HIS MAJESTY'S GOVERNMENT

OF

NEPAL

International Drinking Water Supply And Sanitation Decade 1981–1990

Ten Year Plan

For

The Provision Of Drinking Water Supply And Sanitation

Department Of Water Supply & Sewerage
Panipokhari, Maharajganj,
Kathmandu, Nepal.

December 1980

SYNOPSIS

His Majesty's Government of Nepal (HMG) initiated the compilation of this "Ten Year Plan for the Provision of Drinking Water Supplies and Sanitation", which was completed in Dec. 1980.

It addresses the major items that are considered crucial to planning in the sector for the next ten years. These include:

- Population
- Water Supply Programme
- Sanitation Programme
- Institutional Arrangements
- Manpower Requirements
- Training Requirements
- Development Finance
- Operation and Maintenance
- Constraints

Where it has been possible, an annual breakdown of requirements has been made. This has not always been possible due to data limitations.

The level of detail contained in this document has often been dictated by its availability. In some areas, it is insufficient, and will need to be collected and included at a later date. The relationship between this sector and others is not explored generally; and some relevant details such as criteria for service, applicable technologies, and public health are not examined in depth, since they have either been established, or are not thought to represent a major limitation to the envisaged programme.

Planning is a dynamic process; thus, this Plan will be obsolete in a few years and will require constant updating. What it seeks to do is to provide a level of data and targets for the sector which will allow the political and technical decision makers the facility to make well advised decisions and revise targets as necessary; to modify strategies; and to lay down new policies in the light of the information, on a national rather than district level.

This document has been prepared by the three sector agencies active in the provision of drinking water supplies and sanitation; namely the Water Supply and Sewerage Board (WSSB); the Department of Water Supply and Sewerage (DWSS); and the Ministry of Local Development (MLD), under the guidance of the National Group, together with the technical cooperation of WHO.

Rate of Exchange

All monetary sums in this document are shown in Nepalese Rupees. Conversions, where necessary, may be effected as follows:

Rs. Nepal 1.0 = US$ 0.083

US$ 1.0 = Rs. Nepal 12.0

NEPAL - TEN YEAR PLAN FOR DRINKING WATER SUPPLIES AND SANITATION

List of abbreviations used in alphabetical order

ECOSOC	:	Economic and Social Council
DHS	:	Department of Health Services
DWSS	:	Department of Water Supply and Sewerage
ESD	:	Environmental Sanitation Division, D.H.S.
FYP	:	Five Year Plan
HMG	:	His Majesty's Government
IDA	:	International Development Association, W.B.
MLD	:	Ministry of Local Development
MOH	:	Ministry of Health
O & M	:	Operation and Maintenance
TST	:	Technical Support Team, UNDP
UNDP	:	United Nations Development Programme
UNICEF	:	United Nations Childrens' Fund
WB	:	World Bank
WHO	:	World Health Organization
WSSB	:	Water Supply and Sewerage Board

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1 INTRODUCTION

1.1 BACKGROUND

This document is intended to be used as a planning reference tool, and addresses most of the major issues involved in the provision of drinking water supplies and sanitation facilities. It supersedes "The Provision of Drinking Water Supply, Proposed Ten Year Plan 1981-1990:, dated July 1978, but uses some of the data from that Plan; and covers the same period, namely 1981-1990.

1.2 THE PLAN

The current plan as reflected in Annexes 7-10, 12-15 and 17-21 is based on existing data much of which are in the form of estimates. The plan is only as good as the data on which it draws, and should be revised regularly, whenever better data are available. To be comprehensive, much reference material should be included with this document; however, only relevant references are listed in the bibliography and section 1.5; and to allow flexibility for revisions in the future, it is kept as short as possible. Data tables are given in Annexes.

The issues addressed are listed in the Table of Contents, and include population, water supply and sanitation programmes, institutional arrangements, manpower and training estimates, and financial requirements for both development and operation and maintenance. Additionally, promotion of programmes, health education and some major constraints are noted. It is not possible to give definitive plans in some areas, but trends are noted to indicate where corrective or other measures might be necessary.

1.3 LIMITATIONS OF THE PLAN

The limitations of any plan are twofold. First, the data, as noted above, may give estimates of existing coverage for instance, which are not correct. The future targets include this

coverage, and thus those figures will also be in error. Per capita costs for the provision of water supplies, unless regularly reviewed against actual and projected population, may introduce large inconsistencies in investment requirements. Secondly, any plan is dependent on both quality and quantity of certain inputs. For instance, manpower; if projected numbers of engineers and overseers cannot be provided for one reason or another, then specified targets may not be reached. The bases of the plan are, wherever possible, carefully spelt out, so that constraints such as manpower, training, procurement and fund release may be eased in a timely manner to allow the targets to be reached. For population coverage, a range of values has been used; the lower part representing what can be expected with presently projected inputs, and the higher range representing what can possibly be achieved with the full cooperation of all concerned government ministries and agencies in removing existing constraints.

1.4 REVISIONS TO THE PLAN

Revisions to the Plan should take place regularly say at least every two years. A census is to be taken in 1981 which will yield very valuable information and these data should be incorporated at the earliest opportunity. When careful surveys have been conducted on existing coverage levels these should be incorporated.

The plan marks the route between the existing position and the required future position. Any change in either the starting point or target or in the route to be followed necessitates a revision. The value of the long term plan is in its indication of the route (or trends) that should be adopted immediately to reach desired targets. Thus timely revisions should be made and these examined for their implications as often as practicable.

1.5 SUPPORTING DOCUMENTS

This Plan supersedes the previous Ten Year Plan, since targets for the end of the Sixth Five Year Plan (1985) have been revised. Population data are all based on the 1971 census and previous trends - those data are listed in the bibliography. For preparation of this plan, much informal data was collected from the water agencies, and this is held in files in DWSS which acts on behalf of the National Group; which data may be consulted as necessary. In addition, a Country Report was prepared by DWSS for the ECOSOC in May 1980, which contains much information. This should be regarded as a supporting document. Further, a list of recommendations has been prepared which lists specific actions needed to be taken to ensure that targets are achieved. Those recommendations should be viewed as separate but supporting this document.

Two other documents were prepared to accompany this plan. They are "The Large Scale Shallow Tubewell Scheme for the Terai", and associated Handbook.

1.6 PLANNING CYCLES

The planning cycles adopted by HMG follow Five Year Plans as follows:

Sixth Five Year Plan : Mid July 1980 – Mid July 1985

Seventh Five Year Plan : Mid July 1985 – Mid July 1990

It is these cycles which are used; it being coincidental that the International Drinking Water Supply and Sanitation Decade occurs nearly between the same dates.

2 POPULATION

Population data at 1980, 1985 and 1990 are presented in Annexes 1, 2 and 3 respectively. The breakdown gives urban (Nagar Panchayats, currently numbering twenty three) and rural (remaining population, irrespective of community size) populations by geographical region (Hills, Midlands or Terai) and by development regions (Far Western, Western, Central and Eastern). Annex 4 presents urban populations by town at those dates.

For reference purposes, the districts which are located in each geographical/development region are listed in Annex 5; and locations of towns into those same regions are shown in Annex 6.

All data are based on 1980 boundaries (district and 23 Nagar Panchayats). Projections are based on published information originating in the Bureau of Statistics.

2.1 REGIONAL DISTRIBUTION OF POPULATION

Identification of regional migration trends between the censuses in 1952/54, 1961 and 1971 have been used in projections of populations in different areas of the country. Where data were lacking estimates based on the experience of agency personnel have been used.

