated funds such as water funds with the local body.
- (ii) Grant from government,
- (iii) Internal borrowing which means investing the surplus funds of the authority itself from its various accumulations such as provident fund and other funds which is the cheapest source as the rate of interest would be the lowest; and
- (iv) external borrowings from
 - ◆ Government with stipulated terms of payment;
 - ◆ Public through Government bonds;
 - ◆ Life Insurance Corporation, Nationalised Banks and such other financing institutions;
 - ◆ Potential buyers who may be desirous of establishing industries in the area;
 - ◆ Direct beneficiaries; and

- ◆ International agencies such as the World Bank, Asian Bank, International Development Authority (I.D.A.).

17.3.1 AUTHORITY RESPONSIBLE.

It is the first charge of the local body or any authority responsible for water supply to provide potable and adequate water supply in the area. Its responsibility starts from the time it is mooted through the various stages of preliminary and detailed investigation, design, administrative, financial and technical sanctions, construction, operation and maintenance and upto the repayment of the loans drawn for the project. The role of other agencies such as the Government in the entire programme is only to help the local body to realise its objective by furnishing the technical and administrative services necessary for the purpose. In regard to the financial commitments, the local body's responsibility is undivided, except in those cases where the State Government agrees to meet a part of the initial capital burden according to its accepted policy.

The problems facing the local body, however is more to find the initial capital to meet the heavy investment of the schemes rather than to device ways and means of repaying the loan over a period of years. The local body has to mortgage the repaying capacity of the beneficiaries against the capital loan secured for the project. The soundness of the project is guaranteed by the assurances of a safe and sufficient water supply to every consumer. (The function of the local body is to sponsor the project on behalf of the consumer). The State and Central Governments generally provide the necessary technical and administrative services to implement the project and arrange for the capital funds necessary therefor. When loans are to be raised by the local body, the State Government acts as a security for the local body to underwrite its financial capacity. It is in recognition of these basic principles of financing and management of water supply utilities for communities that the World Bank and specifically the I.D.A. have come out with loan assistance for community water supplies in the different countries as part of a global programme.

Financial autonomy can be built into the operation of water supply systems, through revolving funds, reliance on bonds and debenture sales in the open market and to public investment institutions as well as assistance from international/bilateral financing agencies. The use of each method or some combination of them, has proven effective elsewhere in launching water systems on the way to self support relieving the State and Central Governments of some part of their burden of support. The local bodies/water supply undertakings should realise that the schemes have to be self supporting.

No proposal for supplying water to a community should be considered complete until adequate arrangements for the disposal of the community waste water are included. A proper monetary assessment of the direct and indirect effects of water supply and sewage facilities for urban communities has to be made to present the financial implications in proper perspective. It will be seen that the consequences of postponing these facilities will be greater than the cost of providing them.

17.3.2 THE RELATIVE MERITS OF THE VARIOUS METHODS

The obtaining of a loan from the Government is beset with the difficulty that the Government will not be able to oblige all local bodies interested in the provision of water supply facility due to its own financial limitations. The local body will have to claim priority for its scheme, advancing its own reasons. However, the State Government may go in for a public loan on behalf of the local body acting as a borrowing agency from LIC and other agencies. It should consider the issue of serial bonds for the purpose since it is believed that this would attract a wide class of investors on account of their varying lengths of repayment.

Direct beneficiaries of the project would willingly contribute substantial part on the initial investment to be adjusted later against the house service connection fee and water charges. This potential source, which has not been tapped so far, should be taken full advantage of.

Industries which are interested to buy water may give loans at reasonable rates of interest and it would be worthwhile to exploit this source fully.

The International Agencies insist on certain preconditions relating to the preparation of the project, its execution, operation and maintenance including revenue collection.

17.4 METHOD OF RAISING REVENUE

The sources of revenue are the funds received by general taxation such as water tax or a portion of the general property tax which is realised by assessment on all taxable property and water rates paid by those who use the water, more or less in proportion to the amount consumed.

