ANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

Report on a Government of India/WHO Seminar
Bangalore (India), 11-14 June 1979

WORLD HEALTH ORGANIZATION
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1. INTRODUCTION

The Seminar was held at Bangalore, Karnataka from 11 June to 14 June 1979 and was attended by 34 delegates and observers (See Annex 1).

It was organised jointly by the World Health Organization and the Central Public Health and Environmental Engineering Organisation (CPHEEO) of the Ministry of Works and Housing in collaboration with the Karnataka Urban Water Supply and Sewerage Board, the Bangalore Water Supply and Sewerage Board and Ministry of Irrigation and Public Health Engineering of Karnataka State.

The objectives of the seminar were to review the financing and management of water supply and sewerage services and, in view of the large programmes envisaged in the forthcoming International Drinking Water Supply and Sanitation Decade, to prepare guidelines for the formation of Boards or other bodies capable of dealing efficiently with the increased volume of work anticipated.

2. PROCEEDINGS

2.1 Opening Session

A speech of welcome was given by Mr Subaiah, Chief Engineer of Minor Irrigation and Public Health Engineering, (PWD) Government of Karnataka. Mr W. Finley, WHO Sanitary Engineer, SEARO delivered a Key Note Address in which the way WHO had cooperated with the Government of India in organising seven national seminars during the last four years was described. Such opportunities for exchanges of ideas between the leading figures in the different States were probably the best ways of utilising the limited funds available to WHO in India and it was felt that WHO could sponsor two such seminars per year in the future. A note of caution was sounded towards the

discussion of finance and management to make sure that the ultimate objective of supplying the people with water supply and sanitary services was not lost sight of. Regret was expressed at the unavoidable absence from the meeting of Mr M.A. Acheson, Regional Adviser on Environmental Health, WHO/SEARO who had made a great contribution to the organisation of the seminar.

The inaugural address was given by Mr H.C. Srikantaiah, Minister for Municipal Administration, Government of Karnataka who outlined the way the various concerned bodies of Karnataka State have attempted to solve the problems of water supply and sewerage. The position in Bangalore was described first, then the situation in the other urban communities in the State and finally the problems in the rural sector were described. Finally the Minister said that because the maintenance of water supply systems by many Municipalities was unsatisfactory for various reasons, the State Government were considering vesting maintenance of all water supply installation in the Karnataka Urban Water Supply and Drainage Board.

The President of the Seminar, Mr S.T. Khare, Adviser, C.P.H.E.E.O, Ministry of Works and Housing, Government of India then addressed the delegates and emphasised the need for increased expenditure on water supply and sanitation in the near future. He also expressed the hope that the delegates would be able to formulate guidelines for use in setting up Boards to handle the increased expenditure.

A vote of thanks to all concerned with the organisation of the seminar was proposed by Mr P.L. Nanjundaswammy, Chief Engineer of Karnataka Urban Water Supply and Drainage Board.

2.2 Summary of the Proceedings

Eleven working papers had been prepared but in order to ensure that essential items received adequate attention and discussion the usual procedure of discussing each paper was not followed. Instead nine essential subjects were selected for discussion during technical sessions. Then the authors of working papers started the discussion by abstracting from their paper and experience details of the session subject. The final two sessions were devoted to summarising and agreeing the findings of the previous sessions.

Technical session I	11 June 1979
Subject	Preliminary work in settingup a Board Constitution. Powers and Duties.
Chairman	Mr P.R.V. Bhiman

Before the constitution or Powers and Duties of a Board can be decided it is necessary to define clearly and unambiguously the objectives of the Board and its area of operation. If all water supply and sewerage functions are with a Board there is less chance of confusion or duplication of activities than would be the case if a Board co-existed with a Public Health Engineering Department. A two tier system had also led to confusion. The constitution should provide for no more than twelve members. The desirability of a full time chairman in addition to a full time managing director was discussed and it was felt that smaller units could probably manage with a part time chairman. The proposal in Haryana is for the Minister in charge of Local Government to be chairman of the Board.

The Board should have the maximum possible autonomy so that performance is not inhibited by artificial administrative constraints. This would mean government transferring certain powers to the Board.

The importance of completing preparatory work before the vesting date for a Board was brought out several times. Such preliminary work should include organization, personnel policies, personnel requirements, training needs, accounting systems. If these things are worked out after formation of a Board then the initial efficiency and morale must suffer. If recruitment, or training of some staff is necessary, say accountants or engineers, delays would be minimized if the preliminary work has been completed before the Board begins operations. The transfer of staff is an area where decisions are very difficult and sufficient time should be allowed before the date for beginning operations to permit solutions to be worked out which will be satisfactory to all concerned.

Technical Session II 11 June 1979

Subject : Organization

Chairman : Mr S.T. Khare

After some discussion as to the necessity or otherwise of a Board the majority opinion seemed to be in favour of an autonomous Board to look after all aspects of water supply and sewerage. A proposal was put forward that Regional Boards should be considered which could include small States instead of separate small Boards.

The historic organizational structure of Government departments need not be adhered to but a structure be devised which suits the objectives and the work load. Internal lines of communication and reporting need to be simple and clear. Experience has proved the value of maintaining an internal audit group, central purchasing department, project appraisal and project monitoring groups.

Outside assistance may be required to design the organization structure so that, provided the Board is genuinely autonomous, there will be greater freedom in personnel matters and quicker decision making than would be possible in Government departments.

In some State Public Works Departments technical personnel may be engaged on work which is incompatible with previous training and experience. A specialized Board would enable properly trained specialized personnel to be engaged and used to maximum benefit. The Board should be organized to operate and maintain works and collect tariffs in addition to designing and constructing new works. This was considered to be the best way of safeguarding the investments and obtaining a reasonable life for the plant. It was conceded that there may be opposition by the municipalities to such a proposal although many municipalities have inadequate funds, facilities and staff for the proper management of water or sewage works.

Technical Session III 11 June 1979

Subject : Costs and Source of Funds for Establishing Boards

Chairman : Mr S.T. Khare

Boards which had already been formed received little or no preparatory work before vesting date so that after formation senior staff were obliged to spend about twenty per cent of their time in developing systems and conditions of service. This resulted in a diversion of effort from the Board's activities. At Madras a consulting firm was engaged to do this preparatory work in connection with personnel, organization structure and accounting systems before the formation of the Metropolitan Madras Board. Whoever does this preparatory work will need an allocation of money, and this work should be completed before the Board becomes operational so that the Board's officials can get on with the job for which the Board is created.

In addition the preparatory work should include an assessment of the accommodation, furniture and equipment needed by the Board. In some cases this may form part of the assets taken over by the Board but where this is not so then provision must be made for purchases or rentals.

Estimates should be prepared of the working capital requirements during the first years of the Board's operation and the State Government should be make an appropriate grant. Most of the Boards formed to date had no provision for working capital and were obliged to seek advances for work not yet done in order to survive.

Unless adequate financial provisions are made to ensure that preparatory work is done and that working capital is available during the first two or three years then the Board's chances of success will be considerably reduced.

With reference to the Board's source of revenue unless the collection of tariffs was the Board's responsibility the sole source income would be derived from centage charges for design and construction work. The Board however could have responsibility for repayment of large loans. If the Board were collecting tariff charges then it would be able to discharge the loans without relying on other bodies.

Technical Session IV 12 June 1979

Subject : Personnel Policies and Recruitment

Chairman : Mr M.S. Sandhu

Delays by State Governments in finalizing personnel policies caused uncertainty so that Government staff are reluctant to transfer to a Board. In one instance staff were given the choice of transferring to the Board or being retired from Government service. In another case the complete Public Health Engineering department was transferred regardless of the work load. Other personnel problems which have caused difficulties have been Provident Fund arrangements, housing, medical attention. All these matters should be decided before forming a Board and past experience shows that unnecessary problems have been created where personnel policies have not been decided before vesting date.

Senior staff will inevitably be from Government service and if they elect to go on deputation it was proposed that it be for a minimum period of three years.

A suggestion was made that where a Board insures its employees with the Life Insurance Corporation (L.I.C.) India then L.I.C. should make loans towards housing the employees who are in fact policy beneficiaries. Another suggestion was that some houses could be transferred to the Board as part of the assets to be taken over. The Punjab Board give up to 25% housing rent subsidy.

Direct recruitment of junior staff grades by Boards has been quicker and produced better calibre recruits than seemed possible through Public Service Commissions.

Boards should not be obliged to take over all Government staff but should be permitted some selection. Similarly, the local body staff may be transferred to the Board but may be required to change locations and this should be provided for.

It was suggested that use could be made of consultants to introduce new procedures and for finalizing recruitment procedures and job descriptions.

The delegates strongly requested that CPHEEO should convene a sub-committee to investigate in depth the problem of housing Board employees and should follow up the sub-committee's recommendations as appropriate.

Technical Session V 12 June 1979

Subject : Training

Chairman : Mr M.S. Sandhu

There was general agreement on the necessity for training plant operatives if operation is undertaken by the Board. Some of the problems envisaged include the training of trainers, motivation of trainees, accommodation and equipment for training. A programme of certification was proposed

with promotions or pay increases linked to either certification of some form of departmental examination.

There are at present fifteen centres where post-graduate training of engineers is possible. Additional facilities are needed.

The setting up of a central training unit, possibly with bilateral assistance, was suggested. This unit would train the trainers who would then go to each State to set up either State training or in-plant training courses. Payment of stipends to trainees, accommodation and messing arrangements at training centres were necessary.

It was suggested that consultants might be able to assist in assessing training needs. Assistance may be available from WHO for the preparation of some manuals or training documents.

Staff provisions should include for between five and ten per cent away under training at any time.

A suggestion that some short course or test for plumbers was needed particularly where new or large extension works are proposed.

Technical Session VI 12 June 1979

Subject : New Projects - Planning, Financing and Monitoring

Chairman : Mr L.M. Chaudhary

New projects are investigated and designed usually at the request of a municipality. Delays are experienced in implementation, with consequent cost increases, because release of funds by the State Governments is often erratic and only on a year by year basis. There is no certainty that sufficient funds will be available in two consecutive years for completion of a project which has previously received overall approval. The result is that too many projects are in course of construction and completion of some must be deferred due to lack of funds. L.I.C. made a strong plea for

adequate preparation of projects, proper planning of construction and financing requirements and monitoring progress. This last item was agreed by several delegates to be very desirable, but useless if slippages are not investigated and the cause corrected.

Priorities of planning were discussed and it was considered that highest priority should be given to local bodies with the capacity to pay but having no water supply or a per capita supply which is insufficient or a low quality supply.

Boards and Public Health Engineering departments at present charge a percentage of the construction cost to cover design and supervision. There was a variety of opinion as to what this percentage should be, some people found 12% sufficient while others considered more than 15% to be necessary.

Some States had been able to build up a store of projects ready for starting. Stocks of pipes and steel are sometimes maintained so that projects can start quickly without waiting for deliveries but the level of stocks held should be reviewed frequently to avoid tying up unnecessarily large sums of money.

The Jal Sansthan of Uttar Pradesh now have first priority for water sources as a result of recent legislation. Inter-State cooperation may be necessary in certain cases to ensure proper quantitative and qualitative control of sources.

Technical Session VII 12 June 1979

Subject : Implementation - Contracts and Purchasing

Chairman : Mr L.M. Chaudhary

Projects are implemented after the local authority and the State Government have agreed the proposals. The usual Public Works Department (PWD)

contracts for civil works are prepared. Purchasing of pipes, steel and pumps usually comes under separate purchasing contracts. Testing of equipment before dispatch from works is frequently carried out by engineers of the Board, or PHE. A central purchasing department co-ordinating the major requirements of the different sections has in several cases been very useful in achieving improved turnover of stock. The experience of Boards in assessing tenders and awarding a contract shows an improvement on the time previously taken by the Government department.

The biggest problem in implementation arose from the erratic supply of funds which sometimes resulted in cessation of construction when the works were partially complete. This would be acceptable if the stoppage point had been planned so that the completed portion of the works could be used.

Technical Session VIII 14 June 1979

Subject : Operation, Maintenance, Tariff, Collection

Chairman : Mr K. Rao Naram.

The importance of the operative has frequently been overlooked but should be emphasized in the future. Additional training and awards should be available to operators. New designations may help to improve the attitude of operatives, if the attitude towards the job is better then the results should be better. The operatives should be required to maintain a high standard of cleanliness and tidiness around the works, possibly including laying out a garden where suitable. The operations should be linked to the quality testing laboratory so that immediate remedial action can be taken in the event of the laboratory obtaining unsatisfactory results. This in effect means that both laboratory and works are part of the same team instead of as in some cases where they

appear to be worlds apart. Good design can also lead to good operations and one of the advantages of a Board covering operation, design and construction is that staff can obtain a wider experience of the complete spectrum of activities.

Maintenance work is quite different from operations. Preventive maintenance should be adopted rather than break-down maintenance, otherwise the service becomes completely dislocated. Good maintenance will help to ensure safety in operations. Maintenance should apply to buildings just as much as to machinery. Good maintenance, and operation, of works is desired by the lending institutions as a safeguard for the investment to ensure that sufficient revenue can be generated to repay the loan.

The staff of local bodies would be given the chance of joining the Board to carry on and improve the operation, maintenance and tariff collection. There would probably be opposition from municipalities to the idea of a Board taking over some of their functions and staff. It is not uncommon for water supply systems operated by municipalities to be unable to account for more than 50% of the water supplied. There is also a revenue leakage due to inefficient tariff collection systems. A suggestion was made that the Board should afford a bulk supply to municipalities who would remain responsible for distribution and tariff collection. However it was agreed that this would still leave the basic source of revenue outside the control of the Board and would not be desirable. Local participation was desirable and could probably be best effected by a sub-committee of the municipality. This sub-committee could be informed monthly of the activities undertaken and could advise the Board on the local requirements. The question of tariff generated considerable discussion, it being generally agreed that present tariffs are insufficent to cover costs and collection was inefficient.

Increasing tariffs is difficult particularly where there is a traditional attitude that water should be free. It was pointed out that oil is also God given but people pay for the convenience of having it supplied and refined. Similarly people are asked to pay for the convenience and quality of piped water supplies, and in addition there is the health aspect to be considered when asking for payments. The question of including a waste water charge with the water supply charge was also raised and this would simplify the revenue collection for both services. This would be necessary if the Board is to be truly autonomous and self financing. It was generally agreed that metering of domestic water supplies is desirable, but in some cases it is physically impossible. Also before embarking on an extensive metering programme the costs and benefits should be examined, there are situations where metering is difficult to justify. The question of cross subsidies between different sections of the community was discussed together with the ways of assessing the proportion of income which could be used for buying water. The rapidly rising cost of electricity presented difficulties in preparing tariffs. In rural areas this was a matter of great concern as the costs of providing water supplies was increasing rapidly as a consequence.

Collection of tariffs was also discussed and it was suggested that existing tax collecting authorities in some rural areas may assist. Banks may cooperate by receiving payments at different branches. If the assistance of other bodies becomes necessary it would increase the costs of collection

but it should be possible to meet these charges from the resulting increased revenue. The experience of some delegates showed that payments were usually forthcoming if a defaulter was convinced that the supply would be cut off. Collection efficiency would require frequent checking and it was further suggested that the works operation and maintenance, and tariff collection should be subject to a management audit at intervals.

Technical Session IX 14 June 1979

Subject : Public Relations

Chairman : Mr K. Rao Naram

It was acknowledged that good public relations can often help to reduce potential problems. This is particularly so when a Board is being formed when staff, municipalities, other government departments, the general public, suppliers, contractors and financial institutions will need to be informed as to the way they will be affected by the Board. When a Board is in existence there is still a need to communicate both internally and externally. Bulletins or house journals can keep staff informed of changed and developments. Members of the staff who are in regular contact with the public such as meter readers and receptionists can, by their attitudes considerably affect the image of the Board which the public develops. The The Jal Nigam of Uttar Pradesh appeared to be the only body employing a full time professional public relations officer. It was conceded that a professional should be employed when the need arose. Campaigns for conservation of water could also be linked with health education programmes, this could be effective in rural areas where there was often ignorance of elementary sanitation.

Talks to clubs and visits to works are other ways of informing the public of the Board's activities. There can be certain days designated as open days when the public may vist works and special visits can be arranged for schoolchildren. In this way people will come to release why payment of a tariff is necessary. Some works and adjacent land can be readily landscaped and become popular picnic areas. Requests for recreational facilities such as fishing or sailing if granted help in public relations, they may also provide a little extra revenue. If there are valid technical reasons why such requests cannot be granted then these should be clearly explained so that the applicant does not feel he has contacted another beaurocratic machine. The timing of special public relations activities is important, many people have a surprising ability to remember, or forget. A badly timed public relations effort may produce on effect contrary to that desired.

Technical Session X

Subject : Summary

Chairman : Mr R. Franklin

This session consisted of a recapitulation of the major items discussed and agreed during previous sessions. The discussions had covered problems encountered in the forming of the first Boards and ways of avoiding or overcoming the problems had been agreed. The majority opinion was that fully autonomous Boards covering the investigation, design, construction, operation, maintenance and tariff collection for urban and rural water supply and waste water collection and disposal would be able to meet the targets proposed by Government during the coming decade whereas the existing organizations

probably would not meet the targets. The terms of reference of such Boards should be sufficiently comprehensive to permit them to provide water for industrial purposes as well as domestic.

The Board of Directors should not exceed twelve in number, a maximum of three being the Secretary of Government Departments, such as Finance, Local Government and Public Health Engineering. Local bodies such as municipalities should have up to four seats on the Board. Another category of director should be drawn from social worker, bankers, economists or public health engineer not employed by the State and again could be up to four in number. The Managing Director would be a qualified and experienced public health engineer and probably the only full time appointment to the Board of Directors.

The Chairman of the Board, who would have an extra casting vote, need not be a full time appointment. Although in large States there may sometimes be a case for a full time appointment. In some States it has been necessary to become involved in drainage work so it was felt that if the title were Water Supply and Waste Water Board (or Authority)this sort of work would not be excluded.

Preparatory work should be completed before vesting date.

The first three years operations costs should be met by grants in aid from the State. If the Board become self financing earlier the grant-in-aid would be proportionately reduced. The States should make arrangements so that open market borrowing from the Banks would be possible for the Board.

Based on the discussions and points of agreement it was considered that guidelines could now be prepared which would be useful when setting up Boards. In order to be effective the Board should be fully autonomous and this could only be achieved if sufficient revenues were available through the collection of tariff and if State Government departments transferred certain powers. Only in this way would it be possible to carry out the volume of work necessary to effect an improvement in the health of the people through good water supplies and sanitation.

3. Guidelines for setting up Water Supply and Waste Water Boards

3.1 Legislation

In order to set up a Water Supply and Waste Water Board it is necessary for a State Government to pass suitable legislation, which subsequently receives the assent of the President of India. Before framing the legislation the proposed Board's area of operation and the affected organizations within that area should be defined. The legislation relating to these organizations may need to be amended so that certain powers are transferred, which can be done by incorporating appropriate clauses in the Board's enabling legislation. Included in the legislation will be definitions of the objectives of the Board, its constitution, powers, duties and responsibilities. It is recommended that Board be directed by a maximum of twelve directors. A Chairman who may be part time depending on the size and complexity of the Board, a Managing Director who should be an experienced Public Health Engineer, the Secretary of the Department of Finance and the Secretary of the Department dealing with Local Government. There could be one more Government Department representative and the remaining 5 or 6 seats apportioned between two groups,1) representatives of various local bodies or municipality associations and 2) the final category would be drawn from social workers,bankers, accountants, public health engineers or economists who are not employed by the State or the Board or persons with considerable experience of public affairs. The date when the Act becomes operative will be defined and it may be necessary for more than one vesting date to be given depending on the size and complexity of the proposed Board. Before vesting date it is essential that certain preparatory work is completed otherwise the Board will start with unnecessary problems which could prejudice its success. If the Board

does not succeed the programmes which the Board is being formed to achieve will not be attained.

3.2 Preparatory Work

3.2.1 The fixed assets, some liabilities and personnel of the new Board will initially be drawn from various existing organizations. In order to effect this transfer to a completely new organization, which may or may not have similarities with some of the parent organizations, in as smooth and effective a way as possible it is essential that basic conditions and terms are agreed in advance. There is a lot of preparatory work to ensure a good start for the new Board and it may be necessary to detach civil servants from other work for some months in order to complete it in time. Alternatively outside assistance may be obtained.

Someone must direct and approve of the preparatory work to be carried out, so an ad hoc board of directors should be appointed consisting of the Managing Director of the new Board, an experienced engineer and an experienced accountant. This group would be responsible to the Minister sponsoring the Board, for the preparation of systems and conditions as specified so that the Board could become operational on the defined vesting date. They would have the power to accept on behalf of the proposed Board, the systems developed and would be responsible for obtaining permissions or agreements of other departments or agencies as necessary.

3.2.2 Organization Structure

The organizations which will be contributing to the Board should be examined critically for their ability to meet the principal objectives of the Board. If these can be developed to meet the Board's objectives reorientation of staff would be facilitated. When there are several

contributory organizations it is unlikely that all the organization structures can be incorporated but there may be excellent sections capable of transfer. The Board's objectives may be summarized as:

- the efficient operation of water supply and sewerage works
- the provision of additional water supply and sewerage works
- the compliance with statutory financial requirements.

The efficient operation of works is dependant on staff being properly trained, the organization being such as will help the staff to work effectively and the availability of adequate funds to pay staff, buy spares and equipment needed for good operation and maintenance. The organization should permit decisions to be made by those who have responsibility delegated to them. In this way the lines of communication do not become choked with routine matters. In cases where staff are not properly trained closer supervision will be necessary and this could affect the initial number of supervisors required. The number of supervisors will also be affected by the complexity and area covered by the works. A works manager will control the activities of several supervisors and he will be responsible to an area manager. In this way a chain can be built right to the managing director but care must be taken to avoid developing too many management levels between the works and the Board of Directors. With very large groups this is difficult especially if the normal spans of control are adopted. There may be situations where taking over directly the operation and maintenance of works and collection of tariffs is difficult due to political, personnel or other problems. The Board must however have some control over these activities or the assets could quickly be devalued and the anticipated return may not be forthcoming. In order to obtain some measure of control and avoid undue delays in forming the Board an alternative organization may be developed whereby the operation and maintenance of works and tariff collection remains with the municipality subject to their obtaining a certificate of competence from the Board. The Board would review the municipality's activities twice a year or at such other interval as necessary to ensure that the standards for the certificate of competence are being maintained. If a municipality cannot in a reasonable period achieve

or maintains the certificate of competence standards, the Board could take over the municipality roles. The Board would only arrange loans and prepare and execute new projects for those municipalities holding a certificate of competence. The Board's managerial staff reauirements for municipality certification would be 70% or less of the managerial staff required for the full management operation. Municipalities would pay the Board a certification fee and where required fees for advisory services which the certification staff could provide. The Board would approve the tariff structures adopted by the municipalities and where necessary would assist in formulating economic charges. Municipalities with no existing services would be required to agree to conform to the certified standards and the Board would assist in recruitment and training of staff to achieve this.

In addition to this front line executive chain, supporting services will be required, but not necessarily at all levels. The supporting services would include: planning, design and construction of new works, personnel and training, maintenance of buildings and plant, materials purchasing and control, transport and quality control. Accounting staff will be required at all management levels but not in all categories of the accounting section, for example works accountants will be principally concerned with the preparation of payrolls and customer's accounts and will have nothing to do with loans and debt servicing. Some of the supporting services may be grouped into one department so that the managing director does not have to deal with more than six department chiefs. For example materials purchasing and control could come under the chief finance and accounting officer while transport could be linked with building and plant maintenance.

Job descriptions should be prepared for all management or supervisory positions to ensure that there are no gaps or overlaps and that no employee is answerable to more than one superior. Job titles would indicate the work and level in the organization, which are probably different to the traditional job titles but this would emphasize that there is a new organization and not the same old thing with a new name. Lines of communication in the new structure should be quite clear and so should reporting procedures.

When this whole concept is approved by the ad hoc Board the next step will be to consider personnel and staffing levels.

3.2.3 Personnel

Many of the staff for the new Board will be transferred from either Government or Municipal employment and will expect conditions at least equal to those previously enjoyed. The Board must have personnel policies and service regulations ready by the vesting date or staff will be unwilling to transfer and morale would be poor right from the Board's first days. The organizations from which staff will be drawn will probably have differing pay scales and service conditions. Therefore job evaluations should be carried out of the positions in the Board. In this way it should be possible to prepare salary grades and other benefits appropriate to the various positions A system developed in this way would enable potential staff to see where they would fit into the new organization and to compare their existing conditions with those proposed.

Having decided on the categories and conditions for staff it is then necessary to examine the numbers required and this must start at the working level. The number of managers and services required depends on the number of workers being managed and serviced. There will be some diversity in the size and complexity of works to be supervised and in some cases one supervisor may be able to look after more than one works where they are relatively small and close together. In developing numbers in executive offices the potential work load should always be considered. There may be cases where one area manager would be sufficient for the immediate work load but developments planned for the area will necessitate the formation of a second area manager's office. It is often difficult to foresee exactly when such a development would be necessary and it is sometimes difficult to decide when the moment has come to create the second office. Nevertheless phased developments of this kind should be included in the initial planning and, like all plans, these are subject to change as circumstances change.

The numbers needed for the supporting services can similarly be determined. Workshops, building maintenance and stores will probably be developed from

the top downwards to provide a reference framework within which these services can be developed.

The training section will probably be the last one to be developed after the numbers and categories needed have been compared with those available in the existing organizations. There may be cases where existing units are overstaffed but the surplus numbers may be redeployed after training. It may be necessary to recruit some categories who could need job related training in addition to induction training. This latter item is often neglected but can be very important in motivating people and showing them that they are indeed contributors and a part of the organization.

An aspect of the personnel policy which will be of interest to those people likely to fill managerial and technical posts will be the promotion prospects. Therefore the methods of staff assessment should be determined which would permit of consistency in making promotions. Promotions rules should permit rapid enough promotion to encourage good young staff to join and be selective enough to ensure the most competent staff reaches the top. One system might be promotion by seniority to a certain age and level after which promotion would be by selection only. The period after which seniority promotions ended would be selected so that numerical stability was achieved after taking account of wastage rates during that period. Those not selected for promotion would be told so, and why, and would be given the chance to leave the organization with either a gratuity or small pension.

3.2.4 Accounting and Financial

Many State and Municipal accounting systems are based on single entry book keeping on a cash basis. Consequently it is difficult to check the accuracy of subsidiary records and the income and expenditure of two periods cannot be truly compared. Rarely is any sort of costing carried out so that management has not the information with which to manage most effectively. The accounting system should be on commercial lines based on double entry book keeping and accrual accounting. The Board will then be better able to attain financial self sufficiency so that when the time comes to replace worn out works it will not be involved in the increasing competition for Government

funds which will be the result of a quickening pace of social and economic development. The system should be simple to operate and within the capabilities of the staff.

The accounting staff can record the transactions of the Board if a system of accounts codes is prepared whereby assets, liabilities, income and expenditure are classified. The code should be sufficiently flexible to allow additions and amendments in accordance with changing requirements. A code based on four primary divisions could be:

Primary analysis	Accounts
01 to 10	Revenue - income
11 to 60	Revenue - expenditure
61 to 80	Capital - assets
81 to 99	Capital - liabilities

Each of the main accounts within each division may be analyzed in greater detail by a secondary 3 digit code. Each account would be allocated a specific secondary code which would be finalized at a later date. Spare codes would allow for subsequent additional accounts which may become necessary. This coding would be used at all the Board's accounting levels thus facilitating detailed analyses of all the Board's financial transactions. When operated in conjunction with departmental or project cost codes it is then possible to prepare a dual analysis of all transactions showing the area as well as the nature of costs, which will be useful for management purposes.

The further possible development of the Revenue - income code is shown below and the other accounts would be expanded in a similar appropriate manner.

Typical structure of revenue - income accounts codes 01 - 10

Primary analysis	Secondary analysis
01/000 Metered sales	011 - 100 Domestic
	101 - 200 Government departments
	201 - 300 Industrial consumers
	301 - 999 Spares

Primary analysis	Secondary analysis
02/100 Unmetered sales	001 - 100 Domestic
	101 - 200 Municipal
	201 - 999 Spare
03/100 Bulk sales	001 - 100 Inter area
	101 - 200 Municipal Authorities
	201 - 300 Inter State
	301 - 999 Spare
04/000 Installation and connection charges	
05/000 } Other income 10/000 }	

Books of accounts such as the ledger and cash book will be maintained as appropriate at each accounting level in the Board. The General Ledger incorporates capital and revenue accounts. In addition it will be necessary to keep the Journal, Asset Register, Remuneration Records, Capital Register, Stores Register and Purchase and Sales Day Books. At the end of each accounting period, say every month, all books of account will be closed, balanced and posted to the appropriate account in the General Ledger. A trial balance can then be prepared from the General Ledger from which operating results for the period can be determined after adjustments for accruals, pre-payments and changes in stock levels. The basic financial statements required each month would include: (a) income and expenditure statement; (b) balance sheet, and (c) sources and application of funds statement. Each unit will also prepare Bank reconciliation statements monthly.

In addition to the main accounting procedure provision must be made for a costing system. This will be particularly relevant in respect of the operation and maintenance of works when tariffs require to be revised.

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This data also forms a useful basis for planning future activities. Costs should be prepared on a basis of per unit produced e.g. cost/km of pipe maintained or cost/cu m of water or sewage treated. Certain elements of the costs are fairly uniform irrespective of the volume dealt with such as depreciation, debt servicing and office rents and in some cases labour costs. Other costs such as power and chemicals are directly related to the quantity dealt with. Cost centres are identified and the person responsible for the cost centre should be provided with information on the actual costs incurred compared with the planned costs. Any variances can be investigated and corrected and it may be that comparison with records of the previous year will help to identify causes. For example the increased costs of water may be due to increased leakages. Therefore provision should be made for current period unit costs, cumulative costs and previous years costs. Provision of costing information should be timed so that use can be made of it, although it is historical to a point it should be very recent rather than very old.

The cost centres previously identified will be the responsibility of designated managers and will also be used as centres for budget preparation. One centre of responsibility may contain several cost centres and in designing budget preparation forms this should be considered. The budgets should be relevant to responsibility centres and to activities. Budgets will be required for capital expenditure, annually and for a period of say five years. Cash Flow budgets will be important as it may be necessary to make adjustments between areas with a surplus and those with deficits to avoid local embarrassments. Budgets for responsibility centres are then consolidated until the consolidated budgets for the Board are produced. The Budget Control section will be responsible for the timely completion and consolidation at higher level of budgets and also will be responsible for the preparation and presentation of monthly, or quarterly if appropriate, statements comparing budgeted and actual performance.

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Billing and collection procedures will possibly require revision. Routing may have to be prepared for meter readers so that meters are read once a month. If consumers are billed monthly or quarterly the process of preparing and sending out bills should be continuous throughout the period. In this way some consumers will receive bills at the beginning of the period, others in the middle and others at the end. Collection should be possible at nominated centres or banks or by direct remittance. Any delay in payment should be followed up promptly by the stipulated reminder notices and persistent defaulters should have the supply disconnected. This aspect of the work should be done promptly and the arrangement of records should be such as to permit this.

An estimate should be prepared of the working capital requirements for the first year's operation by the Board. Arrangements will need to be made, probably with the State for a grant, to provide funds for salaries and so on. The initial revenue collections are not likely to meet the Board's expenses because most tariff structures are uneconomically low and there are large quantities of unaccounted for water from most water undertakings. Also charges for sewerage services are low and not always collected. In fact the Board may need a grant-in-aid to cover running costs for about three years. In cases where a Public Health Engineering Department has been transferred to a Board to form a design and construction organization it has been possible to obtain advances on the centage charges for these services from the municipalities. But with a fully autonomous Board responsible for operations as well as design and construction, this sort of advance would not be possible. The Board will eventually be dependant on the revenue derived from tariffs but assistance in funding will be required until the revenue is built up. Therefore it is essential that working capital requirements are known and provided for or the Board will not be able to operate.

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In addition to the preparation of systems for accounting, costing and budgeting the preparatory work will include a listing and valuation of the fixed assets to be taken over. The various authorities contributing to the Board will own pipelines, tanks, pumping stations, treatment plant and buildings used solely for water supply and sewerage purposes. If many authorities are involved there may be advantages in a phased takeover of such assets. It is essential that the new Board has a complete list of the items it is to take over and their valuation. If historical costs or records of the actual assets are not available then recourse may have to be made to estimates of the extent of the asset and either the historical cost or the current cost. There may be items such as workshops or offices which are shared with other groups but if there is any doubt about whether these can be wholly used by the new Board they should not be included in the assets taken over. Items such as public supply points or public conveniences may generate some discussion, these are usually wanted by a municipality who will maintain them, in which case it is better not to transfer them but to charge the municipality for the water supplied and the sewage collected. Many of the staff may be living in houses owned by the parent organization and there is a case for the Board to include these houses in the assets taken over. The contributing organization should not begin any new capital works within a minimum of three months of vesting date. Any works in progress at vesting date should be assessed so that the Board may be given the opportunity of supervising until completion which would be by the original authority. The date when these works will be handed over should be ascertained.

The cash and bank balances of the Water and Sewerage departments should be checked to find out what cash the Board may expect to take over. The final sum may be difficult to determine for various reasons but some

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proportion of cash and bank balances should be available to the new Board.

Similarly the liabilities which the Board can reasonably be expected to take over should be listed, valued and agreed. Loans for the construction of new works outstanding at vesting date will probably form a large proportion of the liabilities. Cash adjustments may be necessary in cases where part of the loan has been used to create assets not to be taken over by the Board.

Other liabilities will probably be in respect of Provident Fund and pension schemes for staff and outstanding bills or claims against the water and sewerage departments. There will be claims for compensation from the Board for assets taken over and these cannot be properly considered until the valuations are completed. When examining any claims for compensation it should be remembered that the Board is a Government body and compensation is not usual for the transfer of assets between Government departments. Furthermore, any compensation paid could be reflected in increased tariffs.

3.2.5 Stock Purchase and Control

There may be considerable stocks of materials and equipment at various locations in the contributory organizations and these must be examined, listed and valued. The stores should be reviewed to determine whether the existing premises could still be utilized by the Board and in what capacity. The stock which is normally kept should be coded so that every item has a unique number. The code could be devised so that the first two digits indicate material, the next three digits indicate the type of equipment. Additional number indicating sizes could be be added. Each item should have a unit of measure for issuing purposes for example cubic metres, litres or number.

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The stores to be operated by the Board will probably be a central store, district or secondary stores and user stores. The user stores will consist of stationery at all offices, workshop stores, treatment plant stores, building maintenance and vehicle stores probably attached to central or district stores and laboratory stores. These will probably operate on an imprest basis and will not require full time storekeepers. The central and district stores will act as feeders to user stores and other consumption areas.

Procedures must be set up for stores accounting which will include the planning of investments, issuing, receiving and auditing stocks.

If the ABC system of inventory control is used an analysis of use and values of stock items will be required. This may only be possible for a limited number of items initially but once started can be extended to other items later.

Central purchasing is recommended but local purchase of certain user store items should be considered in order to avoid delays.

The purchasing section should prequalify suppliers so that tenders can be obtained for regular supply contracts or for particular supplies for new projects. The system of prequalification and tender evaluation needs to be worked out. Purchasing authorities can be delegated for maximum values to different levels of officials for day to day orders. Purchasing will be working within budgets and the revenue budget should be broken down into main groups and scheduled by period as to the time of purchase.

It is important that the purchase, control and storekeeping systems are devised at an early date to ensure that proper operation is possible and to avoid excessive investment in idle stocks and storage space.

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3.2.6 Reports and Systems

In addition to some financial reports previously mentioned, various officials will require regular reports on different aspects of the Board's activities. Some of these will require consolidation for passing to higher levels. These could include costing reports, operational reports on water supply and distribution, operation of sewerage systems and sewage treatment, quality reports, stock reports, new project reports, personnel reports and internal audit reports. There may be other subjects on which regular reports are required. If a schedule is prepared showing who prepares which report, at what frequency and who uses it there is a possibility that some reports can be omitted or prepared less frequently. Adequate information must be timely and available to all levels of management but reporting procedures should be streamlined whenever possible to avoid choking the system. If the essential reporting requirements and procedures are decided at an early date they can be incorporated in the Office Procedures Manual. This Manual should be available to all staff before the Board begins operations. The Manual could conveniently be in specialist volumes dealing with accounting, general office systems for correspondence and filing, new projects, stock purchases and control and reports. Preparation of these basic manuals will help the Board to start functioning smoothly.

3.2.7 Accommodation and Equipment

When the staff and work requirements are known it is then possible to work out the accommodation requirements for offices, stores and workshops. The accommodation available from the contributing organizations may not be adequate so that alternatives must be found. Care should be given to the arrangement of all accommodation, even temporary quarters can be conducive to good work if carefully laid out, and it is surprising what a long period can be temporary.

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Similarly, the equipment and furnishing of the accommodation requires advance planning. The number and type of desks, chairs, typewriters, cabinets should be known and adequate telephone arrangements should be provided. Decisions will be needed on duplicating equipment and drawing printing machines.

Many printed forms will be required by the new Board and the essential ones should be designed and printed by the time the Board begins to operate.

3.2.8 Final arrangements

Arrangements must be made with banks to receive money from specified points and for the withdrawal of money and transfers. Authorized signatories will be agreed for various purposes.

Establishment schedules and organization charts should be available to all departments so that they are aware of their place in the organizatio

All outside bodies should be notified when the Board is to begin operations. These will include the consumers, suppliers, contractors, staff, government and local government departments. The Board's addresses and telephone numbers should be included in the notifications.

The Board of Directors will be appointed and procedures for meetings and sub-committees will be agreed.

Although this preparatory work will enable the Board to start functioning there will still be work to complete in personnel, accounting and engineering departments but the foundations will have been laid on which the Board can be built up.

Check List Summary of Procedure for Setting Up Water Supply and Waste Water Board

Appoint Managing Director.

Appoint ad hoc Board.

Appoint team to carry out preparatory work.

Check existing relevant legislation.

Draft new legislation.

Develop organization structure.

Determine lines of communication and reporting procedures.

Decide personnel policy, pay scales, leave, pension, housing, medical, other benefits, recruitment, transfer, promotion criteria.

Prepare job descriptions and job evaluations.

Obtain records of staff which may be transferred.

Decide how existing staff will fit into new organization and any potential transfers to new work or locations.

Decide which staff will not be required and how they will be dealt with.

Decide recruitment needs and recruit for vesting date.

Notify appropriate departments about transfer of staff.

Prepare service regulations.

Decide what fixed assets are to be taken over and method of valuations.

Agree valuation.

List current liabilities to be taken over and agree valuation.

List stocks to be taken over and agree valuation.

List grants due for work in progress.

List work in progress and agree which is to be taken over for completion and which after completion and value.

Determine cash balances to be taken over.

Prepare working capital requirements.

Finalize billing arrangements.

Obtain details of collection arrears.

Finalize collection procedures.

Decide payroll procedures.

Make arrangements with banks for payroll, collection and other accounts.

Appoint auditors.

Prepare a financial statement of the ad hoc Board's activities to within a month of vesting date.

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Prepare accounts system and codification of accounts.

Prepare stock purchasing recording system and coding.

Prepare organization manual.

Prepare office procedure manual.

Determine office, depot, stores and workshop requirements.

Determine locations, furniture, equipment requirements.

Draft printed forms to be used, approve, print and issue.

Notify consumers, staff, other government departments, banks, suppliers, contractors.

Prepare draft regulations for water supply and sewerage.

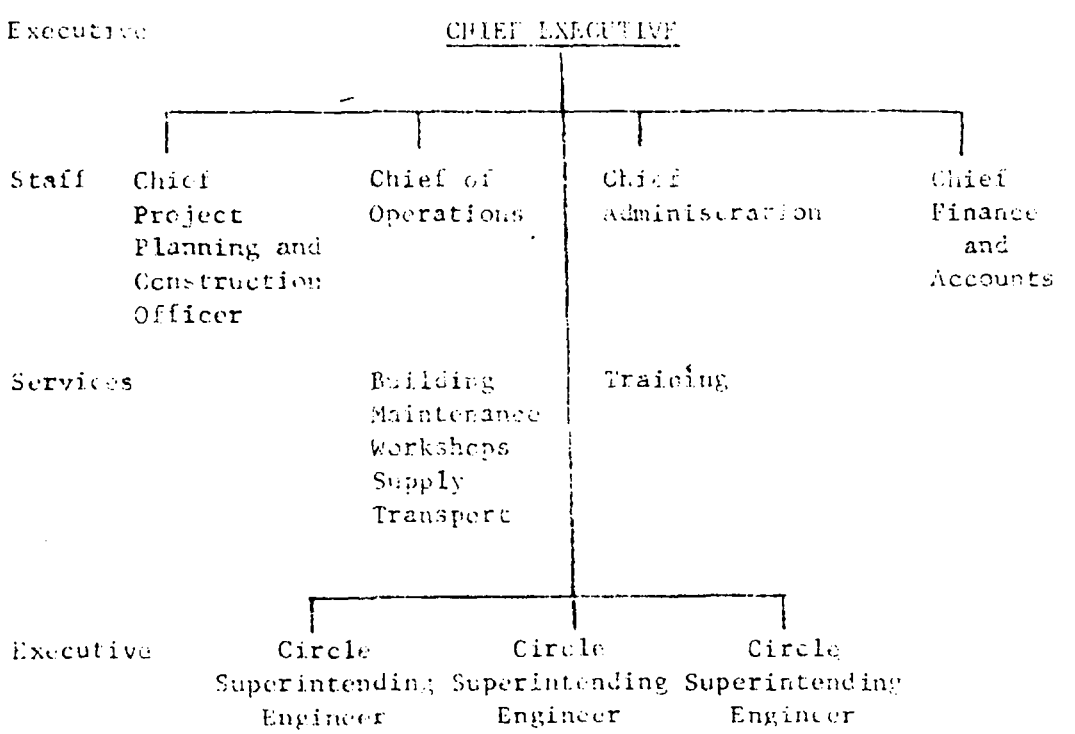
Prepare immediate action programme and cost estimates.

State Legislature passes legislation.

Presidential assent

VESTING DATE

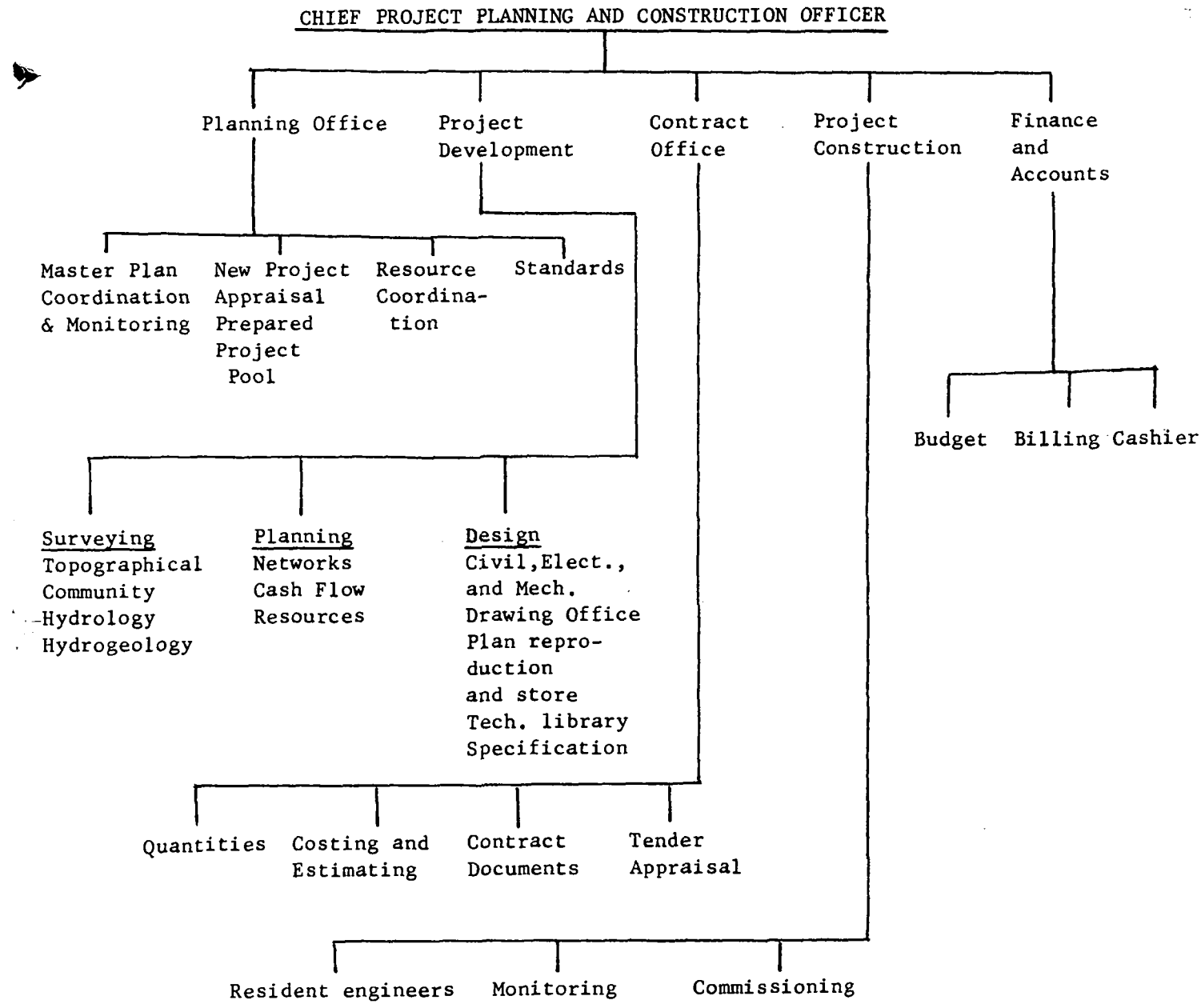
DIAGRAM OF POSSIBLE ORGANIZATION OF CHIEF EXECUTIVE'S OFFICE



Services are aligned with the staff branches which sponsor them.