2.2 URBAN POPULATION

Data on present urban populations have come from several sources. Projections of future urban populations have generally been made using a growth rate which is higher than the appropriate regional growth rate. The amount by which the rate differs has been one of subjective judgement, but is based on expected industrial development trends, location, communications and physical limitations, together with any other data specific to the particular town. The average growth rate for all towns is taken as some 50-55% above the national growth rate.

2.3 RURAL POPULATION

Rural population is that part of the total which does not live in urban areas, irrespective of community size. These communities range from "rural compact communities" of 15,000 approximately, down to isolated, very small groups.

3 WATER SUPPLY PROGRAMMES

HMG has enunciated policies which apply to various water supply programmes which are executed by the three main sector agencies. These agencies coordinate their activities through the National Group (vide Section 5.1) and for reasons of efficiency in exceptional circumstances operate in areas not strictly under their jurisdiction. To avoid the complications of the actual division of responsibilities, HMG policy as it applies to various areas is noted in this section generally without regard to agency activities. The administrative arrangements which apply to the sector agencies are addressed in section 5.

3.1 URBAN WATER SUPPLIES

It is the policy of HMG that all towns should have a piped water supply. By 1990 this will be the case; however, this does not imply complete coverage of the population in those towns, since the boundaries which apply to Nagar Panchayats are drawn for social rather than geographic reasons. Thus, in some, there are wards which are so far from the town as to make it uneconomic to include them in the town's water supply. Also, in some towns, it will be more rational to supply certain areas through community hand pumps where the geology makes this a possibility.

It is government policy that recipient communities should be responsible for the operation and maintenance of their own supplies. For towns now under the jurisdiction of WSSB, the effect has been that communities pay an economic tariff for the

supply of water, while, the Board maintains responsibility for the operation and maintenance of the systems. For the rest, though this is commendable policy, the communities in practice do not have the technical expertise to operate & maintain their own supplies and thus it is left to the responsible sector agency to supply competant personnel and retain responsibility for the supply. The problem is related to the tariffs which may be levied for urban water supplies. Should an economic tariff be charged for the supply of water, then hiring of able technical personnel by each community, whether through a sector agency or not, would be feasible. Where towns are large, such as Kathmandu and Lalitpur, this presents few problems; but in smaller towns in other regions, where costs are high, and there are few attractions for technical personnel, the competance of the community to retain such personnel, is hampered by their inability to charge a high enough tariff to pay competitive salaries. HMG presently is considering the question of tariff levels; while water is regarded as a social amenity, this problem will remain. This problem is also addressed in Section 10 under "Constraints"; in Section 5 under "Institutional Arrangements"; and in Section 9 under "Requirements for Operation and Maintenance".

3.2 RURAL WATER SUPPLIES - HILLS AND MIDLANDS

HMG policy in the Hills and Midlands is aimed at reducing the water collection journey, improving water quality and providing an adequate supply. By 1990 it is required that there shall be at least one water supply system in each & every Gram Panchayat in the country. To meet this requirement 2266 gravity piped water supply systems has been planned for implementation in the Hills & Midlands between 1980 and 1990.

HMG policy is that recipient communities should be responsible for routine operation and maintenance of their own water supplies. The implications of this is that the technology in use should be the simplest type possible. Water purification by slow sand filtration is presently not being included in these systems as the maintenance of this type of filter is considered

slightly too advanced for general usage. Presently constructed systems make available adequate water within easy reach of the communities. Protective measures are also taken to prevent contamination and or pollution at the source. Chlorination is not provided for as it is not possible under the present conditions to ensure steady supply of chemical and also the maintenance of the chlorinators. It is proposed to provide filters and or chlorinators at some later date in systems where it becomes necessary.

Pumping schemes are not favoured for the rural water supply systems in the Hills and Midlands as these are expensive. In addition pumped systems will need well trained manpower and require a much higher level of maintenance than is presently available. However water rams, which do not need a prime mover, have been used successfully in some systems. Here again there are severe limitations to their use.

The terrain and geological conditions rule out any possible use of handpumps except in some very small areas in valleys which have an alluvium, such as parts of the Kathmandu valley.

3.3 RURAL WATER SUPPLIES - TERAI

Rural water supplies in the Terai will depend entirely on the geology and aquifer levels in each area. Wherever possible, shallow tubewells with handpumps will be used; in other areas, deep tubewells, generally with some motor driven pump, will be used.

For those areas in which alluvium occurs, and where the water table is, always within 7 m below ground level, handpumps will be installed. HMG has laid down that coverage is to be one handpump per 200 people by 1990 for the provision of pumps. In addition, the wells shall be sited so as to minimise the water carrying distance to 150 meters. It is proposed to lower the ratio of user per well from 200:1 in 1990 to 75:1 by the year 2000 which implies approximately 32,000 handpumps need to be

provided between 1980 and 1990 and some 70,000 - 80,000 additional handpumps will be needed between 1990 and 2000. The area to be covered by these tubewells is thought to represent about 80% of the Terai, but will need to be surveyed for the correct figure to be determined. The "Large Scale Shallow Handpump/Tubewell Scheme for the Terai" is the subject of a separate document, which should be read as supplementary to this document. The population projections on which that Scheme was based have recently been revised, and this should be borne in mind when reading that document.

For the remaining areas of the Terai, which generally lie in the zone where the alluvium rises to meet the Churia Hills and some larger rural communities deep tubewells will be needed. Drilling will, in almost all cases, need to be by percussion or rotary methods, since even in areas where the alluvium dominates, there are boulder layers, ruling out the easier jetting method. As before, surveys will be needed to determine the precise population to be supplied by deep tubewell; and the likely drilling methods to be employed. In certain areas, it may be possible to use deepset handpumps, which are easier to maintain and do not suffer the disadvantages of power interruptions and diesel shortages. Thus, deepset handpumps will be needed in some areas. The total numbers are thought to be small compared with the shallow tubewell suction type envisaged for most of the Terai. The programme of works for the concerned agencies do not reflect these requirements, which will be included in the plan when the necessary relevant surveys have been conducted.

3.4 POPULATION COVERAGE BY WATER SUPPLY

The coverage of population with water supplies at 1980, 1985 and 1990 is noted in Annex 7. Annex 8 presents the breakdown of urban population, with anticipated coverages at the same dates.

Existing coverages are based on estimates made by the sector agencies. While urban estimates are relatively easy to make, those in rural areas are not, and may be inaccurate, which could affect the achievement of the set targets. The problem of surveying the rural areas to determine precisely what coverage has to date been effected, is currently under study; the results will need to be incorporated in this Plan at the earliest date.

In estimating what coverage it is possible to achieve, it has been found necessary to reduce that set for 1985 in the "1978 Ten Year Plan". This has been mainly because the required manpower is not available, nor can it be trained in time to be utilized to accelerate the present level of activities in the sector agencies. The original targets set for 1990 have been retained, but they can only be reached provided certain limitations such as manpower levels, total quantum of finance, etc., can be made available at the time that they are needed. The graphical presentation of targets in Annex 7 illustrates this.

4 SANITATION PROGRAMMES

For the purposes of this Plan, Sanitation is taken to mean excreta disposal systems only. Urban surface water drainage and garbage disposal are not addressed here, even though it may be necessary for the country. It is pointed out that these two items are both closely related to health; and that safe water and excreta disposal systems will only have a marginal impact if they are not linked to drainage and garbage disposal. The National Group is acutely aware of the need for both, and shall shortly be seeking assistance in setting up the requisite systems.

4.1 URBAN SEWERAGE

Annex 9 presents data, supplied by WSSB, on the present and anticipated coverages of population by sewerage up to the year 1990. Plans presently only envisage the installation of this type of system in the core (central) areas of twelve towns.