17.4.1 WATER TAX

Since the provision of a water supply to a town enhances the value of the property, a water tax is justifiable on the annual rental value of the property. This may be a separate tax or included in the general property tax but it is desirable that the revenue under this head is earmarked for water supply purpose.

For supply of water for general purposes such as the supply through public fountains, places of public resort, for fire protection etc., for which no charge is leviable on the public individually or collectively, the local body has to apportion a part of its income from general taxes for meeting this obligation. This will help the water wing of the local body to manage its affairs on a sound business footing. This revenue is assured for the local body as it is independent of the actual quantity consumed and the party catered to. This revenue is preferably utilised to pay annuity charges on the loan obtained for the installation of the water supply system and can be adjusted to meet this commitment fully.

17.4.2 WATER RATES

The revenue from the sale of water or water rates recoverable from parties actually consuming the water such as for domestic purposes or for commercial and industrial purposes is utilised to meet the annual recurring cost of operation and maintenance and to provide for a reserve for meeting the capital expenses for future improvement to the system.

Any major augmentation of the system should, however, be dealt with as a new scheme for which the capital is to be raised in the usual manner.

The simplest form of a water rate is a flat rate payable monthly or quarterly by the customer regardless of the quantity consumed, the services being not metered. Many local bodies also adopt the system of a fixed tap rate charged per tap irrespective of the quantity used. This rate is easily fixed by dividing the total revenue required by the total number of customers or taps so as to make the local body meet its obligation. But this system leads to waste of water and is therefore not satisfactory. Since the charges for water bear no direct relation to the cost of service rendered, such a rate is discriminatory.

The most equitable method will be based on metering of all the supplies. The quantity actually accounted for by the meters is invariably less than the quantity produced since there is a considerable wastage as 'unaccounted water', which should also be considered in fixing the water rates. This will mean that even the supplies to places of public resort for which the general wing of the local body has to bear the charges should also be metered. This is all the more necessary as substantial wastage occurs at these supply points and the consumption figures will point out to the need for greater vigilance.

Some local bodies allow a free allowance for the metered supplies, based on the water tax collected and charge only for the excess. This is also not desirable as the revenue collected by water rates is to finance the operation and maintenance costs fully. A worthwhile alternative is to collect a fixed charge called the service charge per consumer in addition to the charge for the water consumed. This fixed charge is to provide for the meter rent where the meters are supplied by the department and for the overhead charges for the billing and collection, meter reading, maintenance of meters and prorated general expenses. The entire supply as measured by the meter is to be charged for, at either a uniform rate or by graded rates. Consumption above a reasonable quantity may be charged at a higher rate to discourage such drawl. This will enable all consumers to get an equitable supply. Again there may be separate meters for measuring the supply for domestic and non-domestic uses. The rates for non-domestic and industrial purposes may be fixed higher. The water rates are to be carefully fixed taking into account the following:

- (i) The rate should be high enough to fetch the necessary revenue and not excessive as to discourage consumers from making needed use of the water for domestic needs and for personnel hygiene in particular.
- (ii) The rate should be such as to make the amenity more or less self paying and worked on a no-profit-no-loss basis.
- (iii) The rate should be such as to provide for generating source for expanding the system to take care of increasing requirements.

It is desirable that water supplies at least to all cities having a population of one lakh or more are metered.

17.5 WATER SUPPLY MANAGEMENT

Efficient and effective management of water supply systems is most essential for their proper functioning. A water supply organisation should be treated as a business enterprise involving managerial skills and engineering knowledge to make it successful in service, in safety and in financial considerations. The quality of water supplied should be the prime consideration for any water supply organisation as the safety and health of the people depend upon it.

The technical and engineering problems involved in the running of a water supply organisation call for a qualified Public Health Engineer as the head of the management.