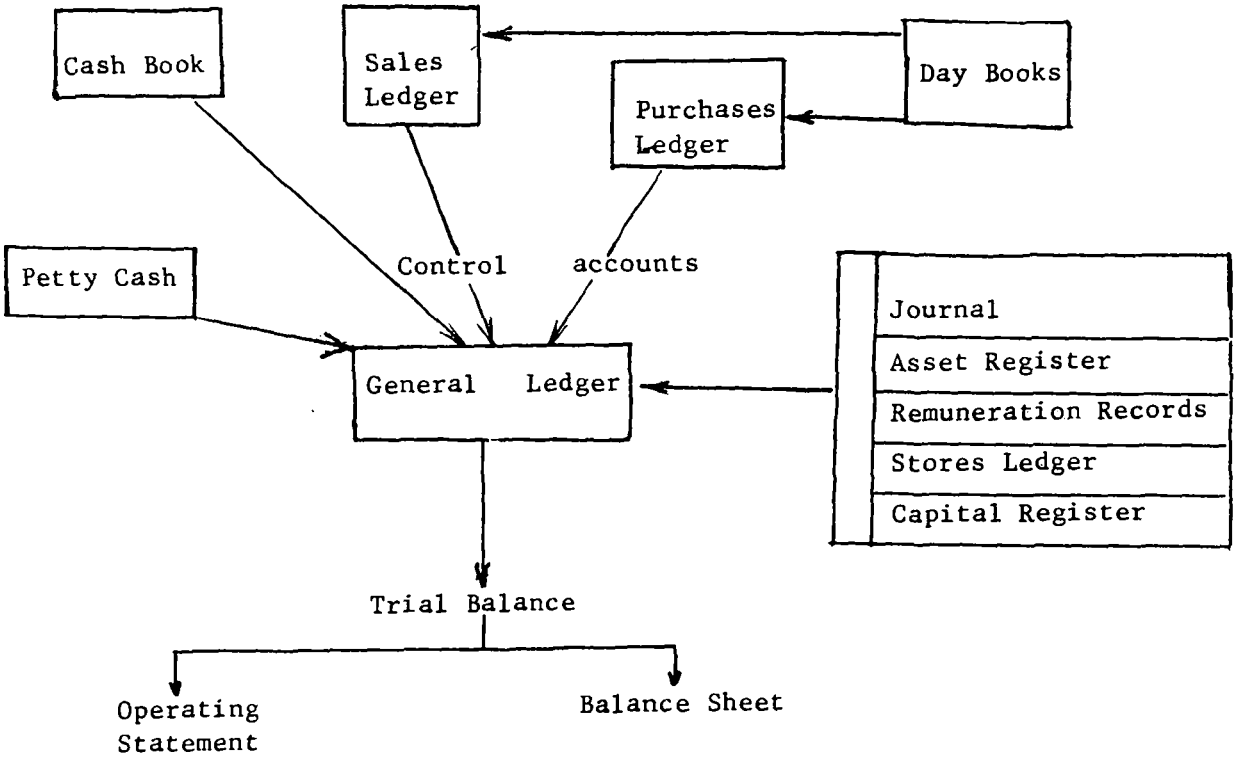
Similar staff and supporting services would be provided as appropriate at each executive level.

DIAGRAM OF POSSIBLE ORGANIZATION OF CHIEF PROJECT PLANNING AND CONSTRUCTION OFFICER'S UNIT



Annex 4

DIAGRAM OF FINANCIAL ACCOUNTING SYSTEM



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GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

BANGALORE, INDIA

11-14 JUNE 1979

Seminar on the Financing and Management of Water Supply and Sewerage
(11-14 June 1979)

AGENDA

11 June	9.30 am - 10.30 am		Inauguration and Opening Address
	10.30 am - 11.00 am		Coffee
	11.00 am - 1.00 pm		Preliminary work in setting up a Board. Constitution and Duties and Powers.
	1.00 pm - 2.00 pm		Lunch
	2.00 pm - 3.30 pm		Organization
	3.30 pm - 3.45 pm		Tea
	3.45 pm - 5.00 pm		Cost and source of funds for establishing Boards.
12 June	9.00 am - 11.00 am		Personnel policies, recruitment and training.
	11.00 am - 11.15 am		Coffee
	11.15 am - 1.00 pm		Costs and sources of revenue.
	1.00 pm - 2.00 pm		Lunch
	2.00 pm - 3.30 pm		New Projects - Planning financing and monitoring.
	3.30 pm - 3.45 pm		Tea
	3.45 pm - 5.00 pm		Implementation - Contracts and Purchasing.
13 June	Field trip.		
14 June	9.00 am - 11.00 am		Operation, maintenance, tariff collection.
	11.00 am - 11.15 am		Coffee
	11.15 am - 1.00 pm		Public Relations.
	1.00 pm - 2.00 pm		Lunch
	2.00 pm - 3.30 pm		Summary of discussions for inclusion in guidelines.
	3.30 pm - 3.45 pm		Tea
	3.45 pm - 5.00 pm		Summary, continued, and closure.

GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE
BANGALORE, INDIA

11-14 JUNE, 1979

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ASSAM

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BIHAR

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GUJARAT

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HARYANA

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MAHARASHTRA

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WEST BENGAL

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4. Mr P.L. Nanjundaswamy, Chief Engineer

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9.) Two observers to
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SEMINAR ON FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

AT

BANGALORE, INDIA
11-14 JUNE, 1979

LIST OF WORKING PAPERS

Paper No.	Subject	Author
1.	The Status of Financing and Administration of Water Supply and Sewerage Services in India	R. Franklin
2.	Life Insurance Corporation of India - Financing Policy for Water Supply and Sewerage Schemes	C.R. Thakore
3.	Financing and Management of Water Supply and Sewerage in the State of Karnataka by the Karnataka Urban Water Supply and Sewerage Board	P.R. Bellubbi
4.	Working of the Kerala State Public Health Engineering Department	N.S. Bhairavan
5.	Notes on Tariffs	R. Franklin
6.	Case Study of the Punjab Water Supply and Sewerage Board	M.S. Sandhu
7.	Uttar Pradesh Jal Nigam; its constitution and Role in the Development of Water Supply and Sewerage Services in Uttar Pradesh	B.P. Varma
8.	A Case Study from Tamil Nadu	K. Madhava Sarma
9.	Proposed Procedures for forming State Water and Sewerage Boards	R. Franklin
10.	Urban Water Supply and Sewerage Pricing Policy	R. Turvey & J. Warford
11.	Water Rates in Developing Countries	J.J. Warford & D. Julius

Working Paper No. 1

The Status of Financing and Administration of Water Supply and Sewerage Services in India

By

R. Franklin

INTRODUCTION

1. Some years ago the organization and financing of water supply and sewerage works was fairly uniform throughout the country. Each State was responsible for the provision of these facilities and also for the operation of rural water supply works. The operation of urban waterworks and sewerage systems was usually the responsibility of the municipal authorities. In each State the Minister responsible had an engineering department specialising in the design and construction of these works. District Development Committees, elected bodies, decided the needs of the District and communicated them to the State. Similarly municipalities would make representation to the State for their requirements. The engineering department would investigate the proposals at the cost of the requesting body. If the scheme appeared feasible the cost would probably be beyond the financial resources of the municipality and so a request to the State for the necessary finance would be made. Should the State be unable to provide all the finance, it was then possible to ask the Central Government of India for assistance. The Central Government technical staff, headed by the Adviser in Public Health and Environmental Engineering would check over the proposals to ensure technical soundness before passing them through to the Central Planning Commission for incorporation in the Five Year Plan.

The Central Government staff generally has had a greater involvement in rural water supply schemes due to the Government's preferential policy with regard to rural water supply. Projects which require funding from international bodies such as International Bank for Reconstruction and Development (IBRD) were also scrutinised by the Central Government staff. In this way the individual States and the Central Government have been able to build up plans for the construction of water supply and sewerage projects to be completed in the next five years.

The operation and maintenance of works when completed is invariably, except for rural water supplies, the responsibility of the local authorities who also collect any charges for the water or sewerage services.

EFFECTS OF INCREASED DEVELOPMENT

2. This system worked reasonably adequately in the fifties and early sixties. Changing attitudes and increasing populations required that the construction rate be speeded up and this increased construction rate meant that sources of finance additional to

State or Central Government resources had to be found. Increased recourse to institutions such as the Life Insurance Corporation (LIC) in India or IBRD became essential in order to finance the expanded programme. Previously the State, or Central Government, had made loans or grants to individual municipalities. If a municipality found difficulty in meeting the repayment terms of loans neither Government was unduly perturbed. Conversely if the Government, State or Central, had difficulty in finding sufficient funds in any year then projects would be delayed until the funds became available. Outside bodies such as LIC and IBRD cannot adopt philanthropic attitudes towards borowers as the Governments have sometimes done. Furthermore if they agree to lend a sum of money for a project, the whole sum will be forthcoming and is expected to be spent on the project within a reasonable time. Lending to many small bodies would create a great deal of administrative work out of proportion to the total of the individual sums involved and thus the lending bodies have preferred to deal with a single body rather than the many municipalities which require assistance. In order to cope with the expanded work load and the new financing arrangements which this work load has required, it has been necessary to examine the existing system very carefully, because in many cases the system already has been working to maximum capacity. If that capacity would have to be substantially increased the system would need revising or expanding, or both and some means would have to be found of consolidating the handling of loans.

ESTABLISHMENT OF STATE BOARDS

3. The solution adopted in some States has been to form an autonomous body to negotiate loans, investigate and design works and supervise their construction. These organization are usually called Boards, but Uttar Pradesh has a Corporation. Legislation has been drafted which defines in varying degrees the Board's duties, powers, responsibilities and constitution, and defines the date of enactment and assets to be provided or taken over and staff conditions. After approval of the legislation by the State Government and Presidential assent has been obtained, then the State has the necessary legal powers to set up the organization which should accelerate the construction of water supply and sewerage works. The legislation differs from one State to another. This is not surprising, but it may be of interest to examine in what respect there are differences. The only States which have enacted legislation are:

Gujarat
Karnataka
Maharashtra
Punjab
Tamil Nadu
Uttar Pradesh

In two of these States there is, in addition to the State Board, a Water Supply and Sewerage Board responsible for these services in the metropolitan area of the State capital city. These are at Bangalore and Madras.

The salient points in the States' legislation are tabulated in Annex 1 for comparison and the principal differences are discussed in the following paragraphs.

ORIGIN OF LEGISLATION

4. The earliest formed Board, Tamil Nadu, examined the legislation for electricity boards before finalizing the legislation adopted. The other Boards have almost invariably examined preceding legislation in order to try to arrive at the best solution.

CONSTITUTION

5. Every Board consists of a Chairman, a Chief Executive called either Managing Director or Member Secretary, and representatives of various State Government Departments, Finance and Health are always represented. Representatives of the elected heads of various local bodies and in three cases persons who are not employed by government but who are technical experts are also included. The average number of directors is 12, which is a very good working number and there is generally a fair representation of interested parties although the Punjab Board has six representatives of Government departments out of a total of thirteen directors. Most of the other Boards have four members from Government and yet Karnataka which has the largest Board has the smallest number of Government representatives at three. These Boards are autonomous bodies formed to deal with problems and work loads not previously encountered by Government departments. Too high a proportion of very senior Government officials whose training and extensive experience has been in very different situations could possibly have an adverse effect on the Board's performance.

FUNCTIONS

6. Every Board is primarily a "design and construct" organization. They have the power to advise on operation and maintenance or to take on this aspect of work if requested. Generally they advise on tariffs to be charged and approve scales proposed by municipalities. Karnataka and Punjab deal with urban situations only but the others also cover the rural areas. A broader and more active role is undertaken in operation and maintenance for rural installations than in urban areas. Organizations set up for the purpose of investigating, designing and constructing works could be embarassed by many requests to undertake operation and maintenance because the personnel with the necessary experience are unlikely to be available in adequate numbers. The Corporation at Uttar Pradesh is unique in that the legislation provides for the setting up of the Jal Nigam, essentially a design and construct organization with powers to raise loans, but also gives the State the right to set up Jal Sansthans which are operational units able to promote schemes under the Jal Nigam. Any loans incurred by the Jal Sansthans are obtained from Jal Nigam. Jal Sansthans have not yet been set up to cover the entire State and where there are no Jal Sansthans the operation and maintenance and collection of tariffs is in the hands of local authorities in the usual way.

Construction is usually undertaken by contract but direct administration of construction is also carried out.

TRANSFER OF ASSETS AND LIABILITIES

7. With the exception of Karnataka there is provision for taking over assets and liabilities usually of the State Government engineering department concerned with water supply and sewerage. The Government decides what shall be transferred and how it shall be valued. In the case of Punjab the valuation is not yet completed three years after formation of the Board, and in Tamil Nadu the valuation was agreed last year, that is seven years after the formation of the Board. A more precise definition of the procedure to be adopted in valuing assets and liabilities taken over is required. Any balance sheet prepared before valuation of assets and liabilities must be provisional and as such cannot give the proverbial snapshot of the Board's financial position with any confidence. In cases where the Board is required to establish a depreciation fund compliance is difficult until the extent and value of assets is known.

WORKING CAPITAL

8. It seems strange that half of the instruments of legislation have made no provision for working capital with which the new organization was to begin its life. This was corrected in the Punjab amending legislation two years after the formation of the Board. How did the Board survive those two years? The difficulties experienced during the early years of the first Boards due to this omission must have been appreciated when the legislation for subsequent Boards at Maharashtra and Gujarat were framed.

LOANS

9. In all cases the State Government guarantees repayment of loans and interest payable by the Board. Therefore it is reasonable that the the State should first approve such loans. Most State Government seem to operate on a yearly basis within the context of the broad five year plan. Presumably consideration of loans to be guaranteed is on a yearly basis and it would be interesting to hear from Board representatives whether this system of prior State approval has had any limiting effect on the amount and timing of funds they have been able to obtain. The repayment of loans by local authorities is not a problem to the Boards as the State guarantees that the repayments will be made. It would nevertheless be of interest to know whether the local authorities ability to repay the loans has been over estimated. This information would be useful in preparing future loan arrangements.

SOURCES OF REVENUE

10. In all cases the Board may accept grants and subventions from the State Government. All the Boards are enjoined to operate without incurring a financial loss, so presumably the grants are made at the request of the Board in order to avoid a loss-making situation.

The only other source of revenue is reimbursement of investigation costs and a centage charge for design and supervision of works. The centage varies from 12% to 15-1/2% of the cost of the works and is intended to cover the cost of the Board's activities. In the case of rural water supplies the costs are usually covered by State Government grants.

The Jal Sansthans at Uttar Pradesh obtain revenue from water and sewerage charges. Some of the Boards obtain a small amount of revenue in this way but as the involvement in operation and maintenance is generally minimal this is a small proportion of total revenue. In some cases where the Board operates the supply, treatment and transmission systems the local authorities pay for the bulk supply received by them. The rates chargeable in these cases are intended to cover the cost of the operation on a "no profit no loss" basis.

PERSONNEL

11. The State Governments have invariably retained a great deal of power in the important area of personnel policies. Although the Boards can formulate regulations concerning recruitment, conditions of service and establishment schedules, the State has the final word on what should be adopted. As the initial staffing is usually from a Government department it is understandable that the conditions of such staff should be protected. But people with knowledge and skill are essential for the Board to be able to provide the service expected. The conditions applicable to Government service may not be adequate to attract the required talents. Therefore the Boards, as autonomous non-loss making bodies, should have more flexibility in personnel matters.

Two Boards are required by the legislation to assess or provide training facilities and other Boards are mindful of this requirement but not legally required to do anything about it. No doubt the various differences from one State to another are the cause of the generally firm retention of control of personnel policies by the States. There may be concern over the effect of establishing an apparently better rewarded section of public employees, or alternatively if the personnel are not public employees there could be concern about recruitment or industrial problems. It appears that the States wish personnel to be seen to be public employees while at the same time producing results comparable with a commercial concern.

PROJECT PLANNING

12. Three of the Boards are required by the legislation to prepare State plans for water supply and sewerage. The same Boards are also required to review every system annually and to establish a facility for the technical, financial and economic review of each scheme. These requirements indicate an awareness of the advantages of long term planning and monitoring of projects which are in some ways inconsistent with the State's firm control of personnel policies. The inconsistency arises because these activities are in practice rarely undertaken within a State Department and probably will require people to be drawn in from outside who may not be attracted by Government conditions.

Irrespective of whether a State plan is required no scheme can go forward unless the local authority agrees to bear the cost of investigation and subsequent costs. In most cases the investigation will take place at the request of the local authority; in some cases the State may initiate the investigation but the local authority still bears the cost. This system must lead to uneven work loads which makes the Boards' operations less economical. In the case of rural water supplies, systems have been developed for awarding priorities and the Boards have been able to make longer term plans resulting in substantially increased output. Although output in the urban sectors has been increased by various alterations to the systems taken over, the costs could probably have been reduced or output improved had there been better work load patterns. The requirement to review systems annually may initially impose an excessive work load on the Boards and some other time frame may need to be considered. These reviews should refer to the appraisal of the scheme made prior to the construction of the system. Any variances should be examined to ascertain the reasons for them and the design section responsible should be advised. In this way future designs should be improved.

PROBLEMS IN SETTING UP BOARDS

13. After the legal part of setting up a Board has been completed the practical problems encountered have been varied. Lack of working capital is one obvious headache most of the Board's have endured. Issuing debentures, obtaining a grant or loan from the State Government, obtaining an advance on centage are some of the ways adopted to overcome this problem. Allied to this problem has been a difficulty in defining and valuing the assets and liabilities to be taken over by the new organization. Work in progress, loans, grants and schemes under discussion have needed to be defined as has the time they would be taken over. The Boards have generally adopted a more commercial form of accounting system then the usual Government system. There will obviously have been problems in doing this as the majority of the accounts staff would initially be from government service. The introduction of internal audit systems would again be a completely new activity to many of the staff. Arrangements for taking over Provident Funds could be complicated where staff were given the option of transferring or going on deputation.

Personnel to be taken over, personnel policy and the re-deployment of personnel to fit into the proposed new organization would be problems of different magnitude in different States. All States were probably confronted by similar difficulties in designing the new organization. These problems must have been particularly difficult when the legislation had been subject to extensive and prolonged debate. The objectives in such cases seem to become less clear and if the objectives are not clear the means of achieving them cannot be satistactorily prescribed.

There seems to have been little attempt at public relations to help concerned authorities and the public understand what was happening and why. It is difficult now to say whether some of the problems relating to personnel or relationships with municipalities or banks and financing groups could have been made easier by carefully prepared public relations activities. Such activities need to be carefully conceived and implemented otherwise the wrong effect may be achieved and this would be worse than no attempt to explain the proposed policies or developments.

This introduction to the problems of improving the water supply and sewerage organizations in order to increase the rate of providing these facilities will be amplified by reports of individual experiences. Already it is clear that some of the earlier errors will be corrected in the more recent measures proposed. But will it be possible for future reorganizations, at present contemplated by about half a dozen States, to be more effective, more quickly than the first-half dozen reorganizations? The discussions of the problems already encountered and the ways of avoiding or solving them should help new Boards to reduce their initial problems.

COMPARISION OF LEGISLATION FOR STATE BOARDS

Date of formation	Gurarat	Karnataka	Maharashtra	Punjab	Tamil Nadu	Uttar Pradesh
	1979	Aug. 1974	Nov. 1976	July 1976	March 1971	1975
Constitution and representation of other bodies	Chairman Member Secretary Health & Family Welfare Department Panchayat Housing & Urban Development or Planning Finance Department 3 from elected heads of local bodies 4 experts in economics development planning or engineering	Chairman Managing Director Finance Health & Municipal Administration Public Works 4 to represent local authorities 8 others of whom 4 should have experience in public health engineering	Chairman Member Secretary Urban Development & Public Health Rural Development Finance Department Planning Department 3 from elected heads of local bodies 2 experts in water supply and sewerage	Chairman ManagingDirector Local Government Public Works Finance Health Director Local Govt. Chief Engineer Public Health Board may coopt five Associate Directors	Chairman Managing Director Finance Health and Family Planning Rural Development & Local Administration Public Works Commissioner Municipal Corp. of Madras Chairman Chamber of Municipal Councils President Tamil Nadu Panchayat Union	Chairman Managing Director Finance Director Finance Department Local Self Government Director of Local Bodies Director of Medical of Health Services 5 elected heads of local bodies
Total number of Directors if all position filled.	12	17	11	13	9	12
Functions or powers include:						
Investigate & design	Water Supply & Sewerage	Urban Water & Sewerage	Water Supply & Sewerage	Urban Water & Sewerage	Water Supply & Sewerage)	Water Supply & Sewerage by Jal Nigam
Construction	do	do	do	do	do)	
Operate & maintain	For limited periods on request.	7 large works only	If requested	If requested	Not Board responsibility	Jal Nigam when requested.
Tariffs setting	Approve for areas in sphere of operation	Suggests tariff to municipalities. In certain cases charges for bulk supply to Municipality.	Review & advises and approve in areas of sphere of operation.	Approved by Board but suggested by Municipality.	Approved by Board but suggested by Municipality.	Jal Santhan operate & fix tariff which goes to Jal Nigam for approval.

	Gujarat	Karnataka	Maharashtra	Punjab	Tamil Nadu	Uttar Pradesh
Transfer of assets & liabilities	Property of Public Health Eng. Service State Govt. to decide how valuation to be made.	Nothing mentioned.	Property of Environmental Engineering Service State Govt. to decide method of valuation.	Assets & liabilities of part of Public Health Dept. Conditions to be decided by Govt. Valuation not yet finalized.	Assets liabilities and property of Public Health Engineering & Municipal Works Dept. as decided by Govt. Valuation agreed in 1978.	Jal Nigam & Jal Sansthan both had transfer of assets & liabilities valued in a manner determined by Govt. Consultants were employed.
Provision of working capital.	State may make contribution of R.1 Crore.	Nothing in legislation	State may make contribution of R. 1 crore.	Amending Act in 1978 states Board to have authorized capital of R.20 crores from Govt. & local authorities.	Nothing in legislation.	Nothing in legislation.
Raising or advancing loans	Subject to State sanction. Government Guarantees repayment of loan.	Subject to State approval. May issue bonds or debentures. State guarantees repayment of loans.	Subject to State sanction. Government guarantees repayment of loan.	Subject to State approval. May issue bonds or debentures. Govt. guarantees repayment of loans.	Subject to State approval. May issue bonds or debentures. Govt. guarantees repayment of loans.	Subject to State approval the Jal Nigam may raise or advance loans. May issue bonds or stock. Govt. guarantees repayment of loans Jal Sansthan may borrow from Jal Nigam.
Sources of revenue	Govt. grants and subvention. Supervision and centage charges.	Govt. grants and subvention. Supervision of centage charges.	Govt. grants & subventions. Supervision of centage charges.	Govt. grants of subventions. Supervision of centage charges.	Govt. grants of subventions. Supervision and centage charges.	Govt. grants & subventions to Jal Nigam Supervision & centage charges. Jal Sansthan obtain revenue from water & sewerage charges.
Personnel	Transfer of Govt. personnel at similar conditions. Required to provide training facilities. May with State approval make regulations for recuritment & conditions of services.	No provision for transfer of Govt. staff. Establishment required & power to make regulation on conditions of service.	Transfer of Govt. personnel under similar conditions. May with State approval make regulation for recruitment and conditions of services.	Recruitment subject to regulation. Remuneration not to exceed that for corresponding Govt. post. Govt. may require Board to reduce numbers & remuneration if Govt. consider then excessive. Provision for transfer of Govt. personnel. Appointments to posts in excess of R.1600/month require Govt. approval.	Provision for transfer of Govt. staff at similar conditions. Govt. sanction before creation of post or any appointment where salary exceeds R.1600 per month. Required to maintain establishment schedule.	Provisions for transfer to Jal Nigam & Jal Sansthan at similar conditions. May with State approval make regulations for recruitment and conditions of services. Assess manpower and training requirements.

	Gujarat	Karnataka	Maharashtra	Punjab	Tamil Nadu	Uttar Pradesh
Project initiation and planning.	Prepare draft State plans on direction of Govt. At request of local authority investigate & prepare schemes. Schemes to be approved by Govt. & local authority. Required to review annually the technical, financial & economic aspects of all systems. Establish facility for technical, financial & economic review & approval of each scheme.	At request of local authority or Govt. Board investigates & prepares schemes. Scheme to be approved by local authority and Govt.	Prepare draft State plans on direction of Govt. Establish & maintain facility to review & appraise technical, financial & economic aspects of all schemes. Review all system annually.	Investigate and prepare schemes. Schemes to be approved by Govt. and local authority.	At request of local authority or Govt. Board investigates & prepares schemes. Schemes to be approved by local authority and Govt.	Prepare State plans on direction of Govt. Prepare & execute schemes. Establish & maintain facility to review technical, financial & economic aspects of all schemes. Review annually every systems.

Working Paper No. 2

GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

BANGALORE, INDIA

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Working Paper No. 2

LIFE INSURANCE CORPORATION OF INDIA

FINANCING POLICY FOR WATER SUPPLY AND SEWERAGE SCHEMES

by

C.R. THAKORE*

1 GENERAL FRAME WORK

Life Insurance Corporation of India (LIC) is a Statutory Corporation established by an Act of Parliament in the year 1956 nationalising more than 200 Insurance Companies operating in the field of Life Insurance in India. LIC being entirely owned by the Government of India, its management is vested in a Board of Members appointed by the Government of India with a whole-time Chairman as its Chief Executive. It operates under the Administrative control of the Ministry of Finance, Department of Economic Affairs, of the Government of India.

2 INVESTMENT POLICY

The funds of LIC represent savings of millions of its policyholders, who through the medium of life insurance seek to make provision for themselves in their old age and for their dependents in the event of their premature death. Such funds are, therefore, virtually trust funds which should be invested and administered in the best interest of policyholders. The keynote of LIC's investment policy has been that the funds should be invested so as to safeguard and promote to the maximum extent possible the interest of the policyholders. The interest of the policyholders as well as the cannons of sound investment postulate that the investments of LIC should be made so as to yield the highest return consistent with safety and security of the funds. The interest of policyholders requires that their money should be safe and earn a reasonable return. At the same time, LIC has to keep in mind the duty enjoined upon it to carry on its business to the best advantage of the community. As the single largest investor in India, it has to keep before it the interests of the community as a whole. LIC has, therefore, to invest in ventures which further the social advancement of the country. Further, since LIC's funds are drawn from all over India, they should, as far as practicable considerations allow, be invested for the good of the entire country. There has, therefore, to be a studied diversification of its investible funds.

LIC has constituted an Investment Committee to advise on the day to day investment operations which have to be carried out within the broad frame work of the Investment policy enumerated above subject to the guidelines issued by the Government from time to time and the provisions of Section 27-A of the Insurance Act as made applicable to LIC.

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3 INVESTMENT IN THE SOCIALLY ORIENTED SECTOR

Effective from 1 April 1975 LIC is statutorily required to make investment in the following pattern:

		Percentage of accretion to the Controlled Fund to be invested every year	
A.	Socially Oriented Sector		
1.	In Central Government Securities being not less than	25%	
2.	In Central Government and State Government Securities including Government guaranteed marketable securities and including (1) above being not less than	50%	
3.	In Socially Oriented Sector, including Public Sector, Co-operative Sector, House Building by Policy Holders, OYH Schemes and including (2) above being not less than	75%	
B.	Other Investments		
(i)	In Private Sector approximately	10%	
(ii)	Loans to Policyholders approximately	8%	
(iii)	Construction & Acquisition of immovable property by LIC	2%	100%
(iv)	Funds in pipe-line not available for investments approximately	5%	

It will be seen from the above that LIC is required to invest 75% of its funds in socially oriented sector out of which 50% has to be invested in Central Government Securities, State Government Securities and Government Guaranteed Marketable Securities and the balance 25% has to be invested in other socially oriented investments in various sectors such as housing, electrification, water supply & sewerage, industrial infrastructure, etc.

4 FINANCING OF WATER SUPPLY AND SEWERAGE SCHEMES

It should be appreciated that LIC's participation in the financing of water supply and sewerage sector is the outcome of its policy to invest a part of its funds in ventures which further the social advancement of the country. Besides, the development of water supply and sewerage facilities would bring the added benefit to LIC in the form of reduced mortality rate following improvement in public health and sanitation. But even while doing so, LIC can never forget the principal objective of its investment policy viz. to earn highest possible return for its

policyholders consistent with the safety of its funds. As such, LIC does not provide finance for water supply and sewerage schemes on concessional terms either for the Sector as a whole or for any particular backward region in the country. The policy of LIC has been to stipulate uniform terms and conditions on loans for water supply and sewerage schemes throughout the country. The rate of interest and period of repayment of principal amount are determined from time to time in consultation with Government of India, Ministry of Finance and Reserve Bank of India keeping in view the general structure of interest rates prevalent in the country.

5 ALLOCATION OF FUNDS

As mentioned earlier, atleast 25% of the investible funds of LIC have to be earmarked every year for investment in the socially oriented sector which includes besides water supply and sewerage, housing, electrification, industrial infrastructure, etc. Considering the various factors such as advices given by the Planning Commission, Government of India, rates of interest available on different categories of investments, etc., LIC currently allocates in its annual Investment Budgets an amount approximating to about 6% to 7% of the investible funds for investment in water supply and swerage sector, though the amount of investment actually made in any year falls short of this target for various reasons which are explained hereafter. For the years 1977-78 and 1978-79 the actual investment in this sector amounted to Rs.30 crores and Rs.32 crores respectively representing less than 5% of the investible resources in each year. It is rather difficult to increase the allocation of funds for this sector beyond the above limits, as LIC has to keep in view the requirements of other equally important socially oriented sectors referred to earlier as per the advices given by the Planning Commission and Ministry of Finance, Government of India, as also comparatively overall higher return available on investment in those sectors. However, at present the entire budgetary allocations are not being used. If these could be used, the actual investment of LIC in this sector will show a substantial rise.

While making Statewise allocation of funds for investment in water supply and sewerage schemes, though LIC keeps in view the allocations made by the Planning Commission in consultation with the Ministry of Works and Housing, Government of India, and various State Governments, the actual investment in each State would mainly depend upon the satisfactory progress of ongoing schemes, LIC's likely commitment in respect of such ongoing schemes and the ability of the State Governments to submit proposals for new schemes that would broadly conform to the LIC's criteria for the selection of the schemes. The nature of organisation obtaining in each State and their capacity to absorb the finances made available by LIC by proper and timely execution of the schemes are also kept in view. It may be emphasised here that the loans for water supply and sewerage schemes are considered as specific project loans and not block loans to the State Governments. Hence, unless the ongoing schemes in any State are progressing satisfactorily both as regards incurring of financial expenditure and achievement of physical targets, further loans are not sanctioned for those schemes. Besides, unless satisfactory progress of ongoing schemes is demonstrated in a particular State, LIC hesitates to take up new schemes in that State. As a result, inspite of the allocation having been made for a

State by the Planning Commission as also in LIC's Investment Budget, loans are not sanctioned if progress of ongoing schemes is found to be unsatisfactory. Ofcourse, while making the Statewise allocation, LIC does give sympathetic consideration to those States which are comparatively underdeveloped and which, therefore, require larger dose of LIC's finance for their development. The question of accelerated development of such underdeveloped States with a view to reducing regional imbalances is kept in mind and a more sympathetic and somewhat liberal approach is adopted while considering loan proposals from such States under this Sector.

6 MAIN FEATURES OF LIC'S SCHEME

For implementing the above policy, LIC has framed a scheme laying down, interalia, (a) the broad criteria for selection of the schemes, (b) pattern of financing, (c) procedures for processing, sanctioning and disbursement of loans, (d) principal terms and conditions for the loans, etc. A circular letter giving the details of the Scheme along with the application forms, both for new and ongoing schemes, is sent to all the State Governments in the beginning of each financial year inviting applications for loans. The salient features of LIC's Scheme are briefly described below:

(a) Selection of Schemes

(i) For ensuring the best use of available resources, LIC would like the State Governments to select new schemes to be financed by LIC as far as possible in the following order of priority which is in general conformity with the guidelines of the Planning Commission and the Ministry of Works & Housing, Government of India.

Water Supply Schemes

(a) New Schemes including extension schemes where at present there is no supply of potable water at all.

(b) Augmentation schemes where the present per capita supply of water is less than the following quantum:

For areas with a population

i)	upto 10 000	15 to 20 gallons per day
ii)	from 10 000 to 50 000	20 to 25 gallons per day
iii)	from 50 000 to 5 lakhs	25 to 30 gallons per day
iv)	from 5 lakhs to 10 lakhs	30 to 40 gallons per day
v)	10 lakhs and above	40 to 50 gallons per day

In all cases preference would be given to tourist centres and places of pilgrimage.

Sewerage Schemes

These would normally be taken up in those places having a population of more than 1 lakh and where the per capita supply

of water is not less than 25 gallons per day. Preference would be given for taking up sewerage schemes in those places which are endemic with filariasis, which are tourist centres and places of pilgrimage.

These norms are however subject to special considerations depending upon the circumstances prevailing in individual States.

(ii) The schemes proposed to LIC must form a part of the approved State Plan.

(iii) For sake of administrative convenience, LIC would like to avoid taking up very small urban schemes of individual local bodies estimated to cost less than Rs.15 lakhs.

(iv) While for feasibility aspect of schemes from engineering and technical point of view, LIC would depend on the studies made by Public Health Engineering Department (PHED) of the State Governments which is the executing agency, the schemes should as far as possible be financially self-supporting in as much as income from the schemes should be sufficient to meet the cost of operation and maintenance including depreciation and debt servicing. For this purpose, the State Governments and local bodies concerned should be prepared to introduce appropriate water and sewerage tariffs.

(b) Pattern of Financing

The pattern of financing the schemes is as under:

i) For first Rs.1.- crore of the cost of the scheme, LIC loan would be to the extent of 2/3 of the cost;

ii) For next Rs.1.- crore of the cost of the scheme, loan would be to the extent of 50% of the cost;

iii) For the next Rs.3.- crores of the cost of the scheme, loan would be to the extent of 40% of the cost;

iv) Where the estimated cost of the scheme exceeds Rs.5.- crores, each case would be considered on its merits after a detailed examination of the whole project, sources of finance, cash flow and financial viability. Loan quantum would be as per the pattern mentioned in (i), (ii) and (iii) above for the cost upto Rs.5.- crores and for the cost in excess of the said amount, loan will not in any case exceed 25% of the excess over Rs.5.- crores.

The State Government must ensure that the balance cost is provided by local bodies from their own resources and/or by the State Government by way of grant and/or loan.

It may be noted that the cost of water supply/sewerage schemes invariably includes supervision/centage charges payable to the PHED

ranging between 15% to 20% of the estimated cost. There is also general provision of about 5% towards contingencies in the cost estimates. The basic cost of material, equipment and labour component is generally around 75% to 80% of the total cost. As an outside financing agency LIC cannot be expected to provide loans for financing supervision charges and contingencies. These must be financed out of the contribution by the State Government and/or the local body concerned. LIC provides finance to the extent of 67% of the total cost for schemes costing less than Rs.1.- crore and the local bodies/State Governments are required to provide the balance, a major portion of which is accounted for by supervision/centage charges and contingencies. Ofcourse, in respect of bigger schemes costing more than Rs.1 crore, the percentage of LIC loan to total cost gets reduced as the cost increases. These schemes would however be meant for bigger cities which are expected to be able to provide substantial contribution from their own resources or by way of issue of debentures for public subscription or a loan from commercial banks or other institutions as a measure of last resort in case assistance from Government of India under Integrated Urban Development Programme (IUDP) is not available or is not sufficient and the State Government is also not in a position to meet the gap. It may be added here that the above pattern of financing water supply/sewerage schemes has been evolved by the LIC considering the constraints on its investible funds and the need to spread the funds over more and more new schemes in as many States as possible.

(c) Procedures for Processing, Sanctioning and Disbursement of Loans

The State Governments are required to sponsor the loan applications of the individual local bodies which should reach LIC during the first half of the financial year. After the applications are processed and the loan proposals are approved by the Investment Committee of LIC, the sanction of the loan amounts is conveyed to the State Governments concerned. Loans for small schemes are sanctioned every year separately depending upon the satisfactory progress in the previous year. In the first year LIC loan is made available in advance to meet the proposed expenditure during that year. The State Governments are required to arrange for the State Government and/or local body's contribution in due course and incur sufficient expenditure during the year for being entitled for another loan in the next year. The proportionate physical targets must also be achieved. In this way, LIC loan is made available on year to year basis provided the scheme progresses well. In respect of bigger projects, full loans for the whole project cost are sanctioned in the beginning after ensuring about the means for financing the balance cost and obtaining necessary undertakings from the State Government and the local body concerned about the smooth flow of finance over the entire project period. The actual disbursement of the LIC loan is however made from year to year in the agreed proportion depending upon the satisfactory progress of the project.

The loans are considered by LIC to individual local bodies and not to the sponsoring State Governments even though the schemes might be actually executed by the State Government. However, from the point of view of administrative convenience in the servicing of the loans, LIC

would like to deal with only one State level agency to whom consolidated loans can be granted against State Government guarantee, instead of dealing with a number of local bodies. Apart from this reason, for various other reasons also, which are discussed hereinafter, LIC is in favour of the formation of State Level Water Supply & Sewerage Boards. Wherever such Boards are established, consolidated loans are granted to them.

(d) Principal Terms and Conditions of Loan (Urban Water Supply Schemes)

Taking into consideration various factors viz. the purpose of the schemes, restricted scope for viability of the schemes, financial and organisational structure of the local bodies which are the borrowing agencies, etc., it is felt that the loans for water supply and sewerage schemes to local bodies should for the sake of safety and security of the investment be guaranteed by the State Governments concerned as to the payment of interest and repayment of principal. The rate of interest and period of repayment in respect of such Government guaranteed loans are determined from time to time in consultation with the Reserve Bank of India and Ministry of Finance and they are uniformly applicable throughout the country. The principal terms and conditions currently in force are as under:

(i)	Rate of Interest	8-1/2% per annum payable half yearly
(ii)	Period of Repayments	25 years with a mortorium of 3 years
(iii)	Security	Guarantee of the State Government for payment of interest and repayment of principal.

Keeping in view the general structure of interest rates presently prevlent in the market and the fact that even the Bank rate is 9%, the rate of interest of 8-1/2% applicable to LIC under this Sector can be considered to be reasonable. For repayment of loans also a sufficiently long period of 25 years is allowed including a mortorium period of 3 years so that the first instalment of repayment of principal will fall due at the end of the fourth year from the date of drawal of the first instalment of loan. This moratorium is allowed so as to reduce the burden of debt servicing during the construction period, which should not normally exceed 4 years at the end of which the benefit of the scheme should normally be available and the scheme should start generating reasonable amount of revenue. In any case it is difficult to extend the moratorium period beyond 3 years. As a matter of policy, LIC does not allow any moratorium on payment of interest even during construction period.

(e) Rural Water Supply Schemes

LIC also grants loans for water supply schemes in rural areas subject to the following three main conditions:

(i) The schemes must be to provide piped water supply. LIC does not grant loans for schemes for merely digging of wells or fixing up of hand pumps.

(ii) LIC does not grant loans to individual village Panchayats as granting of very small amounts of loans to thousands of Panchayats spread all over the country would cause considerable administrative inconvenience and increase the cost of looking after the servicing of such loans. LIC is, therefore, granting loans for rural schemes only to either district level bodies like Zilla Parishads or State Level Boards.

(iii) The quantum of loan will not exceed 50% of the cost of the schemes in any case.

The terms and conditions for loans for rural water supply schemes are more or less identical to those applicable to urban schemes except that the rate of interest for these loans is a quarter per cent higher than that for urban schemes (i.e. presently 8-3/4% per annum). This slight increase in the rate of interest is stipulated because of longer repayment period of 28 years as compared to 25 years in the case of urban schemes with the moratorium period of 3 years remaining unchanged. The quantum of loan is restricted to 50% of the cost of the schemes because in majority of the cases the balance cost is provided by the State Government by way of grant. Thus, lower percentage of the cost of schemes as loan component is to the advantage of the schemes and the borrowing agency.

So far as rural piped water supply schemes are concerned, LIC does appreciate that it may be very difficult to make the schemes financially self-supporting on two counts - (i) the higher per capita cost of the schemes because of the difficulty in tracing the source of water within a reasonable distance in many places and (ii) very low capacity of the people to pay for the cost of operation and maintenance and debt servicing. Since, however, it is the State policy to provide potable water in all the rural areas as early as possible, the State Governments may be eager to undertake these schemes on a large scale. But LIC would entertain for the purpose of raising loans only such schemes where the per capita cost is not too high and it is possible to collect from the beneficiaries, income by way of water charge which should be able to meet at least the cost of actual operation and maintenance. So far as the debt servicing of loans in respect of these schemes is concerned, State Governments may have to provide revenue subsidies out of their budgets if sufficient income cannot be generated. The designs for these schemes should be simple providing for per capita supply of not more than 15 gallons per day mainly through public stand posts. Besides, costly treatment by way of filtration should be avoided as far as possible, so as to reduce the capital as well as running costs and ultimately the burden of revenue subsidies on the State Governments.

The budgetary resources of the State Governments and the extent to which they can bear the increasing burden of subsidies to rural water supply schemes from year to year are kept in view by LIC while sanctioning loans for rural water supply schemes. State Governments are also suitably advised to keep these aspects in mind before taking up too ambitious a programme of rural water supply.

7 FORMATION OF STATE LEVEL WATER SUPPLY AND SEWERAGE BOARDS

As mentioned in para 6(c) above, LIC prefers to deal with State Level Boards for the purpose of granting loans for water supply and sewerage schemes from the point of view of administrative convenience. However, the importance of formation of State Level Water Supply and Sewerage Boards has to be emphasised from the point of view of ensuring speedier execution of the schemes and also for efficient operation, maintenance and management of the schemes, which is very vital for the development of the Sector as a whole. Though the existing Executing Agency for water supply and sewerage schemes is the PHED in the States which enjoy certain advantages of centralised planning and designing and economies of scale in the matter of bulk purchase, etc., as a Government department it suffers from certain inherent defects such as administrative bottlenecks, delay in approval of the projects and necessary financial sanction. It may be pertinent here to quote the observations of the Working Group on Drinking Water, Sewerage and Sanitation for the fifth Five-Year Plan made in its Report dated 18 January 1973, namely "The present government machinery as set up today is not geared up for rapid technical development of the country and has rigid builtin safeguards. This inherently delays the implementation of the programme. To obviate this, the need to establish autonomous Water Supply and Sanitation Boards is imperative. This will not only result in better implementation of programme due to removal of these bottlenecks but also give overall service to the nation more efficiently. It will also be able to operate and maintain the system with better organisational facilities. This is at present far from reality due to limited finance available at the smaller village local bodies or due to tremendous red-tapism in large Government administration".

Apart from the question of speedier execution of the schemes, the question of efficient operation, maintenance and management of the water supply and sewerage schemes is of equal importance from the point of view of the development of the Sector. In addition to efficient technical operation and maintenance of the schemes, efficient management of the schemes calls for implementation of suitable water and sewerage tariffs proper billing, collection and accounting. Though it is the statutory responsibility of local bodies to provide water supply and sewerage facilities to the public, the performance of the individual local bodies from the point of view of operation and maintenance of the schemes has not been very encouraging in India. This problem of proper management of water supply and sewerage system has attracted attention of the highest authorities in the country in as much as the Estimates Committee of the Parliament for the year 1972-73 had inter-alia observed in their 38th Report thus: "Though the cost of water supply has been steadily rising consequent to the rising capital investments for setting up new high cost projects and for augmenting existing water supply systems, there has been a general reluctance on the part of local bodies to raise correspondingly the water charges with a view to make the water supply schemes viable..... Consequently there is hardly a major local authority in the country with the exception of Madras and New Delhi Municipal Committee that has not been incurring deficits which have to be

made up from general revenues. This has in turn inhibited the initiative of the local bodies towards assuming responsibility for operating maintaining and extending water works". In the opinion of the Committee the proposal in regard to the setting up of the water and sewerage boards might help in finding a satisfactory solution to the whole problem of financing and management of the water and sewerage works. They recommended that Central Government and Central Public Health Engineering Organisation should assume the leading role in this matter and persuade the State Governments to set up these boards.