The towns are listed in that Annex. It has been found that the per capita cost of sewerage is so high that its widespread use in the country is not contemplated. However, WSSB is investigating the possibility of extending limited facilities to six other towns, and these systems will only be aimed at the bazaar and other heavily congested areas.

4.2 URBAN ALTERNATIVE SYSTEMS

For coverage of those areas not to be served by sewerage, alternative low cost sanitation methods are needed. Presently, plans are being laid for pilot projects in eight towns or large villages to determine the acceptability of pour-flush latrine types. When this work is complete, only then can specific plans be formulated for the urban areas. Thus, no targets have been set for these; what is shown on Annex 9 refers to private rather than government implemented systems.

Because of the living patterns of the people, where even in rural areas they tend to congregate in "rural compact communities" where housing densities can be very high, the solutions applicable to the urban areas may in many instances be similar to those required in the rural communities.

It is notable that the National Group (vide Section 5.1) has fostered close collaboration between sector agencies in this field, and it is expected that when the pilot projects and other schemes being undertaken have indicated what systems and methods are most successful, plans will be formulated and implementation will follow quickly.

4.3 RURAL SYSTEMS

Under the programme to achieve "Health for All by 2000" a number of targets were set for various sections of the rural community. These targets are presented in Annex 10. The systems envisaged are of the pit-latrine type, with or without water for flushing.

It is the intention of the two agencies active in the rural sub sector, namely D.W.S.S. and M.L.D., to evolve a system for implementation of rural sanitation schemes by a process of trial and evaluation. By this means it is hoped to develop sanitation which is technically appropriate and acceptable to the users, which may involve the use of a number of different systems depending on defecation practices, cost. soil conditions water availabllity, acceptability of recycling excreta etc.

The agencies intend that a subsidy for necessary materials should be paid to cover the cost of squatting slab & water seal (and vent pipe where appropriate). This is currently estimated to cost some Rs 300/ per unit. All other costs are to be borne by the users. Since the technology envisaged is designed to incorporate only locally available materials with the exception of those items covered by the government subsidy this appears appropriate. It also allows users to build according to their means without loss in performance of the latrines.

Experience elsewhere in the world and in the South East Asia Region in particular has highlighted the need for health education and promotional campaigns to educate prospective users into the need forsanitation and how to maintain and operate their own systems. Without this component, large sums of money have been, and may still be wasted. This item is addressed more fully in section 5.5.

It is notable from Annex 10 that the rural sanitation programme accords priority to the Terai where enteric diseases are rife. This should be an administrative advantage, since the systems to be adopted and implementation methods can be developed in the Terai generally before moving into the more difficult areas in the Midlands and Hills. To avoid duplication of Annexes the costs of this programme have been included in Annex 10.

4.4 SCHOOLS' PROGRAMME

Annex 10 includes the targets set under the Health for All by 2000 programme for rural schools.

It is the intention of HMG that all existing rural schools, some 18000 in number, should be given sanitation before 1995. In addition, a policy directive should shortly be made which will oblige all schools built after 1980 to have sanitation incorporated at the time of construction.

MLD has recently drawn up plans for the implementation of sanitation in ten selected schools, which is part of a much larger programme in the rural areas. The results of this project will be very closely monitored so that any necessary modifications can be made before large sums of money are spent. Again, health education of both teachers and pupils is crucial to the success of this programme.

4.5 DEMONSTRATION SCHEMES

Until appropriate types of latrines for both urban and rural application have been determined, no valid plans can be made. Thus, several demonstration projects have been proposed, but none yet executed. If the targets are to be met, it is crucial that these be undertaken at the earliest date.

External support for these programmes is readily available. Agencies active in support of HMG include the World Bank, UNDP, WHO and UNICEF. A number of voluntary organisations have also gained some experience in this field. The National Group intends to coordinate these external resources with it's own activities, and proposed demonstration projects could very quickly lead to a substantial programme.

4.6 POPULATION COVERAGE BY SANITATION

The data relating to this programme is found in Annexes 9 and 10. Since plans only exist for parts of the urban community and for a phased development in the rural community, no combined tabulation is given. Also it should be noted that the schools programme is complementary to the rural programme; double counting should not take place.

If these targets can be achieved, some 2 million people should have access to one type or another of excreta disposal system by 1990, which represents a coverage of about 11% by that date.

5 INSTITUTIONAL ARRANGEMENTS

This section describes what the present administrative arrangements are; and where appropriate, how government policy affects development, operations and maintenance of water supplies.

5.1 THE NATIONAL GROUP

On 19th March, 1979, a meeting was held by the "National Group" to determine what external support was needed to supplement existing programmes being executed by the sector agencies. The membership and terms of reference of the National Group had been decided and formed part of the minutes of that meeting; which information may be found in Annex 11.

The functions of the National Group are laid down in the Terms of Reference; the principal responsibility being to initiate and coordinate activities in the sector. Most of the work of that Group is performed by a smaller technical working group from the three main agencies involved WSSB, DWSS and MLD. The Chief Engineer, DWSS, is chairman of the Group, ex-officio; which is an advantage, since DWSS is designated as the responsible agency for all aspects of overall sector planning & development. The coordination has, to date, been very good amongst those three agencies.

Represented in that Group is the Department of Health Services (DHS) for obvious reasons. The Environmental Sanitation Division of the DHS was created in response to the need for an agency to take a leading role in the sanitation programme in the country. The ESD of DHS will need to play a far more active role in both health education, and perhaps more importantly, in promotion of the need for sanitation, than hitherto; as this lack is hampering the efforts of three other agencies. This role must include active representation on the National Group.

5.2 THE WATER SUPPLY AND SEWERAGE BOARD

The Water Supply and Sewerage Board (WSSB) is a semi-autonomous Board with responsibility to the Ministry of Water Resources. It was created in 1973 and is at present responsible for water supplies and sewerage in six towns (vide Annexes 8 and 9). These activities are being expanded to include water supplies in twelve towns by 1985. It is expected that the Board should eventually be responsible for all urban water supplies and urban excreta disposal systems in the country.

5.2.1 URBAN AND RURAL WATER SUPPLIES

Although the responsibility of the Board is primarily for urban water supplies, it has been the practice for practical reasons that where a water main passes a rural compact community, for a water supply to be given to that community. This is shown numerically on Annex 8, where Gram Panchayats in the Kathmandu Valley, Pokhara and Biratnagar are included in the WSSB listing.

Water supplies to urban communities have been developed by the Department of Water Supply and Sewerage. The pattern of handover of towns from DWSS to WSSB has included major towns where works are suitable for external funding.

The financial arrangements of the Board are addressed in section 8 and 9; while manpower and training requirements are noted in section 6 and 7.

5.2.2 URBAN SEWERAGE AND SANITATION

In addition to the plans for sewerage in the core areas of six towns viz Kathmandu, Lalitpur, Bhaktapur, Pokhara, Biratnagar and Birgunj and the feasibility studies carried out by the Board in six additional towns namely Dharan, Janakpur, Hetauda, Bhairawa, Butwal and Nepalgunj, there is a need for studies to be carried out for the provision of alternative sanitary measures for the safe disposal of excreta in the unsewered areas of the ten towns and also the remaining 13 urban areas. At present, such alternative systems have been privately initiated, and usually are of the septic tank or direct pit privy type. Two particular problems arise from this need. The first is that of the view taken by a number of urban dwellers in towns where sewerage is being installed; it is noted that some believe there is no need to instal a private system since they will eventually be connected to the sewer main. This view cannot be supported by the facts in many instances, and such people should be disabused of the idea that they should await developments. First, only limited areas of the towns will receive sewerage; and very often, even if their particular area will be covered by sewer mains or feeders, the time delay is such that it would be much better to instal a system immediately and convert at the appropriate moment. The second problem is that the installation of pit privies raises little, if any, revenue, and thus may not be attractive to the Board.