17.5.1 SCOPE

A good management of a water supply system includes a number of functions such as;

- (i) Provision and maintenance of adequate facilities;
- (ii) Good and smooth operation;
- (iii) Efficient and economical maintenance;
- (iv) Efficient administration;
- (v) Establishment of sound fiscal methods;
- (vi) Development of equitable water tax and water rates;
- (vii) Efficient control of equipment and supplies;
- (viii) Keeping the wastage of water to a minimum;
- (ix) Good public relations and a satisfactory service to consumers; and
- (x) Development of technical and financial plans for future expansion.

17.5.2 TASKS

A successful management involves;

- (i) A detailed knowledge of the components of the system, the basis of their design and the assumptions made;
- (ii) Objective plans with charts to indicate the work, past, present and future and the time schedules;
- (iii) Promptness in changing plans to meet any contingencies and unforeseen conditions;
- (iv) Detailing job specifications;
- (v) Prescription of the duties, powers and responsibilities of each employee of the organisation for routine maintenance and in emergencies and to prepare a list of "do's and don'ts" for the operational staff;

- (vi) They should be drafted in a form which can be easily understood by the operators, preferably in the languages, they are accustomed to;
- (vii) Evaluation of a good record systems of manuals, drawings, lubrication charts for machineries etc., so that they are available even after a decade or two when there is every likelihood that they cannot be obtained from manufactures etc. due to possible change of design or other reasons;
- (viii) Search for an elimination of unnecessary job inefficiencies in the working of the system;
- (ix) Recruitment and inservice training of the personnel, technical and nontechnical;
- (x) Recognition of merit and choosing efficient men to occupy position of higher responsibility. Persons associated at the construction stage should be preferred as key personnel since they have had the opportunity of understanding how the system had been put together and the mode of its working;
- (xi) A thorough knowledge of the business methods including financing, budgeting, billing and revenue collection work and investment of funds; and
- (xii) Carrying out health education programmes to get the full cooperation of the public, in not only preventing contamination of the water supply but also making them appreciate the value of protected water, with a view to prevent wastage.

17.6 FINANCIAL APPRAISAL OF WATER SUPPLY PROJECTS

17.6.1 INTRODUCTION

Project appraisal is the analysis of costs and benefits of a proposed project with an aim of obtaining a rational allocation of scarce resources among alternative investment opportunities in view of achieving certain specified goals in the National Development Programme. As the number of projects to satisfy the identified needs exceed the resources available, project appraisal becomes necessary to choose the best alternative one from a package of projects. Moreover, careful project analysis will point out unrealistic or questionable assumptions and indicate ways in which a project can be modified to improve its wealth generating capacity. A project carefully analyzed and revised in the light of this analysis has a much improved chance of being implemented on time and of yielding the benefits aimed at.

In projects analysis, there is a critically important distinction to be kept in mind between two complementary points of view viz.

- (i) Economic analysis; and
- (ii) Financial analysis.

Economic analysis is concerned with the total return or productivity or profitability to the whole economy of all the resources committed to the project regardless of who in the society contributes them and regardless of who in the society receives the benefits.

The social cost benefit or economic analysis aims at evaluating the profitability according to the impact on the society as a whole, while the financial cost benefit analysis tries to assess the profitability to the operating entity.

Accounting prices are used in social cost benefit analysis to establish the undistorted basic relationship between world prices and domestic prices. There are two ways of doing this. The first method known as Little and Wireless method contemplates valuing all goods and services in terms of world prices without the use of exchange rate. The second method known as UNIDO method envisages valuation of goods and services in terms of their contribution to consumption at domestic prices. Export and import prices, under this method, are converted into domestic price relatives by the use of Shadow Exchange Rate, the purpose of this adjustment being to allow for tariff induced distortions between domestic and border prices.

On the other hand, financial analysis is concerned with the individual financial entities which participate in a project, viz. entrepreneurs, businessmen, farmers, public agencies, etc., each is interested in the return to the equity capital one contributes. Project appraisal is very important for the developing countries which are in the process of achieving stupendous task of recycling of financial and other resources for productive purposes and welfare of the poor people.