Based on the recommendations contained in the above mentioned two Reports, Central Government had also in July 1976 commended to the State Governments formation of such Boards at State level in the larger interest of this Sector. Such Boards have so far been formed in the States of Karnataka, Maharashtra, Punjab, Tamil Nadu and U.P. Such a Board is in the process of formation in the States of Bihar and Gujarat. From the reports available so far from these Boards, it can be generally stated that the execution of the schemes is comparatively expeditious in their case.

There is one another important consideration for the formation of State Level Water Supply and Sewerage Boards. It is generally conceded that it is very difficult to make rural piped water supply schemes financially self-supporting. As a result, huge revenue subsidies will have to be provided from the general revenues of the State Governments if water supply is to be provided in all the rural areas. This would cause immense burden on the financial resources of the State Governments. At the same time, there is a view in the knowledgeable circles that the urban water supply and sewerage schemes can not only be made self-supporting but some of these schemes may be able to generate satisfactory surpluses provided the schemes are efficiently operated, maintained and managed. Such surplus earned from urban schemes can be utilised to meet a part of the deficits suffered in the rural areas by way of cross subsidisation thereby reducing the burden on the budgetary resources of the State Government. If, on the other hand, it is thought that the surpluses generated from urban schemes should not be utilised to reduce the deficits in respect of rural schemes, such surpluses can be utilised for further capital expenditure and development of the Sector as a whole.

In view of various considerations mentioned above, LIC is, by and large, in favour of formation of the State Level Boards which will be vested with powers of planning and execution of the schemes as also of operating, maintaining and managing the schemes after their completion, which would include implementation of suitable tariff structure, proper billing, collection and accounting. If, for any reason, it does not become possible for State Level Boards to take over immediately the actual operation and maintenance of all the schemes in a State, they can certainly exercise, through suitable powers vested in them, greater control and better monitoring on the operation and maintenance of the schemes by individual local bodies leading to their efficient management.

8 PARTICIPATION WITH WORLD BANK

The International Development Association (IDA) of the World Bank has of late started providing assistance in the financing of Water Supply and

Sewerage Projects in India. The first such Project financed by them was the Water Supply and Sewerage Project of Greater Bombay to which a second IDA credit has also been finalised recently. Thereafter, two IDA credits have been sanctioned for Water Supply and Sewerage Projects in the States of U.P. and Punjab and the third one in the State of Rajasthan is in the preliminary stages of appraisal. While LIC on its own has played a significant part in providing sizeable finance for water supply and sewerage schemes in the country totalling Rs.265 crores as on 31 March 1979 spread over 18 States out of 22 States (nil in Union Territories) in the country, it is aware of the fact that it has not been able to make a major impact on the development of this Sector on account of comparatively limited availability of funds for investment as also other constraints. It, therefore, decided to participate with IDA in the financing of such projects and made a beginning in the year 1975-76 by agreeing to grant a loan of Rs.18 crores for financing the U.P. Water Supply and Sewerage Project estimated to cost Rs.60 crores where IDA has agreed to provide credit equivalent to Rs.32 crores. In the case of Punjab Water Supply and Sewerage Project LIC has agreed to grant a loan of Rs.13 crores out of the total cost of Rs.66 crores and IDA has agreed to provide credit equivalent to Rs.32 crores. Whereas the U.P. Project consits of both urban and rural schemes (1000 schemes for improving water supply and sewerage facilities in 5 KAVAL towns and 200 villages and small towns), the Punjab Project consists only of urban schemes for improving water supply and sewerage facilities in 8 cities of Amritsar, Jullunder, Ludhiana, Mogha, Patiala, Pathankot, Bhatinda and Rajpura. It is expected that on completion of these projects a significant impact would be made on the improvement of water supply and sewerage facilities in the respective States. Besides the improvement in services, a very important advantage of IDA participation would be the development of institutional frame work on which a greater emphasis is laid by IDA. In both these States, Statutory Boards have been formed and these are expected to develop modern techniques of project management, monitoring and control, as also efficient operation and maintenance of the systems including the implementation of appropriate water and sewerage tariffs, billing collection and accounting. If these Boards show satisfactory performance as envisaged, it will lead to speedier development of the Sector. It is from this point of view that LIC would be willing to participate in IDA Projects in the coming years also. However, in doing so, it may not always be possible to suddenly increase LIC's assistance in the concerned States beyond reasonable limits though some additional assistance over the normal quantum may be considered. The main terms and conditions of LIC loans even in respect of IDA Projects are the same as those in case of non-IDA Projects though certain additional covenants are provided in the Agreements in consultation with IDA which the State Governments and the borrowing agencies are required to comply with. Further, in case of IDA Projects, while initial instalment of loan approximating to about 10% of the total LIC loan is granted as an advance on the lines similar to the disbursement of first instalment of loan in case of non-IDA Projects, the balance loan is disbursed by way of reimbursement of expenditure already incurred.

9 REVIEW OF LIC'S PERFORMANCE

Making a small beginning in the year 1961-62 when loans totalling Rs.1.60 crores were granted in only 4 States of Haryana, Madhya Pradesh Maharashtra and Punjab, LIC has made a sizeable contribution to the financing of water supply and sewerage schemes in the country inasmuch as at the end of 1978-79 the total loans advanced for these schemes had gone up to Rs.265 crores spread over 18 States. There has been a marked increase in the advancement of loans for these schemes from the years 1975-76 onwards when the disbursements have exceeded Rs.30 crores in each year. From the table annexed herewith showing Statewise disbursements of loans for these schemes upto 31 March 1979, it will be seen that while some States like Maharashtra, Tamil Nadu, Kerala, Karnataka, Gujarat, Rajasthan, U.P. and Madhya Pradesh have taken sizeable advantage of LIC's assistance, LIC has not been able to make any significant contribution in the financing of these schemes in the remaining States; particularly in the States of Bihar and West Bengal where so far no loans have been advanced. As mentioned above, LIC's Scheme is circulated to all the States every year regularly, but perhaps these State Governments have their own problems due to which they are not able to take adequate advantage of LIC's Scheme. It is possible that water supply and sewerage sector has not received the due priority in the Plans of these States or they are finding it difficult to provide the matching contribution for financing the schemes or they lack in the PHED Organisation for executing the schemes. Be as it may, it is LIC's endeavour to increase the investments in this Sector in these States by providing all possible cooperation to the concerned State Governments in sorting out the problems they may be facing in this regard and it is hoped that in the coming years LIC loans in this Sector would increase in these States. So far as the actual benefits accruing from LIC's investments are concerned, it may be noted that as at 31st March 1979 about 1000 urban local bodies with a population of about 5 crores as per 1971 census out of total number of about 2600 urban towns with a total populationof about 10 crores in the whole country have received LIC loans for their water supply and sewerage schemes. (The figures of actual population served by the schemes financed by LIC are not available). In the Rural Sector, so far only 4 States viz. Andhra Pradesh, Gujarat, Kerala and Maharashtra have been able to take advantage of LIC's Scheme. The total loans advanced in the Rural Sector have exceeded Rs.31 crores for financing more than 1,600 schemes, the lion's share having gone to Maharashtra which has received LIC's loan exceeding Rs.24 crores. The main reason for the inability on the part of other State Governments to take advantage of LIC's Scheme for rural water supply is either the total absence of District level bodies like Zilla Parishads in certain States or their unwillingness to raise loans from LIC for variety of reasons. It is also likely that in most of the States the rural water supply schemes are financed by the State Governments from subsidies received from Central Government and they are reluctant to raise the loan liability for financing the rural schemes. LIC is, however, willing to increase its assistance for rural piped water supply schemes also provided suitable agencies are developed and schemes satisfying LIC's selection criteria are put up.

Considering the various constraints including financial and statutory faced by LIC in making investments in the water supply and sewerage sector

in the country, its performance so far can certainly be claimed to be satisfactory though its overall impact on the development of this Sector as a whole in the country may not be that significant. It is, however, the desire of LIC to increase its contribution for the development of water supply and sewerage facilities in the country with increasing amount of investment under this Sector and also to make a bigger impact on the development of the Sector with increased participation with IDA in future.

ANNEX

LOANS DISBURSED IN VARIOUS STATES FOR WATER SUPPLY AND SEWERAGE SCHEMES UPTO 31 MARCH 1979

(Rupees in lakhs)

STATE	URBAN	RURAL	TOTAL
1. Andhra Pradesh	947.94	331.94	1279.88
2. Assam	20.00	-	20.00
3. Gujarat	1951.95	106.17	2058.12
4. Haryana	1025.24	-	1025.24
5. Himachal Pradesh	109.25	-	109.25
6. Jammu & Kashmir	50.00	-	50.00
7. Karnataka	2599.99	-	2599.99
8. Kerala	2557.88	221.00	2778.88
9. Madhya Pradesh	1439.75	-	1439.75
10. Maharashtra	4008.00	2442.21	6450.21
11. Manipur	67.00	-	67.00
12. Nagaland	105.00	-	105.00
13. Orissa	303.42	-	303.42
14. Punjab	623.30	-	623.30
15. Rajasthan	1767.41	-	1767.41
16. Tripura	42.50	-	42.50
17. Tamil Nadu	4043.89	-	4043.89
18. Uttar Pradesh	1733.78	-	1733.78*
Total:	23396.30	3101.32	26497.62

States which do not find a place in the above Table are as under:

1. Bihar
2. Meghalaya
3. Sikkim
4. West Bengal

*This includes Rs.604.99 lakhs advanced under IDA Project which cover rural schemes also but for which separate figures are not available.

Working Paper No. 3

GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

BANGALORE, INDIA

11-14 JUNE 1979

Working Paper No. 3

FINANCING AND MANAGEMENT OF WATER SUPPLY & SEWERAGE IN THE STATE OF KARNATAKA BY KARNATAKA URBAN WATER SUPPLY & DRAINAGE BOARD

by

P.R. BELLUBBI*

1 INTRODUCTION

From times immemorial, the importance of water in respect to man's well-being has been appreciated. Water supply has become a critical factor in public health and economic development in most parts of the World, particularly in the developing countries. The importance of Public Health in the less developed areas of the World susceptible to water-borne diseases is universally accepted.

The Global significance of water found expression in the United Nations Water Conference in March, 1977 in Mardel Plata, Argentina where delegates from about 135 countries discussed the role of water in the World.

This conference unanimously adopted a resolution recommending "that where human needs have not yet been satisfied, National Development Policies and Plans should give priority to the supplying of drinking water for the entire population and to the final disposal of waste water etc."

The above resolution was endorsed by the Thirtieth World Health Assembly in May, 1977 and the proposal that the Decade of 1980-1990 be designated as the International Drinking Water Supply and Sanitation Decade.

In the above context, I feel this Seminar organised with the Cooperation of World Health Organization has a special significance in the interest of our country at large and the State of Karnataka in particular in the field of urban water supply and sewerage. I am overwhelmed by the fact that the above Seminar is being conducted at Bangalore, the capital of our State of Karnataka and the Karnataka Urban Water Supply & Drainage Board is the host organisation for the Seminar.

I deem it as a great privilege to participate in this Seminar and to present a case study on the Financing and management of water supply and sewerage works in the State of Karnataka.

In India, after Independence, progressively more and more provisions came to be made in the successive Five Year Plans for National Sanitation Programmes.

Graphs, showing total outlay for Water Supply and Sewerage Vs Urban Water Supply and Sewerage and showing population Vs per capita investment on urban water supply and sewerage are enclosed.

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Bar Diagram showing the expenditure on urban water supply and sewerage from the year 1961-1979 is enclosed.

The civic authorities face serious handicaps in the promotional stages of a project in the pre-financing and fund raising stages. Attempts by them individually to raise loans in the open market to finance local water supply projects often do not attract encouraging responses. Hence to solve the above problem, Autonomous Water Supply and Sanitation Boards have come into existence in the country.

In the Karnataka State, prior to 1975, the Minor Irrigation and Public Health Engineering Branch of the Karnataka Public Works Department was primarily responsible for Planning and execution of urban and rural water supply and sewerage schemes on behalf of the local authorities. The responsibility for the operation and maintenance of the urban systems was however vested in the Municipal Committees.

2 KARNATAKA URBAN WATER SUPPLY AND DRAINAGE BOARD

The Karnataka Urban Water Supply and Drainage Board was constituted as per Karnataka Act No. 25 of 1974 and the Board started functioning from 14 August, 1975.

The Board is attached to the Housing and Urban Development Department of Government of Karnataka which is administered by the Secretary to the Government under the Minister for State Government.

The Karnataka Urban Water Supply and Drainage Board is responsible for Planning, Design and execution of water supply and sewerage works in all the urban areas of the State excepting Bangalore Corporation Area.

Karnataka State is an autonomous State of India. It has an area of 192,203 Sq. Kms. Its population is 29.23 million according to 1971 census and its urban population is 7.10 million including Bangalore City. The projected urban population in 1981 is 8.65 million, and in the year 2001 is 12.86 million.

The Karnataka Urban Water Supply & Drainage Board has at present jurisdiction over 242 towns and cities covering a population of 5.56 million (excluding Bangalore city).

The Board to handle the programme of works such as planning, design, execution of works, Financing and Management of the systems, has the following organisational set up:

The Board has a Chairman, with a Managing Director and 15 other Directors. To it are attached secretarial and finance wings. It has an Engineering Zone headed by a Chief Engineer, who is a qualified Environmental Engineer. Under the Chief Engineer, there are four Superintending Engineers, three Superintending Engineers controlling 3 Circles and one Superintending Engineer incharge of Investigation and Design Wing. The Superintending Engineers are the Administrative Heads holding powers for proper

implementation of works. There are 12 Division, each under the control of Executive Engineers who are primarily responsible for the direct execution of works/Investigation of projects/Design etc. Under them, there are 48 Sub-Divisions, each Sub-Division under the control of Assistant Executive Engineers.

In addition to the organization of the Board, the other agencies indirectly involved in the Sector Development are (i) the State Irrigation Department for supply of water from Rivers, reservoirs etc. (ii) the State Water Resources Development Organisation and Central Water Power Commission who will tender advice where needed in ground water potential, (iii) the Karnataka State Board for Prevention and Control of water pollution for controlling pollution loads into streams/rivers etc., from which this Board has to tap water for its schemes, (iv) The respective Town Planning Authorities for supply of Master Plans and Coordination for preparing water supply and sewerage master plans, (v) The C.P.H.E.E.O., Government of India which will give technical clearance to major urban water supply and sewerage projects costing more than Rs.50 lakhs and 25 lakhs respectively and (vi) The Planning Commission, Government of India and the Planning Department of Government of Karnataka which formulates the basic policy, planning strategies and programme priority for allocation of funds in Annual/Five Years Plans.

3 FUNCTIONS OF THE BOARD

The Board is a public utility service Organisation involving managerial skills and Engineering knowledge to make it successful in service, in safety and in financial considerations. The functions of the Board to provide; (a) financial assistance by way of loans and advances to the local authority in the State for assisting in:

(i) Water Supply and Drainage for Urban Areas, and

(ii) Other activities which are entrusted to the Board from time to time by the Government.

(b) The functions of the Board also include: at the instance of the Government or local authority:

(i) Investigating the nature and type of scheme that can be implemented.

(ii) Planning and preparation of schemes.

(iii) Executing such schemes under a phased programme for the provision of drinking water and effective excreta disposal.

(iv) Providing technical assistance.

(v) Establishing and maintaining schemes.

(vi) Any other matter which is supplemental, incidental or consequential to any of the above functions.

4 LOANS

The Board is empowered to:

(a) raise loans from any bank or other financing institutions like L.I.C. of India.

(b) raise loans from the Public by issue of bonds or debentures or stocks or otherwise in the form and manner approved by the Government.

(c) raise loans from any Corporations owned or controlled by the Central Government or State Government.

Loans taken by the Board shall be repaid by the Board within the period agreed by the Board by such of the following methods as may be approved by the Government namely:

(a) from a sinking fund established in respect of the loan.

(b) by paying in equal yearly or half yearly instalments of principal or of principal and interest, throughout the said period.

(c) from money borrowed for the purpose.

(d) partly from the sinking fund established in respect of the loan and partly from money borrowed for the purpose.

(e) from any other source within the prior permission of the Government.

5 PROJECT PLANNING

For execution of any urban water supply scheme, the basic parameters needed are (1) Abstraction, (2) Conveyance, (3) Treatment, (4) Distribution and (5) Maintenance. The first three play an important role and cover the technical aspects, the latter two have more of management aspects. Correct visualisation of these parameters during planning and design stages will have far reaching bearing on the overall management of the scheme.

For schemes of small communities, the sub-surface sources like different categories of wells viz., bore well, shallow well, an infiltration gallery may suffice as the quantities that can be drawn will have their limitations.

For major urban schemes, we have to mainly depend on surface sources, which may be a rivulet, a river either perennial or non-perennial. Even perennial source could have either an unlimited quantity or at times a minimum run-off, which could be marginally sufficient to satisfy the needs of the town. It could be non-perennial river with peak runoff bringing in major floods but no run off at the fag end of the fair season, needing creation of artificial impoundage at a convenient point along its course and so on. The main aspect involved is that of optimum utilisation with the above permutation and combinations of tapping of various categories of sources.

When abstracting water from any of these perennial sources in order to render the water fit for domestic purposes, treatment will become necessary. Also as per the prevention of water pollution act, the discharges into the surface waters needs to be treated to within the tolerance limits so as to prevent the surface waters from being polluted and thus unsuitable for abstraction downstream as a raw water source. It is in this very context that the Board is interested in tackling the water and sewage treatment as an integrated water supply and sanitation scheme from the overall concept, as the achievements in one area have a great significance in the financial management of the other.

For Urban Water Supply Systems, with multiple sources and with variable degrees of anticipated runoffs, the aspect of maximum utilisation with minimum expenditure automatically comes in. Though, these aspects are technical but are important from the point of management.

As the urban water supply and sewerage schemes are being designed for 30 years period, the schemes have to be for supplying water and disposal of excreta to the future anticipated population of 30 years.

In the Long Range Planning or projected planning for any scheme, there is always a gestation period and also a phase wise implementation. For example, a dam could be designed for its full capacity, but constructed in stages or transmission pipe lines could be designed for duplication or multiplication of lines to cope with the demand in stages.

In any project, resources generation is vital. The resources come from internal sources such as the difference of revenue over expenditure or internal borrowings from deposits etc. as also the external borrowings. These need to be adjusted for the capital cash out flows and also revenue cash outflows in operations. These are in turn dependent upon the cost of implementation and the organisational set up needed for effective management.

At times, in many projects which are taken up for execution, the capital cost involved will substantially over run the estimated cost, giving a set back in its progress because at the time of estimation of such projects the cognisance of adequate cost contingencies and physical contingencies have been not properly assessed.

Regarding conveyance and distribution of water, the concept of an effective water supply system is to make available clean potable water at the consumer end. It may be said that a continuous system of distribution of water is not likely even in big urban areas and intermittant system for variable durations may go on to continue for some more time to come. Leak detection and leak prevention has a significant role. A systematic programme of prevention of leakage will contribute to the resources of the civic authority.

Regarding urban sewerage, as the towns are supplied with adequate water supply, the waste-water disposal problem will follow, that is to provide new sewerage systems. In towns/cities, which are having the sewerage system but due to their development requires providing of additional lines or Remodelling of the system to cater to the new layouts etc. Also in Towns/Cities, the sewage has to be treated to the standards prescribed by the prevention of water pollution board before the effluents are discharged.

While the conception of a scheme, its investigation, design and construction would normally fall within the skills of Engineer, the organising of several projects for completion, within predetermined time targets falls within the skill commonly termed "Management".

A policy of deliberate development will generally be related to the factors of resource allocation, money and time. Such activity connected with a large programme, will require careful and detailed preparation in order to ensure consistency and that the component parts of the programme form a coordinated and coherent whole. Logically, the more extensive and complex the programme, the stronger the need to be able to recognise and define the inter-relationships of the various complementary activities in respect of time and resources and to arrange these activities so that the desired end result is achieved. The Management for organising of several projects for completion within the time schedule, requires effective programming which stems from a plan and has for its purposes:

a) an assessment of the resources which will have to be deployed to realise the plan.

b) an assessment of time and timing.

c) the coordination of activities and agencies as may be required.

An organisation in a developing country is faced with the challenge of deriving, simple, inexpensive methods of providing urban communities with their basic safe water requirements and excreta disposal systems.

The human mind cannot possibly keep simultaneously abreast of the various complexities and inter-relationships of the various activities of a large development project, unless it is assisted by a system or device by which the entire operation can be graphically or statistically expressed.

The projects should be given National importance to overcome many hurdles during its execution and it is better to go by systematic planning with preparation of proper CPM/PERT (Programme Evaluation and Review Technique) etc. duly updated as and when necessary.

A National or State Programme of water supply and sewerage will in the first instance involve:

(a) formulation of a Country or State wise programme (Macro plan).

(b) convincing Government of the economic development value of the proposal.

(c) evolving a plan for financing the programme over the phased period and securing Government acceptance.

(d) detailed planning of projects within the plan and ensuring that they have the most advantages cost/benefit ratio.

Water Supply planners must think and speak the language of economists and management experts if they are to influence resource allocation. This would include the ability to identify indirect benefits of a water supply programme and acceptance of the fact that certain facilities will be found to be necessary because they perform auxiliary functions to the primary objectives.

6 THE BOARD'S SCHEMES

The Board is executing the following categories of urban water supply and sewerage schemes.

(i) Piped Water Supply Schemes

The water supply schemes for towns having population less than 20,000 is termed as Piped Water Supply Schemes. The Government will grant in aid to an extent of 90% of the cost of the scheme and the balance 10% is provided by the Municipality.

(ii) a) Urban Water Supply

Water supply Schemes for Urban Areas having population more than 20,000 is taken up under the loan assistance of Government and L.I.C. of India. The Government will provide 1/3rd loan and remaining 2/3rd cost of the scheme is provided by the L.I.C. of India as loan to the concerned Municipalities.

b) Urban Sewerage Schemes

Sewerage schemes are undertaken under the loan assistance of Government and L.I.C. of India. The loan assistance being 1/3rd and 2/3rd.

(iii) Water Supply Schemes fully assisted by Government

Some of the water supply schemes are fully financed by Government which were maintained by Government prior to the formation of the Board.

(iv) Centrally Sponsored Schemes/Sewage/Sullage: Utilisation Schemes

These schemes are mainly intended to promote an intensive agricultural system with the use of treated sewage/sullage of U.G.D. schemes. The Central Government will provide 33% of the estimated cost as grant-in-aid and balance 67% met by local authority.

(v) Central Sector Scheme

This scheme is for conversion of Dry latrines into water seal/ sanitary latrines. The Central Government gives 100% grant for providing sewerage system and treatment units. The local body has to meet the conversion of dry latrines into sanitary latrines.

In addition to the above category of schemes, the Board is handling augmentation schemes as follows:

(a) In a city or town, there may be rise in the number of consumers due to the population growth.

(b) Increased demand on account of Industrial, Commercial and urban political activities, and

(c) Due to improvement in the standard of living etc.

The Board is also investigating prestigeous schemes for Industrial complexes like Vijayanagar Steel Plant etc.

Also development of Sewerage system as spent water flow increases due to increased supply of water to cope up with the Development of towns/ cities as per the programme of City/Town Planning Boards.

7 PREPARATION & EXECUTION OF SCHEMES OF LOCAL BODIES BY THE BOARD

The Board takes up investigation and preparation of schemes at the instance of either a local authority or by Government. The cost of investigation and preparation of schemes are to be met by the local authority.

The Board after investigation of the schemes, prepares an estimate regarding the cost likely to be incurred on the schemes and refer to the local authority for concurrence and to intimate the source of meeting the cost of the schemes by it.

If the local authority decides to get the scheme implemented, it shall pass a resolution authorising the Board to execute the scheme specifying clearly that the local authority shall meet the cost of execution and its maintenance and the manner of meeting the cost of the scheme by the local authority.

On receipt of such a resolution from a local authority on a particular scheme, the Board examines the scheme in full both in its feasibility of implementation and in particular the financial capacity of the local authority concerned, if satisfied, the Board forwards the draft scheme to the Government for its approval. The Government after examining the scheme in all respects, if satisfied, approved the schemes by a notification in the Official Gazette.

After the notification of approval by the Government in the Gazette, the Board shall execute the approved scheme in the areas of the local authority or authorities concerned.

After the scheme is completed, the schemes will be generally handed over for operation and maintenance to the local authority.

8 ACHIEVEMENTS OF THE BOARD

Out of 242 towns and cities, 181 towns have population less than 20,000 and 61 towns have more than 20,000 population as per 1971 census.

Out of 242 towns/cities, protected water supply have been provided to 212 towns covering a population of 5.22 million. For 19 towns, the work of providing water supply is in progress which will benefit a population of 0.23 million. Protected water supplies to eleven towns are to be provided.

Augmentation of water supply works to 61 towns are in progress.

12 towns have been provided with sewerage system for a population of 1.31 million as per 1971 census. 18 sewerage schemes are in progress covering a population of 0.93 million.

In addition to the above categories of schemes, 23 centrally sponsored schemes i.e. sewage/sullage utilisation schemes have been taken up.

The Board has also executed water supply schemes for providing water supply to Industries in Industrial towns.

The Board is also maintaining 11 major water supply works.

9 AIMS OF THE BOARD

Master Plans of Water Supply and Sewerage for individual urban Towns/ Cities are under preparation.

It has been estimated by the Board that to provide the entire urban population in Karnataka with water supply and sewerage facilities will cost roughly Rs.1012.00 and Rs.323.00 million respectively. The Board aims to provide all Towns/Cities in Karnataka with adequate water supply and sewerage facilities to better the Environmental conditions in the International Water Supply and Sanitation Decade which commences in 1981.

To achieve the above goal, the Board, in addition to obtaining part of finance from the State Government, L.I.C. and floating debentures, will require a large amount of extra finance possibly as foreign aid.

The Board for its Financial Management of water supply and sewerage has the following:

(i) raising adequate funds for capital investment at low rate of interest, and

(ii) fixing appropriate water rates so as to earn sufficient revenue for the undertaking for self management.

The Board has a Financial Wing for dealing all matters of Finance, like accounts in connection with income and expenditure for a sound understanding of Financial policy and for transactions of the undertaking regarding capital and revenue.

The Board is raising funds, from Government, L.I.C. and from local a authorities concerned, as per the ratio of share of the amount for different categories of schemes of the Board. Also it will be floating debentures for obtaining funds for several schemes. These external borrowings are governed by terms of repayment with interest thereon.

In the five year plans, there will be allocation of funds for this sector but these are subjected to change and review every year. As urban projects are financed entirely on a loan basis, the capacity of local authorities for servicing the loan and the contributions from their own resources become the most important factors in taking any decision in such matters. Thus in practice it has been found difficult to decide on a long term goal for development of the sector in the urban areas.

The Board is making its best of efforts on sound understanding of the elements of financial policy to raise capital from local bodies, from the Government and from external borrowings.

Due to financial constraints for the programming of urban schemes, the Board is endeavouring to obtain funds as external borrowings from World Bank specifically from the I.D.A. loan assistance.

The Board is maintaining 11 water supply works and have also fixed water rates to 7 major water supply works in the State on the basis of 'No Profit No Loss Basis' for efficient operation and maintenance of the systems.

The remaining works in the State are maintained by the respective local authorities. The Board is now finding that in an urban scheme, the enthusiasm envinced at the time of its launching have faded and disappeared during the operation stage and the operation and maintenance of the plants are not good.

The Board is considering taking over the operation and management of all the water works in the State in a phased programme after ascertaining the self sufficiency of the systems regarding the servicing of the operative cost by the communities in the way of water rates and water taxes.

The Board is finding difficulty in enforcing revised water rates on the consumers.

Though in foreign countries, particularly in advanced western ones, water supply is often arranged by commercial firms as a business enterprise yielding profits, in our country, such a commercial proposition is not looked upon with favour.

Throughout the long past in the country, water has been looked upon as a free gift of nature. Even the princely States were supplying water free of cost and they never gave a thought to charge for water. Later Municipalities and Corporations started supplying water on 'No Profit No Loss' basis. It has now come to a stage where water supply undertakings will not be treated merely as service organisation to the community but as an undertaking based on a sound financing policy and a self supporting one.

The Board is interested in installing a meter on all connections in Cities/Towns where there is more than 1 lakh population. This may bring in revenue for supporting the operation and maintenance of several water works to the standard level of acceptance.

The Board is endeavouring to arouse public conscience that every drop of water that is being supplied at the consumer end has cost money and it is a burden on the water supply undertaking, unless the same is reimbursed by the community in terms of 'Water Rates Fixed' to run the establishment on 'No Profit No Loss' basis.

In this connection, the Board is requesting the Government, to give suitable direction to local authorities concerned for implementation and enforcing the revised water rates as and when fixed by the Board and to be given effect to.

Also the Board is requesting the general public to be more responsive and to arouse public conscience for the payment of water rates considering water as a commodity as any other ones in the interest of self supporting maintenance of water works for better environmental protection to the community.

In summary, I stress the following:

(1) For implementation of urban schemes to improve service goals for communities as contemplated under the programme of water supply and sanitation Decade, the Board should be given more autonomous powers so that the scheme from investigation upto the approval and implementation is to be vested with the Board. This requires some modification in the present Act of the Board.

(2) All the water supply and sewerage system in the State are to be maintained by the Board for efficient management of the system and the Board to fix and levy water rates on the basis of 'No Profit No Loss' to raise revenue for maintenance of such works on a self supporting basis.

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GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

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11-14 JUNE 1979

Working Paper No. 4

WORKING OF THE KERALA STATE PUBLIC HEALTH ENGINEERING DEPARTMENT

by

N.S. Bhairavan*

1 KERALA AT A GLANCE

Kerala the land of palm trees, evergreen vegetation and scenic splendour is bounded on the west by the Arabian sea and on the east by the mighty Western Ghats. In between lies the narrow strip of lush green lands extending for about 580 kms. from north to south, interspersed with lakes and crisscrossed by inland water ways. The width ranges from 35 to 120 kms. with an average of 65 kms. The topographical and physical features vary distinctly and markedly from east to west within this small width. From the Western Ghats rising to an elevation of 2500 metres, the land slopes down steeply to the Arabian sea on the west. Evergreen forests of the Western Ghats; extensive paddy fields in the mid-land region; clean, sandy, sunny and palm fringed beaches all along the long coastline; picturesque backwaters and lakes; criss-crossing palm lined inland waterways are all the pride of this tiny State of the south and make it a paradise for the tourists of all interests and tastes. The State can boast of a rich and varied flora and fauna.

The most important resource of the State is its highly intelligent and industrious manpower of 21.3 millions as per 1971 census. In density of population, Kerala ranks foremost among the various States in the country with a figure of 549/sq.km. which is more than three times the average for the country as a whole.

Kerala is blessed by both the south-west and north-east monsoons and receives an annual average rainfall of about 3085 mm. The State, approximately 39000 sq. km. in extent, is enlivened by the gush of 44 major rivers. Nevertheless, paradoxically, most areas of the State experience acute scarcity of potable water during the summer months. This happens because the rainfall is not evenly distributed round the year but restricted to the monsoon periods. When the two monsoons are active i.e. June to August and September to November the rivers are in spate. In the period from December to June the rainfall is scanty and at the height of summer almost all rivers and other surface water sources get dried up. Added to this, in the coastal belt, saline intrusion adversely affects the rivers in this reach and renders them unfit, as source of drinking water. With the depressing of the water table, the ground water also turns brackish in this belt during the summer months. The result is Kerala experiences scarcity amidst plenty of water and the saying "water water everywhere but not a drop to drink!" becomes literally true. Under such conditions the provision of unfailing supply of water to all of its people poses a great challenge to the authorities.

2 HISTORY OF FORMATION OF THE PUBLIC HEALTH ENGINEERING DEPARTMENT

Kerala can take pride that it is one of the first few States that took a lead to form an independent department exclusively for implementing

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and managing water supply and sewerage schemes in pursuance of the advice given by the Central Government when the National Water Supply and Sanitation Programme was launched in 1954. Realising the importance and far reaching benefits that can result from this programme, a separate and independent department was formed on 1 April 1956. Then Kerala was the second State in the country to form an independent Public Health Engineering Department, closely following West Bengal. In little over two decades, the department has grown into a full fledged and major department of the Government manned by a competent and highly trained team of Public Health Engineers.

3 ORGANISATIONAL STRUCTURE OF THE DEPARTMENT

The Department is headed by the Chief Engineer who has to provide all the necessary leadership and higher direction for the efficient functioning of the Department. He also functions as the Ex-officio Additional Secretary to Government in the Ministry of Local Administration and Social Welfare, under which the department comes. He is assisted in office in technical matters by two Deputy Chief Engineers of the rank of Superintending Engineer, six Executive Engineers and other subordinate staff. The administrative and financial wing functioning under the Chief Engineer provide necessary assistance in these areas.

The State is divided into four regions under the charge of a Superintending Engineer, each having jurisdiction over a few Districts. Each of the eleven revenue districts in the State are put under the charge of an Executive Engineer who is responsible for all the works relating to the functioning of the Department coming within his jurisdiction. He has to attend to the execution of the water supply and sewerage schemes and also to the maintenance of the schemes under the management of the Department. In certain Districts where the work load is heavy additional Divisions are also working. But the Division of work is basically on territorial basis i.e. all the works of the Department coming within a particular area are put under the charge of a single officer having jurisdiction over the territory.

There is also a Project Circle under the charge of a Superintending Engineer assisted by two Executive Engineers to exclusively attend to the construction of a major storage reservoir for stabilising water supply to Trivandrum City.

The Special Investigation Circle consisting of a Superintending Engineer and three Executive Engineers and other subordinate staff attends to the investigation of the various schemes. Bulk purchases of materials like pipes are arranged by Chief Engineer's Office. The Central Stores for the Department located at Cochin, is under the charge of an Executive Engineer.

An organisation chart is appended (vide Appendix 1).

4 THE PRESENT STATUS OF WATER SUPPLY AND SEWERAGE SCHEMES

At the beginning of the First Five Year Plan in 1951 only four Municipalities viz. Trivandrum, Alleppey, Cochin and Calicut Towns had any protected water

supply system. Even after the constitution of the Public Health Engineering Department in 1956, the implementation of the water supply schemes did not gain the desired impetus because of the low priority assigned for this sector. The National Water Supply and Sanitation Committee in 1961 ranked Kerala as 13th among the 15 States in respect of urban water supply. According to the report of the Committee only 24% of the urban population of Kerala enjoyed adequate water supply then. With the L.I.C. loan assistance becoming available there was a spurt in the tempo of implementation of the water supply schemes from 1970 onwards. Details vide appendices 2,3,4 & 5.

An ambitious programme for providing water supply schemes in all the existing Municipal Towns was drawn up and 25 major schemes were taken up simultaneously for execution and these schemes have been completed and commissioned now as scheduled. Except for the 12 new Municipalities which were recently formed, all the other 29 Municipalities in the State have already been provided with water supply which is benefiting a population of 22.37 lakhs and water supply schemes in 4 more Municipalities are nearing completion. The financial outlay on the Urban Water Supply Schemes during all the Five Year Plans has been Rs.6275 lakhs. We are now in the process of introducing water supply in the 12 Municipalities that have been recently formed, which will ensure total coverage of Municipal Towns.

5 RURAL WATERS SUPPLY SCHEMES

In Kerala there are 1242 Villages in 988 Panchayats. Unlike in the other parts of the country, the pattern of development is rather continuous and it is rather difficult to delineate between the urban and rural areas since one merges with the other. The development is more or less uniform and there is not much difference in the standard of living between the urban and rural areas. Under such a situation, the department has been providing piped water supply schemes in rural areas also, although comparatively, a lower per capita supply is only provided for in the design of the rural water supply schemes. Comprehensive Water Supply Scheme covering a group of villages have also been executed and this has been found to be economical especially when there is difficulty for locating dependable sources and when the villages are clustered together. Since the urban areas, merge into the rural areas, extension of the urban water supply scheme to rural areas have also been practised. Even the people in the rural areas are quite conscious and educated about the benefits of protected water supply and they take to the schemes quite readily. There is absolutely no need for any health education to persuade the people to make good use of these schemes and derive the full benefits therefrom. On the contrary, it is their demand which often assumes the form of agitation for implementing protected water supply schemes in their areas. The department is however unable to meet the ever-increasing demands of the people due to the limited financial resources that are made available for the rural water supply schemes. For a few years we received L.I.C. loan assistance for rural water supply schemes as well, but from 1976 onwards, the L.I.C. has been taking the stand that they can offer loan assistance for rural water supply schemes only if an autonomous Board is formed for the execution and management of the schemes. With the accent now on rural development, the rural water

supply programme has gained a new momentum, with additional resources made available by the Government of India, under the Accelerated Rural Water Supply Programme from 1977 onwards. Today 663 Rural Water Supply Schemes are in operation which serves a population of 34.15 lakhs with drinking water. 80% of the rural population is yet to be covered by any rural water supply scheme. The total expenditure on rural water supply schemes so far has been Rs.2286.36 lakhs.

6 SEWERAGE

Very little headway has been made in the implementation of Sewerage Schemes. Only a beginning has been made in this field and Trivandrum is the only City where a sewerage scheme is in operation. Large areas even within this town are yet to be covered with this facility.

A project is now under implementation for extending the sewerage scheme to more areas in Trivandrum. In Cochin also a sewerage scheme is under implementation and the sewers laid in a small area has been pressed into service recently. A Sewerage Scheme to the Pilgrim Town of Guruvayur is also being completed and will be ready for commissioning soon. Sewerage schemes to Calicut and Quilon Towns have been taken up this year with L.I.C. assistance.

Here again it has been the paucity of resources that has been holding up the implementation of sewerage schemes. It is only from this year onwards that the L.I.C. has come forward to extend their assistance for sewerage schemes as well.

7 PATTERN OF FINANCING

According to the present pattern of financing the cost of water supply and sewerage schemes in Urban areas are to be shared equally by the State Government and the local body concerned. Initially the entire funds are made available by the Government and the local body's share of fifty percent is treated as loan to be repaid by the local body in twenty annual instalments. The loans from L.I.C. are received by the local bodies who remit the same to Government for executing these schemes. The present arrangement is that the schemes after completion will be operated and managed by the Government until the L.I.C. loan is repaid completely, since the Government guarantees the loan. The local bodies are required to reimburse to Government the annual maintenance charges actually incurred. The water charges collected by the department will be adjusted towards the dues from the local bodies. Most of the local bodies are in default of payment in this respect and the arrears are mounting. In the case of rural water supply schemes, the Panchayats are required to meet only 25% of the capital cost of the water supply scheme and this can be remitted in 25 annual instalments. The Panchayat is also required to reimburse to Government the actual maintenance charges. But to meet any excess over 12-1/2% of the annual income of the Panchayat towards this liability Government grants are sanctioned.

It has been our experience that wherever the water supply schemes have been entrusted with the Municipalities for management, they have not been

able to discharge this responsibility efficiently, economically and to the satisfaction of the people. Because of the large number of public hydrants that are usually provided by them, the economics of the scheme is adversely affected. They also resort to indiscriminate extensions without examination of the hydraulics or technical feasibility and this has resulted in loud complaints from the dissatisfied consumers. The repairs including leakages are not promptly attended to and this seriously affects the working of the schemes. All the advantages and economy inherent in a single agency like the department managing all the water supply schemes in the State, are also lost.

8 TASK AHEAD

We are on the eve of the International drinking water supply and sanitation decade. The task ahead for achieving the target of providing drinking water and sanitation to all the community is indeed stupendous. It has been roughly assessed that for achieving this target, an outlay of the order of Rs.500 crores will be required during the decade which calls for more than four times the present rate of investment. The resources of the Government alone will not be enough for this rate of investment and this will have to be supplemented with resources that could be raised from financing institutions like L.I.C., I.B.R.D., etc., who have to assist in a big way in financing of these schemes.

9 FORMATION OF THE BOARD

Most of the financing institutions insist on the formation of an autonomous Board vested with functions of planning, investigation, execution and management of water supply and sewerage schemes as a pre-requisite for extending loan assistance. Only an autonomous Board will be in a position to execute and manage these schemes on commercial lines by implementing appropriate water rates in order to make the schemes economically self-supporting.

Water supply and sewerage schemes, after completion should be operated and managed by the Board to ensure that it is done efficiently, economically and on a scientific basis. Such arrangement will also provide the staff to gain experience in all areas of water engineering and management and they will be better equipped to discharge their responsibilities. The Board should not merely be an agency for execution of the schemes. The Board should have a technical management for better appreciation of the problems and for ensuring a scientific and public health approach.

Availability of adequate finances alone cannot ensure the execution of the schemes as per schedule. The desired tempo of progress cannot be reached and maintained unless the materials like pipes are also made available to meet the full requirements. Even now, there is a shortage of all kinds of pipes and we are experiencing great difficulties in procuring these materials in time to ensure the desired progress. The accent has to be on maximising internal production, and creating additional capacity for the manufacture of the various kinds of pipes so as to raise indigenous

production to the level of the possible requirements. However, the immediate shortages will have to be met by imports, but the costs may be higher, and the solution lies in creating sufficient capacities internally to meet our requirements fully. The solution of this problem will not brook any delay, if the scarcity of materials is not to be allowed to hold up the utilisation of the increased finances that may become available.

Another field where attention is to be paid simultaneously will be the creation of sufficient facility for the training of the officers. There will be a sudden spurt in the demand for trained man-power for executing the water supply schemes at this tremendous pace and to eliminate dearth of trained people, available training facilities should be increased adequately. Research facilities will also have to be developed on a national basis to promote economies in the execution of the schemes by adoption of suitable techniques, new concepts. New construction materials will also have to be invented. These are but some of the problems that I can foresee in the implementation of a gigantic programme for provision of water supply and sanitation.

10 PLANS FOR THE FORMATION OF A BOARD

The Kerala Government is seriously considering the formation of a Water Supply and Sewerage Authority in order to facilitate raising of additional resources for the implementation of water supply and sewerage schemes. A composite Board for both Urban and Rural Water Supply and Sewerage Schemes is being contemplated. A composite Board has been thought of for the reason that the rural water supply scheme and urban sewerage schemes will not be financially viable and the deficit on this account has to be made good by the profits made from the urban water supply schemes. In this connection, the following alternative types of Boards have been considered.

(1) A purely financing Board with the limited purpose of raising loan from the financing institutions, giving loans to the local bodies for the execution of the schemes and recovering the loans in instalments and repaying the loans back to the financial institutions. Since such an arrangement will not ensure the management of the water supply and sewerage schemes on commercial lines so as to render them economically self supporting, this type did not find favour with the financing institutions.

(2) Creation of a small autonomous Board which will entrust the execution and maintenance of water supply schemes to the agency of the Public Health Engineering Department, the idea being that the employees of the P.H.E.D. will continue to be Government Servants which will bind them to the Government Servants' Conduct Rules. This would mean dual control over the schemes which will not be conducive either to the efficient implementation of the schemes or efficient maintenance. For this reason this type of Board was also not acceptable to the financing institutions.

(3) Converting P.H.E. Department into a local authority invested with powers given to the local bodies and the following functions:

(i) Selection of water supply and sewerage schemes.

(ii) Raising necessary resources and keeping of accounts, thereof.

(iii) Execution of works.

(iv) Maintenance of the completed water supply and sewerage schemes, collection of water charges and water taxes and repayment of loans.

The authority will be controlled by a Board consisting of official and non-official members, majority being Government nominees. The authority will have its own funds with full freedom of operating these funds. The accounts are to be maintained on commercial lines. The Board will have also powers of fixing appropriate water rates and collecting the water charges and water tax. Such a Board even working under Government control, will have full freedom of operation so that it will be financially viable and need not depend upon Government budgetary grants either for the maintenance of the schemes or for the repayment of the loans.

Apprehensions strongly voiced against the formation of a fully autonomous Board on the pattern of the Electricity Board, preferred by the financing agencies are:

(1) The wage bill will shoot up with the liability for payment of bonus, overtime and other benefits that the employees will become entitled to.

(2) The employees will have freedom to form themselves into trade unions and this may seriously affect the discipline.

(3) In the event of any labour trouble, it can spread easily to all parts of the State which can result in State wide disruption of water supply.

(4) Water supply being an important obligatory function of the local bodies it will not be proper to strip them of this function.

(5) The financial viability is also questionable, since there may be strong opposition from the public for any increase in the water rates.

In order to overcome these problems and difficulties, a via-media solution proposed is the establishment of an autonomous Board similar to the Tamilnadu Water Supply and Drainage Board and invested with the responsibility of investigating and preparing schemes for water supply and drainage schemes and executing such schemes on behalf of the local authority concerned and handing over such schemes to the local authorities for management. The Board will also be empowered to borrow funds from outside and recover the cost of the schemes from the concerned local bodies. There will be provision for the Government to give directions to the Board to take up schemes and to guarantee the loans to be taken by the Board for executing the schemes.

This proposal suffers from following serious disadvantages:

(i) The Board to be formed should meet the requirements of both domestic and international financing agencies to obviate the necessity for constitution of a separate Board when we have to seek loan from international agencies. A Board which is not vested with the functions of both the execution and management of the schemes is not likely to be preferred by the international financing agencies.