For urban dwellers in towns not to be covered by sewerage, the need for excreta disposal systems is self evident. However the administrative arrangements associated with this have not yet been determined. It remains to be seen whether the Board will need to create its own alternative sanitation division or

indeed whether the Nagar Panchayat should take this responsibility with technical support from either the Board or DWSS or the ESD. The demonstration projects planned for implementation in some selected towns under the UNDP assisted Global Project is hoped to provide the methods and procedures to be adopted for the provision of alternative sanitary measures in the unsewered areas.

Experience in parts of this region have shown that during conversion to sanitary (usually water seal) latrines, revenue can be raised to meet part of the operational cost by recycling mature excreta. This could well be the system by which the Board or the Nagar Panchayat could be prevailed upon to engage itself in this activity with HMG support.

5.3 DEPARTMENT OF WATER SUPPLY AND SEWERAGE

The Department of Water Supply and Sewerage (DWSS) falls, like the WSSB, under the Ministry of Water Resources. DWSS is charged with responsibility for urban water supplies and sanitation in towns not covered by the WSSB, currently numbering 17, probably reducing to 11 by 1985 when WSSB takes over six more towns (vide Annex 4). This responsibility involves development, augmentation and rehabilitation of water supplies. In addition, the Department has responsibility for rural compact communities' water supplies and sanitation where such communities' population exceeds 1 500 in number in the Hills and Midlands. Further, in the division of responsibilities for rural population in the Terai, DWSS will administer the Shallow - tubewell/handpump scheme in the Central and Far Western Region; and deep tubewells throughout the Terai.

Tabulation of DWSS activities during the Decade may be found in Annex 12.

5.3.1 URBAN WATER SUPPLIES

All towns in Nepal, with one exception - (where a system is under construction) have a piped water supply. Most are in need of extensions, augmentation or rehabilitation. Supplies are generally intermittent, and maintenance of below the necessary level, which is because of inadequate fund generation and limited technical and managerial manpower.

HMG policy requires that recipient communities operate and maintain their own supplies. Evidence has shown, though, that this policy cannot be followed for lack of expertise, and that a number of systems have had to be taken back and operated by DWSS. This has put a disproportionate burden on DWSS, which is partly reflected in its O&M budget, and partly in the relatively high manpower levels it requires. Until an economic price is charged for water in urban towns covered by DWSS, this is likely to prevail.

In Terai towns under the Department, it may well prove advantageous to consider more widespread use of handpumps in parts of towns not easily or economically reached by piped water supplies.

5.3.2 RURAL WATER SUPPLIES, HILLS AND MIDLANDS

The type of system implemented in the Hills and Midlands by DWSS is usually a gravity piped supply. The technology is simple and effective, and widespread use is made of HDP pipes.

The Department faces a number of problems which limit the scope of its work. First, the recipient community is, by HMG policy, supposed to contribute free labour during development of the supply, to dig trenches, transport construction materials by head loads, etc. Experience has shown that the organization of the works is so unpredictable, being dependant on weather, the harvest, market arrangements and the like, as to make it unworkable. Labour has to be hired to ensure that it is available

when required, with a consequence that the share of the per capita cost of the supply to the Central Government is higher than when all unskilled labour is provided by the community.

For many reasons DWSS may have up to 50 projects in hand, while only 20 may be completed in a year. Another contributing factor to this slow rate of progress has in the past been from procurement problems and slow fund releases, whereby up to three months activity in a year can be lost for lack of money.

The maintenance of these systems was originally intended to be carried out by the recipients. Either for lack of training of the responsible worker, or difficulties in ensuring that the worker is paid by the community for his services, the system has not worked as it was intended. This maintenance work must revert to the community possibly supported by the District Administration, since DWSS has not the manpower at this stage to provide maintenance crews throughout the country, nor is it provided with the financial resources to do so.

5.3.3 RURAL WATER SUPPLIES, TERAI HANDPUMPS

In the division of responsibility for the provision of handpumps to the rural Terai population (where ground water is available in abundant quantity at shallow depth and the abstraction is also cheap) DWSS has been assigned the Central and Far Western Terai Regions. By 1985 DWSS should have provided 5,000 handpumps, covering one million people. By 1990 a further 12,250 pumps should have been provided, giving a total coverage of 3,450,000 people. The detailed arrangements for this project, "The Large Scale Shallow Tubewell/Handpump Scheme for the Terai" is the subject of a separate document.

However, a number of pumps will need to be imported until local capability is established. The handpumps for this scheme are intended to be made locally. Negotiations to this end are

in progress, to locate and arrange with interested manufacturers the casting and machining of a handpump similar to the "Bangladesh New No. 6 Handpump", since that has proven to be reliable and meets the requirements for which it was designed. There is adequate local capability to produce these pumps; although the rate of production (some 32,000 units will be needed by the combined DWSS and MLD programme by 1990) is limited, it could well be expanded to include more of this type or the MOSTI (Manually Operated Shallow Tubewell for Irrigation) which is essentially similar. This would not only expand production of pumps, making it more economic, but would enhance irrigation production capability. DWSS, as lead agency in the negotiations, will be in a good position to coordinate the local manufacture of handpumps.

In Annex 18 which estimates fund requirements for DWSS programmes, no item is included for deepset handpumps as adequate data is currently not available. It is noted that in the Bhabhar Zone, where percussion drilling will be needed the unit cost per well will be some Rs 30,000 while in other areas where the sludger method of sinking wells is possible, the unit cost will be about Rs 6,000. These unit costs must affect the choice of well type to serve a particular community; and as data are still lacking, no estimate can be made.

5.3.4 RURAL WATER SUPPLIES, TERAI DEEP TUBEWELLS

Throughout the Terai, DWSS will be responsible for the provision of deep tubewells. This is adequately covered in section 3.3, above.

5.3.5 SANITATION, URBAN AND RURAL

The modus operandi of DWSS in sanitation has not yet been established. Sections 4.2, 4.3 and 4.4 show what is intended, but as DWSS has not yet undertaken any work in this field, how the coverage aimed at can be achieved has yet to be determined. Proposals have been made for demonstration projects which need

to be implemented at the earliest date to indicate what problems exist and how they can best be managed. Designs for various types of pit latrines exist in DWSS. Once these are translated into reality, rational planning can be performed.

5.4 MINISTRY OF LOCAL DEVELOPMENT

Ministry of Local Development is charged, in the Hills and Midlands, with responsibility for rural compact communities between 300 and 1500 in number, for both water supply and sanitation. In the Terai, all rural population in the Eastern and Western Regions are MLD's responsibility.

Tabulation of MLD activities through the Decade may be found in Annex 13.

5.4.1 RURAL WATER SUPPLIES, HILLS AND MIDLANDS

The types of systems being installed by MLD in the Hills and Midlands is basically the same as that for DWSS, only smaller. MLD does elicit the support of communities in the provision of unskilled labour and locally available materials which results in lower costs to HMG. However, because of variable work forces, and in some cases the lack of a village contribution at the required time, progress of work some times suffers. During the construction phase MLD trains a water technician from the village; this technician is employed by the village to take care of the system. This has not proved to be successful in several villages as the Panchayat has not been able to raise adequate revenue to meet the O&M cost which includes the salary payment to the water technician. Inability on the part of the Panchayat to retain the service of the trained water technician is a matter for serious concern.

MLD is planning to have roving maintenance crews to undertake major repair and rehabilitation works which are beyond the capability of the Panchayat water technicians.