The analytical techniques employed for Economic and Financial appraisal comprise deriving values for the net present worth (NPW), internal rate of return (IRR) and the benefit cost ratio (B/C). These are defined as follows:

Net present worth (or Net present value): (NPW/NPV)

This is defined as the present worth of the net benefits of a project discounted at the opportunity cost of capital.

i.e. Net present worth = (Present worth of benefits - Present worth of costs)

Internal rate of return: IRR

This is defined as that discounted rate at which the present worth of benefits, is equal to the present worth of costs. This measure represents the return over the life of the project to the resources engaged in the project.

To determine IRR the NPW is first calculated at two different discounting rates (r_1 and r_2 being the higher and lower discounting rates)

$$IRR = r_2 + \frac{(r_1 - r_2)NPW_2}{NPW_2 - NPW_1}$$

Benefit Cost Ratio: (B.C. Ratio)

This is defined as the present worth of benefit divided by the present worth of costs.

17.6.2 PROJECT CYCLE

Any project has to under go the following project cycle:

(i) Identification

The first phase of the cycle is concerned with identifying projects that have a high priority with reference to the set objectives and needs of the country.

(ii) Preparation

The next stage is project preparation which should cover the full range of technical, institutional, economic and financial conditions necessary to achieve the project objectives:

A critical element of preparation is identifying and comparing technical and institutional alternatives for achieving the project objectives. This has to be followed by a more detailed investigation of the most promising alternative and the most satisfactory solution is finally worked out.

(iii) Appraisal

As the project takes shape and studies are nearing completion, the project is scheduled for appraisal. It is a critical stage of the project cycle because it is the culmination of the preparatory work, provides a comprehensive review of all aspects of the project, and lays the foundation for implementing the project and evaluating it when completed.

Appraisal consists of four parts viz.,

- (a) technical
- (b) institutional
- (c) economic
- (d) financial

Technical appraisal is necessary to ensure that the project is designed in a sound manner as least-cost solution following all the accepted engineering norms. The various technical alternatives considered and the solution proposed are part of technical appraisal. This also includes appropriateness of technical standards adopted, reality of the implementation schedule, likely hood of achieving the expected results, review of capital cost and operating cost estimates and engineering and other data, proposed procurement arrangements etc.

Second part is the appraisal of the institutional aspects of the project which also includes recognition of the need for a continuous re-examination of the institutional arrangements with an open mind to accept new ideas and adopt a long term approach that may extend over several projects.

Third is the economic appraisal which aims at assessing the contribution of the project to the development objective of the country and this remains the basic criterion for project selection and appraisal.

The fourth and the last one is financial appraisal which has several purposes viz, to find out whether the project is financially viable to meet all its financial obligations including debt servicing, to generate adequate working capital, to generate funds from internal sources, to earn a reasonable return on its assets in operation and make a satisfactory contribution to its

future capital requirements. The financial review often highlights the need to adjust the level and structure of prices charged to the project.

It is the objective of economic analysis to identify whether projects have Net Present Worth which will be a positive quantity and whether, Benefit-Cost ratio will be atleast unity. In the absence of these conditions being fulfilled, they also provide criteria based on which projects could be arranged in the order of preference.

(iv) Negotiations with the Financing institutions

Negotiations is the stage at which the lending institution and the borrower endeavour to agree on the measures necessary to assure the success of the project. These agreements are then converted into legal obligations, set out in the loan documents. All the principal issues that have been raised prior to and during appraisal are dealt with in the loan documents. The drafting and negotiation of the legal documents are an essential part of the process of ensuring that the borrower and the lender are in agreement not only on the broad objectives of the project, but also on the specific actions necessary to achieve them and the detailed schedule for project implementation.

(v) Implementation and Supervision

Implementation by the borrower and supervision by the lender form the next stage. Progress reports followed by field visits constitute part of supervision.