(ii) In Kerala quite a number of even urban schemes are comprehensive and integrated ones, which serve more than one local body and also the way side and peripheral Panchayats. The Headworks, Transmission mains, Treatment Plants etc. are common in the case of such schemes and the maintenance of these common units cannot be entrusted to any single local body.

(iii) At present most of the local bodies are defaulters in reimbursing the maintenance charges and the arrears are huge. If the schemes are handed over to the local bodies, they will be further collecting water charges also and there is no guarantee that they will pay regularly and promptly the interest charges and annual instalments towards loan repayment. They will also be reluctant to enhance the water charges to make these schemes economically self supporting.

(iv) Having two separate agencies for the maintenance of the headworks and for the distribution system will not be conducive to efficiency and economy. Further rural water supply schemes which are now under the maintenance of the department have to be taken over by the Board, since the Panchayats do not have any infrastructure for carrying out this function. The most economical and efficient arrangement, which is acceptable to the financing institutions as well, will be to entrust with one agency viz. fully autonomous Board, the responsibility for planning, execution, maintenance and management of the water supply and sewerage schemes in the State. Of course in the formation of such a Board all possible safeguards against the pitfalls and apprehensions discussed earlier are to be integrated.

11 CONCLUSION

The objective of providing drinking water and sanitation to the entire population within a reasonable time can be achieved only if bold and imaginative steps are taken without further loss of time which will enable adequate financial resources to be raised for financing the schemes. Certain calculated risks will have to be taken and if we fight shy of venturing for the same we may miss the bus. The people will not patiently wait indefinitely for these basic amenities. If we fail to provide adequate water supply and sanitation we are sure to run into difficult situations inhibiting growth all round. Let not such a sitution develop. We have to plunge into action on a war-footing to achieve the task ahead within the shortest possible time.

I am sure that the seminar will be able to evolve a suitable strategy and plan of action as a result of these deliberations.

Appendix 4

STATEMENT OF LOAN RECEIVED YEAR-WISE FROM L.I.C.

(Amount in lakhs of rupees)

Nature of Schemes	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79
Urban Water Supply Schemes	253.40	407.98	394.20	476.60	390.00	189.00	71.00	38.00	132.70
Urban Sewerage Schemes	-	-	-	-	10.00	-	13.00	16.00	114.00
Rural Water Supply Schemes	50.00	-	70.00	-	50.00	51.00	-	-	-

Appendix 5

PROGRESS ACHIEVED IN IMPLEMENTATION OF WATER SUPPLY SCHEMES

Period	Physical Achievements			Rural schemes completed during the period	Total at the end of period.	Population in lakhs.	Financial Achievements		
	Urban schemes completed during the period.	Total at the end of the period.	Cumulative population benefitted during the period(*)				Expenditure during period. Urban W.S.S & Sewerage (Amount	Rural WSS in lakhs of rupees)	Progressive total expenditure
Prior to 1st Five Year Plan	4	4	3.28	)					
During 1st Five Year Plan 1951-56	-	-	-	12	) Details not available				
During 2nd Five Year Plan 1956-61	-	-	-	48	60	1.36	444.85	31.32	476.17
During 3rd Five Year Plan 1961-66	4	8	6.23	139	199	8.21	444.47	67.22	987.86
During Annual Plans 1966-69	-	-	-	71	270	9.30	259.46	82.97	1330.19
During 4th Five Year Plan 1969-74	6	14	10.79	155	425	22.85	2327.00	410.05	4067.24
During 5th Five Year Plan 1974-78	14	28	17.00	219	644	32.54	2353.42	1125.80	7602.04
During the 1st year of 6th Plan 78-79	1	29	17.29	19	663	34.15	562.13	569.00	8733.13

* Population served by sewerage system 2.2 lakhs.

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Working Paper No. 5

NOTES ON TARIFFS

by

R. Franklin*

1 TARIFFS

In order that autonomous Water and Sewerage Boards can meet their statutory obligations and the requirements of international financing bodies they must be able to generate adequate revenue. The revenue will be in payment for the services provided and may be collected by the Board or their authorised agents. The methods of making the charges at present vary throughout the country but almost every State is not charging enough, so that subsidies and grants become essential for the survival of the services. Therefore if the Boards are to be truly autonomous revision of the tariffs or charges for water supply and sewerage will be necessary. When an examination is made of the tariff structure it is necessary to make projections for several years ahead of the costs and revenue required to meet them. This is particularly the case when large capital expenditures and increases in works capacity are anticipated. By making a projection of say ten years it is possible to develop a tariff structure which acknowledges potential deficits in years of high capital expenditure to be offset by surpluses in subsequent years when sales increase.

2 CHARGING

Methods of charging will affect the type of tariff structure developed; for example where it is possible to fix water meters water charges can be based on the unit cost of water. The sewerage charge could also be based on the quantity of water consumed.

In some places it is not practical to fix meters to a large proportion of the services each of which may serve several households. Therefore alternative methods of charging may be used which could be based on the property rateable value, the number of water using appliances, the number of rooms or area of rooms or simply a flat rate for each size of service pipe. Each undertaking would decide which system of charging is suitable or there could even be two systems operating in cases where part could be metered and part could not.

3 SUGGESTIONS FOR TARIFF STUDIES

The categories of consumers should be decided and consumption patterns analysed for the different categories. The categories may be domestic and non-domestic or further subdivided into metered, unmetered and again by average consumption where a large proportion of consumers are metered. The extent of the consumption analysis will affect the simplicity of the final tariff structure. Simplicity should be one of the objectives consistent with other objectives which the Board may

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legally incorporate. The consumption patterns for the future are projected from the historical data in order to predict the volume of sales to different categories of consumers in the years to come. Such predictions would of course be within the capacity of the works existing or to be built.

The costs are then calculated for the years corresponding to those for which sales have been predicted. The costs should include for operation and maintenance, debt servicing and depreciation of the works. Both the sales and costs are then discounted at a rate which should represent the opportunity cost of capital. The selection of the appropriate rate is difficult but the lending institutions or the National Planning Commission should be able to give some assistance. The total of the discounted costs divided by the total of the discounted quantities gives the average incremental cost of the service. This can then be used as a basis in finalising the tariff structure. It is at this point that the complications may begin if the categories of consumers are too numerous and diverse. The word consumers is used for both recepients of water supplies and contributors to sewerage systems as the same basic procedure can be applied in both cases.

The amount and timing of increases in the tariff structure require careful assessment as consumers will resent increases if there is no observable improvement in the service. There may also be objections from categories of consumers who have previously received free supplies, such as the municipalities where there has been extensive use of public supply points. The municipality should pay for each public supply point which they require and whether this payment is on the basis of quantity supplied or not there should be meters on these points wherever possible. Such meters would provide useful data to the water undertaking as to the adequacy of their estimates of such 'free' supplies and the costs.

4 BILLING AND COLLECTION

Finally in preparing a new tariff structure the capabilities of the staff who will be responsible for the billing should be borne in mind. If the system is too complex for them to handle, arrears will soon build up and once such a situation develops it is difficult to correct without undue loss of morale.

The collection of tariffs can be examined under two headings. Firstly collection will be impossible if the charges are beyond the consumers' ability to pay. Secondly the collection points should be located so that consumers can reasonably reach them to make payments. In widely scattered areas special arrangements may be necessary to permit collections promptly.

The costs of billing and collecting would be included in the recoverable costs used to determine the tariff structure. It is convenient to calculate new tariff structures in conjunction with the economic and financial appraisals required when large capital investments are contemplated but tariff reappraisal need not wait until large capital investments are necessary.

Working Paper No. 6

GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

BANGALORE, INDIA

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Working Paper No. 6

ORGANISATION AND FINANCING OF THE WATER AND SEWERAGE BOARDS

CASE STUDY OF THE

PUNJAB WATER SUPPLY AND SEWERAGE BOARD

by

M.S. SANDHU*

1 INTRODUCTION

Provision of safe water supply and improvement in sanitation are basic requirements for improving the health status of the people. This has to be ensured within a given time frame if any marked improvement in quality of life is to be achieved.

In this field numerous obstacles have to be overcome. The foremost obstacle, perhaps, is the lack of funds. Another factor that is complicating this programming is the excessive growth of population coupled with unplanned urban migration and lack of adequate and effective urban planning. The paucity of trained personnel at all levels - local, municipal and State Government - is also a cause of inefficiency and delays in the development of these services. Another major reason for inadequacies in these systems is the age-old wide-spread belief of the people that water should be free or, at the most, very cheap. This obviously creates great resistance to development of financially viable tariff structures, etc.

In our prevalent system there is no possibility of any private sector support for such services because provision of water supply and sewerage services is a municipal function. Inadequacy of municipal resources is very well known factor. These works, therefore, have been remaining dependent on Government funds and even such government input has also been inadequate. To accelerate this essential programme, funds in the shape of loans have, therefore, to be sought from different financial institutions - national as well as international. Our greatest problem for using these sources of finance is the lack of institutions, policies and procedures for obtaining, administering and re-paying loans so far as water supply and sanitary sector is concerned.

Therefore, considerable effort needs to be applied to the development of sound institutions, policies and procedures for financing, planning, executing and maintaining such municipal services. Water supplies in developed countries are supported by a large infrastructure which provides supplementary services, e.g., establishment and monitoring of quality standards, technical advice and to some extent even supervision. These sources of support are missing in our country as is the position in most

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other developing countries. We should not try to create and duplicate such infrastructural agencies, but instead find a way to efficiently and economically provide these services. In very large municipal systems it may be feasible to provide most of these services within the municipal organisations themselves. Such medium and smaller systems cannot, however, afford to employ, within their own organisations, the skills and the resources required. Therefore, developing national level and State level bodies for such services is absolutely essential. The Water Supply and Sewerage Boards coming up in various States is an effort towards achieving this objective.

2 EXTENT OF PROBLEM IN PUNJAB

Out of a total of 109 towns and cities in Punjab, only 70 have intermitent piped water supply serving part of the population and 53 towns have similar partial sewerage systems. The percentage of population having access to water supply and sewerage is 60% and 19% respectively. The total urban population of Punjab is 4.05 million which is approximately 35% of the total population of the State. To cover the remaining population with these services the likely investment in this sector during the years 1979-90 is of the order of Rs.2250 million.

3 ORGANISATIONAL SET-UP BEFORE FORMATION OF THE PWSS BOARD

Prior to the year 1976 the implementation of the water supply programme for urban and rural areas and the sewerage programme for urban areas was being looked after by the State P.W.D. Public Health Branch on behalf of the Local Bodies. So far as the rural water supply was concerned, the same is practically being treated till now as Government-sponsored work and funds for the same are flowing from the budgetory provisions made in the Central and State Government budgets. Funds for urban water supply and sewerage works were coming mainly from the resources of the local bodies themselves, and to some extent, from the loans/grants from the State Government. Even though the state of partially provided services in the municipal areas was unsatisfactory on account of lack of proper maintenance by the local bodies, the supplies were intermitent and interrupted and efficient operation rarely existed, there was no strong public pressure towards accelerating work on these Projects because of various social factors. The annual investments in this sector ranged only in the neighbourhood of Rs.25 to 35 millions.

The State Government was quite conscious that this sector needed a faster rate of development and in view of limitations of financial resources at the municipal and State level, it was keen to attract institutional finance. Before such institutional finance could be attracted towards this sector, an organisational set-up had to be created which could develop and evolve sound technical, financial and managerial organisation and procedures. It was for this purpose that the State Government moved in the direction of creating an autonomous Water Supply and Sewerage Board.

4 SETTING UP OF WATER SUPPLY AND SEWERAGE BOARD

After a lot of preliminary drafting and legislative work the Punjab Water Supply and Sewerage Board was constituted on 15 September 1976 under the Punjab Water Supply and Sewerage Board Act, 1976 (Punjab Act No. 28 of 1976). The Board was created for the express purpose of regulation and development of drinking water, supply and sewerage in the State of Punjab. Later on this Act was amended to some extent by the Punjab Water Supply and Sewerage Board (Amendment) Act, 1978 (Punjab Act No. 31 of 1978).

The functions of the Board as defined in the Act are given in Appendix 1. Before the Bill was passed by the State Legislature in 1976, the P.W.D. Public Health Branch was aware of the imminance of creation of the Board. Necessary reorganisation, therefore, was planned in their set-up. The P.W.D. Public Health Branch was vertically split functionally into three units and each of these units headed by a Chief Engineer was looking after particular type of works. One of the units was looking after urban water supply and sewerage works; the second unit was dealing with rural water supply works, and the third one was taking care of water supply, sewerage, sanitary installations, etc., in Government buildings and Government campuses including hospitals, schools, colleges, Government developed urban estates, etc. All these three units were functioning smoothly and satisfactorily before the setting up of the Board and the Unit dealing with the urban water supply and sewerage was transferred enblock to the Board w.e.f 1 January 1977 finally both administratively and financially. All the works in progress with this Unit, however, stood transferred to the Board for administrative purposes w.e.f. 15 September 1976. This set-up at that stage consisted of one Chief Engineer (who was designated and appointed as Managing Director of the Board), two field Circles each under the charge of a Superintending Engineer, eight field Divisions each controlled by an Executive Engineer.

To ensure smooth transition and facilitating the efficient working of the Board in its infancy, all the office buildings, stores, vehicles, furniture and other items such as T & P, etc., that were being used by this Unit of the Public Health Branch stood transferred to the Board along with the Organisational set up.

All the staff of the P.W.D. Public Health Branch so placed at the disposal of the Board was considered to be on deputation to the Board (without, however, any deputation allowance). The Act provides for permanent transfer of staff to the Board from the P.W.D. Public Health Branch in the due course and a procedure for the same is prescribed in the Act itself.

5 CONSTITUTION OF PWSS BOARD

As per provisions of the Act the Board consists of whole-time Directors and Ex-officio Directors as under:

(a) Whole-time Directors

(i) Chairman; and
(ii) Managing Director

(b) Ex-officio Directors

(i) Secretary to Government Punjab
Local Government Department
(Vice-Chairman)

(ii) Secretary to Government Punjab
Public Works Department

(iii) Secretary to Government Punjab
Finance Department

(iv) Secretary to Government Punjab
Health Department

(v) Director, Local Government, Punjab, and

(vi) Chief Engineer, Punjab
P.W.D. Public Health Branch

In addition, the Board may co-opt not more than 5 persons having prescribed experience as Associate Directors, provided that one of the Associate Directors shall be co-opted from amongst members of the Scheduled Castes and one amongst women.

Before amendment of the Act in 1978, provision also existed for a whole-time Technical Member and this provision was deleted through Punjab Act No. 31 of 1978.

From the date of the formation of the Board, i.e., 15 September 1976 the Managing Director and the Ex-officio Directors started functioning as Directors of the Board and the Secretary, Local Government, Punjab continued to exercise the powers of Chairman in the absence of appointment of a whole-time Chairman till 15 September 1977 when the whole-time Chairman was appointed.

Any person may be appointed as Chairman by the Government.

The Managing Director is appointed by the Government from amongst officers holding posts not below the rank of Chief Engineer, preferably with experience of Public Health and Sanitary Engineering.

The main functions of the Chairman are to call meetings of the Board atleast one in two months and to preside over such meetings. But the State Government has circulated general guidelines indicating functions of the Chairman of the State Corporations and Boards and these are summarised in Appendix 2.

The general functions of the Managing Director, as flow from the Act and Regulations, etc., framed thereunder, have been summarised and indicated in Appendix 3.

In brief, however, the Managing Director has to act as the Chief Executive of the Board and conduct and supervise its activities.

6 APPOINTMENT OF OFFICERS AND EMPLOYEES OF PWSS BOARD

Section 11 of the Punjab Water Supply and Sewerage Board Act, 1976 empowers the Board to appoint a Secretary, Chief Engineer, an Accounts Officer and such other officers and employees as it may consider necessary for the efficient performance of its functioning. These are, however, subject to the provision that sanction of the creation of posts carrying monthly salary exceeding Rs.1600.- or appoint any person to any post the maximum salary of which exceeds Rs.500/- (including dearness pay, dearness allowance, etc.)shall only be made with the prior approval of the State Government. This is, however, subject to certain relaxations and giving some powers to the Managing Director in case of any emergency for periods not exceeding three months.

The recruitment and conditions of service of the officers and employees of the Board has to be regulated in accordance with the regulations framed by the Board and approved by the Government, but it is clearly laid-down in the Act that the remuneration assigned to the posts shall not be in excess of that admissible on the corresponding posts under the Government.

The Board has since evolved some procedure for direct appointments and these recruitments and selections are made by various Committees of the Board as mentioned below:

(a) In the case of posts carrying monthly salary exceeding Rs.1100.- the Committee consists of:

(i) Chairman
(ii) Secretary, Local Government, Punjab
(iii) Managing Director, and
(iv) One non-official member nominated by the Chairman

(b) In the case of posts carrying monthly salary exceeding Rs.500.- but not exceeding Rs.1100.- the Committee consists of:

(i) Managing Director, and
(ii) One non-official member nominated by the Chairman

(c) In the case of posts carrying monthly salary upto Rs.500.- the Committee consists of the Managing Director assisted by a Sub-committee appointed by him.

By adopting the above procedure direct recruitment has been carried out to fill some posts which have resulted on account of expansion of activities of the Board since its formation. The recruitment so made has been at the level of Assistant Engineers, Sectional Officers, Accounts Clerks and Clerks, Tracers, Stenographers, etc. We have been able to get very good candidates and the recruited persons consistantly possess good merit.

Even though prior approval of the Government is required in all appointments of persons with salary exceeding Rs.500.- (as total emoluments) per month, but this procedural provision, which would normally have delayed our functioning, has not held-up any work because of perfect coordination between the Local Government Department and the Board office. This provision, however, is not condusive to efficient management in the Board and in a way affects its autonomy.

7 INVESTIGATION, PREPARATION & EXECUTION OF SCHEMES

The Act provides comprehensive frame-work to guide the activities of the Board for investigation and preparation of schemes after study of their feasibility, approval of schemes by the Government, execution of the approved schemes, transfer of finally executed schemes to the local authorities.

The Act provides that the Board will execute the approved schemes from its own funds and recover the cost thereof from the local authorities concerned. But in practice, as no working capital or bridging finance was made available to the Board, we have been getting deposits or the costs of approved schemes from the local authorities concerned in advance, in instalments in case of large schemes, and the works have been executed against such funds.

8 REVISED STAFFING PATTERN, WORK-LOAD NORMS AND POWERS OF FIELD OFFICERS

The P.W.D. Public Health Branch was earlier looking after the works under a set sanctioned pattern for staffing and work-load norms. As this staffing pattern and work-load norms related to the type of general works being handled by that Branch and the office work that is involved in normal works subject to budgetory control of the type prevalent in the Government, the Board had to have a look at this and re-structure its own field offices and staffing pattern so as to suit the changed procedures. The aim was to effect economy in the overhead costs without, however, sacrificing the quality of works. After detailed examination the Board decided that the annual work-load norm for a field Division should be raised from Rs.4 million (which is prevalent in P.W.D. Public Health Branch) to Rs.6 million. The Board also decided to have a revised pattern of staffing right from the Sub-Divisions to the Circles in the field for a trial. A pattern was accordingly devised and tried for over a year. Some changes have again been made in this pattern w.e.f. 1 April 1979 to cover up the deficiencies noticed. But even now the staff employed in the field offices is lesser than the norms prevalent in the P.W.D. Public Health Branch and the comparison is given in Appendix 4.

The Board management also considered the matter of enhancing powers of the field officers to accelerate the progress of works, decentralise powers for decision-making and to cut down delays without, however, affecting the works qualitatively. The following table shows a comparative picture of some of the powers enjoyed by the officers in the P.W.D. Public Health Branch and their counterparts in the Board:

S.No.	Delegation of power	As applicable in P.H. Department		As introduced in the PWSS Board
1.	Technical sanction of estimates	i) S.E.	Rs.0.1 million	Rs.0.5 million
		E.E.	Rs.0.04 million	Rs.0.10 million
		ii) having more than 5 years service as E.E.		
		iii) having less than 5 years service as E.E.	Rs.0.01 million	Rs.0.05 million
2.	Acceptance of tenders	i) S.E.	Rs.0.40 million	Rs. 1.00 million
		ii) E.E. having more than 5 yrs. service as E.E.	Rs.0.10 million	Rs. 0.20 million
		iii) E.E. having less than 5 yrs. service as E.E.	Rs.0.04 million	Rs.0.10 million

Enhancement of powers in other spheres have also been made.

In addition to the enhancement of powers and other improvements brought about for efficient execution of the works some additional facilities have also been granted to the employees of the Board to provide requisite incentives for improving their work performance.

In the case of House Rent Allowance payable to employees, the rate has been raised from 12-1/2% as admissible in the State Government Departments to 25% of the basic pay. In case of Daily Allowance for touring, the rate has been made 1-1/2 times the rates admissible in the Government Departments.

Although the State Government and the Board had not agreed to the payment of deputation allowance to the employees/officers coming on deputation from the P.W.D. Public Health Branch, the facilities given have to some extent countered this negative approach.

9 PROCEDURE ADOPTED FOR PLANNING AND ESTIMATION

In most of the towns, except for any large scheme prepared as in the case of Projects accepted by the IDA or by LIC for loan assistance, execution of works is done in very small packets. But before any such estimates are framed a Master Plan for the water supply/sewerage for the town is prepared, alternatives considered, evaluated and final designs adopted.

For purposes of such design finalisation field data is collected by the field Divisions. Alternative proposals are formulated and these are fully scrutinised and evaluated in the Planning & Design Cell in the Head Office of the Board before approval to the finally-selected design is accorded. Thereafter, depending upon the priorities and demands of the town, estimates are prepared for work-packages according to the needs of the town, and these estimates are scrutinised, in light of approved designs, by the field Circles. If the estimates in question are upto an amount of Rs.5 lacs, no further scrutiny of the estimates is carried out in the Planning & Design Cell but the estimates get into the channel prescribed for getting administrative approval. If the estimates exceed the above amount, these are fully evaluated and scrutinised in the Planning & Design Cell and thereafter, consequent upon their approval by the Planning & Design Cell, it is put into the channel for administrative approval. For administrative approval purposes, the estimates are forwarded to the Local Bodies concerned and their comments obtained. Estimates which are formally accepted by the Local Bodies concerned, are placed before a Standing Committee of the Board for according administrative approval to such estimates. This Committee comprises of i) Chairman, ii) Director, Local Government and iii) Managing Director of the Board. If the Local Authority concerned has any objection to the estimates, their representative discusses the same with the above-mentioned Committee and the administrative approval is accorded only when the local authority agrees to the work being executed.

Once this stage of administrative approval is over, detailed estimates are prepared by the field Division concerned for technical sanction and guidance of the field staff during execution thereof. The technical sanction to the same is accorded according to powers vested with various officers.

10 WORK PROGRAMME OF PWSS BOARD

Before the formation of the Board the annual workload was in the range of Rs.25 to 35 million. During the two financial years, i.e., 1977-78 and 1978-79, when the Board has been functioning, we spent Rs.92 million and Rs.84 million, respectively. This involved lots of strains on the organisation in the sector, as the basic source from which the organisation expansion requirements could be drawn was P.W.D. Public Health Branch. This high rate of growth of work-load and expansion of the organisation caused strains and resulted in the non-availability of adequately trained personnel at appropriate time. There were other similar factors such as non-supply of materials, non-availability of suitable agencies for execution of works, etc., which hampered the smooth and timely completion of works. Our problems are in fact going to multiply because the rate of growth of work-load is continuing and we are planning to achieve a work-load of about Rs.200 million during the year 1979-80 and Rs.250 and Rs.275 millions in the next two financial years. This projected work-load is mainly based on the Punjab Water Supply and Sewerage Project (with IDA loan assistance) costing about Rs.667 millions and has to be executed by the year 1982. This Project covers 8 major towns, salient features thereof are given in Appendix 5.

Another group of schemes costing about Rs.48.10 million relating to water supply of 9 towns have been approved by L.I.C. Against these schemes L.I.C. is advancing us a loan of Rs.32.5 million, representing 2/3rd of the estimated cost, over a period of two years. The work on this Project is already in an advanced stage and this is scheduled to be completed in the year 1980. The L.I.C. has also agreed in principle to assist us in more schemes once it is satisfied with the achievement on the above group of schemes for 9 towns.

In addition to this group of scheme there are Centrally-sponsored schemes like Sewage/Sullage Utilisation schemes and schemes regarding conversion of dry latines into sanitary ones. Against the former group of schemes, we have about 61 schemes approved by the State Government at an estimated cost of Rs.34.15 million and 33% of this cost is being given by the Central Government as grant to the State. In regard to the latter mentioned group of schemes, two schemes costing about Rs.2.55 millions are under execution and this work is progressing satisfactorily.

In addition to this, individual schemes of water supply and sewerage and Storm Water Drainage in various towns are proceeding and the cost thereof is being met from the financial resources of the Municipal Committees concerned. We expect to spend about Rs.37 - 40 millions per year on such schemes.

11 STRATEGY ADOPTED FOR RE-ORGANISATION OF BOARD SET UP AND PROCEDURES

As mentioned earlier, also it would not be possible to maintain the high level of efficiency and performance by the Board organisation on account of the strains of rapid growth in the work-load if suitable changes in the organisational set-up and procedures are not planned and carried out to meet the situation.

To evaluate possible re-organisation alternatives, for ensuring execution of the project with efficiency and speed and in conformity with appropriate administrative, engineering and financial practices suitable for public utility services, the Board has engaged Consultants for the following fields:

(i) Preparation of management, organisation and staffing proposals and the development and implementation of Project Monitoring Systems and administrative procedures;

(ii) Development of accounting and financial management information systems and their implementation;

(iii) Development of Tariff structures and levels based on appropriate socio-economic research to introduce tariffs, suiting paying capacity of different sections of society, and

(iv) Identification of the need for training at all levels and for preparation of training programmes.

The work of these Consultants is already in progress and in regard to the first three consultancies it is well advanced.

Some rough data of the pattern of organisation that is likely to develop as a result of acceptance of some of the recommendations of the Consultants can now be formed and the skelton form of the organisation would be as indicated in Table 1. It shows the functional relationship of main Cells/Units into which the set-up is proposed to be organised. Each of these Cells/Units would have its own organisational pattern and their main jobs/functions are indicated below:

(1) Chief Engineer (Planning & Design)

This Unit would be responsible for all planning, design and material purchases activities. Chief Engineer (P&D) acts as the main technical pillar on whose competence, quality and execution of works depends. He evaluates feasible alternatives and selects the best and least cost solutions, classifies the works and lays down the stages for execution thereof and provides technical advice and guidance to S.Es and E.Es where necessary. The Purchase Cell staffed suitably according to the volume of purchases in a particular year, looks after the procurement of material relating to all the works under the Board.

(2) Chief Engineer (Works)

The Chief Engineer (Works) is the Chief Executive incharge of all constructional activities as well as operation of any water supply & sewerage systems that are to be maintained by the Board on behalf of the Local Bodies. He will have three to five SEs (Works) under him. He works in close liaison and coordination with the Chief Engineer (Planning and Design). He is responsible to the Managing Director in every respect including quality, speed, financial control, etc., for all the works under his jurisdiction and control. He inspects works from time to time to see that these are being executed in accordance with the targets, provisions in the estimates, budget allocation, specifications, etc.,. He is the administrative head of Works Department.

(3) Chief of Finance

He is incharge of cash resources management, financial management information, compilation of accounts of PWSS Board, etc. He will be assisted by a suitable staffing set-up after evaluation of alternatives suggested by the Consultants.

(4) Chief of Personnel & Administration

This Unit would be concerned in assisting the Managing Director in recruitment, placement, training of personnel required; pays salary, administration, discipline, promotion and transfer, staff

welfare and incentive assessments, personal records, etc. The size of this Unit would be finally developed according to the needs of the Organization.

In addition to the above four major Cells/Units the following cells would be performing staff functions directly with the Managing Director:

(1) Cell Incharge of Management Information System and Monitoring

It is proposed to provide a senior Executive Engineer with supporting staff for this assignment. The position would be reviewed after some experience.

(2) Secretary

The Secretary, assisted by suitable staffing set-up would be basically looking after the Board work including processing of Agendas, recording of decisions taking follow-up action thereon; and providing suitable assistance to the Managing Director in the conduct of Board's business and follow-up action.

(3) Chief Internal Auditor

He will be acting as the eyes and ears of the Managing Director and carry out independent internal audit functions in areas about which the Managing Director would like to probe into the quality and propriety of accounts and financial expenditure, etc. This Unit will be acting as independent control over the functioning of all the field organisations which are major spending units as also over the accounting set-up of the Board.

(4) Public Relations Officer

The Public Relations Officer will plan communication and understanding between the organisation and the inter-facing groups of the public and the local bodies with which PWSS Board shall inter-act. A satisfactory public relations compaign can only smooth out the adverse reactions of the public - both to scientific fixing of tariffs as well as to unavoidable inconvenience caused to them by the type of work the Board has to undertake, and also to adequately project the achievements of the Board as also the State in this regard.

Regarding the two main operative units, i.e., Planning, Design & Purchases and Works, tentative projections of engineering officers/ charges required for years upto 1981 and 1982 have been worked out and are shown in Tables 2 and 3. These Tables only indicate the basic charges and these charges would naturally be supported by adequate staff set-up - both technical and non-technical.

Table 1

PWSSB - BASIC ORGANISATION STRUCTURE

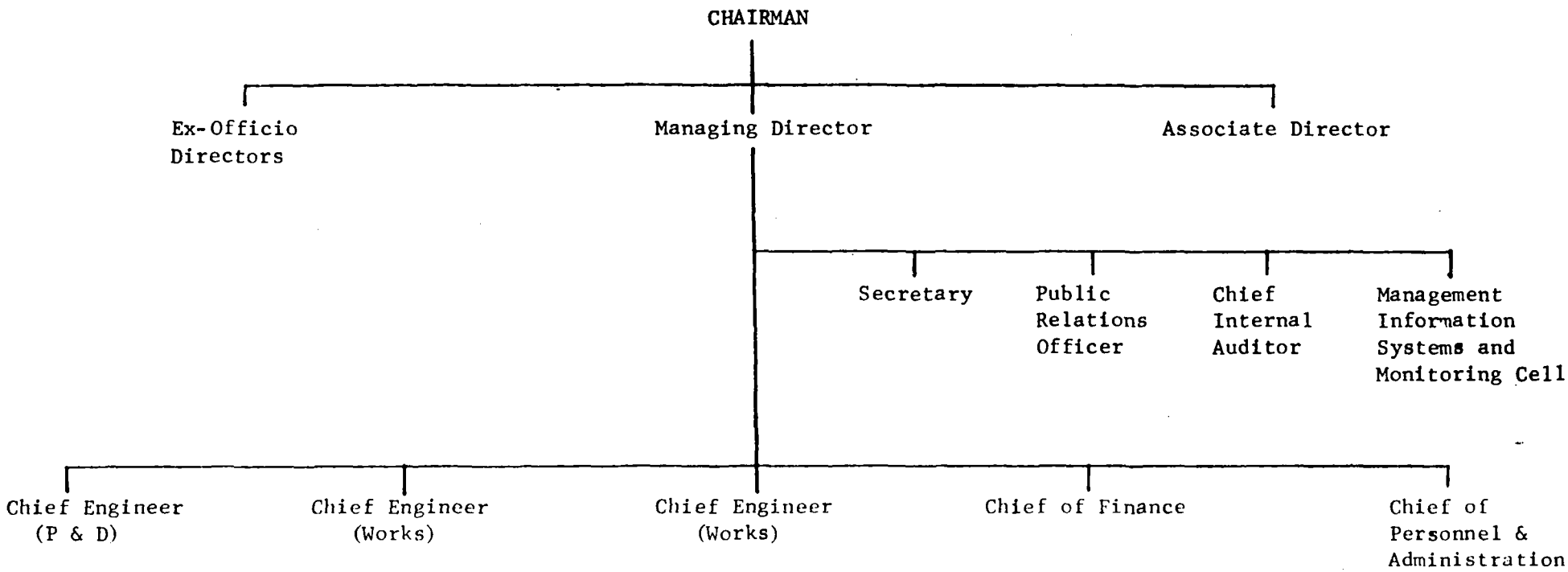


Table 2

PUNJAB WATER SUPPLY AND SEWERAGE BOARD

HEAD OFFICE ENGINEERING ORGANISATION

Sr. No.	Year	Planning & Design Cell				Purchase Cell			M.I.S. & Monitoring Cell		
		Chief Engineer (P&D)	Superintending Engineer (P&D)	Executive Engineer (Design)	Assistant Engineer (Design)	Superintending Engineer	Executive Eigneer	Assistant Engineer	Superintending Engineer	Executive Engineer	Assistant Engineer
1.	1978-79	1	-	4	8	-	1	2	-	-	-
2.	1979-80	1	2	8	16	1	2	4	-	1	2
3.	1980-81	1	2	10	20	1	2	4	1	2	4
4.	1981-82	1	2	10	20	1	2	4	1	2	4

Table 3

PUNJAB WATER SUPPLY AND SEWERAGE BOARD

WORKS ENGINEERING ORGANISATION

Sr. No.	Year	Planned Work Load (Rs. in million)	Chief Engineer Works	Superintending Engineer (Circle)	Executive Engineer (Divisions)	Assistant Engineer (Sub-Divisions)
1.	1978-79	100	-	[illegible]	16	64
2.	1979-80	200	2	[illegible]	33	132
3.	1980-81	250	2	10	40	160
4.	1981-82	275	2	10	42	168

12 CENTAGE CHARGES

The whole of the organisational set-up has to be supported by levying centage charges on the actual cost of works. These administrative overheads which have to be supported by centage charges include all wages to the staff, leave and pensionary benefits, medical cover benefits and other benefits allowed by the Government from time to time, contingent expenditure on office hiring and maintenance, furniture, stationery, travelling, etc. The P.W.D. Public Health Branch to whom this Board is successor for the urban water supply and sewerage works, is charging 14% over the cost of works for this very purpose. Consequent upon public pressure all efforts have been made to economise and the centage charges have been fixed at the rate of 12% on the cost of works. For the year 1977-78 and 1978-79, we have been able to meet our overhead charges by this centage.

It is, however, felt that these centage charges would not be capable of supporting the expanded organisation in fields like planning and design, purchase of stores and equipment, and development of proper management information systems and monitoring etc. The World Bank authorities have permitted us to include in the Punjab Water Supply and Sewerage Project (IDA Project) a centage of 4% on the cost of works for planning and design, purchases and 11% for all other overheads. Presently, however, we are doing our best to restrict ourselves to a total of 12% and the major casualty on account of this restruction is the organisation for planning and design, monitoring, management information systems and purchases Cell.

13 FINANCING

As mentioned earlier, at the time of its creation the Board was neither provided with any equity capital nor with any working capital or even a loan by the State Government. The only finance that helped the Board to start functioning was (i) receipt of deposits from the Municipal Committees where works were being done and (ii) the stock inventory inherited from the P.W.D. Public Health Branch. As referred to earlier too, at the time of setting up of the Board a Wing of the P.W.D. Public Health Branch which was looking after the work of the local bodies, stood transferred to the Board along with fixed assets and stock inventory which was in its charge. The value of these fixed assets, e.g., buildings, furnitures, T&P and vehicles, was about Rs.6 million and the value of stock inventory was about Rs.9 million. As against this the outstanding liabilities which the Board took over were about Rs.18 million approximately. As such the Board started functioning with a negative capital of Rs.3 million.

The actual evaluation of the transferred assets and liabilities is still in the process of detailed study and a special committee has been constituted on which the representatives of the Government as also of the Board are working. It will still take some time before a final picture of evaluation of assets and liabilities taken over by the Board emerges.

The initial response of local bodies for deposit of funds required for continuation of their works was quite satisfactory and in consultation with the Local Government Department, therefore, the budget which was prepared for the year 1977-78 projected an expenditure of Rs.173 million approximately. The flow of funds from local bodies, however, remained very inadequate during the year 1977-78 and the incurring of expenditure was naturally restricted to availability of such funds. The same pattern was repeated in the year 1978-79 when against the budget proposal of Rs.261 million the funds received from the local bodies were to the tune of Rs.99.4 millions only. Detailed year-wise comparasion of the budget estimates, actual receipts and expenditure for years 1976-77 to 1978-79 are given in table 4. The details of the receipts during these three financial years split-up on the basis of source of receipt is given in table 5 below:

Table 5

Statement of funds received from different sources from 1976-77 to 1978-79

(Rupees in lacs)

Year	Receipts* from local bodies	Loan from State Government	Loan from L.I.C.	Miscellaneous Receipts	Total
1976-77	249.76	-	-	0.46	250.22
1977-78	739.37	175.00	100.00	3.18	1017.55
1978-79	731.68	130.00	130.00	2.44	994.12
Total:	1720.81	305.00	230.00	6.08	2261.89

*These receipts include deposits made by the Municipal Committees out of their own resources and any grants/loans received by them from State/Central Governments for water supply and sewerage works.

In view of the persistent constraints of insufficient inflow of funds the Board has not so far been able to achieve a satisfactory rate of development of these services. Figure 1 indicates a cumulative picture of achievements targeted in the Budget, actual receipt of funds and the actual expenditure incurred since the inception of the Board. This clearly brings out the constraint imposed by inadequate receipts. To overcome this bottleneck the State Government while amending the Act in 1978, has since made a provision therein for an authorised capital of Rs.200 million for the Board. This capital is to be contributed by the State Government and the local bodies in the State. So far, however, no contribution in respect of this capital has been received by the Board.

Another step taken, with the approval of the State Government, was to explore and go in for soft-term institutional finance from within and outside the country to accelerate the development of these essential

Table 4

STATEMENT OF BUDGET ESTIMATES, RECEIPTS AND EXPENDITURE FOR 1976-77 TO 1978-79

(Figures Rs. in lacks)

	1976-77			1977-78			1978-79		
	Budget Estimates	Receipts	Expenditure	Budget Estimates	Receipts	Expenditure	Budget Estimates	Receipts	Expenditure
1st Quarter	-	-	-	431.65	293.85	193.12	653.66	108.29	176.43
2nd Quarter	-	-	-	431.66	103.06	228.80	653.67	234.67	201.54
3rd Quarter	142.31	125.40	0.80	431.66	240.50	210.29	653.67	277.44	200.52
4th Quarter	142.33	124.82	113.37	431.67	380.14	373.50	653.68	373.72	382.69
Total:	284.64	250.22	114.17	1726.64	1017.55	1005.71	2614.68	994.12	961.18

services. The Punjab Water Supply & Sewerage Project at an estimated cost of Rs.667 millions was prepared covering 8 major towns of Punjab, and this Project was accepted by the World Bank and the LIC for providing loan assistance to the extent of about 50% and 20% of the project cost, respectively. A brief note regarding the financing and other features of this Project are given in Appendix 5. During negotiations with the World Bank authorities an agreement was reached that the State Government would provide a bridging finance of Rs.80 millions to the Board as working capital so that the works could go on. This was absolutely essential as the loan assistance which has to come from the World Bank, would be in the shape of reimbursement of the agreed proportion of the actual expenditure already incurred on works.

L.I.C. is also providing loan assistance to the extent of about 66% of cost of another group of water supply schemes in 9 towns, the estimated cost of which is Rs.48 millions. As such L.I.C. contribution therefore would be about Rs.32.5 millions.

Table 6 below gives an abstract of the approved budget for the year 1979-80 and this would indicate the sources of finance being tapped for execution of works by the Board.

Table 6

Receipt	Amount (Rs. in lacs)	Expenditure	Amount (Rs. in lacs)
i) Loan from State Government	290.00 (including for World Bank Scheme = 240.00)	Works and other capital	2210.53
		Establishment expenditure	230.15
ii) Loan from World Bank	560.00		
iii) Loan from LIC	245.00		
iv) Loan from HUDCO	5.00		
v) Deposits from local bodies	1384.03		
Total:	2484.03	Total	2440.68

Requirement of funds during the years 1980-90 for achievement of Board aims would be of the order of Rs.2000 millions. The State Government in the Local Government Department is providing all cooperation and assistance in working out ways and means by which

resources of the local bodies are developed further, maximum possible loan contributions are arranged - both from the State Government as also the Government of India - and soft-term loan are arranged from the financial institutions like L.I.C. and international agencies.

Tapping of finances from L.I.C. and international agencies will have, ofcourse, to be planned at the Central Government level where exercise is already afoot to assess the needs for 1981-90 decade which has been declared as the "International Water Supply & Sanitation Decade" by the United Nations. It is hoped that this exercise would be completed well in time and financial inputs for various States are assured to achieve these essential targets, now backed even by the United Nations.

14 MANAGEMENT OF STOCK INVENTORY

Judicious and proper utilisation of stock inventories is one of the essentials for successful and efficient financial management. In my opinion this has been a traditional weakness in the P.W. Organisation in the State. The net result is that the stock turn-over is very unsatisfactory and the funds that get uselessly frozen in stock inventory are not available for profitable utilisation.

An attempt is being made to streamline this system and to keep the stocks at the minimum possible levels, thus avoiding blocking of funds which have otherwise affected the progress of works. Table 7 given on page 16 indicates the stock turn-over picture for the years 1976-77 to 1978-79.

In the consultancies already contracted for by the Board, recommendations from Consultants for efficient system of material management are expected shortly and this particular area of activity in the Board would receive our special attention so that the best possible utilisation of finances is ensured.

15 FINANCIAL AND ACCOUNTS ORGANISATION - STAFFING

Adoption of proper financial and accounting systems and scrupluous adherence to such systems is very vital for the health of any organisation, more so for a public utility service organisation which has to be run on commercial lines. As mentioned earlier, Consultants have been engaged for developing accounting systems and procedures and financial management information systems, etc. Their preliminary report for finance and accounts organisation and staffing & accounting system of the Board has been received and is under study in the Board office. After a detailed evaluation of their recommendations suitable systems for staffing pattern shall be evolved. The organisation of this Wing in the Board is, at present, divided into distinct activities and wherever the volume of work of a particular activity does not warrant and justify independant staffing therefor, then more than one activities are grouped within one section. Presently, five sections

Table 7

Value of stock in hand at the close of month.

(Figures in Rs. lacs)

	1976-77	1977-78	1978-79
April	-	136.54	66.40
May	-	110.59	72.67
June	-	114.74	63.12
July	-	116.19	64.27
August	-	117.52	71.76
September	-	112.59	68.40
October	-	119.47	83.11
November	-	112.60	79.32
December	-	115.14	67.06
January	152.08	100.53	65.53
February	142.38	100.40	63.41
March	137.44	72.44	61.39
Total:	431.90	1328.75	826.44
Average	143.96	110.73	68.87
Works) Exp.)	100.74	920.09	833.34
Stock turn-) over Ratio)	.7	8.3	12.1

This above table confirms a progressive improvement in the stock turnover ratio during these three financial years.

have been created in the Finance & Accounts Organisation of the Board. These are indicated below:

(i) Establishment Section deals with work regarding all wage claims, etc., of the employees and miscellaneous office establishment expenses.

(ii) Works Accounts Section deals with work regarding works expenditure in the Divisions and Circles of the Board.

(iii) Cash & Budget Section deals with work regarding Banks, Cash, Final Accounts, Budgeting and reports of statutory Auditor, etc., and

(iv) Finance Section deals with raising of funds from various sources, issue of financial concurrence for purchase, proposals, release of payments for various Consultancies and purchases made by Central Purchase Section in the Head Office of the Board.

(v) Internal Audit Section has been assigned internal audit of various Divisions and other offices of the Board so that integrity of the information, accuracy of reporting, consistent measurement and comparisons is ensured by way of conducting routine Audit of Accounts System Audit and Management Audit.

The Finance & Accounting Wing of the Board is headed by a Financial Manager.

Provisional projections of staffing in each of these five sections discussed above, upto the years 1982-83 are given in Appendix 6.

16 STATUTORY AND INTERNAL AUDIT

In the P.W.D. Public Health Branch of the State the responsibility of maintaining accounts and conduct of audit thereof vests with the Accountant General, Punjab. The Divisional Accountants posted in Divisions of P.W.D., Public Health Branch belong to the cadre of Accountant General, Punjab. The administrative control, no doubt, is with the Executive Engineers of P.W.D. Public Health Branch. The annual Confidential Reports of Divisional Accountants in the P.W.D., Public Health Branch are written by Executive Engineers and reviewed and finalised by the Accountant General, Punjab. In the Board under the Punjab Water Supply and Sewerage Board Act, 1976, the Examiner, Local Fund Accounts (ELFA) has been made the statutory Auditor of the Board. The accounts in the Board are maintained by the staff of the Board itself. As the Board has not so far been able to develop its own services, the requisite staff is posted on deputation from the office of Accountant General, Punjab as also from the Finance Department, Punjab.

According to the Act accounts of the Board are to be maintained in such a manner and in such a form as may be prescribed by regulation and the accounts are to be audited by the statutory Auditor, i.e., ELFA, as far as possible once a year. The Government, if it so decides, may direct that the accounts of the Board be audited from day to day under the pre-audit system.

To meet with the obligations entered into with the World Bank in respect of the IDA Project the annual audit of the accounts of the Board will be conducted concurrently, so that the final accounts, on completion of the audit, are prepared and submitted to the World Bank also. According to contractual obligations with the World Bank, the audited accounts are to be submitted to the World Bank before the expiry of 6 months from the last day of financial year.