5.4.2 RURAL WATER SUPPLIES, TERAI HANDPUMPS

MLD has responsibility to provide handpumps to the rural population of the Eastern and Western Terai Regions. This involves the supply of 4,190 pumps for 838,000 by 1985 and a further 9,770 pumps for a total coverage during the Decade of 2,792,000 people. The general notes in section 5.3.3, above, apply here. It is particularly noted that since MLD is involved in integrated rural development rather than water supplies per se, they might be in a good position to encourage the use of handpumps both for irrigation and drinking water.

5.4.3 RURAL SANITATION

MLD has drawn up plans for a small project to instal sanitation in ten selected schools in the rural areas. As for DWSS, this work should be accelerated to give indications of what management problems are likely to be encountered, before drawing up detailed plans. The work should also be expanded into rural communities where there are no schools.

5.5 ENVIRONMENTAL SANITATION DIVISION (DHS/MINISTRY OF HEALTH)

The Environmental Sanitation Division of the Department of Health Services of the Ministry of Health (ESD) was created to take a leading role in the promotion and health education aspects of the Sanitation programme in Nepal. To date, the activities of this agency have been limited, for one reason or another; this, at a time when greatly increased inputs are required from the ESD.

It is understood that the ESD may not have the facilities for the necessary construction programme, while both DWSS and MLD do. On the other hand ESD by being in the DHS, under which the Health Education Section also falls, has access to necessary expertise which DWSS and MLD lack. For the sanitation programme in both urban and rural areas, both executive capacity (administration, construction of latrine slabs, water seals, transport etc)

and "promotion and health education" are prerequisities for the success of the programme. The coordination of these activities will, of necessity, be undertaken by the National Group, included in the membership of which ESD is nominally represented. Unless this representation becomes active, the function of promotion for the programme and associated health education may have to be undertaken by DWSS and MLD, for neither agency can fulfill its obligations without the services that ESD should provide.

6 MANPOWER REQUIREMENTS

In reviewing the manpower requirements of the three executive agencies, it is clear that the major constraint lies in technical personnel. Administrative personnel do not appear likely to be a problem to recruit, and are thus not listed. Annex 14 lists by year and category the technical manpower requirements of the three agencies.

The estimates of manpower requirements have been made based on individual agency estimations. These were in themselves based firstly on the capacity to execute a specific number of projects with existing staff, and also requirements for operations and maintenance.

From the summary, it can be seen that for the present proposed 1990 targets to be met, some 50-60 engineers will need to be trained annually for five years, starting with immediate effect; and likewise some 60-70 overseers will need to be trained for each of six to seven years starting immediately. How far the shortfall can be filled by drawing on excesses of these categories elsewhere is uncertain, but this level of requirement is thought unlikely to be available. Thus the immediate need is for large scale training programmes to be set up. This is addressed in section 7, following.

In addition to increasing the technical staff by training, the demands of the programme are such that until these large numbers of engineers and overseers will have become available,

there will be a need for more technical personnel than are available when needed. Salary scales are such that externally recruited engineers and overseers cannot be attracted and thus the gap can possibly only be filled by expatriate volunteers.

It is proposed that greater use be made of overseers on construction projects to relieve DWSS and MLD of the need for such large numbers of engineers. Indeed, it has been the policy to offer to qualified experienced overseers 25% of the posts which fall vacant in the engineer grade. This policy leads to a further depletion of the overseer grade which is that the agencies seek to increase. However it is the total numbers of engineers and overseers required which should be noted. One further very important point that should be taken into account when computing manpower requirements is the time taken for training and gaining some field experience.

7 TRAINING REQUIREMENTS

Annex 15 presents a tabulation of training requirements for the period 1980-1990. It does not name any institutions where training may take place, nor does it specify at what level candidates will be taken for training. The matrix of possible solutions is too great to deal with each possibility in this document; thus only a small number of possible solutions are discussed below.

As noted in section 6, inspection has indicated that the major constraint to the water and sanitation agencies lies in their recruitment of technical personnel, of which engineers and overseers represent the most critical. Only these two grades are discussed, other grades, such as draughtsmen, tracers, lab technicians, chemists being needed in small numbers that individual special arrangements can be made for them.

No training programme can hope to succeed unless three particular needs can be satisfied. First, the conditions of

service for which candidates are being trained must be satisfactory, so that they can be kept in service after training. Secondly, the candidates selected must be of a sufficiently high academic ability that they can complete the course of study for which they have entered, which implies that their secondary schooling levels must be adequate; and thirdly, the course which was designed for them must, assuming they complete the course, provide them with a qualification which will be recognised.

In reviewing the rate at which any category can be trained, cognisance should be taken of the ability of the agency requiring that particular category, to absorb large numbers at one time. This is because, immediately after qualification of new graduates, an appreciable amount of time needs to be spent by agency personnel in providing in-service training of an informal nature for these graduates. Thus, though it is logistically possible to train all the required engineers in one batch, providing that sufficient numbers of suitably qualified school or college leavers are available, such numbers could not be satisfactorily absorbed all at once. Hence a regular batch size for a number of years should be trained.

7.1 GENERAL ADMINISTRATION

No special arrangements are thought to be necessary for general administrative staff at the present moment. They appear to be available in sufficient numbers; though the position should be reviewed regularly to ensure that this remains the case.

7.2 ENGINEERS

The flow of engineers to the sector who have had an university education privately sponsored, is so small that it can be discounted. Few engineers are expected to accrue to

the sector from presently UN or bilaterally sponsored courses in the foreseeable future. Thus, the vast majority will need to be sponsored through the agencies or through schemes initiated by them. The level referred to is that of the first degree (or diploma) at batchelors level.

Annex 16 presents some samples of the entrance qualifications required of candidates wishing to study for a B.E. degree at selected recognised Indian Universities. It is included for information.

Either one of two approaches can be made for selection of candidates; they can be high (secondary) school leavers with adequate qualifications, or they can be experienced overseers. Since they are required in such large numbers, training may have to take place in other countries of this region, as the Institute of Engineering presently does not have the capacity to train them.

An alternative, and perhaps for more attractive approach to serve the long term needs of the country both academically and financially, is to expand the facilities of the Institute of Engineering to cater for both types of candidates. If this is not feasible in the immediate future, facilities may be expanded to take in more overseers for degree/diploma level training. For experienced overseers, the course can be so structured to ensure they qualify for the B.E. in the shortest time possible. In addition, it should be possible to set the degree or diploma requirements at a level competitive with other universities or institutions in the region. As this alternative will be available only after the Institute is expanded to cater to the categories stated above the present method of training should be proceeded with till the expansion to the Institute is made.

7.3 OVERSEERS

Participants in overseer courses will normally be taken from available school leavers. The present course is of two

years duration. As part of the continuing general expansion of post school education the training of civil Engineers is to be expanded by the formation of a Diploma/Degree course in Civil Engineering. To meet the requirements for feeding this Diploma Course and also update the course given to Certificate students, a new Certificate Course (Overseer course) has been devised for implementation commencing July 1981. The course duration has been increased to 5 semesters (2 1/2 years).

The Institute of Engineering has been running certificate courses in the past, It should take relatively little effort and additional finance to train the larger numbers envisaged.

It has been stated that a number of overseers are available for immediate employment in the sector; if this is the case, the numbers so gained should be subtracted from the total numbers of overseers to be trained for the sector, to avoid a surfeit of this category. Annex 16 shows estimates of the costs of training in Nepal the required numbers of overseers during the Decade.