(vi) Evaluation and Feed back

This is the last stage of the project cycle and provides lesson of experience which are built into subsequent project identification, preparation, and appraisal work.

17.6.3 FINANCIAL APPRAISAL

Financial Appraisal of Water Supply Scheme is necessary:

- (i) To ensure that the project is financially viable; whether the project will meet all its financial obligations including debt servicing; whether there will be adequate working capital; whether the project can generate funds from its internal resources to earn a reasonable return on its assets in operation and make satisfactory contribution to its future capital requirements;
- (ii) To adjust the level and structure of prices charged, when need arises; and
- (iii) To ensure recovery of investment and operating costs from the project beneficiaries.

The finances of a project are closely reviewed through projections of the balance sheet, income/expenditure statement, and cash flow. Where financial accounts are inadequate a new accounting system has to be established with technical assistance financed out of the loan.

The economic appraisal of a project aims at assessing the contribution of the project to the development objective of the country whereas the financial appraisal aims at ensuring the financial viability of the project.

Two important factors which lead to the distinction between financial analysis and economic analysis are:

- (a) exclusion / inclusion of some costs and benefits in the appraisal of a project; and
- (b) valuation of costs and benefits and market prices or some other prices.

In the Project Appraisal Technique, the costs and benefits of the project in financial/ economic terms are evaluated. It is easy to identify costs and benefits in financial terms whereas it is difficult to identify in economic terms. The project incurs expenses on capital investment, such as machinery and equipment, operation and maintenance cost, purchase of raw materials, payment of wages and import of goods and services etc. In addition, the project has to pay taxes, import duties, fees, repay the loan with interest and allow for the depreciation of fixed assets. The project gets its return from the sale of goods and services and also receives subsidy, if allowed by the Government, which reduces the costs or add to the income.

Two types of costs and benefits are encountered in the appraisal of a project-one involves the use of resources, and the other which does not involve use of resources, but it is a transfer of resources from the project to the Government or any other institution/ individual (taxes, fees, duties, loan repayment and interest) or viceversa (subsidies). Thus in the identification of costs and benefits, it is useful to deal with each individual item, briefly described below.

(i) Transfer Payments

(a) Depreciation

It is a provision of funds over the life time of the project for its replacement. Depreciation is excluded from the economic appraisal of a project as it is only an accounting concept.

(b) Interest rate

Similarly, in the economic analysis no allowance for interest on the capital employed is made as the analytical technique automatically takes care of the return of capital (interest) in determining the worth of a project.

(c) Opportunity cost

In the economic analysis, estimated income foregone would feature as cost, while in the financial analysis, it would not feature as cost.

(d) Taxes

Taxes are also transfer payments. In the financial analysis where analysis is done from the point of view of the individual entity of a project, all taxes are treated as financial costs and benefits is done from the point of view of society, taxes are transfer payments. Taxes are not included as cost in economic appraisal as they are in the nature of transfer payments which do not involve the use of resources. But in the case of financial appraisal, taxes are included on the cost side as it is a financial cost to the project. This would apply to all types of taxes-income tax, import duties, local taxes etc.

(e) Subsidies

In financial analysis, subsidy reduces cost and adds to the income of the project. In the case of economic analysis, it is a transfer payment and increase or decrease in it does not add or subtract income from the point of view of society.

(f) Social Costs and Benefits

In financial analysis, social costs such as air pollution, noise, wear and tear of road etc., would not enter as costs in the calculations as these are no costs to the individual project. But social costs would be included in an economic analysis when the project is appraised from the point of view of society.

(ii) Solution of proper prices

In financial analysis, costs and benefits are calculated at market prices. But in economic analysis costs and benefits are calculated after making certain adjustments in market prices. The rational, of course, is the efficient use of available resources which have alternative uses. An economy should utilise more intensively that resource whose process is lower compared to a resource whose process is higher. However, since markets of the factors of production are no perfect in reality, the price of an item may not correctly reflect the scarcity or abundance of the factors of production.