The Secretary or any other officer authorised by the Board is to cause the reports of the audit to be printed and furnish a copy thereof to each Director and Associate Director of the Board. This report shall then be considered by the Board in one of the meetings of the Board. The Board will remedy forthwith any defects or irregularities that may be pointed out by the Auditor and then submit a report to the Government thereon. The accounts of the Board as certified by the Auditor together with the audit report thereon, are to be forwarded annually to the Government and the Government may issue such instructions to the Board in respect thereof as it deems fit and the Board is required to comply with such instructions.

The accounts of the Board together with audit report thereon are required to be laid annually before the Punjab Vidhan Sabha.

Whereas functions of maintenance of accounts and conducting statutory audit have been separated in the Board, both these functions are performed by the same agency, i.e., Accountant General, Punjab in so far as P.W.D., Public Health Department is concerned. Keeping in view the magnitude of expenditure incurred and the size of organisation the Board has decided to introduce internal audit also, so that the system of internal check provided in maintenance of accounts and conduct of statutory audit is strengthened suitably.

17 FORMATION OF RULES AND REGULATIONS UNDER THE PWSS BOARD ACT, 1976

Under sections 71 and 72 of the PWSS Board Act, 1976, as also under other various sections of the Act a number of rules and regulations are required to be framed and enforced. Whereas the rules under the Act are to be framed by the Government, for carrying out the purposes of the Act by notification, subject to the condition of previous publication in the Official Gazette of the State, regulations not inconsistent with the Act and rules made therein for the purposes of giving effect to the provisions of the Act, are required to be made by the Board with the previous sanction of the Government.

The Board appointed a Committee comprising, (i) Director, Local Government, Punjab; (ii) Chief Engineer, Punjab, P.W.D., Public Health Branch; and (iii) Managing Director, PWSS Board in the very early

stages of the constitution of the Board, for taking care of this rather important work. As a result thereof the spadework regarding framing of rules and regulations has almost been done and the same are now pending at various stages of consideration with the Government. The Board is also required to offer from time to time, its comments on observations made by the Administrative Departments i.e., Local Government Department, as a result of consideration of these rules and regulations at the Government level. The Board is very keen to ensure that all the rules and regulations under the Act, are finally approved and enforced without any delay; yet the procedural hurdles that consume a lot of time in the functioning of any Government Department, are felt in regard to this task also. However, with constant endeavour and with the cooperation of the Local Government Department it is hoped that this job will be completed at an early date.

The Secretary of the Board is steering this job at present as one of his main duties. With the expansion of the organisation, the work regarding enforcement of rules and regulations at various levels and also attending to legal problems is bound to increase manifold. In the light of recommendations to be made by the Consultants, who are already considering this matter, we may have to engage a Legal Adviser also for the Board at appropriate time.

18 MAJOR CONSTRAINTS

Obviously, any new Organisation has to face a number of problems for a few years of its infancy. The problems in the case of PWSS Board are even more complicated as not only the organisation has been created anew but also the rate of growth of work-load that this organisation has to handle is very high. The works are also expected to be done almost on a war-footing to create an impact on the urban population of the State.

Some of the constraints are remediable by conscious action on the part of the Government and every effort is being made in that direction. But some of these constraints are very difficult to be solved successfully. No effort is, however, being spared to overcome the retarding effect of these constraints. Some of these constraints are enumerated below:

(i) Although the Board is expected to be autonomous for being able to adequately and efficiently discharge the functions entrusted to it, yet is does not enjoy enough autonomy particularly in the matter of recruitment of staff and payment of emoluments, etc.

To enable the Board to achieve a higher degree of efficiency, speed and quality in works, not only has autonomy to be provided to the Board for recruitment of staff atleast upto a monthly salary of Rs.2000/- but also the Board should have the option to give higher grades where considered necessary, deviate from the Government rules and regulations for staff management and schemes of special incentives. Only then it could ensure not only attracting better quality of

of manpower but also motivating them adequately for continuing to serve the Board whole-heartedly.

(ii) The biggest constraint in the smooth functioning of the Board is the inadequacy of receipt of funds as also uncertainty thereof. Originally no capital was provided for the Board; but in the amended Act in 1978, although a capital of Rs.200 millions has been provided for, no part thereof has been subscribed yet either by the State Government or by the local authorities as provided in the Act.

Deposits of funds by the local authorities is also very slow, rather erratic thus causing a very serious constraint on the achievement of the Board.

(iii) Although the Board has been created as a specialised agency for development of specialised field of services for the urban population, so far adequate sense of participation and cooperation is not available from a number of local bodies. In the case of Punjab Water Supply and Sewerage Project this spirit of cooperation amongst the converned local bodies and the Board is very vital, otherwise some parts of the programme, particularly that regarding providing assisted W.C. connections, new water connections, metering of water connections, etc., will suffer a serious set-back.

(iv) A very serious constraint is there on account of either non-availability or serious delays in the availability from the P.W.D. Public Health Branch of adequately trained Engineers for senior posts of Executive Engineers and above. This would continue till the process of final transfer/allocation of staff of P.W.D. Public Health Branch to the Board takes place. The major delay in this regard is on account of finalisation of rules and regulations governing the service conditions of employees of the Board which are at present with the Government for final sanction.

(v) General shortage of materials, which is presently a country-wide problem, such as pipes for water supply and sewerage, cement, bricks, steel, pig iron, slack coal, etc., is affecting the progress of works very seriously.

(vi) There is a shortage of suitable and experienced contracting agencies for handling large scale sewerage works, particularly as the rate of execution of these works is multiplying manifold in the State.

(vii) Non-framing/finalisation of rules and regulations under the PWSS Board Act, 1976 is also creating a number of problems and also affect efficient and smooth functioning of the Board. With the expected cooperation of Local Government Department, however, this constraint may get solved at an early date.

(viii) Another important constraint in my opinion is inadequate consciousness in the general public mind as yet of the importance and urgency of these services and, therefore, constructive cooperation of the people where the work is actually being done, is generally not available. Efforts are being made in this regard to enlist cooperation of voluntary social organisations and social workers, etc., and in this behalf Chairman of the Board is playing a very vital role in deed.

19 CONCLUSIONS

Although the intention was to restrict the paper purely to organisation and financing of the Punjab Water Supply and Sewerage Board, yet is was considered necessary that a fuller background and review of general field of activities of the Board may also be given, so that the discussion regarding organisation and financing is available in proper overall perspective. The discussion on the organisation and financing has not been exhaustive as both these aspects are still in the stage of development in the Board and also as the detailed discussion of these matters would make the paper very lengthy and such details may not be of much interest to this forum.

The problem of urban water supply and sewerage in Punjab is very large as compared to the population of the State and finding satisfactory, and financially viable solutions and translating these into actual commissioned Projects is a challenging job. We are very conscious of our limitations and constraints. But no effort would be spared to achieve the goals set for us. For achievement of our objectives, in addition to the requirement of inflow of adequate funds in a smooth manner; availability of adequately trained staff, particularly at senior levels and availability of vital materials - a very important factor - would be awakening of public consciousness for obtaining full participation and cooperation from the community as well as the local bodies and educating the beneficiary population so that they willingly accept the tariff structures evolved on scientific financial basis.

Appendix 1

FUNCTIONS OF PUNJAB WATER SUPPLY AND SEWERAGE BOARD

1. Investigating and surveying the requirements of Water Supply and Sewerage;

2. Planning and preparing schemes including schemes covering areas falling within the jurisdiction of more than one local authority for the purpose of providing drinking water and sewerage facilities;

3. Executing schemes under a phased programme for the provision of drinking water and sewerage facilities within the areas of local authorities to which such schemes relate;

4. Executing such drinking water supply or sewerage schemes as may be transferred by the Government from the Department of Public Health to the PWSSB;

5. Working out priorities with the approval of the Government and drawing up detailed programme of executing the schemes;

6. Laying down the norms of staff to be employed by a local authority for the operation and maintenance of water supply and sewerage works which the local authority concerned shall not withstanding anything contained in any other law, take into consideration while employing the additional staff necessitated by such work;

7. Any matter which is supplemental, incidental or consequential to any of the above functions, and

8. Such other functions as may be prescribed.

Appendix 4

STAFFING PATTERN IN FIELD ORGANISATION OF PUNJAB WATER SUPPLY AND SEWERAGE BORAD

Sr. No.	Name of post with scale	Number of posts as per pattern		
		Applicable in Public Health Department	Revised and applied in the Board sometimes after its formation	Revised anew for acceptance with effect from 1 April 1979
1.	2.	3.	4.	5.
	Circle Office			
1.	Superintending Engineer (1600-2000)	1	1	1
2.	Sub-Divisional Engineer (Design) (400-1100)	-	1	1
3.	Superintendent (400-650)	1	1	1
4.	Head Assistant (225-500)	1	1	1
5.	Head Draftsman Grade-I (450-500)	1	1	1
6.	Stenographer (160-400)	1	1	1
7.	Accounts Clerks/Assistants (160-400)	6	6	5
8.	Assistant Draftsman (170-300)	2	1	2
9.	Clerks (including leave reserve (110-250) against 12 posts)	11/12	3	7
10.	Tracers (110-250)	2	-	1
11.	Jamadar Peon (75-105)	1	1	1
12.	Daftri (75-105)	1	1	1
13.	Sweeper (70-95)	1	1	1

1.	2.	3.	4.	5.
14.	Chowkidars (70-95)	1	1	1
15.	Peons (75-105)	5	2	3
	Divisional Offices			
1.	Executive Engineer (800-1600)	1	1	1
2.	Head Clerk (225-500)	1	1	1
3.	Accounts Clerks (160-400)	3	2	(3* ((2**
4.	Divisional Accountant (425-750)	1	1	1
5.	Head Draftsman Grade-II (200-450)with minimum start of Rs.250.- per month	1	1	1
6.	Assistant Draftsman (170-300)	2	2	2
7.	Tracers (110-250)	2	2	2
8.	Steno-typist (110-250 + 25.- as special pay)	1	1	1
9.	Clerks (including one leave reserve (110-250) out of 10 clerks)	9/10	5	7
10.	Peons (70-95)	4	2	3
11.	Sweeper (70-95)	1	1	1
12.	Chowkidar (70-95)	1	1	1

*For Divisions continuing from prior to 1 January 1972.
**For other (New) Divisions opened after 1 January 1972.

1.	2.	3.	4.	5.
	Sub-Divisional Offices			
1.	Sub-Divisional Engineer (400-1100)	1	1	1
2.	Sectional Officers (200-450)	4	4	4
3.	Sub-Divisional Clerks (110-250 + 20.- as special pay)		(in the scale of 160-400)	(in the scale of 160-250 + 20.- as special pay)
4.	Assistant Sub-Divisional Clerk (70-95)	2	-	1
5.	Peons (70-95)	2	1	*1 to 2
6.	Chowkidar (70-95)	1	1	1
7.	Sweeper	1	1	1(part-time)

*6 posts for 4 Sub-Divisions so that Executive Engineers may allocate 2 peons each for outstation Sub-Divisions and one peon each for Sub-Divisions where larger number of offices are located.

Appendix 5

BRIEF NOTE ON PUNJAB WATER SUPPLY AND SEWERAGE PROJECT

(IDA PROJECT)

1. A complete project for providing drinking water supply, underground sewerage system including water connections and sanitary latrines in dwelling houses to a major chunk of urban population living in 8 premier cities and towns of the State, initiated by the Board soon after its inception was finally accepted by the World Bank in October 1978. Besides introducing water supply and sewerage in urban areas on a massive scale, the project seeks major sectoral changes and introduction of tariff on scientific basis so as to make the project self-finance.

2. The cost of the project amount to Rs.667.00 millions will be borne by the following agencies as under:

		(Rupees in millions)
1.	IDA through Government of India	226.10
2.	Government of Punjab	114.60
3.	L.I.C.	130.00
4.	Municipal Corporations/ Committees concerned	196.30
		667.00

The cost of sub-projects of the 8 towns is as under:

S.No.	Name of Town	Population (1978) (in lakhs)	Cost (Rs. in millions)
1.	Jullundur	3.8	142.00
2.	Amritsar	5.60	154.50
3.	Ludhiana	6.01	190.65
4.	Patiala	1.80	52.54
5.	Rajpura	0.46	31.69
6.	Bhatinda	0.74	36.63
7.	Moga	0.69	25.45
8.	Pathankot	1.15	22.83
	Total:	19.93	654.29
	Specialised equipment consultant services and training.		12.76
			667.05
		Say:	667.00 millions.

4. The project has since been taken in hand and is scheduled to be completed within a period of 3-1/2 years ending March 1982. The loan from World Bank and LIC will only be in the form of actual expenditure. The initial expenditure on the Project will be met out of (1) amount of equity provided to the water supply and sewerage Board by the State Government (ii) State Government share towards the Project in the form of loan, (iii) funds to be made available by the concerned Municipal Corporations/Committees and (iv) Rs.1.30 crores made available by L.I.C. in advance as 10% of its total contribution of Rs.13.00 crores.

5. The loan which carried 8-1/2% rate of interest, for the Municipalities is repayable over a period of 25 years. The existing tariffs in respect of water supply and sewerage are proposed to be suitably enhanced in order to establish financial viability of the project and to operate and maintain the system after completion on scientific and sound commercial principles. From the technical point of view also the design of water supply distribution system constituting a major chunk of the project has been got computerised from I.I.T. Kanpur, Guindy College, Madras and Administrative Staff College, Hyderabad for the three Corporations of Amritsar, Jullundur, and Ludhiana respectively. The PERT Charts have been prepared with the help of N.P.C. Chandigarh.

6. The major components of the World Bank Project are as hereunder:

i)	Tubewells	38 Nos.
ii)	RCC Reservoirs 1 to 5 lac gallons capacity	40 Nos.
iii)	Distribution system	550 Kms.
iv)	Water connections and water meters	46,400 Nos.
v)	Water meters only	95,000 Nos.
vi)	Sewerage system	730 Kms.
vii)	Flush toilets in private houses.	101,500 Nos.

7. Some of the salient features of the World Bank Project are:

i) A provision of Rs.18 crores has been made in the project to be disbursed to the poorer strata of society for providing a hand flush toilet in the dwelling units. This amount will be partly in the form of loan on soft rate of interest recoverable over a long period and partly an outright grant;

ii) The existing unmetered water connections are proposed to be metered and for this purpose adequate provision has been made in the Project;

iii) The existing populated areas in these towns shall almost be fully covered with water supply and sewerage on completion of the Project;

iv) It is proposed to introduce sewerage charges equivalent to water charges to make the project financially viable and self generating, and

v) The project provides for consultancy services to prepare feasibility reports in respect of sewage treatment plants in all the 8 towns. The World Bank has informally agreed to favourably consider providing loan for sewage treatment plants also under a separate project and this will be considered formally when the present project is nearing completion.

Appendix 6

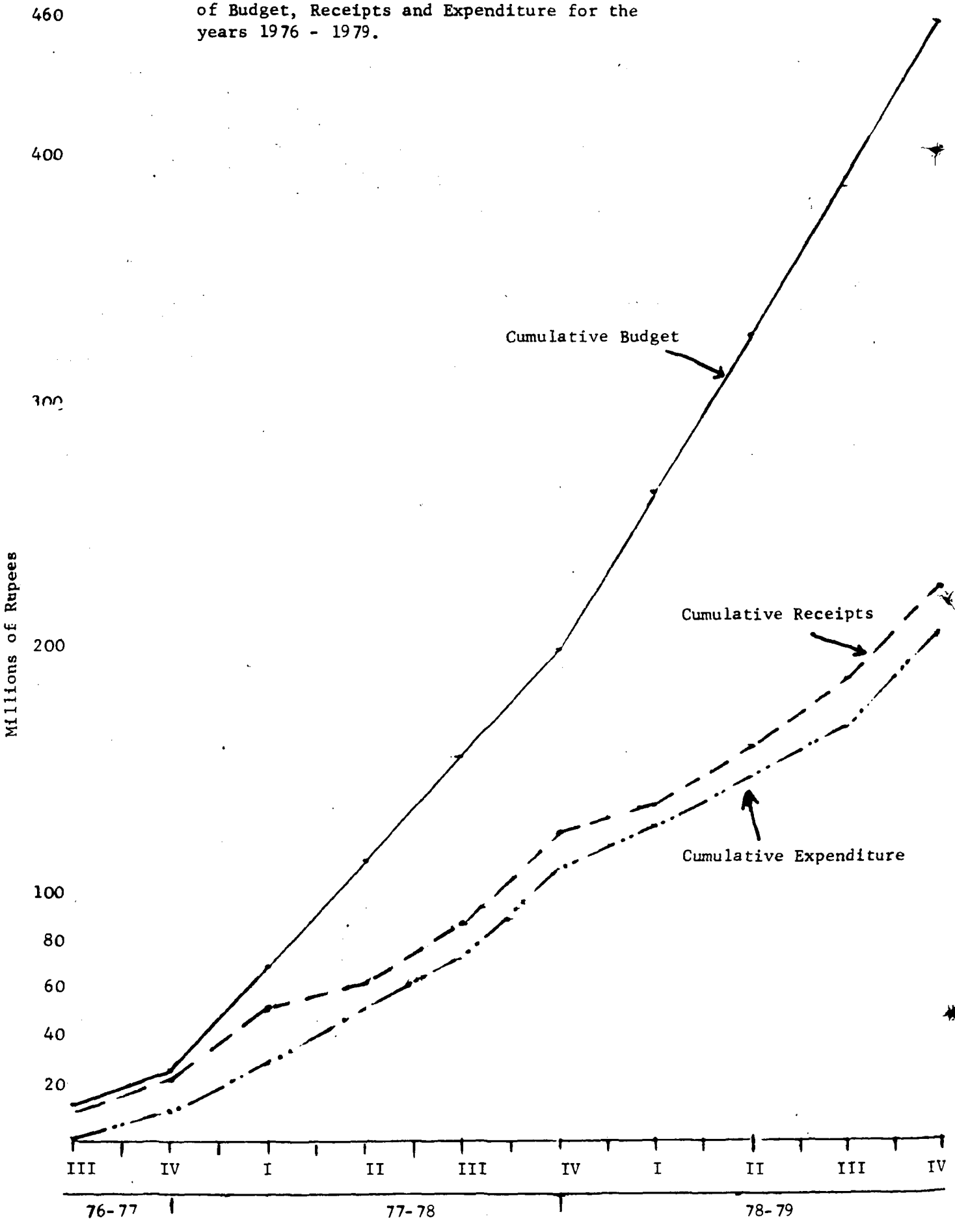
FINANCE & ACCOUNTS ORGANISATION - STAFFING PROJECTIONS

Year	Accounts/ Audit Officers		Establish-ment Section	Works Section	Budget & Cash Section	Finance Section	Internal Audit Section
1976-77	1	S.A.	-	-	-	-	-
		Asstt.	1	1	-	-	-
		Clerks	1	1	-	-	-
1977-78	2	S.A.	1	1	1	-	-
		Asstt.	1	2	2	-	-
		Clerks	1	2	1	-	-
1 3-79	2	S.A.	1	1	1	1	-
		Asstt.	1	5	2	1	-
		Clerks	1	3	2	-	-
1979-80	3	S.A.	1	2	1	1	2
		Asstt.	2	2	2	2	6
		Clerks	1	3	2	-	-
1980-81	4	S.A.	1	2	1	1	2
		Asstt.	2	2	2	2	6
		Clerks	1	3	2	-	-
1981-82	6	S.A.	1	2	1	1	4
		Asstt.	2	4	2	2	8
		Clerks	1	3	2	-	-
1 ?-83	6	S.A.	1	2	1	1	5
		Asstt.	2	4	2	2	8
		Clerks	1	3	2	-	-

FIGURE I

PUNJAB WATER SUPPLY AND SEWERAGE BOARD

Graph showing progressive quarterly totals of Budget, Receipts and Expenditure for the years 1976 - 1979.



Working Paper No. 7

GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF
WATER SUPPLY AND SEWERAGE
BANGALORE, INDIA

11-14 JUNE 1979

Working Paper No. 7

UTTAR PRADESH JAL NIGAM; ITS CONSTITUTION AND ROLE IN THE DEVELOPMENT OF WATER SUPPLY AND SEWERAGE SERVICES IN UTTAR PRADESH

by

B.P. VARMA*

1 INTRODUCTION

Uttar Pradesh (U.P.) covers an area of 294,366 sq. Kilometres and is divided into 56 administrative revenue districts. The State has four distinct geographical regions viz. a Himalayan region in the north; a narrow boulder strip running west-east along the Himalayan foot hills and Shivaliks; a broad alluvial Indo-Gangetic plain running west-east through the middle of the State; and a Vindhyan region in the southern parts of the State.

U.P. has a population of about 90 million, about 85 percent of which lives in 112,561 villages and about 15 percent in 619 urban townships, including the five Corporation towns of Kanpur, Agra, Varanasi, Allahabad and Lucknow. Of the above 112,561 villages 35,506 villages suffer from drinking water scarcity.

Piped Water Supply was first introduced in the State in the above five major towns about the year 1890. After that some more towns were provided with piped water supply systems but the progress remained rather slow upto the time India became independent in the year 1947. By then 27 towns had been covered with piped water supply and 10 towns had been provided with sewerage system. The rural areas remained practically untouched in this respect before Independence.

For several years after Independence the development of water supply and sewerage sector did not make much progress. In the year 1954 the National Water Supply and Sanitation Programme was launched by the Government of India and an allocation of Rs. 11 crores was made in the First Five Year Plan for development of water supply and sewerage sector in the country. Thereafter more and more allocations were made for the sector in the subsequent Plans. The allocations made under these Plans for the whole country and the share of Uttar Pradesh in these allocations have been shown in the following table. The table also shows the number of towns in which piped water supply and sewerage systems were introduced and the number of villages that were covered with piped water supply systems in the State up to the end of the Plan periods.

It will be seen from the table that up to the end of the 4th Plan i.e., up to the year 1973-74, only a small part of the sector could be covered in Uttar Pradesh. This was mainly on account of insufficient allocations made for this big State for this sector. It was, therefore,

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Plan	Total allocation for the sector in the country (Rs. in crores)	Allocation for U.P. (Rs. crores)			Share of the State (percent of national allocation)	Progress upto the end of the Plan		
		Urban	Rural	Total		Urban water supply (No. of towns covered)	Urban sewerage (No. of towns covered)	Rural water supply (No. of villages covered)
I Five Year Plan	11	6.65	0.01	6.66	60.5	73	17	Nil
II Five Year Plan	114	4.89	0.15	5.04	4.4	74	17	37
III Five Year Plan	116	9.58	2.04	11.62	10.0	132	18	164
Three Annual Plans (1966-69)	106	4.47	6.12	10.59	10.0	144	26	1437
IV Five Year Plan	574	9.45	16.63	26.08	4.6	180	35	3824
V Five Year Plan	750	32.53	30.68	63.21	8.4	376	39	6670

considered desirable to explore the possibility of obtaining assistance from international agencies like the World Bank, UNICEF, financial institutions, Governments of other countries etc. to accelerate the development of this sector in the State. Negotiations in this regard were started with the World Bank in 1972 and the Bank came forward with an offer of a financial assistance of 40 million US $ on two conditions viz. that the drinking water service should be run on modern commercial lines to make it self-supporting, and that the recovery of the loan made available to the local bodies in the shape of completed works should be entrusted to a central organization with statutory powers.

At that time the framing of water supply and sewerage projects for the local bodies and the execution of these projects with the funds deposited by the local bodies (generally obtained from the Government as grants or loans) was done by the "Local-Self Government Engineering Department" of the State. In June 1975 the State Government created an autonomous Corporation with the name "Uttar Pradesh Jal Nigam" by an Act of the State Legislature and merged the Local Self Government Engineering Department with that Corporation.

2 JAL NIGAM

The constitution, functions and powers of the Jal Nigam are briefly described below:

Constitution of the Jal Nigam

The Jal Nigam has a full time chairman (to be appointed by the State Government) and the following members:

(a) Managing Director (to be appointed by the State Government) who is to be a qualified Engineer having administrative experience and also the experience of water supply and sewerage works.

(b) Finance Director (to be appointed by the State Government) having experience of matters relating to finance and accounts.

(c) The Secretary to the State Government in the Finance Department (ex-officio).

(d) The Secretary to the State Government in the Local Self Government Department (ex-officio).

(e) The Director of Local Bodies, U.P. (ex-officio).

(f) The Director of Medical and Health Services U.P. (ex-officio).

(g) Five elected heads of the local bodies in the State to be nominated by the State Government.

Functions of the Jal Nigam

(i) To prepare, execute, promote and finance the schemes for the supply of water and for sewerage and sewage disposal;

(ii) To render all necessary services in regard to water supply and sewerage to the State Government and Local bodies and on request to private institutions or individuals;

(iii) To prepare State Plans for water supply, sewerage and drainage on the directions of the State Government;

(iv) To review and advise on the tariff, taxes and charges of water supply in the areas of Jal Sansthans and Local Bodies;

(v) To assess the requirement for materials and arrange for their procurement and utilisation;

(vi) To establish State standards for water supply and sewerage services;

(vii) To perform all functions, not stated herein which were being performed by the Local Self Government Engineering Department before the commencement of the Act;

(viii) To review annually the technical, financial, economic and other aspects of water supply and sewerage system of every Jal Sansthan or local body;

(ix) To establish and maintain a facility to review and appraise the technical, financial, economic and other pertinent aspects of every water supply and sewerage scheme in the State;

(x) To operate, run and maintain any water works and sewerage system, if and when directed by the State Government, on such terms and conditions and for such period as may be specified by the State Government;

(xi) To assess the requirements for manpower and training in relation to water supply and sewerage services in the State;

(xii) To carry out applied research for efficient discharge of the functions of the Nigam or Jal Sansthan, and

(xiii) To perform such other functions as may be entrusted to Nigam by the State Government by notification in the Gazette.

Powers of the Jal Nigam

(i) To inspect all water supply and sewerage facilities in the State by whomsoever they are operated;

(ii) To obtain such periodic or specific information from any local body and operating agency as it may deem necessary;

(iii) To provide training for its own personnel as well as employees of the local bodies;

(iv) To prepare and carry out schemes for water supply and sewerage;

(v) To lay down the schedule of fees for all services rendered by the Nigam to the State Government, local bodies, institutions or individuals;

(vi) To enter into contract or agreement with any person, firm or institutions, as the Nigam may deem necessary, for performing its functions;

(vii) To adopt its own budget annually;

(viii) To approve tariffs for water supply and sewerage services applicable to respective local areas comprised within the jurisdiction of Jal Sansthans and local bodies;

(ix) To borrow money, issue debentures, to obtain subventions and grants and manage its own funds;

(x) To disburse loans to local bodies for their water supply and sewerage schemes, and

(xi) To incur expenditure and to grant loans and advances to such persons or authorities as the Nigam may deem necessary for performing its functions.

3 JAL SANSTHAN

In the same Act that created the U.P. Jal Nigam, the State Government also provided for the creation of Jal Sansthans for operation and maintenance of the water supply and sewerage systems in their respective areas.

The constitution, functions and powers of Jal Sansthans are briefly described in the following paragraphs.

Constitution of Jal Sansthan

A Jal Sansthan constituted to have jurisdiction over the local areas of Nagar Mahapalika consists of a Chairman, who will be the Nagar Pramukh of the Nagar Mahapalika (ex-officio), and the following other members, namely -

(a) A general manager, to be appointed by the Nigam with the approval of the State Government who will be a qualified engineer having administative experience and experience of water supply and sewerage works;

(b) A Joint Director of Medical and Health Services to be nominated by the Director of Medical and Health Services, Uttar Pradesh;

(c) Three Sabhasads of the Nagar Mahapalika nominated by the State Government;

(d) Two representatives of the Nigam;

(e) The Director of Local Bodies, U.P.;

(f) The Mukhya Nagar Adhikari of the Nagar Mahapalika.

A Jal Sansthan constituted to have Jurisdiction over the local areas of a Municipal Board will consist of a Chairman who will be the President of the Municipal Board (ex-officio) and the following other members, namely -

(a) A General Manager, to be appointed by the Nigam with the approval of the State Government who will be a qualified engineer having administrative experience and experience of water supply and sewerage works;

(b) An officer subordinate to the District Magistrate nominated by the later;

(c) Two representatives of the Nigam;

(d) Deputy Chief Medical Officer (Health) of the district in which the head office of the Municipal Board is situated;

(e) An officer nominated by the Director of Local Bodies, Uttar Pradesh;

(f) Two elected members of the Municipal Board, to be nominated by the State Government.

Any other Jal Sansthan will consist of a Chairman appointed by the State Government, and the following other members, namely -

(a) The Collector of the district in which the head office of the Jal Sansthan is situated (ex-officio);

(b) The most senior officer of the Community Development Department having his head-quarters within the area of the Jal Sansthan;

(c) A General Manager, to be appointed by the Nigam with the approval of the State Government who will be a qualified engineer having administrative experience and experience of water supply and sewerage works;

(d) Two representatives of the Nigam;

(e) One nominee of the State Government from amongst the elected heads of members of the local bodies of each district within the jurisdiction of the Jal Sansthan; provided that where the number of districts within the jurisdiction of the Jal Sansthan is less than five, the number of such noninees will be five out of which at least one will be from each district;

(f) The Chief Medical Officer of the district in which the head office of the Jal Sansthan is situated.

Functions of Jal Sansthan

(i) To plan, promote and execute schemes of and operate an efficient system of water supply;

(ii) Where feasible, to plan, promote and execute schemes, and treatment of trade effluents;

(iii) To manage all its affairs so as to provide the people of the area within its jurisdiction with wholesome water and where feasible, efficient sewerage service;

(iv) to take such other measures, as may be necessary to ensure water supply in times of any emergency; and

(v) Such other functions as may be entrusted to it by the State Government by notifications in the Gazette.

Powers of Jal Sansthan

(i) To exercise all powers and perform all the functions relating to water supply, sewerage and sewage disposal of the area which lies within its jurisdiction;

(ii) To acquire, possess and hold lands and other property and to carry any water or sewerage works through, across, over or under any highway, road, street or place and, after reasonable notice in writing to the owner or occupier, into, through, over or under any building or land;

(iii) To abstract water from any natural source and dispose of waste water;

(iv) To enter into contract or agreement with any person or body as the Jal Sansthan may deem necessary;

(v) To adopt its own budget annually;

(vi) To introduce or amend tariffs for water supply and sewerage services, subject to approval of the Jal Nigam and collect all taxes and charges for these services as may be prescribed;

(vii) To incur expenditure and manage its own funds; and

(viii) To obtain loans, advances, subventions and grants from the Nigam.

The State Government may by notification direct that in such rural areas for which no Jal Sansthan has been established, all or any of the powers, duties and functions of a Jal Sansthan shall be exercised, discharged or performed by the Jal Nigam. In such cases, the Jal Nigam shall be deemed to be the Jal Sansthan and the date of notification shall be deemed to be the date of constitution of the Jal Sansthan.

At present there are three Regional Jal Sansthans and five KAVAL Jal Sansthans. The jurisdictions of these Jal Sansthans are being briefly described below:

Regional Jal Sansthan

1. Garhwal Jal Sansthan

It covers 5 hill districts of Garhwal revenue Division namely Chamoli, Dehradu, Pauri, Tehri and Uttarkashi.

2. Kuman Jal Sansthan

This Sansthan has jurisdication over three administrative districts of Nainital, Almora and Pithoragarh which also constitute the Kumaon revenue Division.

3. Jhansi Jal Sansthan

This Sansthan covers the five districts of Banda, Hamirpur, Jhansi Jalun and Lalitpur.

KAVAL Jal Sansthan

These five Jal Sansthans have been set up for five corporation towns in the State namely Kanpur, Agra, Varanasi, Allahabad and Lucknow.

4 REORGANISATION

Soon after the creation of the Jal Nigam an agreement was entered into with the World Bank (IDA) for their providing the above mentioned

financial assistance for quickening the development of the water supply and sewerage sector in the State. U.P. was perhaps the first State in the country to take up a vast rural piped water supply project with the World Bank assistance. The World Bank while agreeing to provide the above financial assistance, insisted on modernisation of organisational set up in the Jal Nigam and Jal Sansthans. It was considered necessary to build up managerial and administrative skills to aid progressive mobilisation of money, material and manpower resources. Reorganisation of the administrative set up was also necessary because the Jal Nigam was entrusted with many more functions and responsibilities than those of the erstwhile Local Self Government Engineering Department.

Before the formation of the Jal Nigam the staff and operating expenses of the Local Self Government Engineering Department were met by the Government and were part of its Budget. The Jal Nigam, though its main source of funds is still the Government, has now to keep itself in existence by centage earnings on the actual design and construction work done for the local bodies. This makes imperative for the Jal Nigam to do a cost-benefit analysis while not forgetting the intangible social benefits and the need for optimising public satisfaction. Monitoring of the discharge of the debt servicing obligations by the local bodies as well as Jal Nigam's own debt servicing liabilities towards the Government and LIC etc. also becomes necessary. No less important is planning and execution of enough construction works so that the fees earned are adequate to cover its staff and operating expenses. To effectively implement the above, the Nigam has to ensure that neither staff, cash nor stores remain idle.

The erstwhile LSGED had full access to the supporting services of the State Government like audit, staff selection through the State Public Service Commission, personnel adminstration at all Gazetted levels, formulation of plans and external publicity etc. All these functions are now to be discharged solely by the Jal Nigam with the State Government in the position of a corrective authority. The Jal Nigam has therefore to provide for an effective system of internal audit, evolve and enforce suitable service regulations, its own process of selection of personnel, their discipline and career planning, plan its activities and manage its external publicity, etc.

To ensure effective discharge of the responsibilities entrusted to the Nigam, consultancy services were obtained in respect of the following:

(i) Organisation and Management including Project Monitoring System;

(ii) Training needs of various categories of personnel employed in the Jal Nigam;

(iii) Financial Management and Accounting System based on accrual system;

(iv) Evaluation of assets of Jal Nigam, and Jal Sansthan;

(v) Socio-economic studies and Tariff evaluation, and

(vi) Designing of Water Treatment plan, and its operation.

Most of the recommendations of the consultants have been implemented and others are at various stages of implementation.

The Organisational set up of Jal Nigam has been shown on the chart at Appendix 1. Similar charts showing the organisational set up of KAVAL and Regional Jal Sansthans are also appended to this paper as Appendices 2 and 3.

In line with the recommendations of the Consultants, the Accounts and Finance Wing of the Nigam has been restructured to follow a commercial accounting system. Similarly the accounting and financial wings of Jal Sansthans have also been restructured in accordance with the consultants recommendations.

5 WORK PROGRAMME FOR THE U.P. JAL NIGAM

As mentioned in the beginning of this paper, Uttar Pradesh has 619 towns and 112,561 revenue villages out of which 35,506 villages suffer from water scarcity. Till March 1979, out of the above 619 towns piped water supply has been provided in 388 towns. In the case of scarcity villages, which are normally taken in groups, some non-scarcity villages located near or in-between the scarcity villages have also to be included in the piped water supply schemes. Out of 35,506 scarcity villages 5,920 scarcity along with 2,667 non-scarcity villages have been covered with piped water supply till March 1979. The U.P. Jal Nigam has therefore to provide piped water supply in 231 more townships and 29,586 more scarcity villages. It has been roughly estimated that provision of piped water supply in the remaining towns and scarcity villages alongwith [illegible] non-scarcity villages as described above, will cost about Rs.950 crores. In addition to this, sewerage remains to be provided in 579 towns [illegible] the time passes, the existing water supply and sewerage systems [illegible] need reorganisation and augmentation to meet the requirements of the growing population. This work is estimated to cost about Rs.550 crores.

The Jal Nigam has thus, a collossal task to carry out in the coming years. The tentative Five Year Plan Document for the period 1978-83 provides for an out-lay of Rs.360 crores in the sector. In this Plan Rs.146 crores has been proposed for urban water supply and sewerage; Rs.201 crores for rural water supply; 7.5 crores for Special Tools and Plants and 10 crores for conversion of dry latrines into flush latrines. The balance amount of Rs.0.5 crores has been earmarked for the Water Pollution Prevention and Control Board. During the plan 1978-83 it has been envisaged to provide piped water supply to all the 619 urban local bodies of the State as well as to provide underground sewerage systems in 39 more towns. In these towns either the schemes are already in hand or the towns are hyperendemic to filariasis or having a population of more than 50,000. Strengthening and re-organisation of water supply systems has been proposed in 83 towns and sewerage reorganisation in 8 towns. A target of covering 14,200 more villages has been set for rural water supply programme.

To boost the progress of rural water supply schemes the Central Government has launched a crash programme under the title of "Accelerated Rural Water Supply Programme". As per indications available at the time

of writing this paper it is expected that a sum of Rs.28 crores (approx.) will be made available for Accelerated Rural Water Supply Programme besides the Plan allocations. This will be utilized for provision of safe drinking water supply facilities to about 2250 additional villages.

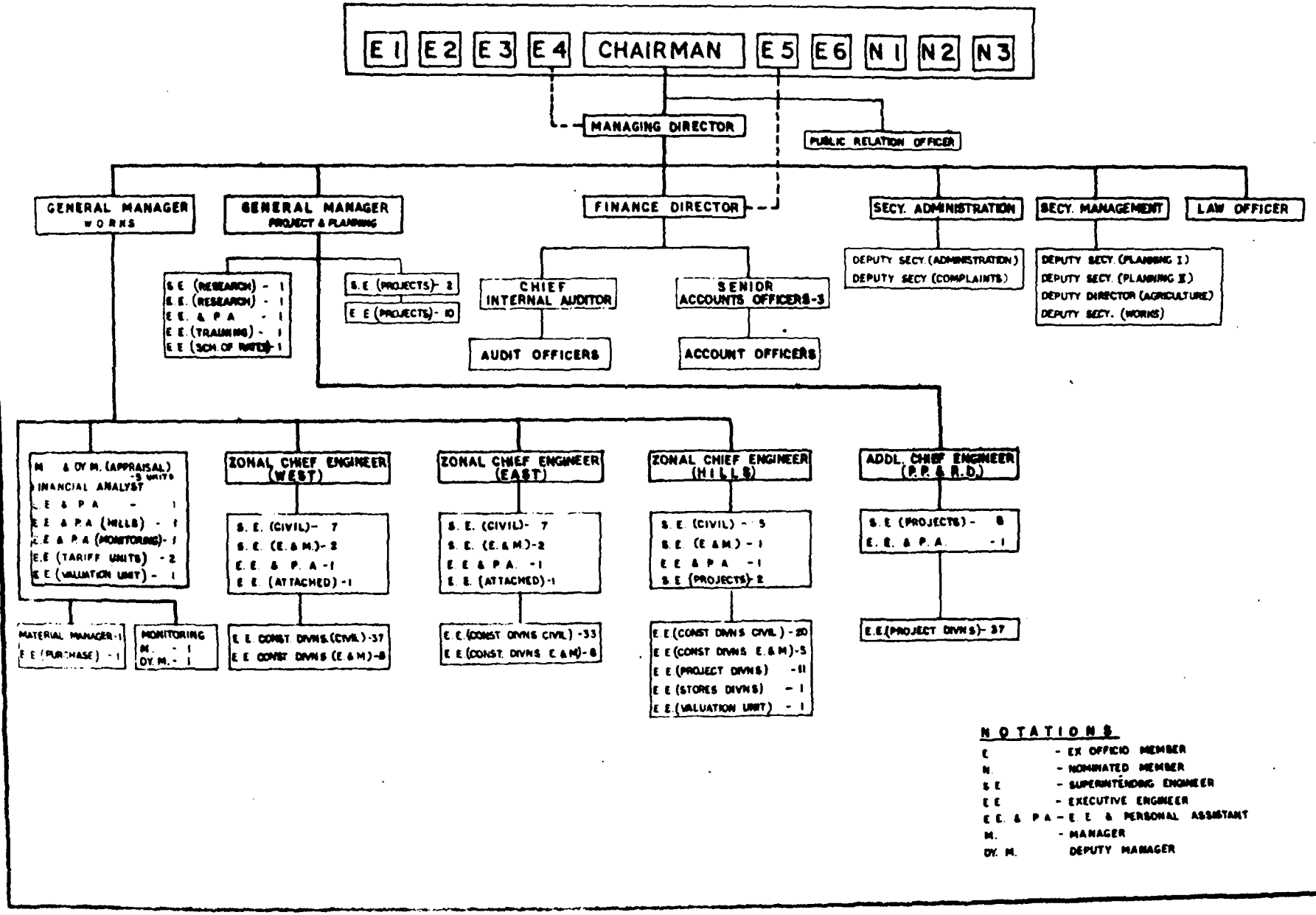
To minimise the burden on the national exchequer the Jal Nigam had put up some proposals for financing rural water supply schemes in 6 districts of the State to the Government of Netherlands through the Government of India. The Netherlands Government have accepted in principle to provide financial assistance to the tune of Rs.10.24 crores for this programme in three districts. First instalment of the financial assistance has already been received by the Government of India. Although 30% of this financial assistance from the Government of Netherlands will form the part of the plan out-lay but 70% of the foreign assistance is expected to be made available to Jal Nigam over and above the Plan allocations.

APPENDIX-1.

INDIA

UTTAR PRADESH WATER SUPPLY & SEWERAGE PROJECT

EXISTING ORGANISATION CHART OF UTTAR PRADESH JAL NIGAM

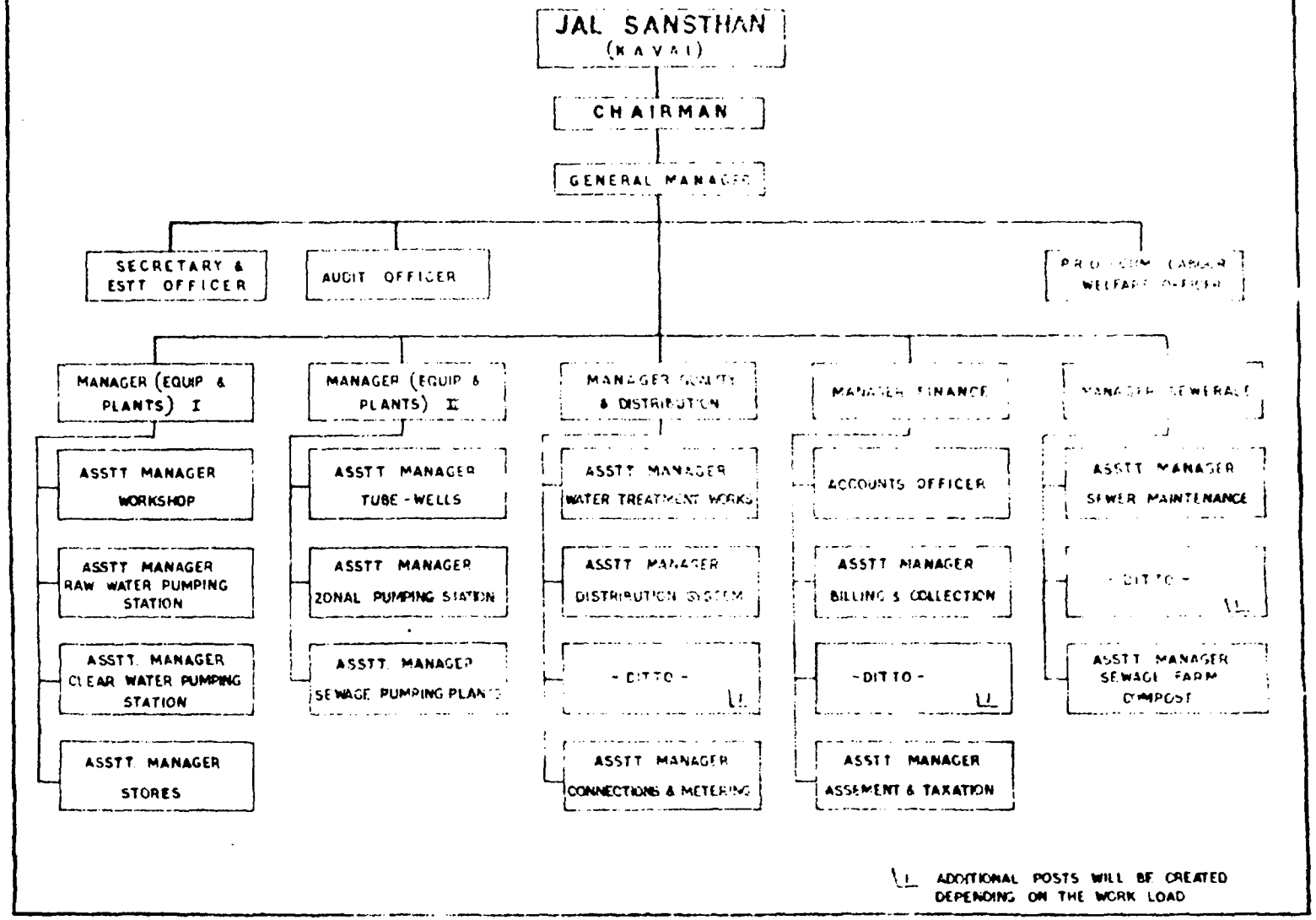


NOTATIONS

E	- EX OFFICIO MEMBER
N	- NOMINATED MEMBER
S E	- SUPERINTENDING ENGINEER
E E	- EXECUTIVE ENGINEER
E E. & P A	- E E & PERSONAL ASSISTANT
M.	- MANAGER
DY. M.	DEPUTY MANAGER

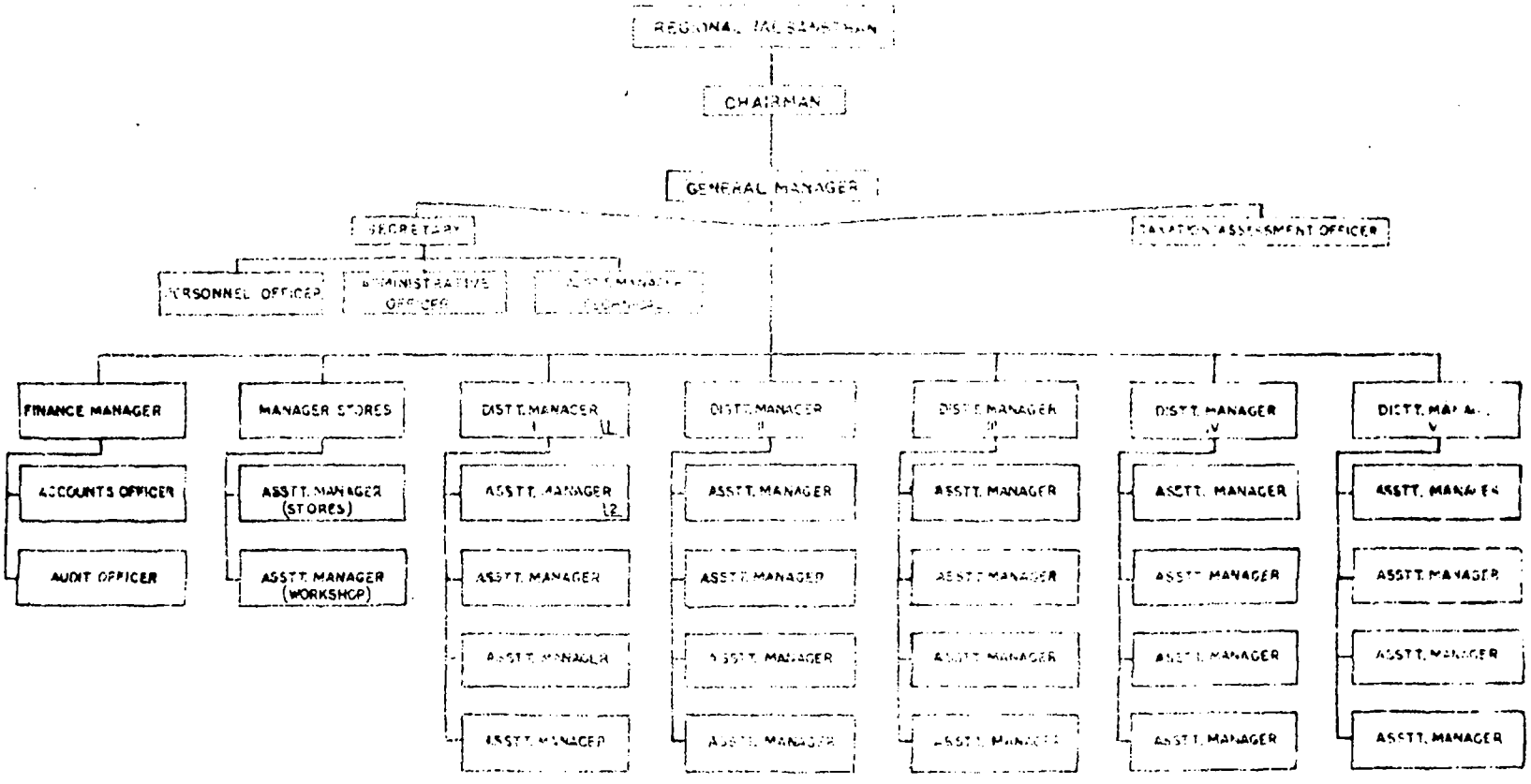
APPENDIX - 2.