7.4 OTHER CATEGORIES

Other categories such as technical and tradesmen (plumbers, plant operations, water technicians etc.) are, and will remain in short supply. However, most of these personnel can gain their training on a part time basis, or in short courses. For some, it may be possible to provide their training during service. The time required for such courses as may be needed will be relatively short, and the sector can respond to a need to supplement numbers by instituting a course at short notice.

More use could possibly be made of the apprenticeship method of training this level of personnel. This would involve a synthesis of on the job training with part time study where that becomes necessary. One item should be particularly noted when considering this type of training route, the qualification so earned should have a higher status than a similar qualification gained purely by study, since personnel who have practical experience are of far more value to the sector than those without. This status could thus be used as an incentive to qualify during service.

7.5 INTERIM SOLUTIONS AND IN-SERVICE TRAINING

For engineers and overseers to be trained takes time. For them to become effective contributors to the water supply and sanitation programme will also take further time. For engineers, a conservative estimate would be some six years from the time they enter the university, and corresponding time for overseers would be some five years. A study of the requirements of the sector agencies shows that substantial numbers of both categories are needed before these periods will elapse; so it will be necessary to fill these vacancies on an interim basis till the required number of new recruits are available and trained.

The shortage of engineers could possibly be met under technical assistance programmes from neighbouring countries such as India, Pakistan and Bangladesh. In addition to above it should be possible for HMG to obtain the services of volunteers in larger numbers than hitherto obtained both in the categories of engineers and overseers. The above two might prove to be acceptable interim solutions to the temporary engineer and overseer deficit.

In the past, MLD has made widespread use of volunteers. It would appear that both DWSS and LDD will need to seek for volunteer contribution in larger numbers for the next 3 to 4

years. Although the volunteer service is virtually free, the cost of transport, orientation, language learning and the like, which are borne by the donor agency, are substantial.

In addition to recruitment and training, it will also be necessary to ensure the continued high performance of personnel in the sector by in-service training. For higher grades, this is done already by their participation in seminars, workshops and meetings both nationally and regionally. For lower grades, annual seminars or workshops should be instituted to review their particular section of work, so that they might be kept familiar with the state of the art. This also will allow for cross-fertilization of new ideas and discussions of improved techniques which have been field developed.

8 REQUIREMENTS FOR (INVESTMENT OR) DEVELOPMENT FINANCE

This section presents the current estimates of needs for sector financing. Not all aspects have been addressed, since not all data are available; but tabulations show what is included, and the basis for the estimate. To avoid unnecessary computations involving projected inflation rates, it should be noted that all figures are based on prevailing 1980 prices. Thus in the preparation of annual budgets, inflation and changes in price structures should be taken into account.

For rational budgetting, close monitoring of price levels will need to take place so that revisions may be made to the planned expenditures to take account of inflation.

Annexes 17 to 20 inclusive show the elements making up the development programme and their costs. The summary shows that during the Decade some Rs 300 crores (US$ 250 million) will be needed on 1980 prices. How this level of finance might be secured is discussed in the following sections.

8.1 REQUIREMENTS FOR INDIVIDUAL PROGRAMMES

8.1.1 WSSB PROGRAMME

For WSSB programmes, IDA loans have been negotiated in the past, and it is anticipated that this will remain the case. For these loans, it has been assumed and is generally accepted that they will make up 75% of the total requirement. The Board, providing it operates substantially as an autonomous body, should be in a position to generate sufficient funds from its activities to cover loan repayments, operation and maintenance and still have a surplus to use for extensions, augmentations, and rehabilitation where required. This will allow for the upgrading of existing supplies to a position in the future when urban coverage can mean a safe, full pressure, twenty four hour supply; which is not the case in many areas under the jurisdiction of WSSB at present. The total Decade requirement is approximately Rs 1000 million (US$ 85 million). Annex 17 gives the make up projectwise and also a rough estimate of the investment requirements.

8.1.2 DWSS PROGRAMMES

For DWSS during the Fifth Five Year Plan (1975-1980), the method of funding was a nearly equal split between internal funds and externally secured grants. The sum of the individual annual budgets during the Fifth Five Year Plan was about Rs 120 million (US$ 10 million) as against projected 1980 based estimates of Rs 290 million (US$ 25 million) for the Sixth Five Year Plan and Rs 930 million (US$ 78 million) for the Seventh Five Year Plan; representing rises of 140% and 675% respectively or an average of 400% rise over the Decade. HMG has developed this accelerated programme in the hope that more external funds will be forthcoming; this is based on the preliminary responses received from bilateral and multilateral agencies.

8.1.3 MLD PROGRAMMES

MLD operations have been substantially supported by UNICEF for materials and by both UNICEF and a number of volunteer agencies for personnel. The sum of the individual annual budgets during the Fifth Five Year Plan was about Rs 46.8 million; this includes the cost of materials plus other services provided by UNICEF but not the cost of personnel provided by UNICEF and the volunteer agencies. Compared to the Fifth Five Year Plan allocation the projected estimates for the Sixth and Seventh Five Year Plans are Rs 196 million and Rs 422 million respectively, representing rises of 310% and 800% respectively or an average of 560% rise over the Decade. As stated under 8.1.2 the accelerated programme has been developed in the hope that more external funds will be forthcoming.

8.1.4 ESD PROGRAMME

No allowance has been made in the calculations for the activities of the ESD since it is unknown exactly what form they will take. In addition, since they will provide services rather than materials, their contribution is not generally viewed as part of the development of the sector. Nevertheless, this input is essential to sector development. If we assume that during the Decade some 1/2% to 1% of the development budget should be devoted to their contribution to the sector, this would amount to between Rs 15 and 30 million, or an annual budget at 1980 price levels of Rs 1.5 to 3 million

8.2 REQUIREMENTS FOR HMG AND EXTERNAL FINANCING

8.2.1 REQUIREMENTS OF HMG FINANCING

Two forms of finance will be required from HMG for the sector during the Decade. One will be in the form of an equity and the other as non recoverable grants. The former will be utilised in the urban sector for WSSB activities, and the latter for the rest - DWSS, MLD and ESD activities.

Since the inception of the Board, HMG has been providing 25% of the capital outlay of the Board in the form of equity payment. In addition to the above HMG has been able to obtain "soft" IDA credit to meet the remaining 75% cost of the development activities of the Board; this sum is re-lent to the Board on terms and conditions agreed to between HMG, Bank and the Board. The re-lending terms and conditions reflect more or less the true cost of money. As WSSB will not be able to raise on their own the large sum needed to implement the decade programme envisaged, it will be necessary for HMG to continue to provide throughout the Decade the needed development funds in the aforesaid manner (i.e.) 25% as equity payment and 75% as loan.

For the rural areas, finances channelled to the sector are all grants and are not recovered. The Fifth Five Year Plan (1975-1980) capital outlay by DWSS and MLD amounted to Rs 170 million (US$ 14.2 million). HMG was able to obtain external assistance in the form of outright grant in a sum of Rs 81 million (US% 6.7 million) from UN and bilateral agencies and soft IDA World Bank credit in a sum of Rs 8.6 million (US$ .72 million) making a total of some Rs 90 million (US$ 7.5 million) equivalent of 52% of the capital outlay both by DWSS and MLD.

The capital outlays needed for the rural sector during the 6th and 7th Plan periods which comprise the Decade is as follows:

Plan Period	Agency				Total	
	DWSS		MLD			
	M. Rs	M. $	M. Rs	M. $	M. Rs	M. $
6th Plan	290	24	196	16	486	40
7th Plan	930	77	422	35	1352	112
Total	1220	101	618	51	1838	152

It will be seen that the planned budget of DWSS and MLD is Rs 486 million for the 6th Plan and Rs 1352 million in the 7th Plan as compared to Rs 170 million in the 5th Plan. Considering the accelerated decade programme estimated to cost Rs 1838 million as a whole the level of capital investment per annum has to be increased some five-fold to that expended during the 5th Plan period if the set targets for the rural sector is to be achieved. During the 5th Plan period HMG met 48% of the capital outlay (i.e.) Rs 80 million from its own resources and sourced external assistance for the remaining 52%.