However, the prevailing market price do not reflect the intrinsic value of goods as they are distorted in many developing countries due to the following factors:

- (a) Inflation
- (b) Currency overvaluation
- (c) Wage rate and unemployment
- (d) Imperfect capital markets
- (e) Tariffs, import quotas
- (f) Inequality in distribution of wealth.

For example, in a labour surplus economy, given the supply of and demand for labour, market wage would be higher than the wage that should be operated, based on the equilibrium of demand and supply.

Similarly the official foreign exchange rate may not correctly show the scarcity or abundance of foreign exchange. In the economic analysis, costs of items are calculated not on the basis of prevailing prices in all cases, but on modified prices assumed on the basis of their supply and demand position. These assumed prices are termed as shadow prices or accounting prices.

Also the prices charged for the product of a project may be lower for various socio economic considerations. In such cases, the modifications of the selling price of an item is done in economic analysis.

17.6.4 FINANCIAL ANALYSIS STATEMENTS

The consultancy study on tariff conducted in a town reveals that the average monthly household income of the persons who are likely to obtain house service connection is about Rs. 630. It is considered that such a household will not be able to pay more than 2% of its income. Hence the monthly water charges are fixed at Rs. 12.60 per connection or 95 paise/1000 litres for domestic purposes based on the tariff study conducted in the town. The tariff for non domestic consumption of water is fixed for commercial and industrial requirements respectively.

The Average Incremental cost of water per 1000 liters works out to Rs. 1.34 (Appendix 17.1). The tariff for domestic consumption works out to about 70% of the average incremental cost.

The Economic Analysis has been carried out using a discount rate of 8.5%. The Net Present Worth is worked out at two different discount rates of 8.5% and 2.0%. The results are as follows (Appendix 17.2).

Benefit cost ratio	:	0.62
Net Present Worth	:	Rs. (-) 0.7933
Internal rate of return	:	2.34%

The assumptions made for the financial forecast are appended (Appendix 17.3)

Three important financial statements namely, Income and Expenditure statement, Source and Applications of funds (Cash Flow) and Balance Sheet relating to the financial analysis of a water supply project are prepared and furnished (Appendices 17.4, 17.6 and 17.9).

The funding pattern is given in Appendix 17.5. Interest calculations during the moratorium period are furnished in Appendix 17.7. Working sheet for arriving at the Annuity is given in Appendix 17.8.

The financial analysis of project has been done with the following lending terms and conditions. The loan period is 25 years with a moratorium of 5 years from the year of receipt of first loan.

The results of the financial analysis indicate that the project can meet its commitment (Annual operation and maintenance cost and Annuity) throughout its life if an element of subsidy is given.

The financial analysis of the project reveals that it is necessary to have a grant element to an extent of 75% of the project cost to make the scheme viable as explained below:

The total cost of the project is Rs. 1.768 million. The monthly water charges are fixed at Rs. 12.60 per month per connection from 1988-89 for domestic purposes taking into account the paying capacity of the users. At this low rate, the project is likely to incur loss financially and 75% of grant towards capital cost is necessary to make this project a financially viable one. If 75% grant is not given, there will be cash deficit.

The modus operandi for the economic and financial analysis as well as the evaluation of benefit cost ratio in respect of different funding agencies will be the same. However, the discount factors adopted by various funding agencies differ which should be taken into account for appraisal of projects.

17.7 STATUTORY WATER AND SANITATION BOARDS

Most of the local bodies at present face serious handicaps in the promotional stages of a project, in its prefinancing stage and in the fund raising stage as well. Saddled as they are with responsibilities beyond their capacity and circumscribed by limitation of finance and procedure, any attempts by them individually to raise loans in the open market to finance a local water supply project may not attract encouraging response. This problem could be satisfactorily solved by the creation of autonomous water and sanitation boards.