PROPOSED ORGANISATION CHART OF 'KAVAL' JAL SANSTHAN



APPENDIX - 3.

PROPOSED ORGANISATION CHART OF REGIONAL JAL SANSTHAN



1. THE NUMBER OF DISTT MANAGERS WILL DEPEND ON THE NUMBER OF DISTRICTS AND/OR MAJOR WATER WORKS
2. THE NUMBER OF ASSTT MANAGERS WILL DEPEND ON THE NUMBER OF SUB-DIVISIONS/GROUPS OF VILLAGES COVERED

Working Paper No. 8

GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

BANGALORE, INDIA

11-14 JUNE 1979

Working Paper No. 8

ORGANIZATION AND FINANCING OF WATER SUPPLY AND SEWERAGE BOARDS

A CASE STUDY FROM TAMILNADU

by

K. MADHAVA SARMA*

1 LOCATION

Tamil Nadu is situated at the South-East corner of the Indian Peninsula. It lies between 8°5' and 13°5' of Northern Latitudes and 76°15' and 80°20' of Eastern Longitudes. Tamilnadu is bounded by Karnataka and Andhra Pradesh States in the North, Bay of Bengal in the East, Indian Ocean in the South and Kerala State in the West.

2 GEOLOGY

The major portion of the State is composed of Crystalline rocks of Archaean age. The sedimentary areas along the coast mainly consist of recent alluvial deposits, tertiary and cretaceous formations with sporadic occurances of upper Gondwana beds. The geological classification of the State is given below:

Table 1

AREAS COVERED BY VARIOUS GEOLOGICAL FORMATIONS

Description	Area in Sq. Km.	Percentage of whole area
1. Archaean	95 677	73.4
2. Sedimentaries		
a) Gondwanas	2 513	1.9
b) Crotaceous	1 513	1.2
c) Tertiary	8 746	6.7
d) Quarternary alluvium	21 908	16.8
Total area of the State including Pondicherry	130 357	100.00

3 RAINFALL

Tamilnadu receives its rainfall from South-West monsoon from June to September and from North-East monsoon from October to December. A major part of the State depends on the North-East Monsoon for its requirement of water. The average annual rainfall for the entire state is 945.7 mm. The districts of Coimbatore, Ramanathapuram and

*Managing Director, Tamilnadu Water Supply and Drainage Board, Madras

Tirunelveli register comparatively low rainfall i.e. between 500 mm and 1000 mm whereas Nilgiris District registers the maximum about 1500 mm to 1750 mm. The total number of rainy days in a year is about 50.

4 GENERAL STATISTICS

The State extends over an area of 130000 sq. km. with a population density of 317 persons per sq. km. Agriculture is the main profession with 62% of the working population engaged in it. The state is fed by a surface irrigation system through five independent major river basins of Palar, Pennar, Cauvery, Vaigai and Thambaraparani. Rice and Millets form the major produce with respective utilisation of 38% and 31% of the total cultivable areas of 6.3 million Hectares. The State has a hydel and thermal power system with a generation capacity of 1764 MW and a power distribution net work extending to about 88,000 Km. Industrial production covers a variety of items and ranges from major industries like High Pressure Boilers and Railway coaches to Small Scale Industries like handlooms and safety matches. The State has a good high way system with a road mileage of 0.73 Km. per sq.km. of areas. The State has a birth rate of 22.88 and death rate of 8.27 per 1000.

The State Budget for the year 1978-79 provides for a Revenue Receipt of Rs.6801 millions and capital receipt of Rs.3405 millions. Corresponding Budget Provisions for expenditure are Rs.7268 millions and Rs.3364 millions.

5 DEMOGRAPHIC DISTRIBUTION

As per the 1971 census, the total population of Tamil Nadu is 41.2 millions. Tamil Nadu is divided into local self Government communities of village Panchayats, Town Panchayats, Panchayat Townships, Municipalities, Municipal Townships and Corporations. These local bodies are governed by specific Acts and have defined territorial jurisdiction. These local bodies are generally responsible for primary education, sanitation, water supply, roads and such other local services as designated by the legislation concerning them. The population distribution among these local bodies is given below.

POPULATION DISTRIBUTION

Sl. No.	Type of the Local Body	No.	Population (Millions)
1.	Corporations	2	3.020
2.	Municipalities	99	5.901
3.	Municipal Townships	8	0.220
4.	Panchayat Townships	13	0.246
5.	Town Panchayats	618	6.113
	Total Urban	740	15.500
6.	Village Panchayats	12596	25.700
	Total		41.200

The distribution of population between urban and rural is 38% and 62%. Of the urban population 59% live in larger towns which are 109 in number while the remaining 41% live in 631 smaller towns.

6 PRESENT STATUS OF WATER SUPPLY AND SEWERAGE

In Tamilnadu Water Supply schemes were initiated only towards the end of the last century. The first two water supply schemes taken up were in Madras City and Ootacamund and they were completed almost at the same time in 1874. Subsequently, by 1900 water supply schemes were provided in four more towns and by the time of independence in 1947, water supply was available in 45 towns in the State.

The first attempt at planning was made during 1947 when a water supply and drainage committee known as "Kaleswara Rao Committee" composed of legislators and officials was constituted by the State Government in 1947. This committee gave recognition to the importance of water supply and drainage schemes in the fight against diseases and formulated a priority list of towns and compendium of requirements, based on factors like endemicity, scarcity, population, religious and commercial importance etc. Broadly based on the Committee's recommendations, the three five year plans were carried out from 1951 followed by three Annual Plans.

The progress in the provision of Urban Water Supply Schemes during the five year plans (FYP) is in the table below:

SCHEMES IN OPERATION

	Water Supply		Sewerage	
	New	Improvements	New	Improvements
1. Prior to I FYP	44	-	5	-
2. During I FYP (51-56)	8	2	2	-
3. During II FYP (56-61)	18	10	2	3
4. During III FYP (61-66)	19	9	2	1
5. Annual Plans (66-69)	15	11	3	1
6. During IV FYP (Part) 69-71	12	9	1	-

The population covered upto this period was 4.5 millions and the investment Rs.271 millions.

The TWAD Board was formed on 14 April 1971 and there has been a substantial progress in the field of water supply from this date. The investment on urban water supply and Sewerage schemes excluding Madras city from this date to the end of 78-79 is Rs.623.87 millions. With this the present status of coverage of urban water supply is in table on page 4.

STATUS OF URBAN WATER SUPPLY

Grade	No.	Population 1971 (mil.)	Covered or in progress			Not yet covered		
			No.	Population (mil.)	% population	No.	Population (mil.)	% population
Corporations	2	3.020	2	3.020	100	0	0	0
Municipalities	97	5.850	92	5.652	96.6	5	0.198	3.4
Municipal Township	8	0.220	5	0.137	62.3	3	0.083	37.7
Panchayat Township	13	0.246	8	0.203	82.5	5	0.043	17.5
Town Panchayat	620	6.164	147	2.091	33.9	473	4.073	66.1
Total:	740	15.500	254	11.103	71.6	486	4.397	28.4

Similar figures for Drainage are in the table below under the same headings:

STATUS OF URBAN DRAINAGE

Corporation	2	2.020	2	3.020	100	-	-	-
Municipalities	97	5.850	13	2.300	39.3	84	3.550	60.7
Municipal Township	8	0.220	1	0.039	17.7	7	0.181	82.3
Panchayat Township	13	0.246	2	0.062	25.2	11	0.184	74.8
Town Panchayat	20	6.164	1	0.023	0.4	619	6.141	99.6
Total:	740	15.500	19	5.444	35.1	721	10.056	64.9

Even the coverage mentioned above in respect of both Water Supply and Sewerage does not specify adequacy but only a reasonable provision consistent with funds availability. In other words, population served in each local body is less than the total population. Proposals for updating other schemes in the urban sector are also on hand with assistance from the State or the L.I.C.

As at present the population served by water supply and sewerage schemes including those which are in progress are respectively 71.6% and 35.1% only.

The number of schemes which are under investigation and planning as on date are in the table below:

SCHEMES UNDER INVESTIGATION AND PLANNING

	Water Supply		Sewerage	
	New	Improvements	New	Improvements
1. Corporation	-	1	-	1
2. Municipality	4	24	16	1
3. Muncipal Township	3	1	2	1
4. Panchayat Township	1	2	1	-
5. Town Panchayats	130	2	5	-
Total:	138	30	24	3

7 RURAL WATER SUPPLY

The expenditure on Rural Water Supply during the previous plans is given in the table below:

EXPENDITURE ON RURAL WATER SUPPLY

(Rs. in millions)

I Five Year Plan (51-56)	19.02
II Five Year Plan (56-61)	31.99
III Five Year Plan (61-66)	58.80
Annual Plans (66-69)	36.56
Annual Plans (69-71)	29.08
Total:	175.45

The physical progress in provision of rural water supply during the recent years are given in the table below:

PHYSICAL PROGRESS FOR RURAL WATER SUPPLY

Year	No. of villages covered	Population benefitted in Millions	Expenditure incurred in Millions
1971-72	2	0.0005	0.215
1972-73	220	0.087	15.972
1973-74	737	0.410	16.552
1974-75	2649	1.323	50.562
1975-76	4037	3.169	50.375
1976-77	8472	2.879	88.800
1977-78	2446 (Hamlets)	0.745	55.000
1978-79	1404	0.880	87.740

8 GOALS FOR FUTURE URBAN SCHEMES

The task ahead for urban water supply and sewerage schemes will be (i) improvement, extension and updating of schemes under operation and (ii) provision of water supply and sewerage schemes for all towns where the schemes are not in operation or construction. New water supply schemes to be taken up are in respect of 5 Municipalities, 3 Municipal Townships, 5 Panchayat Townships, and 473 Town Panchayats i.e. a total of 486 local bodies covering a population of 4,397 millions corresponding figures for sewerage are 84, 7, 11, 619 and 721 respectively covering a population of 9.056 millions.

All the water supply and sewerage schemes so far implemented have been designed for a population to be reached 30 years hence. Most of the component units of the schemes are no doubt designed for a 30 year life while units like borewells, pumpsets etc. are designed for a 15 year life in view of their reduced life span. In certain cases even reservoirs and distribution systems are not provided for full design requirements, on grounds of economy. In many cases, the population increase has far outrun the expectations leaving a widening gap between the demand and the capacity. It has therefore, been programmed to organise a systematic review of the functioning of the existing schemes after they have served for a period of 15 years and evaluate their further needs to cater to increased population. For example, the further requirements of schemes commissioned in 1964 would be considered sufficiently in advance so that the improvements scheme could be taken up in 1979. It is therefore necessary to take up every year the task of updating all schemes executed 15 years earlier.

9 GOALS FOR FUTURE FURAL SCHEMES

For Rural Water Supply, the goal of the Government is to cover all the habitations in the rural areas of the State according to certain norms which will provide potable and perennial water inside each habitation, with only a public distribution system. Based on the results of the survey conducted in 1977, it is estimated that it will cost Rs.1400 millions to achieve this goal in rural areas. The proposed Sixth Plan starting in 1978-79 has an allocation of Rs.7,000 millions for the entire country and the share of Tamil Nadu in this Plan will be adequate to cover all the villages according to the norms proposed during the next 10 years.

CHAPTER II - ORGANIZATION

1 TWAD ACT

The Tamil Nadu Water Supply and Drainage Board (TWAD) has been constituted in April 1971 as the successor to the Public Health Engineering and Municipal Works Department (PHE & MW) under an Act of the Legislature of Tamilnadu. The structure of the Act is as follows:

Preliminary (Sections 1 & 2)

Creation and constitution of the Board, Chairman, Managing Director, term of office and conditions of service, disqualification and removal (Sec. 3-11) officers and members of the staff of the Board (9-11) Conduct of the Business of the Board (12-15) Functions of the Board (Sec. 16) General Powers of the Board (Sec. 17) Investigation, preparation and execution of the Schemes by the Board (Sec. 18-27) Transfer of assets and liabilities of the Public Health Engineering and Municipal Works Department to the Board (Sec. 28-33) Finance, Accounts and Audit (34-48) Penalties for Violation of the Act (Sec. 49-54) Miscellaneous (Sec. 55-71) Powers of the Government and Board to make rules and regulations (Sec. 72-73)

2 BOARD OF DIRECTORS

The Constitution of Board of Directors is as follows:

CHAIRMAN							
Official Directors Representing Departments of				Technical Director	Whole-Time Director	Directors to represent elected bodies	
Health	Rural Development and Local Adminstration	Finance	Public Works	Madras Metropolitan Water Board	A person with experience in Public Health Engineering and not connected with Government.	Managing Director	Chairman, Chamber of Municipal Councils	President Tamilnadu Panchayats Union

The Chairman has been a Member of the Assembly of the Ruling party of the State concept. In 1976 when during the President's Regime, the Secretary, Rural Development and Local Administration has been the Chairman. The Chairman, Chamber of the Municipal Councils is elected by all the Chairmen of Municipal Councils while the president, Tamilnadu Panchayat Union, is elected by all the Chairmen of the 374 Panchayat Unions of the State (Blocks or Panchayat Samities in other parts of the country). During the last 3 years, the Municipal Councils and Panchayat Unions are under supersession by the Government and so these two

ex-officio directorships are vacant. The Chairman, Managing Director, the representatives of the departments and the 'Technical' Director are appointed by the Government. The term of office of Chairman, Managing Director and non-official Directors is to be prescribed by Government. The Chairman and other non-official Directors may be removed by Government for sufficient cause after giving an opportunity to them to defend themselves.

3. FUNCTIONS OF THE BOARD

The Board shall perform all or any of the following functions namely:

(a) at the instance of the Government or a local authority:

(i) Investigating the nature and type of schemes that can be implemented in the area of any local authority for the provision of drinking water and drainage facilities;

(ii) Planning and preparing of schemes including schemes covering areas falling within the jurisdiction of more than one local authority for the purpose of providing the supply of drinking water or drainage facilities;

(iii) Executing such schemes under a phased programme for the provision of drinking water and drainage facilities within the areas of local authorities to which such schemes relate;

(b) providing technical assistance or giving advice to local authorities in the execution and maintenance of water supply and drainage works;

(c) establishing and maintaining schemes incidental to water supply and drainage such as testing of water, designing of plant for purification of water, conducting research relating to water supply and maintaining schemes;

(d) any other matter which is supplemental, incidental or consequential to any of the above functions, and

(e) such other functions as may be prescribed.

4 OTHER SALIENT FEATURES OF THE ACT

The other salient features of the Act are given below:

(1) The Managing Director (MD) is the Chief Executive of the Board subject to such regulations as may be framed by the Board and will preside over the meetings of the Board in the absence of the Chairman.

(2) The Board may associate suitable persons with itself and also can invite any person to offer his views. It can form Committees as it deems fit.

(3) While the Board can create any post and appoint persons, they shall not create or appoint any person to, without the previous approval of the Government, any post, the maximum monthly salary of which exceeds one thousand six hundred rupees.

(4) The Board has been given powers to acquire, etc., property, powers under land acquisition act and powers to incur any expenditure or enter into any contract. This implies that the Board need not take the orders of the Government regarding any contract whatever be the size of the contract.

(5) The investigation of a scheme is at the cost of the authority who proposes the scheme. In case of a local authority, it shall agree to bear the cost of the scheme and its maintenance. The Board should satisfy itself about the feasibility of the scheme and then forward it to Government. The Government accord the approval to the scheme and the Board shall execute and apportion the cost of the scheme among the local bodies concerned. If local bodies do not pay the cost of the scheme to the Board the Government shall pay the same to the Board and recover it from the local bodies.

(6) The Board is authorised to charge supervision and centage charges at prescribed rates.

(7) The local authority can not alter or withdraw its concurrence to a scheme without prior permission of the Government.

(8) If a local authority refuses or fails to pass a resolution for a scheme considered necessary by the Government, the Government can direct the Board to undertake the scheme and recover the cost from the local authority.

(9) The Board may refuse to prepare or execute a scheme proposed by a local authority, if it considered it unnecessary or not feasible or unexecutable, but the Government may review the orders of the Board.

(10) No local authority shall, without the approval of the Board, investigate, prepare or execute any scheme provided the Board shall not give such an approval if the scheme is likely to cost more than Rs. Rs.50,000/-. Thus, water supply and drainage schemes of more than Rs.50,000/- shall be executed only by the Board.

(11) Regarding the personnel of the erstwhile department, every person serving the Department is deemed to be a servant of the Board and ceases to be an employee of the Government, unless the employee concerned intimates that he does not want to become a Board employee. Only one or two persons had expressed such an intention. There is a protective clause that the conditions of the service as obtaining in the Government shall not be varied by the Board to an employee's disadvantage except with the previous approval of the Government.

(12) Power has been given to the Government to direct that any other categories of employees be absorbed in the Board. This is intended to offer personnel to the Board to the extent necessary.

(13) The Board has been authorised, subject to conditions prescribed by the Government, to raise loans from any bank, corporation, LIC, Government or by debentures and it is permitted to give loans to local authorities.

(14) The estimates of income and the expenditure of the Board should be submitted to the Government and their approval obtained.

(15) The Board shall give an annual administrative report to the Government and this shall be laid before the State legislature.

(16) The accounts may be prepared in the manner prescribed by the Board and the Government shall appoint an Auditor. At present the Accountant General is appointed as the Auditor and the accounts are maintained in a commercial form. The accounts are sent to the Government and are placed before the Legislature. The Board has powers to write off sums upto Rs.25,000/- and for exceeding this limit prior Government approval is necessary.

(17) The MD has powers in case of emergency, to appoint any officer required and to execute any work considered essential by him.

(18) The Government have got powers to issue any orders to Board or local authority and they are bound to execute such orders.

(19) The Government are the arbitrators in any dispute between the Board and a local authority.

(20) Any dues to the Board can be recovered as arrears of land revenue.

5 ORGANIZATION HISTORICAL BACKGROUND

The department of Public Health Engineering which consisted of one circle headed by a Superintending Engineer (SE) and 3 divisions in 1953-54 has grown to one of a Chief Engineer, (CE) 2 circles and nearly 8 divisions in 1969 with the annual expenditure going up from less than a million Rupees to about 14 million Rupees. The department dealt only with Urban Water Supply and Drainage leaving Rural Water Supply (RWS) to be provided by the Panchayats and Panchayat Unions under the direction of the department of Highways and Rural works. The department also had the responsibility of supervising the Water Supply and Drainage works in the Corporation of Madras and all works of all Municipalities. With the arrival of Life Insurance Corporation of India (LIC) as a financing agency, in 1969 the water supply activities have picked up greatly. Tamilnadu has decided to utilise the L.I.C. loans only for Urban Water Supply and as a result the number of schemes and expenditure in this sector have gone up sharply from 1970. The TWAD Board has been formed in 1971 with the eneineering staff of one Chief Engineer, 6 circles and about 20 divisions attending to investigation and execution of Urban Water Supply and Drainage schemes. The Board also continued supervision of all the Municipal works including the maintenance of water supply and drainage schemes.

6 TWAD AND RURAL WATER SUPPLY

The RWS sector has received great filip in 1970 with the import of deep-well drilling rigs with the help of UNICEF. A programme of drilling 8850 tube wells for drinking water in the Scarcity affected villages, sanctioned by the Government of Tamilnadu (GOT) in 1970 was initially entrusted to the Highways and Rural Works Department but was transferred to TWAD in 1971 with one division. The next impetus to RWS was provided by the Government of India (GOI) in 1972-73 when they financed the special investigation division which identified scarcity and endemic villages. The Accelerated Rural Water Supply Programme (ARP) of the GOI was executed by TWAD and even though GOI discontinued the scheme the GOT continued to finance schemes for scarcity and endemic villages to be executed by TWAD while Panchayat Unions provided water supply to other categories of villages. The years 1974-75 to 1976-77 were years of severe drought in Tamilnadu. The standard type of RWS scheme normally executed i.e. an open well in the village with a power pump has completely failed with the wells going dry. The drilling rigs of TWAD, capable of drilling upto 300 ft., were looked upon as the saviours and an intensive drilling programme was sanctioned by the GOT during these 3 years. About 11000 bore wells were drilled with a peak of 8,000 wells in 1976-77. Inspite of a 10% complete failure in the wells and inspite of the fact that a large percentage of wells yielded only 2-3, G.P.M., these wells really saved the situation in the rural areas during the drought. This drought generated acepticism regarding the figures of 'scarcity' villages and regarding the reliability of schemes executed in Rural areas. A fresh, computerised survey was therefore conducted by TWAD and Director of Rural Development of all the rural areas and revised priorities drawn up among the villages. The TWAD Board has set up 13 RWS divisions, one for each district, for its drought relief operations and had been recognised as the technical department most suited to solve the RWS problems. The GOT have passed orders in 1977 that all the villages will be tackled in the order of priority according to the new survey and named TWAD as the coordinating agency for the programme. TWAD also got the largest allotment (Rs.60 million in 1977-78) with Panchayat Unions getting Rs.15 million. Both the agencies are to cover villages identified in the survey in the order of priority drawn up. The newly elected Government in Delhi (GOI) also made RWS a priority item and alloted Rs.21.5 millions in 1977-78 with a hint of more to come. The RWS expenditure of TWAD in 1978-79 was about Rs.100 millions compared to about Rs.0.2 million in 1971-72.

7 TWAD AND MADRAS CITY

The erstwhile department of PHE as well as TWAD had the responsibility to supervise the Water supply and Drainage works of Madras Corporation. The corporation got the designs of schemes approved by the C.E., TWAD and was responsible for the construction of all capital and maintenance works relating to the City. An exception to this occurred when the Veeranem Scheme, designed to supply water to Madras City from a distance of 218 KM was entrusted to P.W.D. first and then to TWAD. The project had its own CE and full complement of staff. The Project, beset with technical and legal problems and contractor's bankruptcy, came to a

complete halt in 1975 and has not been resumed. The staff is now very much reduced and looks after the maintenance of work already done and the legal problems. The Water Supply and Sewerage sector of the Madras Metropolitan Areas is handled now by the newly formed Madras Metropolitan Water Supply and Sewerage Board since August 1978.

8 TWAD AND MAINTENANCE OF URBAN SCHEMES

The TWAD, historically, has been responsible only for the construction of schemes. The schemes are handed over, after completion, to their sponsors for maintenance. The personnel and finance needed for maintenance are intimated by the Board to the sponsor and sponsor's willingness to employ the needed personnel and provide necessary funds obtained before the Board recommends the scheme to the Government. Typically for example the Sendamangelam scheme proposal with a capital cost of 2.6 millions estimates that the following personnel are needed for the maintenance.

1.	Electrician Grade II	1
2.	Cleaner-cum-watchmen at Head Works	2
3.	Pipe line fitters	2
4.	Watchmen at Service Reservoir Site	2

The amount needed for maintenance is estimated as follows:

		(in Rupees)
(i)	Cost of Electricity	6,900
(ii)	Establishment charges	23,650
(iii)	Cost of Chemicals	1,550
(iv)	Inspection charges	500
(v)	Repairs, Renewals etc. to pumpsets including wastes and lubricants.	900
(vi)	Telephone charges	1,500
	Total:	35,000

The sponsor is intimated slightly before the completion of a scheme, to have the maintenance staff in position. The TWAD continues to maintain the schemes till the staff is appointed. The Municipal Engineers of all of Municipalities are employees of TWAD and are seconded to the Municipalities. The S.Es. of circles are the supervisory authorities of all the Municipal Engineers in their jurisdiction. The bye-laws of a Municipality which regulate the water supply and sewerage in all respects like tariff, conditions of supply etc. are subject to approval of the S.E. A Mechanical Engineer of S.E.'s office annually inspects the Municipal pumping installations. Any work costing more than Rs.40,000 needs approval by the S.E. The maintenance is thus guided and supervised by the S.E. through inspection and instruction.

There are a number of cases, however, where the maintenance is undertaken by TWAD. Where a scheme serves a large number of local bodies,

without a single dominant local body, the maintenance is carried on by TWAD at the request of the local bodies. The head works, the pumps, and the main pipe line are operated and maintained by the TWAD and water supplied to the local bodies. The capital cost is appportioned among the local bodies according to the water allotted and the annuities are paid by them accordingly. The internal operation and maintenance within a local body is done by the local body itself and the revenues kept by it. The O & M costs incurred by TWAD are paid by the local bodies to TWAD in the same proportion as the capital cost. About 20 schemes are maintained by TWAD at present out of about 130 urban schemes in operation.

9 TWAD AND INDUSTRIAL WATER SUPPLY SCHEME

The TWAD had been entrusted with the responsibility of water supply to industries wherever considered necessary by the Government. The 20 MGD scheme to the Tuticorin Industrial area (with a Fertiliser plant, Heavy Water Plant, Thermal Power generation plant and several industries), Water Supply schemes to Salem Steel Plant, B.H.E.L. and Avadi Heavy Vehicles Factory are some of the schemes executed by the Board. The capital cost of the schemes are borne by the sponsors i.e., G.O.T. or the concerned institution. These schemes are all operated and maintained by TWAD with the expenditure being reimbursed by the sponsor. In case of Government schemes the revenue derived is credited to the Government.

10 TWAD AND MAINTENANCE OF R.W.S.

The RWS schemes executed by TWAD, be they hand pumps or wells with power pumps, are handed over to the Panchayats for operation and maintenance. The TWAD has taken over the maintenance of the deep well hand pumps in the rural areas in 1976 under the pressure of severe drought as they went out of order frequently due to heavy use. The cost of the maintenance is met by the Panchayat Unions with a graded subsidy by the Government in case of financially week Unions. TWAD has appointed a mobile team with an Assistant Engineer with fitters for every 1000 pumps and one fitter, for every 100 pumps at the block level to look after the handpump maintenance. It has also selected caretakers for each handpump in the villages and is training the caretakers with the help of UNICEF in preventive maintenance. There are about 19 mobile teams and 230 fitters now for about 20,000 handpumps in operation.

There is considerable pressure on TWAD to take over the maintenance of power pumps in villages also as the panchayats are unable to maintain them. TWAD hastaken over the maintenance of 2730 pumps in 3 Districts as a pilot scheme, 30 Electricians are appointed with 3 Assistant Executive Engineers to look after these pumps.

11 TWAD ADMINISTRATION AND FINANCE

As a result of the activities mentioned above, there has been considerable increase in the technical part of the organisation. TWAD also has a small administrative wing to look after the Board affairs and the duties hitherto discharged by the Government. TWAD has to prepare its own accounts in

Commercial form and has to provide for internal audit, reconciliation of bank accounts, preparation of employee Accounts, budgetary control etc. These services were previously rendered by the Accountant General. The finance wing has therefore grown considerably.

12 TWAD ORGANISATION CHARTS

There are, at present, 9 circles headed by Superintending Engineers, in the field, under the Chief Engineer, responsible for investigation and execution of water supply and sewerage schemes in Rural and Urban areas. The divisions in these circles are, however functional, looking after either Urban or Rural schemes. There are, at present, 8 investigation divisions, 20 R.W.S. divisions, and 21 urban divisions. The Board is now constructing its own office buildings and has one Executive Engineer with two Assistant Executive Engineers and other staff engaged in the construction of buildings. One Executive Engineer (Mechanical) is in charge of the Workshop at Tiruchirapalli looking after maintenance major repairs and overhauling of the Department Rigs, Compressors, welding plants and other machinary including planning and procurement of spares. At Headquarters the Chief Engineer is assisted by one Superintending Engineer with 4 divisoons for preparation of designs, one Superintending Engineer with 2 divisions for material procurement, one Superintending Engineer with complementary staff to look after establishment and special projects 3 Executive Engineers to monitor the progress of Urban and Rural schemes with complementary staff to answer queries from the Government, the field offices and the public and one Executive Engineer (Research) with staff who is conducting research in sewage and water treatment. The Executive Engineer (Research) also conducts water analysis of samples of water or sewage submitted during investigation in the laboratory located in Madras. A Hydro-geologist assists the Chief Engineer in co-ordinating the work of the geologists of the Board.

The abbreviations used for various posts and scales of various posts are given in Annexure III. Administrative sanction of schemes for which loans are required is to be given by the Government while the schemes of a local body or other institutions who deposit the cost out of their own resources can be adminstratively sanctioned by the Superintending Engineer upto Rs.200,000/- by Chief Engineer upto Rs.500,000/- by the Board if it is more and scheme upto Rs.100,000/- can be technically sanctioned by Executive Engineer; upto Rs. 5.- lakhs by Superintending Engineer while all the schemes of higher cost will be technically sanctioned by Chief Engineer. The detailed designs are all prepared by the Central Designs Section.

All costly materials called listed materials are purchased centrally by C.P.S.O. while all, other materials are purchased by various officers according to the following powers.

Listed Items			Unlisted Stores	
1.	Superintending Engineer, C.P.S.O.	Rs.20,000/-	1. Executive Engineer	10,000/-
2.	Chief Engineer	above Rs.20,000/- upto Rs.100,000/-	2. Superintending Engineer	20,000/-
3.	Board	above Rs.100,000/-	3. Chief Engineer	100,000/-
			4. Board .... above	Rs.1.00 lakh

Chief Engineer

Circles Superintending Engineers (9)			Hydrogeologist	S.E. (Designs) Executive Engineers (4)	S.E. (Purchase of materials) E.Es. (2)	Senior Deputy Chief Engineer Superintending Engineer (Establishment and Spl. Projects)	E.E. (Workshop)	E.Es. (3) Monitoring Cell	E.E. Research	E.E. (Building)
E.E. Einvestigation Division (8)	E.Es. Urban Water Supply (21)	E.Es. R.W.S. Divisions (20)								

The normal organisation of a division, headed by an Executive Engineer is as below:

Executive Engineer

Assistant Executive Engineers (3)	Geological Assistants (in R.W.S. Divisions) (2)	Office				Assistant	1	Junior Engineers (9)
		Technical		Non-Technical		Junior Assistant	1	Workcharged Establishment
		Draftsman II Grade	1	Manager and Divisional Accountant	1			
		Draftsman III Grade	3	Superintendent	1			
		Assistant Draftsmen	1	Assistant	2			
		Blue Print Operator	1	Steno Typist + typist	(1+1)			
				Junior Assistants	6			
				Record Clerk	1			

The normal support given to the Superintending Engineers is given below:

Superintending Engineer							
Executive Engineers	Municipal Engineers	Assistant Geologist	Office				
			Administrative Officer	1	Personal Assistant	1
			Superintendent	2	Assistant Executive Engineer (Technical)	1
			Assistant	4		
			Junior Assistants	6	Asstt. Executive Engineer (Mechanical)	1
			Typists	4		
			Steno-typist	1	Assistant Engineer/ Junior Engineer	5
			Record Clerk	1		
					Draftsman Spl. Grade	1
					Draftsman I Grade	1
					Draftsman II Grade	2
					Draftsman III Grade	4
					Assistant Draftsmen	2
					Blue Print Operator	1

The contracts are settled according to the following powers:

Chief Engineer	upto Rs.2,500,000/-	with tender excess upto 5%
	Rs. 500,000/-	with tender excess upto 10%
Superintending Engineer	upto Rs. 500,000/-	with tender excess upto 5%
	Rs. 100,000/-	with tender excess upto 10%
Executive Engineer	upto Rs.1.00 lakh	with tender excess upto 5% over sanctioned estimates.
Assistant Executive Engineer	upto Rs. 10,000/-	without any excess over estimate.

All tenders above these powers will be decided by the Board.

The secretarial section is headed by Secretary. He looks after the Board matters, matters referred to by Chief Engineer regarding establishment and administration. He is assisted by an Assistant Secretary, 7 Section Officers, 18 Assistants, 10 Junior Assistants and 17 typists. The Assistant Secretary (Projects) looks after the L.I.C. proposals and Loans for Urban projects. He consolidates the loan applications by the local bodies, prepares proposals to Government and L.I.C., and follows them upto sanction.

The finance section is headed by a Financial Adviser and Chief Accounts Officer with the staff shown in the chart. Annexure II. The section scrutinises all papers with financial implications and gives its recommendations. They supervise the work of Divisional Accountants and compile the accounts of the Board. They conduct Internal Audit and manage the funds of the Board. They are responsible for replying to Audit objection by the Accountant General. They are in charge of preparation of Annual Budget and forwarding the same for approval by Government. The stock verification Officer, an Executive Engineer with a compliment staff verifies the stock of divisions once in a year and functions in the finance wing.

A Vigilance Cell, recently started, is headed by a Superintending Engineer of the Public Works Department and consists of a Police Officer, one Junior Accounts Officer, 2 Junior Assistants and one Steno-Typist. The functions of this cell are to conduct detailed enquiries at the instance of Managing Director into any reported malpractices. If the report of the cell reveals the existence of malpractices, disciplinary action is taken under the normal rules.

The organisation charts for the organisation are appended vide Annexures I and II.

13 TWAD PERSONNEL REGULATIONS

The regulations framed for the employees have divided the personnel into five units.

1. The higher administrative and account officers of the Board.
2. The higher Engineers of the Board.

3. The Subordinate Engineers of the Board.
4. The subordinate Administrative and Accounts Personnel of Chief Engineer and the Engineers under him.
5. The subordinate administrative and account personnel added on after the formation of the Board.

A distinction has been made between the departmental personnel and the personnel recruited after the formation of the Board in the Administrative and accounting wing. The latter personnel have the right to all the higher administrative and accounting posts at the headquarters.

14 RECRUITMENT

The mode of recruitment is by a Selection Committee of TWAD through the Employment Exchange and the reservation of posts to the Scheduled and the Backward castes is followed as in the GOT. All the appointments excepting that of Secretary, Chief Engineer and Superintending Engineer can be made by TWAD while the GOT have to approve panels for these posts. The Board is competent to create posts upto the level of S.E. Direct recruitment is provided for upto the level of Executive Engineers even though no such direct recruitment has been made so far beyond the level of Assistant Engineers. Certain regulations are made to regulate promotions as between degree holders and diploma holders in engineering. In the accounts branch, out of the three Financial Advisers who have served, two have been from the Accountant General's office and one a direct recruit. There are one Accounts Officer and two Junior Accounts Officers who are Chartered Accountants and directly recruited. The rest are drawn from the Accountant General's office or the office of the Director of Treasuries and Accounts. While the accounts have been converted to commercial pattern from 1 April 1977 the procedures and rules for expenditure are governed by the various codes of the Public Works Department. Thus the Divisional Accountants of the office of the Executive Engineers who prepare the expenditure account are required to pass an examination conducted by the Accountant General.

There are a number of deputationists still serving in the Accounts branch. In the engineering branch some of the engineers who came on deputation from P.W.D. have beeb absorbed while others have been sent away.

15 POWERS OF CHIEF ENGINEER AND SECRETARY

The Chief Engineer continues to have all the powers previously held by him in respect to transfer, leave, employee advances, promotion etc. of all the administrative and engineering personnel of his office and the offices of his subordinates. The Secretary of the Board is given similar powers for the newly created administrative and accounts sections of the Board. The disciplinary powers are shared between the Board, Managing Director, Chief Engineer and Superintending Engineers.

16 ORGANISATION - A CRITICAL APPRAISAL

At the time of its creation the Board was thought of simply as an instrument to discharge the certain additional duties in administration

and accounting hitherto discharged by the Government and the Accountant General. Thus certain additional posts were created, on scales on par with those obtaining in Government (and higher than in the department of PHE & MW) to discharge these duties. The Chief Engineer's role and office was kept undisturbed. The methods of working and the goals remained the same. The organisation's growth was channelled into the lines already set. No attempts were made to analyse, modify, and update the departmental structure and procedures to suit the changed conditions.

The characteristics of the functioning of the department, which arose primarily from the functioning of the Government itself are as follows:

(1) There was no proper financial appraisal of schemes.

(2) Too many schemes are taken up at a time and too little money was spent each year on each scheme. The Government made allotments each year for each scheme (see Annexure IV).

(3) The schemes took too long for completion. The departmental officers thus had no incentive at all to plan all the aspects of a scheme properly.

(4) The monitoring of schemes was not adequately done.

(5) The preparation of designs and estimates proceeded bit by bit throughout the life of the scheme.

(6) There was no materials purchase system at all excepting a buy-as-you need system.

(7) There was no costing at all and there was no price to pay if costs exceed the estimates beyond reasonable limits.

(8) There was no follow-up of schemes after completion to see if the initial assumptions hold good.

(9) The departments had no planning role in the sector but was expected to merely respond to requests of local bodies or Government.

The formation of the Board created an excellent opportunity to introduce new skills and to modify the structure. It was not utilised. The Board was thought of merely as a device to do more efficiently what was being done. So an additional small structure was added to the existing large structure and both the new and old structures were allowed to grow in their respective patterns already set. The Board was not given the planning role but is simply expected to provide water supply and sewerage facilities as per the requests of local bodies or Government.

This is not to say that the formation of TWAD has not been beneficial for the water supply and sewerage sector. It speeds up decision making at every level. The representatives of the Government who sit around a table in Board Meetings are invariably more reasonable than they are when files are sent to them. There is scope for discussion and exchange of ideas in the Board. Clarifications which take a long time to obtain through correspondence can be obtained immediately from the technical and financial

heads of sections during the Board meeting. While a great revolution in the methods of operation, regarding recruitment of personnel, purchase of materials, award of contracts, etc. is not possible in view of the Government directors objecting to any departure from the norms set by the Government for public sector undertaking, it is still possible to proceed fast within the frame work of the existing Government rules. This will accordingly expedite the decisions and functioning of the departments. This has certainly resulted in absorbtion of larger doses of money, quicker conception and completion of schemes and greater prestige which led to the enormous growth of the sector in a short period (please see Annexure V).

However, this is not enough. The psychological profile of the department, conditioned for nearly a century on scarce money distributed over a larger number of projects, loosely interpreted time and cost schedule for schemes, absence of penalties for non-performance and absence of systematic planning and monitoring, requires to be changed through proper structural changes and induction of new skills. The identification of the changes needed and skills necessary to make the new Board function efficiently in an environment of increased resources and increased accountability, should be done, preferably by an expert outside the Government. The existing personnel are unlikely to suggest induction of new skills about which they have little idea. Newly inducted persons may prove the existing ideas wrong and will be viewed as a threat by those in position now. Only an outside expert will be in a position to arrive at the correct solution to the problems and convince the decision-making authority about the need for changes. Proper technical and financial appraisal of schemes is being done now only under the compulsion of an outside financing agency which will not part with its money unless such appraisal is done. The other source of financing i.e. the Government has neither the time nor the inclination to ask too many probing questions before the sanction of a scheme. The TWAD has therefore, not developed fully the capability to answer such questions. Now, however, the Life Insurance Corporation and World Bank who are becoming large soucres of financing, have started to ask these questions and we are trying to equip ourselves properly. I would, recommend that a thorough study may be made of the following aspects among other things, before forming a Board and recommendations of the study be implemented in all new Boards.

(1) Transfer of assets and liabilities and staff and the principles on which these are to be done.

(2) Organisational structure, job descriptions

(3) Training plans and manpower planning and development

(4) Service regulations and personnel policies

(5) Accounting principles, costing system and budgetary control systems.

(6) The project planning, appraisal and control systems

(7) Management information system

(8) Internal Audit

(9) Materials Management

17 TWAD FUTURE PROSPECTS FOR ORGANIZATION

The TWAD Board has proposed to the World Bank a 110 crore scheme to provide Water supply to 230 town Panchayats, drainage to 2 Municipalities and improvements to 35 Municipalities. Hopefully, the scheme will be agreed to by the World Bank and will start functioning from 1 July 1980. This would increase the current annual expenditure of about Rs.250 million to Rs.500 million. This increase would certainly require a thorough revamping of the structure and organisation. To examine this restructuring, the Board has appointed M/s Fergusson and Company to suggest changes and their report is expected shortly. It is hoped that the World Bank assistance would make a qualitative difference to the functioning of the Board apart from the quantitative difference.

CHAPTER III - FINANCIAL ASPECTS OF THE BOARD

1 PRELIMINARY

The formation of the Board was in effect reconstitution of the erstwhile Public Health Engineering and Municipal Works Department into an autonomous body. The Assets and Liabilities held by the PHE and Municipal Works Department on 14 April 1971, i.e., the date of formation of the Board, were transferred to the Board. These assets were in the form of materials such as pipes, valves etc. No separate share capital was raised by the Board on its formation. During the year of formation (1971-1972), the Board obtained a ways and Means advance of Rs.200 lakhs from the State Government to meet its immediate commitments. The Board approaches the Government for sanction of ways and means advances as and when finance is required.

2 SOURCES OF FINANCE FOR WORKS

The sources of finance of works undertaken by the Board are as follows:

i) Loans and Grants advanced by Government of Tamilnadu

ii) Loans and grants advanced by Government of India

iii) Debenture loan proceeds

iv) L.I.C. loans

3 DEBENTURES FLOATED

The Veeranam Water Supply Project for the supply of water to Madras City was transferred to TWAD by the Government in 1973 and this Project is now held by the Board as a capital work. Expenditure on this project is met from the loans obtained from State Government and debenture loans contributed by L.I.C. and Bankers. A debendutre loan of Rs.50 millions bearing interest at 7.5% per annum raised in the name of Corporation of Madras toward Veeranam Project was fully contributed by the L.I.C. of India. Another debenture loan of Rs.55 millions bearing interest at 6% per annum issued during 1973-1974 for this scheme was contributed by Commercial Banks.

The debenture proceeds of Rs.50 millions bearing interest at 7.25% per annum floated in 1972-73 are being utilised to meet the internal commitments of the Board for other schemes.