It will be seen that if HMG is to meet 48% of the capital outlay as in the 5th Plan the capital outlay of HMG for the ten year period will be Rs 882 million as compared to Rs 80 million during the 5th Plan period of 5 years; as stated earlier this represents some five-fold increase. Considering the limitations of the internal resources and also the amount that can be made available to this sector it would become necessary for HMG to source increased level of assistance. If the level of external assistance can be raised to 75% for the implementation of the accelerated programme envisaged for the Decade the HMG commitment over the decade would be some Rs 460 million; this represents an increase in the level of investment, say 2 1/2 times that in the 5th Plan.

8.2.2 REQUIREMENTS OF EXTERNAL FINANCING

Section 8.2.1 discusses HMG's possible obligations; this section is written on the assumption that targets presently set will be met and funds not secured by HMG will have to be found from external sources. Annex 21 presents the range of resources that is likely to be requested of donors by HMG during the Decade. For the rural sector this range varies from 52% to 75%.

In the urban sector for WSSB activities, it is assumed that IDA will finance 75% of the total need of Rs 1000 million (US$ 85 million) which will amount to Rs 750 million (US$ 62.5 million). The IDA financed "Third Project" has been negotiated, and investigations towards the "Fourth Project" will shortly be started. If WSSB can charge tariffs which allow for full cost recovery, it would seem few difficulties will be encountered in securing the necessary finance.

In the rural sector, the level of external assistance received during the 5th Plan period was 52%. For the reasons stated in 8.2.1 it would appear that HMG will need to source external assistance to meet 75% of the planned capital outlay. This split of 25% by HMG and 75% from external assistance assumes that HMG will be able to raise its level of internal funding to 2 1/2 times that provided during the 5th Plan. The external assistance required to meet 75% of the Decade programme cost is Rs 1378 million (US$ 115 million).

During the 5th Plan period, of the total external assistance received 90% represented outright grants and only 10% loan. It is possible that HMG may have to go for increased level of credit assistance considering the quantum of external financial support required.

8.3 FUNDING REQUIREMENTS FOR TRAINING

Only requirements for training of engineers and overseers is noted in this section, since their training will represent the major cost item under this aspect of sector development.

The total cost of training engineers and overseers necessary for the Decade is Rs 24.36 million (US$ 2.03 million), which does not include necessary expansion of the Institute of Engineering if that course is selected. This estimate is based on the assumption that engineers will be trained in the region and the overseers at the Institute of Engineering by special arrangement. If both an

expansion of the Institute and use of Indian institutions is made, the costs will vary. It is assumed that universities, polytechnics or technical colleges in Europe or North America will not be used except for minor individual post graduate study courses. They are much more expensive than regional institutions, and courses are generally geared to a level of technology which will not be found in Nepal except in a few very specialised applications.

The timing of training of engineers and overseers presented in this document, which will reflect the rate at which funds must be disbursed, does not take into account the ability of institutions both in Nepal and India (or elsewhere in the Region) to absorb such numbers nor does it examine the availability of candidates suitable for such courses. This will need to be examined in greater detail at the earliest possible opportunity.

8.4 ROLE OF THE TECHNICAL SUPPORT TEAM (TST)

As part of the activities aimed at smoothing and increasing the flow of funds to the sector towards achieving higher targets for the Decade, a small two tier group was created with the Resident Representative of UNDP as focal point. The TST working group recently agreed to work with nationals to identify projects suitable for external funding; and it will be the role of the steering committee, chaired by RR UNDP, to promote these projects with donor agencies.

9 REQUIREMENTS FOR OPERATION AND MAINTENANCE

This section addresses briefly the major issues in respect to operation and maintenance (O&M) of water supply and sanitation systems.

9.1 OPERATION AND MAINTENANCE: WSSB PROJECTS

By virtue of being a body which is charged with providing a public service for which recipients must pay an economic price, the Board is obliged to operate and maintain its facilities to discharge its obligations. In addition, because the agency financing the major portion of WSSB's investments, the IDA, is interested in protecting its investments in a manner which will ensure the recovery of money loaned to the Board, very close monitoring by both officials of WSSB and IDA takes place. To date, the levels of tariffs appear adequate to ensure the satisfactory operation and maintenance of WSSB systems; given of course, the fact that intermittent supplies are improving steadily, with the aim of eventually attaining a twenty four hour pressure supply.

If tariff levels can be determined by economic rather than by policy considerations, then sufficient funds should be available for operation and maintenance, or a deteriorating position might result. If HMG finds it necessary to support certain sections of society for humanitarien reasons, some of which are indeed compelling, then the shortfall in finances should continue to be met by HMG until the Board can charge for such services, like standposts etc.

9.2 OPERATION AND MAINTENANCE : DWSS ACTIVITIES

For DWSS activities in the urban sector, the issue of O&M is complex. HMG policy is that recipients be made to contribute towards the cost of the service where they have private connections. Presently, public standposts are providing a water supply for which no charge is made; which must not be allowed to continue. No attempt has been made, for various reasons, to achieve a self sustaining operation in towns under jurisdiction of the Department, as tariffs do not reflect the cost of the service, and moneys so collected accrue to the general fund of the government in any event.

Where systems have been handed over to communities to be operated, management has been poor, technical manpower when available so poorly paid, and inadequate fund for satisfactory operation have been available that it is understandable that most have had to be taken back by the Department before a total collapse of the system occurs. A disproportionate share of DWSS resources is devoted to O&M. It is noted that DWSS operates some 60 systems today (13 urban and 47 rural).

Until there is an incentive of some type which would make the smooth running of a community's own system attractive, this status is likely to prevail. If it is known that HMG will keep subsidising the operation, there is no incentive whatsoever to manage the system. It is of interest to note that during the Fifth Five Year Plan (1975-1980), some 10% of DWSS's development budget, was devoted to urban renewals extensions and augmentation, while 75% of the regular budget went to O&M. Further, the annual budget for O&M rose from Rs 661,000 in 1975/76 to Rs 2,382,000 in 1979/80, a rise of 260%. This is a matter for concern as the water revenue collected falls far short of O&M expenditure. If this trend continues, the time may come when O&M budgets exceed those for development; and this at a time when scarce funds are being sought for development rather than operation & maintenance. It would not seen fair and equitable to spend a disproportionate share of the resources on serving the very small percentage of the population who have been fortunate enough to have systems constructed in their areas through generous grant by HMG. It would appear that these people are capable of paying a near economic price if not fully. Annex 22 presents the annual budgets during the period 1975/76 to 1979/80 for WSSB, DWSS and MLD with selected comparisons to illustrate this point.

For the tubewell/handpump scheme in the Terai, it will be of paramount importance to train specific maintenance workers during installation of the handpumps so that HMG's involvement thereafter is cut to an absolute minimum. Hence the budget for training, promotion and health education is crucial to the success of the scheme, and should not be trimmed under any circumstances.

For the Terai deep tubewell scheme, where motor driven pumps are envisaged, ways and means of reducing O&M costs to a minumum should be found, such as standardised equipment and roving maintenance crews, who will service equipment regularly, and not let its condition deteriorate as might be the case if untrained personnel were involved.