These boards are devices by which State Governments will be able to establish corporate public entities to construct, manage and operate water and sanitary services on a fully commercial basis in large metropolitan areas as well as in smaller urban communities. Not only provision of safe drinking water is important to health but so are sewage disposal and related sanitary measures. These are all interconnected in their effects on health as well as technically the failure of any one service endangers other and consequently affect the health of the community. These boards should be empowered and equipped to raise such capital from local resources and the open market to supplement the provisions which the government at the State and Central level could not provide for the purpose. Such boards will have the advantage of;

- (i) Increased efficiency resulting from financial autonomy;
- (ii) Improved ability to raise capital with confidence;
- (iii) Better opportunities for small municipalities grouped together to finance and operate their schemes as a business proposition;
- (iv) Economies implicit in a common source of water which may be made to serve several undertakings;
- (v) Better realisation of water revenues when this duty is divorced from local politics;
- (vi) Economies possible by pooling technical and administrative staff to serve a number of municipalities; and
- (vii) Opportunities for equalising the rates in every region.

A statutory water and sanitation board may be set up at State level with regional boards if and to the extent necessary within the State, to provide water and sanitation services and to collect revenues to meet such services, to raise the capital needed to provide the facilities and to exercise all other corporate powers necessary to act on behalf of the local bodies within its jurisdiction.

Normally, such boards would encompass all activities, including production, conveyance and distribution of water within their statutory areas and also for the collection, treatment

and disposal of sewage from that area as well as other sanitation services. It is, however, possible that some local bodies may prefer to purchase water in bulk from the statutory boards and arrange for the internal distribution themselves and may also prefer to have the statutory board take over sewage in bulk from the local area and arrange for its treatment and disposal. This should be avoided as far possible as the supply and distribution of water as also collection and disposal of sewage are two inter-dependent functions and the divisions of such functions amongst two independent agencies might lead to inefficiency and avoidable difficulties for both parties. Any local body managing its systems satisfactorily need not necessarily come under such a board.

17.8 CONCLUSION

In India, water is considered a "free gift of nature" and therefore charging for water, by any agency, may it be a Municipal Corporation/Council/Panchayat or a Water Board, is not liked by the people. Providing water supply was not considered to be a commercial or even no-profit-no-loss activity.

The situation has since changed considerably. Per capita use of water has increased, sizes of human settlements are increasing at faster rates and industrial and agricultural uses of water have increased considerably. As the reliable sources of water are getting exhausted, we have to go in for additional sources of supplies. Irregular and inadequate rains, as also the pollution of surface and ground waters being caused by discharges of industrial and domestic wastes have rendered the problem of meeting rising drinking water demands, increasingly difficult and expensive.

No doubt, water is still the free gift of nature but it is so in "as it is where it is" condition. When it is desired that water, as is available in nature, should be made safe for drinking and transported to the points of consumption, it becomes a "Commodity" i.e. it acquires economic value. A water works must therefore be treated as an industry and be built and operated as a "Commercial enterprise, with professional approach where the aim is not only to meet the debt servicing and operational costs, but also to earn a fair return on the investments made, so that future expansion of the water works can be financed atleast partly and the undertaking can attract funding from outside sources. It is in this context that the financing of water works, water pricing policy, and overall financial management of water supply undertakings have been receiving serious attention of the planners and administrators at National and State levels.

India had launched the International Drinking Water Supply and Sanitation Decade with effect from 1981. Hence both the Central and State Governments have been providing appreciable financial assistance to the local bodies for construction of new facilities and for augmentation/ rehabilitation of existing facilities. Almost in all the States and Union Territories capital expenditures on rural water supply are fully funded by the States/ Union Territories and the Central Government also provides funds to the States and Union Territories, under Accelerated Rural Water Supply Programme.

For financing Urban Water Supply Projects, normally the following sources of funds are available.