4 SOURCES OF FINANCE - URBAN WATER SUPPLY AND SEWERAGE WORKS

The position of financing the execution of Urban Water Supply and Sewerage Schemes is as follows:

(a) The Tamilnadu Government grant to the local body as loan 1/3 of the estimated cost of the schemes but pay the amount directly to the TWAD Board.

(b) L.I.C. grants to TWAD Board, loan to an extent of 2/3 of the estimated cost of the scheme. The repayment of these loans along with the interest is guaranteed by the Government of Tamilnadu.

(c) A separate agreement is concluded between the TWAD Board and the local body to the effect that the loan raised by the TWAD Board is on behalf of the local body and the local body agreeing to repay the principal along with the interest to Government.

(d) Whenever repayment to L.I.C. falls due, the Government provide requisite funds to TWAD Board which in turn remits the amounts to L.I.C.

(e) Based on the undertaking given by the local body referred to in (c) above the local bodies repay loans granted by L.I.C. directly to Government. The L.I.C. loans are repayable in 25 years with three years moratorium. The Government loans are repayable in 30 years in the form of annuities where the interest on loans is capitalised and the amount is payable every year covering both principal, and interest. The rate of interest for the L.I.C. and Government loans is 8-1/2%.

The quantum of assistance received from the L.I.C. and the Government for L.I.C. assisted schemes from 1971-1972 till 1978-1979 for Urban Water Supply and Sewerage schemes is indicated below:

Rs. in millions

Year	Water Supply Scheme			Drainage Schemes			Grand Total
	State Loan	L.I.C.	Total	State Loan	L.I.C.	Total	
1971-72	18.310	43.220	61.530	3.740	13.950	17.690	79.220
1972-73	25.690	14.510	40.200	1.410	3.220	4.630	44.830
1973-74	17.410	24.840	42.250	4.270	5.440	9.710	51.960
1974-75	25.490	45.500	70.990	3.130	-	3.130	74.120
1975-76	28.480	23.930	52.410	5.740	11.070	16.810	69.220
1976-77	24.115	43.960	68.075	5.550	9.540	15.090	83.165
1977-78	45.280	45.060	90.340	5.310	15.740	21.050	111.390
1978-79	43.243	50.543	93.786	8.619	7.557	16.176	109.962
Total:	228.018	291.563	519.581	37.769	66.517	104.286	623.867

Besides these loans, TWAD Board also uses its own resources, obtained from the debendutres for the execution of the schemes as and when required. This is recouped from L.I.C. funds or Government funds in the next year.

5 SOURCES OF FINANCE - RURAL WATER SUPPLY

Works on Rural Water Supply sanctioned by the Government are entrusted to TWAD for implementation. The finance needed for this work is obtained from the Government of India and Government of Tamilnadu as grants. Grants sanctioned by the Government of India and State Government for this work for the years 1971-1972 to 1978-1979 are as follows:

Year	Grants received from	
	Central Government	State Government
	(Rupees in millions)	
1971-1972	-	0.274
1972-1973	10.000	2.000
1973-1974	9.500	-
1974-1975	-	45.000
1975-1976	-	35.000
1976-1977	-	120.593
1977-1978	21.730	50.000
1978-1979	40.400	79.000

The Government have ordered in 1977 that the villages must contribute 20% to 50% of the capital cost of the scheme, the contribution depending on the financial soundness of the Panchayat Union in which it is located. However, in practice, it happens that costly schemes are located in the financially weakest Panchayat Unions as, such Panchayat Unions, located in unirrigated and dry areas and having a very low income, have very little groundwater and would need costly transportation of water from a distance through pipes. As the outlay on RWS has enormously increased the contributions due also have increased and only a few are in a position to pay. Thus the contribution has not been a real source of funds.

6 SOURCES OF FINANCE - MAINTENANCE OF SCHEMES

Besides execution of schemes, the TWAD Board also maintains certain schemes. Government Water Supply Schemes intended for supplying water to Industries and Institutions are being maintained by the Board on behalf of the State Government. The maintenance cost is met by the State Government. Water Supply Schemes which supply water to more than one local body are maintained by the Board. Certain schemes are maintained by the Board as a temporary arrangement pending their handing over to the concerned local body. Maintenance costs in these cases are recovered from concerned local bodies. In case of RWS while the cost of maintenance of handpumps is partly subsidised by Government of Tamilnadu, the cost of maintenance of power pumps wasexpected to be recovered completely from the Panchayats concerned. (see Annexures VII and VIII) The annual works outlay in this regard will be about Rs.100 lakhs.

In addition to the above works TWAD executes schemes on behalf of Government or private institutions whenever the schemes are entrusted and sufficient funds deposited with it.

7 SOURCE OF FUNDS FOR INVESTIGATION

As per the TWAD Board Act, the investigation charges of water supply and Drainage Schemes should be deposited by the concerned Municipalities/ Town Panchayats concerned in advance. Recently, the Board has decided to take up investigation of schemes in Town Panchayats in anticipation of deposits and merge the investigation charges with the cost of the scheme. This has been done to enable TWAD to proceed with the investigation speedily.

8 SOURCE OF FINANCE FOR THE BOARD EXPENDITURE

i) Petty supervision and contingent charges

In order to meet the cost of work charged establishment, skilled and unskilled labour, engaged in the execution of work, a petty supervision and contingent charges at 5% of the cost of the work is included in the estimate of the work. At present there are about 2577 employees under Workcharged Establishment in the Board.

ii) Centage Charges

The TWAD Board levies centage at the rate of 15% or 15-1/2% on the work expenditure on every work towards the Service charges. This centage approved by Government, is expected to be apportioned as follows:

		For a scheme of more than Rs.200,000.- percentage of works outlay.	For a scheme of less than Rs.200,000.- percentage of works outlay.
(a)	For establishment employed on execution, supervision and direction.	10	10
(b)	For pensionary charges	1-1/2	1-1/2
(c)	For preparation of plans and estimates	2-1/2	2-1/2
(d)	For scrutiny by the Chief Engineer Chief Engineer	1/2	Nil
(e)	For audit and accounts	1	1
		15-1/2	15

This is the main source of income to the TWAD Board. The Board meets the cost of its establishment and other administrative expenses from out of this centage. The table below shows the yearwise details of centage realised and establishment etc., expenditure incurred by the Board during the years 1971-1972 to 1977-1978.

Year	Centage realised	Establishment and Administrative Expenditure (Rs. in millions)
1971-1972	7.554	8.939
1972-1973	10.358	11.653
1973-1974	9.668	13.814
1974-1975	18.106	17.222
1975-1976	17.509	19.197
1976-1977	23.255	21.523
1977-1978	21.937	24.678

iii) Other sources

By the prudent and meticulous cash management followed by the Board, it has become possible to invest a portion of the cash available with it in term deposits, without affecting the progress of works and to earn considerable amounts every year by way of interest. This interest has come in handy to offset the deficit in centage.

9 PROFIT AND LOSS OF BOARD OPERATIONS

The details of Income and expenditure Statement, since the formation of the Board is appended in Annexure VI. The expenditure has been much higher than the income till 1976-77. This clearly shows that the establishment inherited by TWAD from the Department was more than adequate according to the centage norms set by the Government. However, the activities of the Board have expanded considerably since 1976-77, with less than proportionate expansion in the staff, resulting in small surpluses. The income is boosted up by interest earned on the debenture money invested at interest rates higher than payable.

10 A CRITICAL APPRAISAL OF THE FINANCING PATTERNS

As seen above, the centage fixed for the operation of the TWAD is adequate to discharge its duties properly. The centage is based on the assumption that a standard division headed by an Executive Engineer and costing about Rs.1/2 million per year will be able to execute works of about Rs. 6 millions a year. This norm has been fixed on the basis of long experience. Considering the inadequate planning and monitoring in the department, which can be improved through structural and procedural changes, it will be possible to improve these norms and reduce the centage. We hope it would be possible to do so in TWAD with the increased turn-over expected in future.

As already explained, both under the Act and in practice, it is the Government which guarantees the repayment of loans taken by the local

bodies from various financial institutions. This means that any shortfall in repayment is made up by the Government which indirectly means subsidies or moratorium to the local bodies. The present repayment rate of the local bodies is only about 50% of the amount due. The reasons for this shortfall have been analysed and some of them are given below:

1) The loans are expected to be repaid by the local bodies through (a) increase in water taxes levied on the general population and (b) revenue from water supply from the consumers through water rates at prescribed rates. It is found that in some cases, the taxes or rates were not increased to the requisite level because of political compulsions.

2) The L.I.C. gives a moratorium of 3 years for the first instalment, two years for the second instalment and no moratorium for the third instalment. The Government give no moratorium at all for its share of loans. Thus, the local bodies have to start repayment immediately in case of Government loans even though it derives no income from the Water Supply Scheme. They are unable to do so.

3) Some of the schemes are delayed in execution for more than 3 years due to problems like land acquisition, non-availability of materials and delay in obtaining permission from other departments like National and State Highways for laying of pipe lines. This delay means that the local body gets no income at all from the Water Supply scheme even though loans become due for repayment.

4) Even when the local bodies levy taxes and water rates as promised, the number of house service connections do not build up as expected immediately. It may take 3 to 4 years to give the requisite number of house service connections for reason of lack of applications or administrative delays. Thus, during this period, the local body is unable to meet the full commitments of the amenity.

The L.I.C. demands repayment of principal in equal instalments and interest on the remaining portion of the principal every year while the Government charges a fixed annuity taking into account the principal and interest.

6) The demand for house service connections depends on the economic status of the towns. It is estimated that a maximum of 30% to 40% of the houses in an average town will avail of the house connections. The rest of the houses are semi-permanent structures belonging to weaker sections of the society. For the benefit of these sections, public taps are provided by the local bodies. Some times, due to competition among the elected councillors, such public taps are provided even in areas where affluent sections live. In such cases, the number of house service connections fall below the expectations.

7) In areas where ground water is available there is a tendency to take house service connections when, due to drought, ground water level in the domestic wells goes down but refuse connections when the domestic wells have plenty of water in good seasons.

8) For some of the towns, because of the non-availability of water in nearby areas, water will have to be pumped from a long distance. In such cases, both the capital and maintenance costs are very high. This factor coupled with poverty of the towns simply makes it impossible for the local body to meet its commitments. The proper course to be adopted in such a case is to calculate the maximum capital cost that can be borne by the local body and treat the rest as subsidy. However, since the Government has a policy of taking up only viable schemes, there is a tendency on the part of local bodies to make tall promises regarding the extra revenue that they will raise to meet the annual commitments. If the local body really has to charge properly for the water supply, the rate becomes so high that very few people can afford the water. We have seen in our experience that a rate of more than one rupee per 1000 litres cannot be afforded by the consumers. Any scheme which costs more than Rs.125 per capita is most likely to require a subsidy. In some cases, the schemes become viable if a proper moratorium is given for a certain number of years, say, 4 or 5 years.

Discussions are now going on with the Government to view this realistically. Even now, the Government are indirectly subsidising the schemes by allowing local bodies to fall in arrears. It may be better to look into this and change this policy.

The present policy of the Government to meet or guarantee the cost of the schemes and having no control at all on the costs, suits the TWAD Board very well in that that construction activities never suffer for lack of money. However, there is no accountability on the part of the T.W.A.D. Escalation in costs is invariably met without question as no scheme can be abandoned in the middle. Failure to stick to the promised costs or promised delivery of the required quantity of water on the part of the TWAD carried no penalty whatsoever. The penalties are all borne by the local bodies or by the Government. The structural changes required to change this and make the TWAD an accountable body are (1) make the TWAD responsible for operation and maintenance of all schemes and run itself as a commercial undertaking or (2) make the TWAD enter into an agreement with the local bodies to deliver water wholesale to the local bodies in required quantities at agreed rates with penalties for breach of agreement. The first solution implies that the role of local bodies will be diminished considerably. Considering the need for development of the local bodies and democracy at the grass roots, this will be a retrograde step. The second alternative is being examined now.

Annexure III

Abbreviation used	Designation of post	Scale of pay
C.E.	Chief Engineer	2000-125-2500
S.E.	Superintending Gneineer	1500-75-1800-100-2100
E.E.	Executive Engineer	1000-60-1300-70-1650
A.E.E.	Assistant Executive Engineer	750-50-1350
A.E.	Assistant Engineer	600-30-750-35-890-40-1050
J.E.	Junior Engineer	525-25-675-30-855--35-925
Secy.	Secretary	1300-75-1900-100-2000
A.S.	Assistant Secretary	1000-60-1300-70-1650
S.O.	Section Officer	675-35-885-45-1200
A.O.I.	Administrative Officer Grade I	750-50-1350
A.O.II.	Administrative Officer Grade II	750-50-1350
Supdt.	Superintendent	525-25-675-30-855-35-925
Asst.	Assistant (Secretariat)	450-20-590-25-740-30-800
Asst.	Assistant (C.E.'s Office)	400-15-490--20-650--25-700
J.A.	Junior Assistant	350-10-420-15-600
F.A. & C.A.O.	Financial Adviser and Chief Accounts Officer	1500-75--1800-100-2100
A.O.	Accounts Officer	1150-70-1850
J.A.O.	Junior Accounts Officer	675-35-885-45-1200
D.A.	Divisional Accountant	600-30-750-35--890--40-1050
A.G.	Assistant Geologist	750-50-1350
G.A.	Geological Assistant	600-30-750--35-890-40-1050
A.W.A.	Assistant Water Analyst	750-50-135L
J.W.A.	Junior Water Analyst	450-20-590-25-740-30-800

Annexure IV

The number of schemes under execution in a year, and the outlay in a year, as extracted from the administrative reports of the years is given below:

Year	Type of Scheme	Number of Schemes	Expenditure during the year (Rs. millions)
1953-54 (October to March)	Water Supply	19	0.86
	Drainage	11	0.14
1963-64 (Full grant)	Water Supply	88	8.92
	Drainage	23	1.24
1968-69	Water Supply	52)	13.5
	Drainage	11)	
1971-72	Water Supply	97)	79.2
	Drainage	12)	
1972-73	Water Supply	104	85.6
	Drainage	12	
1973-74	Water Supply	107	63.1
	Drainage	12	
1974-75	Water Supply	130	76.5
	Drainage	9	
1975-76	Water Supply	123	69.2
	Drainage	8	
1976-77	Water Supply	131	83.17
	Drainage	8	
1977-78	Water Supply	114	111.13
	Drainage	10	
1978-79	Water Supply	96	110.00
	Drainage	15	

Annexure V

URBAN WATER SUPPLY SCHEME

Year	No. of schemes under execution		No. of schemes taken up during the year		Population to be benefited in thousands		No. of schemes put into beneficial use				Population benefited in thousands	
							Municipality		Town Pt.			
	Water Supply	Drain-age	Water Supply	Drain-age	Water Supply	Drainage	Water Supply	Drain-age	Water Supply	Drain-age	Water Supply	Drainage
1966-67	41	9	7	-	387	-	5	-	4	1	213	16
1967-68	44	9	5	-	236	-	10	1	-	1	116	86
1968-69	66	11	9	-	453	-	2	-	5	-	143	-
1969-70	56	8	9	-	1202	-	2	-	1	-	97	-
1970-71	56	10	21	3	970	967	3	-	2	-	80	-
1971-72	97	12	27	-	999	-	5	1	4	-	347	13
1972-73	104	12	10	3	88	347	7	-	4	-	384	-
1973-74	107	12	18	-	338	-	5	1	12	-	445	49
1974-75	130	9	20	-	315	-	4	-	8	-	300	-
1975-76	123	8	25	-	405	-	7	-	9	-	125	-
1976-77	131	8	29	-	255	-	7	-	10	-	988	-
1977-78	114	10	15	5	380	93	9	2	10	-	443	152
1978-79	96	15	28	-	440	-	-	-	7	-	62	-

Annexure VI

COMPARATIVE STATEMENT SHOWING THE INCOME AND EXPENDITURE DETAILS SINCE THE FORMATION OF THE BOARD FROM 1971-72 TO 1978-79

(Rs. in millions)

	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79
I. INCOME								
i) Centage	7.554	10.358	9.668	18.106	17.509	23.255	21.937	36.185
ii) OTHER INCOMES								
a) Establishment charges reimbursable	0.440	2.419	2.457	0.840	0.845	0.889	-	-
b) Interest	1.072	5.331	7.315	6.843	5.303	7.915	17.067	7.125
c) Miscellaneous	0.430	0.175	0.065	0.846	0.641	1.205	2.211	1.192
d) Hire charges	-	-	-	-	2.614	10.965	3.640	2.455
Total:	9.496	18.283	19.505	26.635	26.912	44.229	44.855	46.957
II. EXPENDITURE								
i) Establishment and Administrative expenses	8.938	11.653	13.814	17.222	19.196	21.523	24.678	28.298
ii) Finance charges	2.534	5.881	10.107	10.912	9.593	9.715	11.686	9.427
iii) Audit fee	0.110	0.091	0.186	0.189	0.198	0.182	0.200	0.181
iv) Depreciation	0.258	1.004	2.581	2.765	2.488	2.772	4.354	3.651
v) Provision for Pension Gratuity	0.469	0.772	0.832	0.997	1.033	1.010	2.123	3.502
vi) Maintenance of vehicles	-	-	-	-	-	0.674	2.607	-
Total:	12.309	19.401	27.520	32.085	32.508	35.876	45.648	45.059
Excess of income over Expenditure (+)						(+)8.353		(+)1.898
Excess of Expenditure over income (-)	(-)2.813	(-)1.118	(-)8.015	(-)5.450	(-)5.596		(-)0.793	

Annexure VII

GOVERNMENT OF TAMILNADU

ABSTRACT

Rural Water Supply - Scheme for Maintenance - Order - Issued.

RURAL DEVELOPMENT AND LOCAL ADMINISTRATION DEPARTMENT

G.O.Ms. No. 1567 Dated 3rd August 1976

Read:

i) From the Managing Director, Tamilnadu Water Supply and Drainage Board. Letter No. 34192/SV III/72-37/ dt. 7.6.1976.

ii) From the Director of Rural Development, Letter No. Roc. 216999/75-H2/ dt. 17.6.1976

iii) From the Managing Director, Tamilnadu Water Supply and Drainage Board, Letter No. 34192/SVIII/72-42/ dt. 26.6.1976.

ORDER

The Tamil Nadu Water Supply and Drainage Board been entrusted with the responsibility of providing safe drinking water to the rural areas of the State, under different programme, such as Accelerated Programme, Minimum Needs Programme and UNICEF Programme. Consequent on the acute drought conditions prevailing in several parts of the State, the Government have also launched a massive programme of sinking borewells in the drought affected areas and this work has also been entrusted to the Tamilnadu Water Supply and Drainage Board for execution and 6400 borewells have been ordered to be sunk under the said programme. The Director of Rural Development in his letter read above has stated that prior to 1971 about 25 000 shallow bore wells have been erected in deltaic areas.

The question of maintenance of hand pumps and power pumps fitted in the bore wells sunk by the Tamilnadu Water Supply and Drainage Board under the various programmes has been under the consideration of the Government.

The Managing Director, Tamilnadu Water Supply and Drainage Board has stated that upto May 1976, a total number of 9444 hand pumps and 1368 power pumps have been installed in various districts and that another 3500 hand pumps and 500 power pumps will be installed till September 1976. He has further stated that the maintenance of these pumps by the local bodies are not satisfactory, thus depriving the people of the benefit of huge investment made by the Government. He has, therefore, suggested that a central agency should assume full responsibility, for the maintenance of the pumps. He has, accordingly, proposed that:

i) One mechanic-cum-fitter may be appointed for every 100 hand pumps, whose job will be to inspect the hand pumps periodically and do minor repairs.

ii) There must be a mobile team with a jeep consisting of Junior Engineer, a Mechanic and a helper for doing major repairs for every 1000 hand pumps. The necessary tools and spare parts will be stocked with this Junior Engineer who will be working with the concerned Executive Engineer (Rural Water Supply) of Tamil Nadu Water Supply and Drainage Board.

iii) For purposes of getting prompt information of hand pumps going out of order, printed postcards will be given to a responsible person in the village where the hand pumps are located and also to the Block Officer so that the fitter and district team can get information quickly regarding hand pumps which need repairs.

He has estimated the cost of maintenance per hand pump at Rs.243.- and the total annual expenditure at Rs.23.00 lakhs. He has also proposed a separate scheme for the sharing of the cost of maintenance between the Government and Panchayat Unions, taking into account the six categories of Panchayat Unions, he has further stated that every quarter, the Tamilnadu Water Supply and Drainage Board will give statements regarding the actual maintenance charges for the entire State along with a statement of work done. The cost per pump will be worked out on the average and each panchayat union will be charged according to this cost per pump and the number of pumps in that panchayat union. The share of the panchayat unions as well as Government shall be reimbursed to the Tamil Nadu Water Supply and Drainage Board directly by the Government and the Government may recover the share of the panchayat from the grants due to the panchayat union. The panchayat unions may be authorised to collect the proportionate share from the village panchayat where the pumps are located or, if this burden is too heavy for some of the panchayats, the panchayat union may be asked to meet the deficit from their general funds.

The Director of Rural Development has pointed out that shallow bore wells sunk in the deltaic areas should also be taken up for maintenance. The Managing Director, Tamilnadu Water Supply and Drainage Board has reported that assuming that a bulk of these 25,000 hand pumps will be only shallow bore wells erected in deltaic areas and that the cost of maintenance of hand pumps on shallow bore wells will be much cheaper than that of the deep bore wells pumps fitted by Tamil Nadu Water Supply and Drainage Board, about 1/4th of these i.e. 6,000 pumps will need maintenance as in the caseeof other bore wells sunk by the Board, the total cost of maintenance is likely to be Rs.33.00 lakhs and the Government subsidy will be Rs.20.70 lakhs.

The Government have carefully examined the proposals of the Managing Director, Tamilnadu Water Supply and Drainage Board, and pass the following orders in the matters:

i) One Mechanic-cum-fitter may be appointed for every 100 hand pumps and he may be put under the administrative control of the Block Development Officer and the technical supervisor of the Tamilnadu Water Supply & Drainage Board.

ii) The headquarters of the fitter will be fixed taking into account the number of hand pumps to be maintained by him i.e. his headquarters will be fixed in the block headquarters itself if the particular block has got more than 100 hand pumps to maintain and if it is less than 100 and spread over more than one block his headquarters will be fixed in the block which has got more number of hand pumps to maintain.

iii) The mobile unit proposed by the Managing Director, Tamil Nadu Water Supply and Drainage Board will be constituted mainly by utilising the existing staff and vehicles in Tamilnadu Water Supply and Drainage Board with as few addittions as possible.

iv) The financing pattern for maintenance would be:

a) For panchayat unions of Category I in respect of which the total annual maintenance cost exceeds Rs.15000/- Government subsidy may be given at 25% of the total cost of maintenance per annum.

b) For Category II, Government subsidy may be given at 50% of the total cost in respect of such of the panchayat unions in which the total cost of maintenance exceeds Rs.10,000/-.

c) In respect of categories III & IV, 75% of the total cost may be given as Government subsidy in respect of cases in which the total cost exceeds Rs.5,000/-

d) In respect of categories V and VI in which the total cost exceeds Rs,3,000/- Government subsidy may be given at 80% of the total cost.

e) The amount due from panchayat Unions may be deducted in advance from the water supply grants being made to them and credited to Tamilnadu Water Supply and Drainage Board along with the Government contribution. Separate orders in regard to the accounting procedure to be adopted for this purpose will be issued.

f) The shallow bore wells erected prior to 1971 in deltaic areas, numbering about 25,000 also would be taken up for maintenance by the mechanic-cum-fitter on the above financing pattern.

This order issues with the concurrence of the Finance Department vide its U.O. No. 117703/A/RDLA/76-1 dated 2 August 1976.

(By order of the Governor)

T.V. Antony
Secretary to Government

(True Copy)

Annexure VIII

COPY OF

GOVERNMENT OF TAMIL NADU

ABSTRACT

RURAL WATER SUPPLY - Scheme for maintenance of power pumps - Orders - issued

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RURAL DEVELOPMENT AND LOCAL ADMINISTRATION DEPARTMENT

G.O. Ms. No.3 Dated the 2nd January, 1978

Read:

From the Managing Director, Tamil Nadu Water Supply and Drainage Board D.O. Letter No. 54028/S.VIII/76-9 dt. 1 September 1977

From the Director of Rural Development Letter No. 216999/75-H2 dated 10 October 1977

ORDER

The Managing Director, Tamil Nadu Water Supply and Drainage Board in his letter read above, submitted a scheme for the maintenance of power pumps installed in Rural Water Supply Schemes of Panchayats, on the lines of those formulated for hand-pumps. The scheme envisages the maintenance of about 10 570 numbers of power pumps of three kinds viz. Centrifugal, Jet and submersible pumps, and the approximate cost of maintenance of these three types of power pumps has been stated to be Rs.200.- , Rs.500.- and Rs.1000 per pump per annum respectively. On the above basis it has been estimated that the approximate average cost of maintenance per annum per pump, irrespective of its type, will be Rs.715.72. The scheme further provides a pattern of Government subsidy based on the fiscal classification of panchayat Unions. The total cost of maintenance of the above basis, for the State as a whole, would be Rs.75.65 lakhs out of which Rs.52.49 lakhs will have to be borne by the Government as subsidy, while the balance of Rs.23.16 lakhs will have to be borne by Panchayats.

The Director of Rural Development has stated that nearly 80% of the total power pumps installed in Rural Water Supply Schemes are of Centrifugal type, the maintenance cost of which would be far less and therefore it would be of great financial strain to the Panchayats to pay a sum of Rs.715.72 as maintenance charges per pump per annum, irrespective of its type.

The Government have estimated the proposal of the Managing Director, TamilNadu Water Supply and Drainage Board, in detail, in the light of the views expressed by the Director of Rural Development in his letter second read above and they pass the following orders:

(i) Tamil Nadu Water Supply and Drainage Board shall maintain all the three kinds of pumps, installed under the Rural Water Supply Schemes, for which the following changes shall be payable by the respective Panchayat Union.

(a) Rs.200/- in the case of each Centrifugal pump per annum;

(b) Rs.500/- in the case of each Jet pump per annum, and

(c) Rs.1000/- in the case of each submersible pump per annum.

(ii) Tamil Nadu Water Supply and Drainage Board shall attend to routine maintenance, the annual overhauling of pumps, minor repairs etc., but major repairs like coil rewinding, shall be charged as per actuals.

(iii) Tamil Nadu Water Supply and Drainage Board shall take over the maintenance of the power pumps with effect from 1 April 1978 in the Districts of South Arcot, North Arcot and Chengalpattu. It shall collect such data, as to the number of pumps their makes etc. and purchase and store sufficient spare pumps, spare parts, etc., suited to them and equip itself, prior to the date of taking over.

(iv) Tamil Nadu Water Supply and Drainage Board shall collect the maintenance charges and the actual cost of repair charges for major repairs annually from the concerned panchayat Union directly which, in turn, would collect it from the respective panchayats. There will not be any payment of subsidy by Government.

(v) In case, original power pump is replaced by a spare pump for purposes of repair, rent for spare pump shall be payable only for a maximum of 15 days within which period the original pump should be repaired and re-installed.

(vi) The maintenance of power pumps by Tamil Nadu Water Supply and Drainage Board on the terms and conditions indicated above, shall be tried in the Districts of Chengalpattu, North Arcot and South Arcot for a period of one year in the first instance and after assessing the working of the scheme in the said Districts, it may be extended to other Districts in due course.

(BY ORDER OF THE GOVERNOR)

K. Chockalingam
Commissioner and Secretary to Government

To

The Managing Director, Tamil Nadu Water Supply and
Drainage Board, Madras-2

(True Copy)

Working Paper No. 9

GOVERNMENT OF INDIA/WHO SEMINAR

ON

FINANCING AND MANAGEMENT OF WATER SUPPLY AND SEWERAGE

BANGALORE, INDIA

11-14 JUNE 1979

Working Paper No. 9

Proposed Procedures for Forming State Water and Sewerage Boards

by

R. Franklin*

1 INTRODUCTION

Having examined the problems and difficulties met during the formation and early years of several State Water and Sewerage Boards, we should now be in a position to set out guidelines facilitating the setting up and operation of future Boards. However rather than suggest piecemeal corrections to the common principal problems experienced it would be better to determine the origin of the problems. Once the origin is established the corrective measures are easier to devise. In order to establish the origins of the problem it is necessary to ask the basic question "Why form a Board?" Whatever answer to this question is accepted will form the base on which will develop the logic in evolving the Board. The experiences of some Boards, and observations by some States contemplating forming a Board, leads to the conclusion that the accepted answer to this basic question was incorrect.

2 FUNDAMENTAL ASSUMPTIONS

Answers to the question "Why form a Board?" have variously been stated as:

a) to permit better financing and planning
b) more flexibility in financing and handling larger programmes
c) larger sums of money can be handled more expeditiously than by Government Departments
d) specialist staffs can be kept

All these answers are concerned with financing and completing increased programmes of capital expenditure. The Boards developed consequently with emphasis on the ability to carry out large capital investment programmes. The incomes of the Boards consist almost entirely of fees for designing and constructing the various works, the fee being a percentage of the cost of the works. Inadequate provision is made for the Board to ensure generation of the funds to repay the large loans which the Boards can negotiate. If generation of funds or collection is inadequate the State Government guarantees repayment of the loans, but neither the State Government nor the Board has adequate control over this income. Adequate control of income can only be achieved if the Board is responsible for the operation and maintenance of works and the collection of charges. The flow of funds is illustrated diagramatically on page 2.

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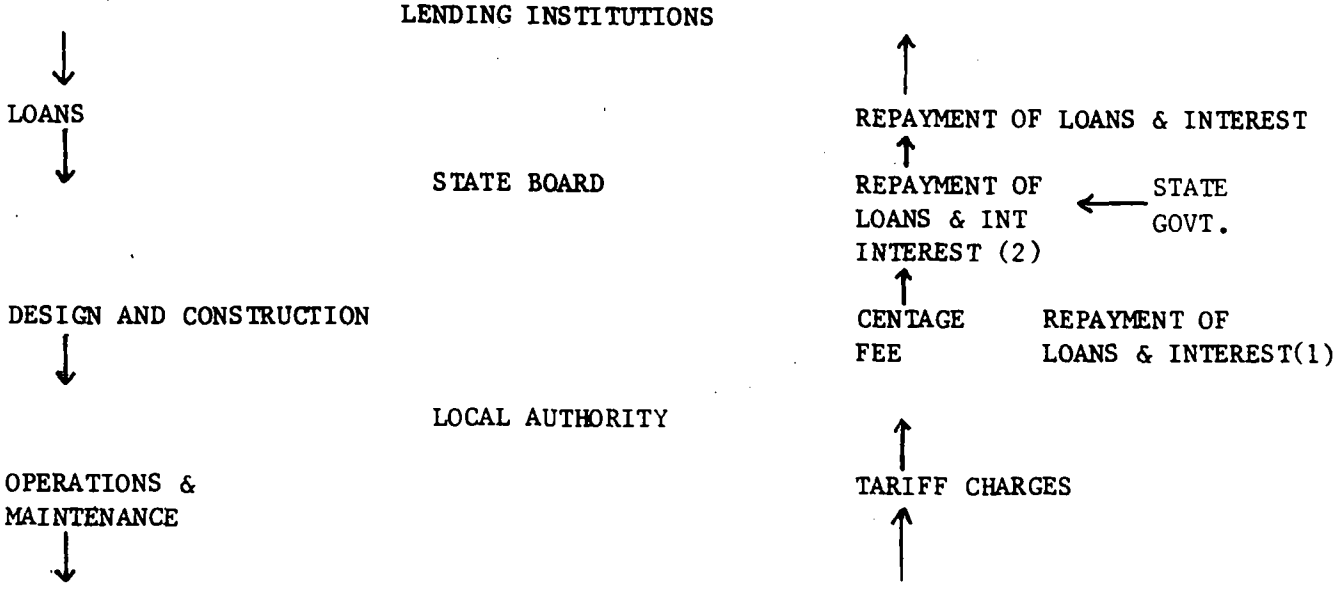


Repayment of loans and interest (2) is made if (1) is in default. To return to the basic question of "Why Form a Board" the answer which would have led to control of income would have been "To provide water supply and sewerage facilities to the people of the State." In order to ensure that the new works are functiong correctly to comply with that answer the Boards would have been obliged to become involved in the operation and maintenance and the collection of tariffs. Different organisations would have been evolved and some of the difficulties encountered would not have developed.

3 DEVELOPMENT OF ORGANIZATION

If it is accepted that the Board's purpose is to provide water supply and sewerage facilities to the people of the State and in order to do this the Board is responsible for operation, maintenance and tariff collection then lines of communication and areas of responsibility become clearer.

The Board accounts to the State Government for its activities and this is best achieved through the Chairman of the Board reporting to a Minister designated as responsible for this sector. This responsibility and accounting chain will lead to the individual waterworks or sewage works so the operations and management function becomes the principal executive function of the Board. This main executive will require supporting functions such as personnel, training, transportation, stores and purchasing, project planning and implementation. Some of these supporting functions will be required at all levels in the Board's Organisation whilst others would be available only at certain levels. For example training training facilities would not be available at every works but may be provided at circle level. This is illustrated diagramatically in Annex I and II. In this way the Board's executive activity is concerned with the generation of income, will continue throughout the period of any major loans, will increase over the years as new installations are completed and is directed to safeguarding and maximising returns from capital investments, whilst ensuring that the

services are available to the public as required. There will inevitably be local variations required and there will also be some objections to such an organization. One objection would be the lack of local participation but this could take the form of advisory groups having regular contact at the appropriate level. Such contact would work two ways in that the Board's activities could be explained whilst local requirements would be made known to the Board. Another objection may be that such an Organization would be more difficult to set up than simply transferring a Government department as has been done in the past. This is not a valid objection, it means that more preparatory work is needed before the Board starts to operate.

4 PREPARATORY WORK

The Board can begin operations on the appointed date if adequate preparatory work has been completed. Much of this work will involve middle level Government officers whose tasks will be facilitated if the Minister designated as responsible for this sector is known to be concerned about the work. Tasks which should be completed before operations begin should include appointments to the Board of Directors, appointment of Chief Executive and Financial Director, completion of staff regulations, organization structures, identification of staff needs and recruitment where necessary. This latter may be more urgent in the training and accounting sections. There should be a knowledge of the current assets and liabilities to be taken over and the method of valuing them should be agreed. Works in progress, either in the design stage or construction stage, need to be listed and the stage reached should be determined. The accounting system should be agreed together with the codification of accounts, particularly when there is going to be a complete change from the usual Government system to a more commercial system.

Working capital requirements need to be determined, budgets should be prepared and banking arrangements made. This latter will also cover arrangements for banking and transmission of funds from district or sub-district offices, whence the income will be derived. The premises to be used by the Board and their equipment will be decided. Consumers, suppliers and contractors will all need to be notified of the date when new arrangements begin to operate, and of course details of the new arrangements. It is suspected that some Boards in the past have only been able to deal with some of these matters after the vesting date. Efforts expended in completing such arrangements before vesting date enable the Board to proceed with proper activities more smoothly and quickly. Personnel matters, working capital requirements and sources are probably the two most important and most difficult items to finalise.

5 PERSONNEL

The personnel needed by the Board will be in two broad categories, technical and non-technical. Many could be drawn from existing Government or Local Authority organizations but such personnel would not wish to change if their new conditions of appointment were not at least as good as the conditions they already enjoy. Apart from pay, pensions, leave and sick leave which are relatively easy to match there are other conditions to be

considered such as housing and medical attention. Provision of equal-to-Government conditions in respect of these items could impose quite a financial burden on the new organization unless carefully considered.

There will probably be a need to recruit from outside Government for non-technical staff such as accountants. Arriving at the right sort of conditions without getting an imbalance requires careful consideration. Existing staff who may be suitable need to be considered in two contexts: (a) would the existing organisation release them and (b) would the person want to join the new organization. If both these questions are answered in the affirmative then where will the staff member fit in the organization structure. Training may be required to help people fit into their jobs in the organization and assessment of training needs is another large personnel problem. When the personnel policies are decided and available personnel determined it will then be possible to examine the organization structure to ascertain the numbers and categories available, to be recruited and to be trained. Adequate time should be allowed for recruitment and training procedures.

6 BUDGETS

Having determined the conditions of employment, number and categories of personnel required to start the Board's operations it is then possible to prepare budgets and working capital requirements. In calculating working capital requirements it will be necessary to consider revenue which will be obtained from tariffs. The tariff structures may require revision so as to conform with any cross subsidisation policies the Board may wish to adopt, or to simply make them realistic.

Each level in the executive chain will have its budget, as also will each supporting service. In this way it will be possible for each section or level in the organization to know what is expected of it right from the first day.

The financing requirements, and sources of finance, for partially completed projects to be taken over by the Board will also be included in the estimates prepared at this stage. Ancillary to the preparation of budgets will be the preparation of cash flow statements. Arrangements can then be made to cover periods of shortfall which are almost certain to occur during the first months.

7 OPERATION, MAINTENANCE AND TARIFF COLLECTION

This being the main effort of the Board's activities requires early establishment of acceptable standards and reporting procedures. There will probably be a wide range of efficiencies in the works taken over so that it will be necessary to establish quickly in what respects and where variations are occurring. The proportion of unaccounted for water in water supply systems, the B.O.D. content of sewage effluents and the tariff collection efficiencies will be the first criteria to examine. In addition to these criteria the quality and costs of water supplied will require examination whilst in the sewage sector the quantity received

should be compared with figures of water supplied to determine whether there is infiltration. There may be difficulty in obtaining the data at some works due to lack of testing facilities or meters. Deficiencies of this kind will need early correction as they provide the basic information for effective managment of the works. Correction of these deficiencies may comprise a financially substantial programme which should be provided for in the budgeting referred to in the previous paragraphs. If the tariff collection efficiency is unsatisfactory, say below 85%, then the system of billing and collection will require investigation and the procedure for dealing with defaulters will probably need revision.

This, being the money producing end of the business, must be conducted efficiently or other and future activities could be restricted.

8 PROJECT PLANNING

This section should cause less difficulty than others because the staff will generally be continuing the work they had previously been doing in the Government department concerned with this sector. Nevertheless the opportunity should be taken to see whether output can be improved without materially affecting costs. Some Boards have found that increasing the value of works which different categories can approve has helped to improve output. This effectively reduces the flow of approvals to higher authority and it will be useful to check periodically the numbers of approval requests. Inflation could increase the upward flow of approval requests.

This section should also be responsible for appraisal of projects and for a system of awarding priorities for construction. The group responsible for appraisal of projects would also monitor the project through to commissioning and should be advised of the results of system appraisals. In this way the designers can be informed of the success or otherwise of the designs.

When a large number of projects are being handled at the same time there will be justification for planning the construction phase and insisting on the contractors following the construction sequence specified. Such planning may result in partial acceptance of projects where the completed portion can be utilised to generate revenue and should be able to help in determination of cash flows and loan requirements. Close collaboration with the finance department would be necessary for this group.

If computer facilities are available a great deal of time can be saved on the analysis of pipe networks, both for water and for sewage flows. There is a tendency however, where such facilities exist, to start to push very simple calculations to the computer and such extravagencies should be curbed.

Sometimes up to date maps of communities are not available. Time and money can be saved by using air photographs, not necessarily a full air survey, and a few ground measurements and levels. In this way sufficient information can be developed quickly and cheaply to permit preliminary pipe layouts to be prepared.

9 PROJECT IMPLEMENTATION

Project implementation begins with the receipt of tenders or placing purchase order for materials and equipment. On receipt of tenders the system should be such that evaluations can be submitted to the appropriate authority in such a way that reasonably quick decision can be made to enter into a contract. The size and complexity of the contract will affect the time needed for evaluation but in no case should there be more than three months between receipt of tender and notice to proceed.

The standards for acceptance of materials and workmanship should be quite clear and unambiguous because in addition to staff supervising site construction and installation it may be necessary to set up a section to deal with testing at manufacturer's works or other test centres. Acceptance testing of equipment and materials is sometimes required before payments can be made.

In the cases where there is a substantial amount of equipment purchased overseas a section may develop to handle customs, taxation, warehousing, transport and insurance problems associated with such purchases. This would be a specialized group possibly forming part of the purchasing section as also would the progress chasers. Unless the correct material or equipment reaches the site at the correct time the whole programme will be thrown into disarray. Most of the programmes contemplated in India involve large sums of money so the results of delayed programmes are usually substantially increased total costs, loss of revenue and no service for the people. Therefore this purchasing aspect of implementation is just as important as the site construction supervision, and yet in many cases less thought or attention is devoted to it.

Once materials have been delivered to a site then the site supervisory staff are responsible not only for ensuring that the installation is correct according to drawings and specification, but also should try to ensure that the work is completed within the programmed time. Delays on site work have exactly the same results as delays in equipment delivery.

10 FINANCIAL AND ACCOUNTING

In order that the very large programmes of providing and maintaining water supply and sewerage facilities can be achieved within the prescribed time span it is essential that developments are free from erratic and piecemeal progression. If the Board responsible has financial independance so that long-term plans can be formulated and carried out, then the programmes may be achieved. Financial independance and autonomy will permit sound long-term financial planning. In order to prepare and execute financial plans there must be adequate financial data which will be provided by the accounting system. The accounting system basically meets the information needs of interested parties in exercising control over the organization's financial resources. This will be done if the accounting section undertakes tasks which will be -

a) to assist in the formulation of and to advise the Board on finance policy.

b) to ensure that funds are available for the effective operation of the Board.

c) to prepare reports as required by differing levels of the Board on financial matters.

d) to ensure that all income legally due to the Board is obtained.

e) to ensure that funds are allocated to Board activities in the most effective way consistent with annual budgets, long-term plans and emergency requirements.

f) to ensure that each meeting of the Board's directors is provided with appropriate financial information.

g) to install, operate and up-date as appropriate, effective methods that will assist budgeting, financial planning and control, the financial evaluation of projects and cost control.

h) to carry out normal accounting work associated with receipts and payments, employees remuneration, accounting records and stores accounting.

i) to advise on the adequate recruitment, retention and development of personnel necessary for the effective performance of the accounting duties in collaboration with the Personnel department.

All the activities necessary to achieve the above will not necessarily be undertaken at all levels in the Board's organization. Owing to the size of the organization which a State must develop it will be necessary to delegate authority, and the appropriate responsibility, for financial and cost control. Therefore the accounting system must allow for the separation, extraction and presentation of information for each area and section of the Board's activities. In this way cost and financial reports will reflect activities for each responsibility that has been delegated. Performance can then be assessed, reasons for variances determined and corrective action taken where necessary. The system must also make provision for the summarisation of costs for reporting to the next higher authority where ultimate responsibility rests.

The provision of financial information is essential in the preparation of budgets, the income and expenditure budgets being prepared at all levels for subsequent consolidation into the Board's total budget. Following from the annual budget longer-term financial plans will be prepared which will enable alternative sources of finance to be assessed and will permit negotiation of loans to be carried out well in advance of the time they will be required.

The principal sources of finance at present appear to be:

a) loans or grants from Central Government
b) loans or grants from State Government
c) deposits from local authorities

d) L.I.C. loans
e) IBRD loans or IDA grant
f) issuing of debentures

Other sources could be the open market borrowings from commercial banks and bi-lateral assistance funds from various foreign governments.

A sound accounting system will be able to provide the necessary information to the management of the Board at all levels so that the objectives can be achieved in a timely and economical way. The accountant must take a more prominent place in the team than has sometimes been the case in the past, so that the rest of the team are assured of the funds and control information which is essential for achievement of their targets.

11 PUBLIC RELATIONS

This aspect of the formation of a State Water and Sewerage Board is sometimes neglected, delayed or done badly. The principal excuse for such an omission is that there are so many more important things to attend to. Certainly a great deal of time can be spent in this activity with results that are not really tangible. But if the Board is to be formed on the lines discussed earlier many sections of the community need to understand what is going on, otherwise through misunderstanding they may become antagonistic and not cooperate or even act directly against the Board's interest. Public relations work needs careful planning of the methods and timing to be adopted. The sections of the community requiring information will vary from time to time depending on how they are likely to be affected by the Board's activities.

The general public obviously will need educating as to why water should not be wasted and why it costs money to get it to the tap. Again with sewerage systems there will be a need to explain the advantages of the system and why it costs money. Later it may be necessary to explain the need for prompt payment of water & sewerage charges. This was achieved at one water undertaking by buying time on the local radio stations to explain how prompt payment enabled a discount to be given. The explanation was simple, brief and effective.

If the organisation discussed earlier were adopted there would be a great need to explain to the local authorities the advantages of transferring the operation and maintenance work to the Board. Various ways of continuing local participation in policy decisions would need to be discussed with the authorities. No general guideline can be issued on how to do this as each case will be different, due to the different personalities and groups involved at the different places.

The staff to be taken into the Board from both Government and local authorities will need to be given,in adequate time, an explanation of the new organization. The conditions and prospects which they may enjoy in the new organization require full explanation especially with regard to pension rights, housing and medical treatment. The need for recruitment of outside personnel should be explained as well as promotion criteria and training requirements and provisions. Question and answer sessions are useful ways of establishing the required relationships.