- (i) Internal borrowing;
- (ii) Government grants and loans;
- (iii) LIC loans;
- (iv) Open market borrowings;
- (v) Loan from financing institutions; and
- (vi) International/Bilateral aids

If a water supply undertaking has to function in the long run on a self-reliant basis, it must charge for supply of water and collect revenues adequate for meeting debt servicing, operation and maintenance charges and also generate surplus for future investment.

If water could be sold to all consumers at the same rate, like any other commodity in a free market, the water tariff structure could be simple. In that case it would be necessary only to fix water charges at suitable intervals of time and charge for sale of water accordingly, depending upon the basis for charging of water i.e. metered supply, non-metered supply etc. However, tariff based on uniform rates of water cannot be adopted in a country like India, where a large percentage of population is below poverty line. Water is to be made available to all in quantities sufficient to meet atleast the minimum needs.

Therefore, appreciable quantities of water may have to be supplied to poor section of the society either free of cost or at adequately subsidised rates, which would be much less than the unit cost of water. The loss thus incurred will have to be made good by charging higher rates to consumers who can afford to pay those rates such as industries, commercial establishments, traders, professionals as well as owners of high value properties, etc. Therefore, it is necessary to identify different categories of consumers as stated above including poor section in a city or town and estimate the likely consumption of water by each of these categories of consumers. Graded rates of water will have to be fixed for these consumer categories, considering their paying capacities, such that the total annual revenue receipt would be equal to or more than the total annual burden.

Water tariff structure also depends upon the methods of charging for sale of water. Generally these are based on:

- ◆ Percentage of rateable value of a property;
- ◆ Flat rate depending upon size of a connection; and
- ◆ Metered supply.

Charging on the basis of volume as measured by meters is the most equitable and rational method, as a consumer pays directly in proportion to the water consumed. Moreover metering helps in accurately estimating the consumption of water by various categories and in locating wastages and leakages. However, this method of charging has the following disadvantages;

- ◆ Metering increases unit cost of water;

- ◆ Meters often go out of order, requiring frequent removal, repairs and reinstallation; and hence accurate measurement of water is not possible;
- ◆ Large skilled staff is required for installations, repairs, testing, reading and billing;
- ◆ Fixing of a meter reduces pressure;
- ◆ Where unfiltered supply is made, meters often choke, requiring frequent cleaning;
- ◆ Where water supply is intermittent, meters may record more reading than the actual consumption of water;
- ◆ During temporary absence of meter (when removed for repairs or testing) or when it is not in working order, billing on the basis of average consumption in the past, is often disputed by consumers and this situation affects recovery of bill.

For the above reasons, universal metering of water is not being practised. Generally only bulk consumers, like industries, institutions, commercial establishments and large premises like co-operative housing societies, etc. are metered, whereas individual domestic consumers are charged on the basis of either flat rates depending upon the size of connections or as percentage of rateable value of a property served.

From the foregoing paragraphs it will be clear that selection of a suitable tariff structure needs consideration of aspects such as income distributions, the possible mix of service levels and the systems of charging. In short the social objectives and systems constraints would influence the tariff structure. Generally the tariff structure should aim at:

- ◆ Collecting target revenue;
- ◆ Sharing out the burden fairly between users of different income groups (by providing different levels of services); and
- ◆ Administrative simplicity and efficiency.

To these aims must be added the one for influencing consumer behavior. In other words pricing policy must be such that it would induce consumers to economise use of water. Considered from this angle, charging on the basis of rateable value of a property or collective metering of an apartment block are the systems which provide little incentive to economise on use of water.

Annual burden imposed by a water supply scheme consists of two components, viz.,

- ◆ Fixed charges comprising debt servicing and such staff and minimum maintenance charges as are necessary to be incurred.
- ◆ Variable charges comprising power, chemicals and raw water bills which are proportional to the quantity of water produced.

When a facility like a water supply scheme is constructed and services are made available to a community, it imposes financial burden as stated above. On account of the services made available the property value goes up. Therefore, it is justifiable for a local body to levy