Special efforts may be necessary with contractors or suppliers in cases where the Board intends to adopt new contract or materials purchasing procedures.

Government departments and financing institutions will at various times need explanations of the Board's policies and intentions.

There will be other special occasions when it will be necessary to inform, various groups of the Board's activities such as increases in charges, road closures and supply shut-offs. Advance information is required but not too far in advance or people will have forgotten about the original announcement. The timing of all public relations efforts is very important and even critical.

The methods of getting a message across are as varied and numerous as the ways of communication. The method which will achieve the best results in one situation may be completely unsuitable in another situation. Therefore in addition to the timing the method of communication needs to be carefully considered. Newspaper articles or advertisements, radio or television, council and public meetings, loud hailers, farmers cooperatives, talking drums, letters, public notices on fixed boards or vehicles have all been used as ways of getting a message across to some body or group about water supply and drainage. Whatever method is used should always be used honestly and clearly. Smart schemes to cloud an issue or even mislead have a way of backfiring and producing the wrong result. Any new Board has a lot of big jobs ahead of it one of which is establishing confidence with the public, with the local authorities, with the Government and with financing institutions and suppliers. The way the Board carries out its tasks will be the main criterion by which confidence will be established but this may be enhanced or otherwise by relationships created through public relations activities.

12 SUMMARY

The procedures to be followed in forming a Board can be summed up as follows:

1. Determine clearly the objectives of the Board bearing in mind the source of income. This should prohibit squandering of effort and resources through dabbling in activities akin to, but outside the Board's objectives.

2. Develop an organization structure to carry out the objectives and obtain the necessary income.

3. Draft and have placed on the Statute Board suitable enabling legislation.

4. Carry out the maximum of preparatory work before the vesting date of the Board. This will include appointment to the Board of Directors, appointment of designated senior officials, determination of personnel needs and policies, determination of financial needs and policies and accounting procedures, procure finance for the preparatory work.

5. Prepare budgets

6. Prepare preliminary work plans and targets.

7. Obtain and equip premises

8. Notify all concerned.

Annex 1

DIAGRAM OF ELEMENTS OF ORGANIZATION WITH SUPPORTING SERVICES

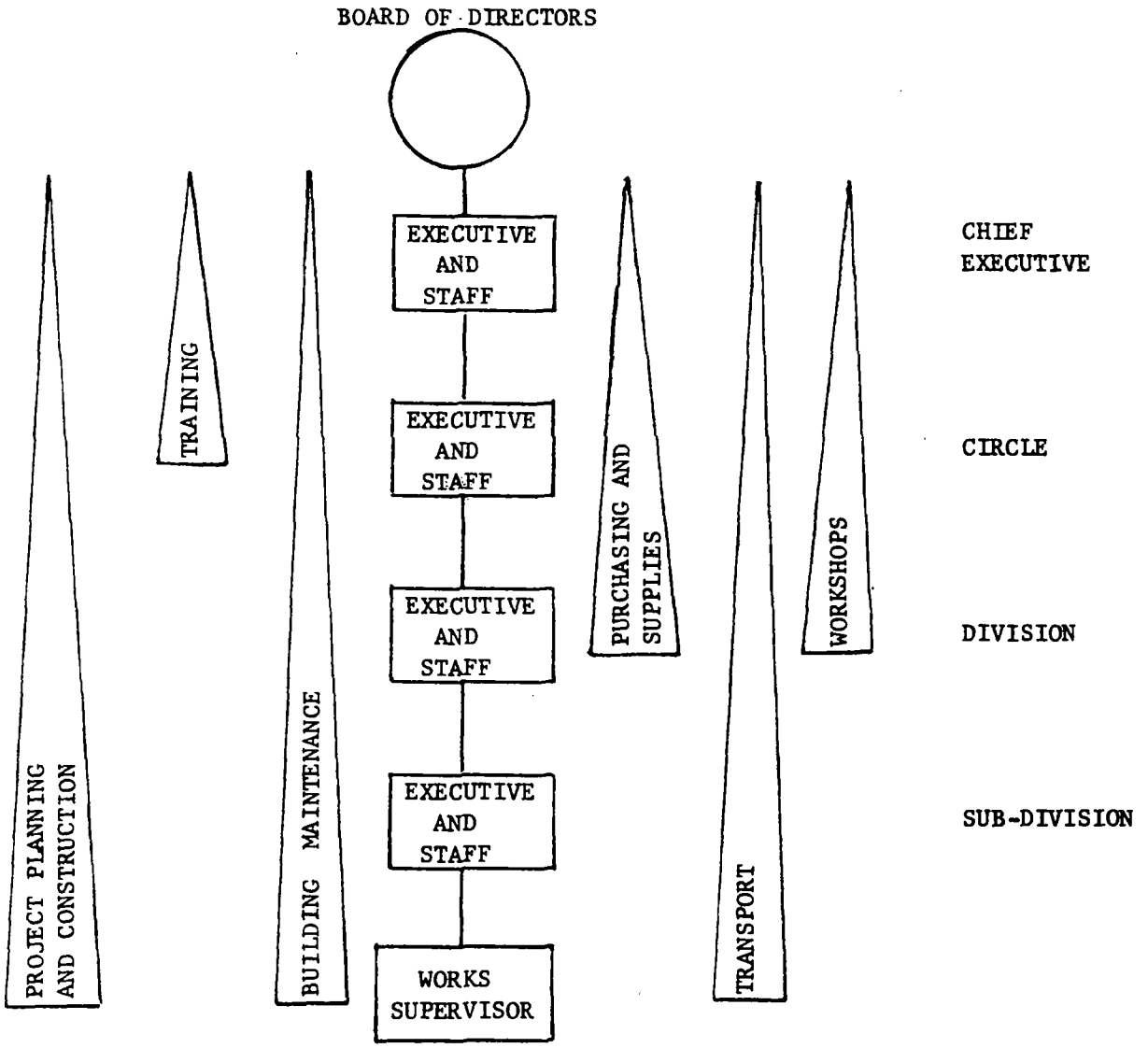
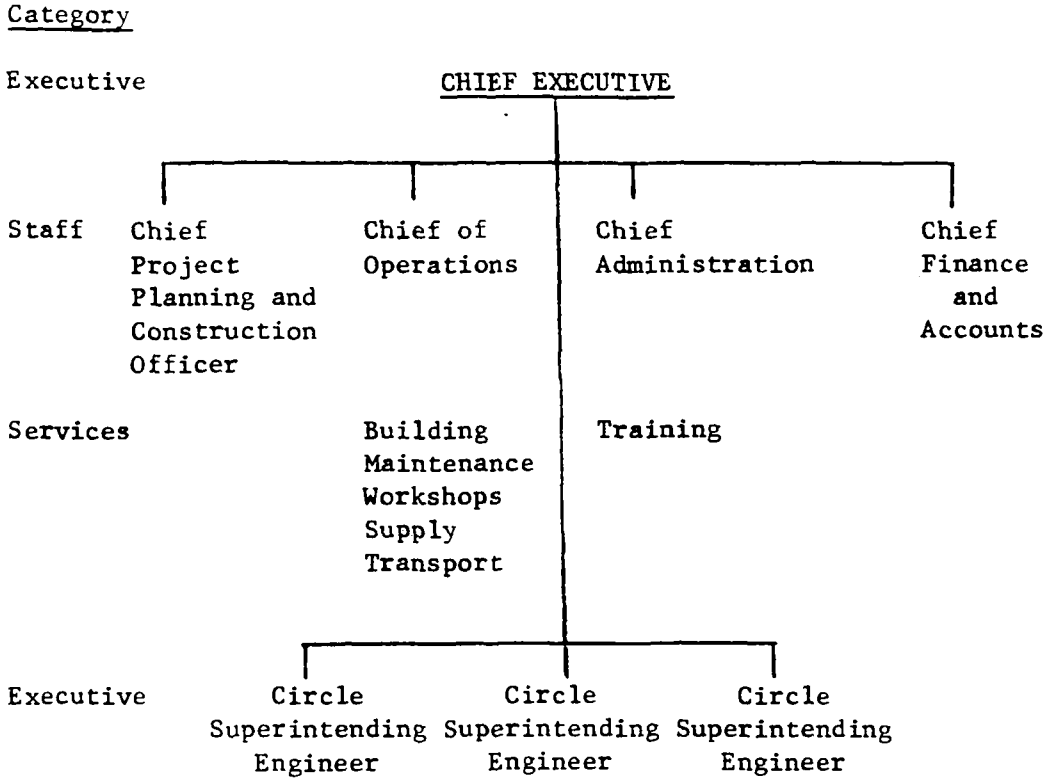


DIAGRAM OF POSSIBLE ORGANIZATION OF CHIEF EXECUTIVE'S OFFICE



Services are aligned with the staff branches which sponsor them.

Similar staff and supporting services would be provided as appropriate at each executive level.

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ON

FINANCING AND MANAGEMENT OF
WATER SUPPLY AND SEWERAGE
BANGALORE, INDIA

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Working Paper No. 10

URBAN WATER SUPPLY AND SEWERAGE PRICING POLICY

by

R. TURVEY (Consultant) and J. WARFORD

I. INTRODUCTION

1. As communities exhaust convenient sources of water supply and have to go further afield for additional supplies, and as surface and ground-water pollution increases, unit costs of water supply and of sewage disposal can be expected to rise. This necessitates efforts to ensure that ever scarcer water resources are not used wastefully. An important means of doing this is to apply pricing policies that reflect, not the historic costs of a utility's operations, but the real resource costs that are incurred as a result of additional consumption. If consumers are willing to pay prices reflecting these real resource costs, it will be demonstrated that those costs are worth incurring.

2. This general objective is necessarily subject to a number of constraints. The choice of the appropriate tariff structure in any particular case will involve judgements about equity and income distribution, about its financial and fiscal implications, and about the cost of implementing the tariff structure itself. There are, that is to say, multiple objectives of tariff policy, this being evidenced by the wide variety of tariff structures in use. Particular problems arise in charging for disposal of waste water, willingness to pay not being as effective a criterion of the value of sewerage as of the value of water supply.

3. This paper examines pricing policies in the sector in the light of the relevant objectives and constraints. Its emphasis is on the economic aspects of pricing policy, in other words, on the role of price as a means of influencing consumer behaviour, since this is the least familiar aspect.

II. METHODS AND OBJECTIVES OF CHARGING

4. Any charging system for water or sewerage or both must consist of one or more of the following:

1) A lump-sum payment at the time a consumer connects to the system, determined by one or more of:

   i) The cost of the connection;

   ii) The size of the connection;

   iii) Characteristics of the consumer directly relevant to the amount of water to be used or amount and type of sewage generated (such as number of taps);

   iv) Characteristics of the consumer not directly related to water use and sewage generation (such as property value or type of consumer).

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*Central Projects Staff, Public Utilities Department, I.B.R.D.

2) A periodic fixed payment determined by one or more of:

   i) Characteristics of the consumer directly related to the amount and type of sewage generated (such as meter inlet size, number of taps, presence of a garden, industrial process);

   ii) Characteristics of the consumer not thus directly related (such as type of consumer or property value).

3) A periodic payment determined by metered water consumption. It may be a single rate or in blocks; it may vary seasonally, by type of consumer or property value; it may reflect the strength of sewage and it may differ between areas.

5. The choice from among these options of the structure of charges and the choice of their appropriate level has to be a compromise between four main aims. These will now be considered one at a time, after which the possible conflicts between them will be discussed.

6. The first aim is to raise some target level of total revenue. The target needs to be set so that the utility can service its debts and maintain the degree of financial independence necessary for it to be an efficient organization. This requirement is usually the dominant one, since it involves not only covering all current costs and debt service but also making some contribution to future expenditure. How large this contribution should be can only be a matter of judgement, but one relevant factor is the availability of capital from other sources. Where fiscal resources are especially limited, a high degree of self-finance will presumably be desirable.

7. Since required revenue is a cash-flow concept, the above considerations need to be looked at in cash-flow terms. But this does not mean that the target actually has to be expressed in such terms: given the depreciation rules and given the book value of assets, the gross revenue target can be translated into a target net rate of return on capital. However, it is important to realize that such an accounting rate of return on total assets is a very different concept from a calculation of the discounted cash flow rate of return on a new project. If the two are the same, it is only a coincidence.

8. Given the total target cash-flow of gross revenue, the second aim is to share out this burden fairly between the different users of the system (and also perhaps local or central government). The difficulty here is of course that what is fair is a matter of subjective political judgement. What the analyst personally feels to be fair may well be irrelevant, in which case all he can do is to get the borrower to formulate clearly what is deemed to be fair. This may entail some discussion, since clarity is not always easy. Thus a borrower who asserts that ability to pay as roughly measured by property values is a fair basis for charging should be asked why this applies to non-domestic consumers; the burden of high charges upon a firm may be borne not by its owners but by its customers. Again, the question of whether some part of the revenue should be provided by local or central government requires some thought. There may, for example, be cases where subsidy to poor consumers who use standpipes, or costs related to storm water are more fairly provided from general taxation than from user charges.

9. The third aim is that of administrative simplicity and efficiency. The strength of this consideration will naturally vary according to the competence of the utility and the characteristics of the users. Not much is said about this aim in what follows, but that is because it is obvious not because it is unimportant.

10. The fourth aim, which forms the main focus of this paper, is the one that is most generally neglected, namely that of influencing consumer behaviour. In the short-term this aim is to induce users to economize when there is a drought or when capacity is inadequate. More generally, the aim is to reflect the costs of system expansion in charges in such a way that users (apart from those who deserve subsidy) only choose to impose such costs when they are willing to bear them. A poor country needs to be very sure that it devotes scarce resources to water and sewerage only when this is at least as good a use of the resources as other kinds of investment.

III. PRICING AS AN INCENTIVE

11. The costs which are relevant to the aim of influencing consumer behaviour are the value of the resources which are made unavailable for other purposes by being devoted to water supply and sewerage. Sunk costs are thus irrelevant and it is the costs of future system expansions which matter; engineering cost estimates rather than historical accounting costs are therefore needed. The aim is to reflect these costs in the charges which affect user choices. If there is no conflict with the other three aims this would require, for example:

- low charges when additions to capacity can be provided cheaply;
- an incentive to reduce the strength of industrial effluents when this would lead to savings in treatment cost or a desirably improved standard of treated effluent from sewage works;
- a greater incentive to reduce water use in summer than in winter in cases where capacity and hence costs are predominantly summer-use related.

12. For consumers currently lacking piped water or main drainage, the costs which need to be ascertained are those of extending the system to provide them with service. For consumers who already have service but whose use is growing, the relevant costs are those of adding to existing capacity. In either case what has to be estimated are the additional costs resulting from additional use. The basic notion is thus that charges which vary with the use of the system should reflect the rate of change of system costs with respect to volume. This is what is meant by charges which reflect "marginal" costs.

13. Because new water supply schemes and sewage works are usually large units and because new mains and sewers may combine the purposes of reinforcement, extension and replacement, a refined analysis of marginal costs may not be possible. But this need not deter the planning engineers from deciding what sort of incentive structure would have to be provided by the charging system for it to convey a sensible message to users. Exact calculations are not required; the point is to reflect the approximate order of magnitude of

the costs of system expansion in the charges which vary with the amount of use of the system. This notion of simultaneously informing and inducing the users to economize most when economy on their part would do most to save scarce resources is, however, easily confused with the entirely different notion of allocating costs between consumers. An example will make this clear. Suppose domestic water consumption is closely related to property values. Then a fixed charge related to property value would approximately allocate costs between consumers according to consumption. Yet the incentive effects would be zero, since no consumer would save money by using less water or be charged more if he used more. Thus whatever the fairness or unfairness of such charges (a matter of the second aim) they would do nothing to realize the fourth aim. This, to repeat, is to influence user behaviour.

14. The distinction is so important that another example will be useful. Consider the collective metering of an apartment block. This makes the payment of all the families in the block vary according to their aggregate use, something which may or may not be deemed fair. But whatever subjective judgement is made on this point, and whatever the administrative advantages of collective metering, the incentive effects of the charging system are minimal. The individual family pays scarcely any more if it uses more and scarcely any less if it uses less.

IV. CONFLICTING OBJECTIVES: THE METERING DECISION

15. The last two examples illustrate very clearly the point that the aims of revenue raising, of fairness, of administrative simplicity and of influencing user behaviour can conflict with one another. This is why the choice of a charging system may involve a compromise. No general rules can be laid down about how to weigh up the achievability and the importance of the four main aims. But there are nevertheless three useful approaches to be adopted in seeking to reconcile them.

16. The first is to recognize that because judgements of fairness are subjective, sometimes reflecting no more than political expediency, they are not unique. Thus to judge one system of charging to be fair does not rule out all other possible systems. The analyst can try out various alternatives even when it is not his business to pronounce upon them.

17. The second is to recognize that while the aim of influencing user behaviour relates to the total charges payable by a potential user who is deciding for or against connection, things may well be different with existing users. Where they are extremely unlikely to seek disconnection, their behaviour will be influenced by the way their charges vary with use but not by their total level. Suppose, for example, that water and sewerage are to be jointly charged for by a semi-annual fixed charge and a charge per thousand gallons of metered water use. The aim of reflecting system expansion costs imposes limitations on the fixed charge only if it is use-related. But if it is determined by some non use-related characteristics of the consumer it will have scarcely any incentive effect and can be so chosen in relation to the metered rate as to make the consumers' total bill constitute a fair contribution towards the required revenue.

18. The third useful approach to reconciling conflicting aims relates to administrative simplicity versus influencing behaviour. The latter demands metering or ascertaining some use-related magnitude such as appliance ownership and either of these adds to administrative burdens. But most of the disadvantages of administrative complexity can be measured in cost terms; the more complex a system is, the more it costs to initiate and run it without any increase in fraud. This makes it possible to illuminate the trade-off in monetary terms. For the important choice between metering and not metering a particular group of consumers for example, the minimum reduction in their average annual water consumption which would be required for metering to be preferred can be calculated. It is that reduction which would make the saving in water and sewerage system expansion costs as large as the cost of metering. This requires information about:

i) The capital cost of procuring and installing meters;

ii) The annual cost of meter reading maintenance and billing;

iii) The future cost of expanding the water supply and distribution system, plus the corresponding operation and maintenance costs;

iv) The relationship between decrements of water use and the rate of flow of sewage;

v) The future cost of expanding the sewage collection, treatment and disposal system, plus the corresponding operation and maintenance costs.

Note that (iv) and (v) are relevant according to whether reduced water usage will lower sewage collection, treatment and disposal costs, whether or not water and sewage are administered jointly. They are, of course, the same costs as are relevant to fixing the metered rate.

19. A calculation like that suggested need not be refined and accurate. If it indicates that an x% reduction in water consumption would be required for there to be a net cost saving, the analyst would only recommend the introduction of metering if:

- Metering with the proposed charges is highly likely to reduce average daily consumption by more than x%;

- The proposed charge per thousand gallons does not exceed the average cost of additional capacity operation and maintenance.

If, in other words, water consumption is likely to be reduced more than enough to secure a net cost-saving by a charge which is not excessive, then metering is probably worthwhile.

20. A similar kind of analysis can illuminate such issues as whether to have seasonal or area differentials in charges per thousand gallons. If forward-looking expansion plans show there to be significant differences between seasons or between areas in the costs of adding to or operating capacity, the reconciliation of the third and fourth aims requires similar calculations.

21. Metering may turn out to be of dubious value in the case of poor consumers. Even if metering is on balance cheaper than unrestricted supply, the installation of some flow-limiting device may be preferable. A Fordilla valve, for example, limits the amount of water each consumer can get and so keeps down the cost of the reticulation system as well as saving on source costs. It costs less than a meter, and the consumers can pay a single simple fixed periodic charge. Possibilities of this sort merit examination when water supply is being extended to poor urban areas.

22. The conveyance of storm water and the treatment of sewage provide collective benefits to a town rather than individual benefits to those of its inhabitants who have sewer connections. As they involve a collective decision they are not necessarily best paid for by charges which vary with individual water use; some other way of recovering the cost will very likely be preferable. It is only where a change in an individual water consumer's water use results in a change in the cost of sewerage or sewage disposal that payment for the latter should be embodied in a charge which varies with water consumption.

V. THE SUBSIDY ISSUE

23. The issue of whether or not to subsidize particular groups of consumers often arises. It can best be looked at in terms of the aims of pricing policy, since this enables one to distinguish three quite separate reasons for a subsidy. Even though more than one of these reasons may apply in any particular case, clear thinking demands that they be separated. They are:

1) The willingness to pay for water supply and/or sewerage understates the strength of the case for providing it either because the consumers are poorer than is considered desirable or because there is not only a benefit to them but also to their neighbors in terms of amenity and health. In either case they may not agree to connection or will use too little water unless they are charged less than the effect upon system costs of providing the service.

2) A reduction in charges for water and/or sewerage will constitute a transfer of income to a deserving group of consumers.

3) The cost of charging for water from standpipes or for communal waste facilities such as public latrines outweighs the benefit.

The important feature of these is that 1) relates to the aim of influencing behaviour, 2) relates to the aim of fairness and 3) to the aim of administrative simplicity. Thus in 1) the purpose of subsidy is to encourage use of the service, in 2) the aim is to leave existing consumers with more money to spend on other things, while in 3) the aim is to save administrative costs.

24. It is not sufficient to examine the case for a subsidy solely in these terms. The subsidy must come either from other users of the system or from the general taxpayer. The effects on their behaviour, the fairness of making them pay for the subsidy and any extra administrative complications in raising the money from them all need to be considered. Thus subsidy of a group of poor consumers for reasons 1) and 2) might on balance be a bad idea if it were to be financed by extra taxation of some item predominantly consumed by the poor, including those who lack piped water.

VI. SOME PRACTICAL APPLICATIONS

25. The analyst attempting to look at a charging system in the light of this paper will often find that his task is to suggest improvements to an existing system rather than to design a totally new one. The adequacy of the total revenue generated can easily be studied and views can be obtained on the fairness or unfairness of the charges. Their administration can also be studied, very often with the result that more should be spent on meter maintenance, on chasing up defaulters and so on. What is most demanding is the task of examining and evaluating the impact of the present system upon the allocation of resources. While it is impossible to provide a generally applicable checklist of matters for investigation, some examples of the kind of work that has to be done may be useful.

26. Once-and-for-all charges upon connection can have some effect upon the number of connections. If they do, then their level has to be looked at in relation to other parts of the charging structure and not in isolation. For users not judged to need a subsidy, it is often the burden of all the charges together which will influence their choice for or against connection and which thus needs to reflect the addition to system costs caused by their connection. In these circumstances, it is the total of connection charge and the periodic fixed charge which matter rather than the split between them. In other circumstances a property developer may pay a connection charge (or meet the cost of connection and of the local reticulation system himself) while subsequent charges are met by whoever buys or rents the developed property. Yet the difference in circumstances will not usually be significant, since the developer will pass on the cost to the buyer or tenant who can well decide whether or not the service is worth having. It is true that connection is often compulsory, and it may appear that in such cases the question of what the charge is and who pays it is not one of resource allocation effects. But it is possible that compulsion may divert development to areas outside the town. Where the choice lies between a shanty outside the limits without water or sewage, or a dwelling within the limits with higher charges for the services than people are willing to pay, then development is unduly handicapped.

27. In practice, charges not related to metered water consumption or to factors directly related to it, such as tank size or number of taps, probably have little influence upon the amount of water used and sewage generated by existing users. It is true that lower charges will make users richer and that this may lead them to spend more money in various ways, some of which will involve an increase in water use. But such indirect effects upon water use are exerted equally by the charges and prices they pay for anything else. Hence the main point about charges to existing users which are independent of water use and of the volume and type of sewage is that they neither encourage economy, nor reflect the system-cost consequences of changes in usage of the services. Whatever their merits in terms of the aims of raising revenue, fairness and simplicity, such charges are no use at all in achieving the aim of influencing consumer behaviour.

28. A metered rate is at the opposite extreme. Whether or not its proceeds are used for sewerage as well as for water supply, if it affects water consumption it will usually affect the amount of waste water to be handled by the sewerage system as well. Hence the costs of both must be brought in, as was suggested earlier. These costs, as a rough order of magnitude, need to be compared with the effective incremental rate paid by users. The sort of thing to look for is:

i) Rates which are the same in dry as in the wet season, even though the risk of shortage or the need for investing in more capacity results exclusively from dry season conditions.

ii) Rates which fail to reflect significant differences in the pumping or capital costs of supplying different areas.

iii) Rate differences reflecting no cost differences, a result which can easily be produced by some consumer-class differentials or by block tariffs.

29. Complicated block tariffs are fairly common. They often result in differences in the effective marginal cost of water as borne by consumers which reflect no corresponding differences in the marginal cost of supply. In such cases it is important to ask, on the lines suggested above, whether the implicit subsidy to those consumers effectively paying less is justified and whether the burden of the cross-subsidization is appropriately distributed. A cheap first block may suffice as a simple way of making minimum water requirement available to all consumers at a low price. If nearly all consumers take more than this first block it needs to be looked at together with the fixed charge.

VII. SUMMARY

30. The main point of this paper is that as the level and structure of charges can affect consumer behaviour and hence system costs they should reflect the way those costs vary with the use of the system. The relevant system may include sewers and sewage disposal whether or not these are financially separate. Revenue-raising, fairness, and administrative

simplicity are the other objectives of a charging system. Compromise between all four objectives will be necessary.

31. The improvement of a charging system normally raises severe political and administrative problems, so that all that is possible initially may be to improve it rather than to move over all at once to a well-conceived system. But the first and subsequent steps of improvement are best chosen in the light of an ideal system. Consequently an attempt should be made to work out such a system, at least in broad outline, to serve as a standard of reference. This involves:

- Analysis of system cost structure in forward-looking terms;
- Considering where metering or flow limitation devices are appropriate;
- Formulating cost-reflecting tariffs;
- Articulating the revenue and fairness objectives;
- Modifying the tentative cost-reflecting tariffs in the light of these objectives;
- Examining necessary institutional and administrative improvements.

32. Armed with this information, the analyst can then judge the main defects of the existing system and work out priorities for action. In particular, he can find out:

- How nearly an appropriate revenue target is met;
- What are the main inequities of the present system;
- How well metering, billing and revenue collection are performed;
- What are the main divergences between the incentives currently presented to users and those in the ideal system;
- What obstacles to improvement have to be overcome.

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Working Paper No. 11

WATER RATES IN DEVELOPING COUNTRIES

by

J.J. WARFORD & D. JULIUS*

I. Introduction and Background

A widely held view concerning less developed countries (LDCs) is that their problems are similar to those faced by the United States and European countries 50 or 100 years ago. If this were so a simple transfer of technology and economic advice from the more developed countries (MDCs) would be the appropriate solution. It is the contention of this paper, however, that at least in the field of resource economics as manifested in the pricing of water, the reverse is often true: there is much we can learn from their experiences. The physical and financial constraints faced by today's LDCs may be cropping up in slightly different guises tomorrow in Los Angeles and New York. Similarly, the solutions worked out in Nairobi or Manila may provide valuable lessons for our public utility planners.

Before taking up the specific topic of water rates in LDCs, it is necessary to set the stage by saying a few words about the overall resource picture of those 111 countries[1] as it relates to water. Of course, any generalization is hazardous when we are discussing countries as economically diverse as Mexico and Tanzania and as hydrologically diverse as the Philippines and Chad. At the risk of completely misrepresenting the situation in a few exceptional cases, however, several important generalizations can be made which add perspective to the particular problems faced by the water utilities of most LDCs.

First, the one characteristic which unites LDCs by definition is their relatively low level of income. In addition to low average incomes, the distribution of incomes is generally more skewed than in the MDCs so that a large proportion of the total population is often living in absolute poverty[2] even in countries where the average income may be moderately high. For example, in the Philippines in 1971 the lowest 30% of households earned only 8% of total income

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1/ As used by the World Bank in World Tables 1976. With the exceptions of Israel, Greece and the oil producing countries, all had per capita incomes of under $1850 in 1973. Over 70 countries had annual per capita incomes of less than $500.

2/ As used in this paper the term absolute poverty refers to those without access to the basic requirements of a healthy life including safe water, adequate nutrition and sanitation facilities.

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while in Japan the corresponding group accounted for 14% (in 1972).[1] This implies that the tax or revenue base of a water utility in an LDC is likely to be fairly narrow.

In many developing countries this problem is reinforced by rapid population growth rates that increase demands for service on the one hand while eroding the growth of per capita income (and thus ability to pay) on the other. This point is amply demonstrated by comparing the growth rates of developed and developing countries during the period 1965 through 1973. The real gross domestic product of LDCs as a group increased at an impressive average annual rate of 6% compared with 4.6% for the industrialized countries.[2] However, when one looks at per capita growth rates the figures are 3.5% for the LDCs and 3.6% for the MDCs. At such compounded growth rates the implications for demand growth and income constraints over time are severe.

The third important characteristic of LDCs which affects resource allocation is that the range of decision variables under consideration is generally broader than that in MDCs. Whereas few Western engineers would consider designing systems for consumption levels lower than 200-400 liters per capita per day (lpcd) or without sufficient pressure to meet peak demands, these are cost-saving alternatives that are feasible in LDCs. (Indeed, they may be the only feasible ones given some countries' tight budget constraints.) Since the technical relationship between cost and such design-specific parameters as pipe diameter, total pipe length, reservoir size, etc. are the same for LDCs as for MDCs (when comparing countries of similar geologic conditions) the differing budget constraints of the two groups often dictate different levels of service.[3]

These three factors--the narrow revenue base, the rapidly growing demand, and the resulting necessity to explore alternative service levels--have helped shape the rate-making philosophy of water utilities in LDCs. These critical constraints on water policy leave little room for maneuverability and less for mistakes so that a tendency has emerged to take a longer run approach in setting tariffs than is usually done in developed countries.

II. Demand Growth, Supply Plans and Prices

A long run approach takes into account both economic and technical interactions between water demands and system supplies. The mediator on the economic side is, of course, the price charged for water. While the evidence on price elasticity effects at low consumption levels is mixed, there is almost unanimous support for the proposition that price changes have a significant impact on consumption patterns at

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1/ JAIN, SHAIL. See Distribution of Income. IBRD, 1975.

2/ World Tables 1976, p. 392. The industrialized countries group excludes centrally planned economies which grew at an average annual rate of 4.8%.

3/ It has been roughly estimated that at present price levels it would cost more than $60 billion to provide everyone in the LDCs with access to safe water and at least another $100 billion for waterborne sewerage.

higher levels.[1] As discussed below, even in LDCs large water users account for a significant proportion of total water use. The impact of technical parameters on demand-supply interaction comes through cost. This is largely influenced by the selection of service levels and the resulting need for waste water disposal systems. The World Bank has begun several research projects which address these questions, and preliminary findings are discussed later in this section. The overall conclusion is familiar to us all: the way to equate demand with supply in the most economic and technically efficient manner is to set the price of water equal to its incremental supply cost. The purpose of this section is not to derive that well-known result but rather to indicate its significance for LDCs.

As a practical matter, the financial viability of a water utility is usually its most important concern. In the United States the main yardstick used to measure financial performance is the rate of return earned on assets employed. When compared with the cost of borrowing in local capital markets this provides a reasonably good measure of the enterprise's performance. In developing countries, however, local capital markets are often non-existent or highly regulated and subsidized so that the yields quoted bear little relationship to the actual availability of funds. Further, most water utilities are government or quasi-government enterprises and thus obtain their funding directly from public sources. With the well-known shortcomings of tax structures and collection rates in LDCs and the great shortage of funds for total public sector investment, this often makes it impossible to objectively determine a target or hurdle rate of return for a water utility in the usual manner. These are alternative financial covenants such as proportional contribution to investment which can circumvent this problem to some extent. However, the internal rate of return (IRR) on new investment is, in many cases, the only objective measure available by which to judge a utility's financial performance. Since the IRR is highly dependent upon the price charged for water this exerts additional pressure on the utility to set the price of water at or near its average incremental cost.[2]

The evidence of water demand patterns in developing countries is very sketchy and little cross-country analysis has yet been undertaken since comparable data are hard to find. However, the water distribution of the capital city of an East African country where records are fairly good is illustrative of the general pattern in many other areas. This particular city classifies residential consumers by size and value of property so that it is possible to see the crude connection between relative incomes and water demand.

1/ See, for example, HOWE, C. W. and LINAWEAVER, F. P. Jr., "The Impact of Price on Residential Demand and its Relation to System Design and Price Structure." Water Resources Research, 3:1:13 (Feb. 1967); HANKE, S. H., "Demand for Water under Dynamic Conditions," Water Resources Research, 6:5:1253 (Oct. 1970); CLARK, R. M. and GODDARD, H. C., "Cost and Quality of Water Supply." Journal AWWA, 69:1:13 (January 1977).

2/ The IRR is defined as the discount rate which equates the present values of the cost and revenue streams generated by the new investment. The same input information can be used to calculate the average incremental cost (AIC) of the water sold since the AIC is simply the cost per thousand gallons, averaged over the investment's life and discounted back to the present using the opportunity cost of capital. Thus if the price of water is set equal to its AIC, the IRR of the investment will just equal the opportunity cost of capital.

Table 1

Water Demand Patterns by Consumption and Connection

Consumer Category	No. of Connect-ions	Average 1975 Monthly Con-sumption (1000 I gal.)	Total 1975 Consump. (1000 I gal)	% of Connect-ions	% of Consump-tion
Residential					
Type 1 (lowest income)	534	~~3.36~~	22,985	6	1
Type 2	5476	~~4.73~~	332,262	56	17
Type 3	171	~~8.49~~	19,709	2	1
Type 4	415	~~12.26~~	65,275	4	3
Type 5	1921	~~13.68~~	337,124	20	17
Type 6 (highest income)	61	~~19.84~~	15,524	1	1
Business, Institutional	1068	~~94.36~~	1,198,033	11	60
Total	9646		1,990,912	100	100

The most notable feature of Table 1 above is that 60% of the water sold is consumed by businesses and institutions which account for only 11% of total customers.

The sensitivity of business to increases in the price of an input is generally considered to be fairly high especially when that input is an important one as,for example, for bottling companies. Meanwhile over 60% of the connections (those in the lowest two income categories) consume less than 20% of the water. This relationship would be even more striking if we included the public standposts which supply a large part of the population that cannot afford private connections. It has been estimated that their average consumption is only 3 Igcd[1/] whereas even the lowest income category with a private connection uses an average of 22 Igcd. Thus water distributed through public standposts accounts for only two percent of total consumption but represents about 10% of the total population served.

These figures may sound reminiscent of the type of income distribution figures that one often hears quoted for LDCs and indeed the patterns are very similar. When one plots Lorenz curves for income and for residential water consumption in a given city the similarity is often striking. This implies that the income elasticity of water demand is close to unity and that the few largest consumers are responsible for a highly disproportionate share of total consumption. Since they are likely to be the most sensitive customers to price changes (on both empirical and theoretical grounds: declining marginal utility suggests less incentive would be needed to induce them to cutback consumption) the conclusion is that charging at least those customers the full marginal cost for their water can go a long way toward holding down the growth of total demand. In the next section we discuss the fiscal and income distributional implications of these demand patterns.

1/ Igcd= Imperial Gallons Per Capita Per day
1 Ig= 1.2 US gallons

On the supply side the major concern is that the least cost package of works be put together to meet the demand. Since the demand will vary according to the price charged, in developing countries this often means offering different standards of service for different consumers. Providing only for house connections usually excludes the poorer people from any service at all unless other consumers are willing and able to subsidize their connection and use. Even where a tariff structure with cross-subsidies exists, the poor are often unable to afford the cost of household plumbing necessary to make use of the potential water connection.

Alternatives to house connections include yard or patio connections and public faucets. A World Bank sponsored research project carried out by Professor Donald Lauria of the University of North Carolina compared the distribution costs of providing for patio connections with those of supplying public standposts at a 50 and 100 meter radius. Based on bid documents for a densely populated city in the Yemen Arab Republic his preliminary results indicated that going from a 100 meter to a 50 meter standpipe spacing more than doubled per capita distribution costs, while moving from 50 meter radii standpipes to patio connections more than quadrupled per capita costs.1/ Thus the willingness of people to pay these cost differentials must be carefully considered before a utility is justified in rejecting lower service alternatives for some customers.

From a longer run perspective the cost differentials implicit in different service levels are even more striking since provision for waste water disposal must be included, and per capita sewerage costs are often much greater than those of water supply. Another research project is just getting underway in the World Bank to explore alternative low-cost technologies for waste disposal. Many of these unconventional methods are only feasible, however, in areas where per capita water usage is relatively low. Therefore, unless the cost of disposing of wastewater is included in the original least cost calculation for water supply, the introduction of piped water into an area can actually cause a decline in health and environmental conditions.

Thus it is crucial when working in a developing country context to consider the long run implications of decisions taken today which affect system costs and future demand growth. Since many water supply systems are at an early stage of development and are situated in cities expecting rapid population growth over the next decade, an appropriate mix of service levels and proper pricing policy from the outset can go a long way toward easing the water utility's job of balancing burgeoning demand and strained resources in the future.

III. Financial and Income Distributional Trade-offs

Social goals which in developed countries are considered the province of the national government, are often left to lower levels and more

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1/ These figures assume a uniform average consumption of 50 lcd. Results from tests using 20 and 100 lcd were fairly similar with cost differentials growing slightly larger as per capita demand increased. Of course it is unlikely that people with patio connections would use only 20 lcd or that those using standpipes would use 100 lcd.

diverse groups in LDCs.[1] To build progressivity into a tax system, for example, requires an expensive and sophisticated machinery which is often lacking. As a second best alternative, prices at which public services are offered to various types of consumers can be designed to achieve a certain redistribution of income.

The financial objectives of a water utility, simply stated, can be met by making sure the average tariff level (i.e., the average revenue per thousand gallons sold) is high enough to yield the desired rate of return. The social or income distributional objectives require that even the poorest members of the community be able to afford access to safe water. The way to reconcile these seemingly conflicting objectives is through careful design of the tariff structure.

The pattern of water demand or the distribution of total water consumption across consumers discussed previously has important implications for the tariff structure. Basically it means that financial requirements can generally be met even if only the large consumers are charged the full marginal supply cost for their water.[2] Thus a typical tariff structure would consist of a social or "lifeline" block which would be sufficient to meet basic sanitation needs (say, 20-25 lcd) supplied at a very low price per cubic meter, and one or more larger consumption blocks where unit prices would approach or equal the incremental supply cost.

It is important to note that the emphasis in designing this increasing block (or "inverted") tariff structure is not one of charging higher unit costs to larger users but rather one of pricing most of the water at its full marginal cost while offering a subsidy for the first few litres consumed on social grounds.

This sort of increasing block tariff has been adopted by 21 of the 36 developing countries metered for connections that have borrowed from the World Bank in the water supply sector. In such countries, where the machinery of tax collection is usually ill equipped and alternative sources of revenue scarce, the proper pricing of utilities can make the difference between community solvency and public sector deterioration.

It is interesting to contrast this with the pricing behavior of water utilities in the U.S.--one of the few countries where declining block tariffs are still widespread. A recent survey of the tariff structures used by over 70 American utilities showed that more than 80% had decreasing

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1/ While water authorities in the U.S. often claim that such goals should be handled outside the realm of utility pricing, an analysis of the actual incidence of their user charges often reveals large inter-customer subsidies.

2/ An important exception, of course, is where marginal costs are below average costs due to significant economies of scale or large amounts of unutilized source capacity. However, such cases are relatively rare in both developing and developed countries where high urban growth rates and inflation persist and where new sources of water are progressively more expensive.

block tariff structures.1/ With the very rare exception of economies of scale on a per consumer basis, the only rationale for such a policy would be if the high initial block were needed to cover consumer related expenses like meter reading in areas where the production costs of water were so low that basing the tariff on supply costs would not cover non-production related expenses. With the rising costs of the last decade and the need to range further afield for new water sources there is little doubt that this situation no longer exists in the U.S. if indeed it ever did. In LDCs the rationale for offering lower prices for some levels of consumption is based on the welfare goal of providing minimal quantities of safe water to all. It is difficult to justify subsidizing large residential and industrial consumers on any similar grounds. In fact, U.S. utilities which continue using "quantity discount" tariff structures will not be able to escape bearing a major part of the blame for the water shortages which are occurring with increasing regularity.2/

The impression should not be conveyed, however, that developing countries as a group have been exemplary in their wholehearted adoption of marginal cost pricing. The use of increasing block tariffs does not, by itself, imply anything about marginal costs and indeed in some countries even the highest consumption block is priced well below incremental supply costs. In addition there has been a widespread unwillingness among public water authorities to permit pricing distinction between consumers on the basis of incremental costs for which they are responsible. The failure to adequately recognize the burden on system costs of peak season water consumption is an example.

A number of difficulties that are typically associated with the practical application of marginal cost pricing principles assume particular importance in LDCs. Income distributional constraints may be greater because of the absolute level of poverty; unemployment and overvalued local currencies raise a problem of shadow pricing, and administration of pricing schemes is particularly difficult--for example, metering of water supplies often presents acute management problems in LDCs. Administrative shortcomings also mean that knowledge of such critical variables for incorporating a redistributional element into pricing policy as beneficiaries' income status, population density, etc., is even less adequate than it would be in a developed country. The problem of technological lumpiness of investment, which always causes conceptual problems for the pricing analyst, is often greater in LDCs because optimally sized investments may, in comparison with developed countries, represent relatively large additons to limited existing capacity and output. This problem is sometimes compounded by financially induced lumpiness where, because

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1/ HELT, A. and CHAMBERS, D. L., "An Updated Hartford Metropolitan District Water Rate Survey," Journal AWWA, August 1976,pp.426-430.

2/ The declining block rate has also been a traditional feature of electricity tariffs in the United States. However, recent energy shortages have prompted a critical review of electricity pricing policies; as a result, rate "flattening" or "inversion" is widely advocated, and there are signs that a significant reform of electricity tariffs may now be under way in this country.

of the uncertainties surrounding future sources of finance, countries may be tempted to build overly large projects so that shortages can be remedied and considerable excess capacity created all at one time.

In general, however, the widely shared concern that the poor be provided with minimal water at low cost has sharpened the LDCs understanding that marginal cost pricing at the other end of the spectrum makes good financial sense as well as furthering the more nebulous goals of economic efficiency.

IV. Lessons for Developed Countries

Much has been written in the popular press over the last couple of years about the "urban crises" developing in major cities across this country. New York's budgetary problems have become legendary and the prospect of general urban decay is a pervasive political and social issue. At the same time concern among environmental groups has been growing over the erosion of air and water quality which has naturally accompanied population growth and the resulting increased pressure on natural resources. The problem of sludge disposal is an especially pertinent example of this.

It is our contention that these changing social and environmental factors are rapidly leading to an investment climate for water utilities in developed countries which is not dissimilar to that in developing countries. Where the local resource base is limited in LDCs by low income levels, in U.S. cities it is limited by the growing demands of competing needs like local school systems and burgeoning welfare and public servant retirement benefits. The increased difficulty of gaining voter approval to new bond issues (which are also used to finance water and sewerage expansions in many cases)[1] is evidence of this trend.

A common factor linking developing countries is the rapid growth in water demand which, combined with the resource constraint discussed previously, has led to the necessity to explore unconventional means of satisfying that demand. While water demands in this country are not expected to experience more rapid growth than in the past (and there is little backlog of unsatisfied demand) the changing supply situation may well bring about the same result. As water utilities must go farther and farther afield to find new sources of usable water, as it grows more and more difficult politically to justify new or enlarged dams or the diversion of water from plentiful to scarce areas, as the costs of wastewater treatment and disposal skyrocket with more stringent pollution control requirements, the need to encourage conservation in water usage will become more and more pressing. The most effective way of doing this, of course, is to price at least that water used in excess of personal hygiene requirements at its full marginal cost.

Another factor which has received considerable attention in public utility literature lately,[2] and which is also tending to sharpen

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1/ DUPRE, E. E. Jr. "Survey of Wastewater Rates and Charges," Journal of Water Pollution Control Federation, January 1970.

2/ See, for example, the January 1977 issue of Journal AWWA; in particular SHIELDS, J. R. "The Effect of Inflation on Water Utility Budgets," & HARDTEN, R.D. "Water Rates in Inflationary Times."

the economic awareness of American utility managers, is the impact of inflation on costs. The financial requirements necessary to meet increased operating costs and permit an adequate rate of expansion of capacity are growing at an unprecedented rate. The reasons include not only general inflation but also the especially large increases in the prices of fuel and chemicals, and the technical and environmental factors mentioned above. Unless tariffs are increased commensurately, a utility would soon face serious financial difficulties. Unfortunately, the solution often advanced has been to introduce a new type of charge[1/] on new customers or special groups of existing customers while leaving the overall consumption charge far below marginal production costs. While this may be an adequate financial solution in the short run, it will not only prove infeasible over the longer term (since such charges fall upon a relatively small group of customers and cannot be increased indefinitely) but will also actually contribute to a worsening situation as demand grows unrestrained.

In developing countries, where resource constraints are tighter and demand growth is faster this problem is being faced today and dealt with through adopting a longer run and forward looking approach toward rate setting. The degree of success achieved through this philosophy will, no doubt, be followed with great interest by those of us who will face similar problems over the next decade.

1/ This goes by many names including availability charge, plant investment fee, meter and service fee, local facilities charge and others.