9.3 OPERATION AND MAINTENANCE : MLD ACTIVITIES

Because the construction of water supply systems by MLD has to rely on village contributions and thus the available work force, more attention needs to be devoted to O&M. MLD has responded to this by budgetting for materials and a number of roving maintenance crews to provide augmentation and rehabilitation services for older and "run-down" systems. Further it is planned that a considerable number of village maintenance workers should be trained annually for routine maintenance work, in a short course. The allocation for this item has already been included in the MLD budget for 1980/81.

9.4 FINANCING AUGMENTATION OF THE INSTALLED WATER SUPPLY SYSTEMS

For the urban sector the tariff charged especially by the Board takes into account the capital outlay including loan charges. Furthermore the Board aims at generating an agreed rate of return on the investment by the Board. In view of the financial management adopted, the Board is unlikely to experience difficulty is raising the needed capital.

In the rural sector augmenting of installed systems as against providing supplies to additional populations through new systems is likely to pose a problem. At the persent moment this problem has not surfaced out as the number of installed systems are rather few and most of them are of recent constructions. It would appear that it will not be possible for HMG to provide the same level of financial assistance as for construction of new supplies for the augmentation of installed systems. One of the possible approaches would be is to call

for the community to meet a great share of the cost if necessary by providing them with loan to meet their share of cost. A study will need to be made to assess the level of assistance that may have to be provided both in terms of loans and grants for the augmentation of installed systems and the method to be adopted to institutionlise the chosen system.

10 CONSTRAINTS

There are a number of documents extent which list the constraints to sector development; in particular, the "Rapid Assessment" dated November 1978. Only those that relate directly to this Ten Year Plan are noted here since a number of recommendations are made as a consequence.

Apart from the limitations imposed on the sector from formidable terrain in the Hills and Midlands, constraints can be grouped under three items - money, manpower and management.

Constraints regarding financial resources include the ability of HMG to find its share of the total development costs; the irregular flow of funds released to the sector making for less than optimum use of manpower and materials; and fixed rules regarding tariffs in operations of DWSS making for some urban systems which are unnecessarily being supported by HMG. Further, the quantum of funds available from donors may not be sufficient to meet the set targets.

Manpower constraints possibly represent the most serious threat to achievement of the Decade goals; and these are mainly in two grades - those of engineers and overseers. Without sufficient numbers of engineers and overseers even though all other constraints can be overcome, there is no possibility, that the necessary works can be undertaken at the required speed to complete this Plan. Further, the standards requisite to deliver safe water will drop, and the burden to the exchequer will increase proportionately. Also, during the training period

before such grades of personnel become available, large numbers of volunteers will be needed.

Management constraints include the ability of HMG to activate the ESD of DHS; promotion of the idea of sanitation with all levels of society, so that adequate resources can be devoted to the programme; the ability to identify fundable projects and promote them with donors; the laying down of service priorities so that a rational sequential programme can be structured, rather than the ad-hoc system which prevails, the ability to attract sufficient numbers of engineers, overseers and other cat egories of personnel to the sector, because of rigid rules regarding conditions of service, salaries, allowances and grades; and a number of other factors.

ANNEX 1

POPULATION OF NEPAL BY GEOGRAPHICAL/DEVELOPMENT REGION, AND URBAN/RURAL GROUPING: 1980

DEVELOPMENT REGIONS

GEOGRAPHICAL REGIONS		Far Western	Western	Central	Eastern	Total
HILLS	Urban	NIL	NIL	NIL	NIL	NIL
	RURAL	534,968	24,885	446,260	361,202	1,367,315
	TOTAL	534,968	24,885	446,260	361,202	1,367,315
MIDLANDS	Urban	11,726	45,755	446,088	21,463	525,032
	Rural	1,630,390	2,075,260	1,842,465	1,255,141	6,803,256
	TOTAL	1,642 116	2,121,o15	2,288,553	1,276,604	7,328,288
TERAI	Urban	84,060	42,600	62,200	146,827	335,687
	Rural	778,694	746,105	1,912,466	1,541,487	4,978,752
	TOTAL	862,754	788,705	1,974,666	1,688,314	5,314,439
TOTAL	Urban	95,786	88,355	508,288	168,290	860,719
	Rural	2,944,052	2,846,250	4,201,191	3,157,830	13,149,323
	TOTAL	3,039,838	2,934,6o5	4,709,479	3,326,120	14,010,042

- Assumed total growth rate 1971-80 : 2.163%
- Twenty three Nagar Panchayats assumed

ANNEX 2

POPULATION OF NEPAL BY GEOGRAPHICAL/DEVELOPMENT REGION, AND URBAN/RURAL GROUPING: 1985

DEVELOPMENT REGIONS

GEOGRAPHICAL REGIONS		Far Western	Western	Central	Eastern	Total
HILLS	Urban	NIL	NIL	NIL	NIL	NIL
	Rural	590,590	27,509	497,216	392,580	1,507,895
	TOTAL	590,590	27,509	497,216	392,580	1,507,895
MIDLANDS	Urban	14,966	53,411	524,828	24,882	618,087
	Rural	1,801,442	2,292,381	2,035,664	1,363,645	7,493,132
	TOTAL	1,816,408	2,345,792	2,560,492	1,388,527	8,111,219
TERAI	Urban	104,755	53,028	75,676	172,984	406,443
	Rural	927,174	835,625	2,168,303	1,730,675	5,661,777
	TOTAL	1,031,929	888,653	2,243,979	1,903,659	6,068,220
TOTAL	Urban	119,721	106,439	600,504	197,866	1,024,530
	Rural	3,319,206	3,155,515	4,701,183	3,486,900	14,662,804
	TOTAL	3,438,927	3,261,954	5,301,687	3,684,766	15,687,334

- Assumed total growth rate 1980-85 : 2.287%

- Twenty three Nagar Panchayats assumed

ANNEX 3

POPULATION OF NEPAL BY GEOGRAPHICAL/DEVELOPMENT REGION, AND URBAN/RURAL GROUPING: 1990

DEVELOPMENT REGIONS

GEOGRAPHICAL REGIONS		Far Western	Western	Central	Eastern	Total
HILLS	Urban	NIL	NIL	NIL	NIL	NIL
	Rural	653,339	30,450	554,722	426,956	1,665,467
	TOTAL	653,339	30,450	554,722	426,956	1,665,467
MIDLANDS	Urban	19,101	62,745	614,236	28,846	724,928
	Rural	1,994,237	2,535,080	2,254,292	1,482,382	8,265,991
	TOTAL	2,013,338	2,597,825	2,868,528	1,511,228	8,990,919
TERAI	Urban	130,543	66,046	92,072	203,815	492,476
	Rural	1,104,448	936,102	2,455,465	1,945,591	6,441,606
	TOTAL	1,234,991	1,002,148	2,547,537	2,149,406	6,934,082
TOTAL	Urban	149,644	128,791	706,308	232,661	1,217,404
	Rural	3,752,024	3,501,632	5,264,479	3,854,929	16,373,064
	TOTAL	3,901,668	3,630,423	5,970,787	4,087,590	17,590,468

- Assumed total growth rate 1985-90 : 2,317%

- Twenty three Nagar Panchayats assumed

ANNEX 4

NEPAL: URBAN POPULATION ESTIMATES AT 1980, 1985 AND 1990

DEVELOPMENT REGION	GEOGRAPHICAL REGION	DISTRICT NAME	TOWN NAME	POPULATION OF TOWN (NAGAR PANCHAYAT) AT			REMARKS ON AGENCY RESPONSIBLE FOR WATER SUPPLIES
				1980	1985	1990	
Far West	Midlands	Surkhet	Birendranagar	11,726	14,966	19,101	DWSS responsibility
	Terai	Banke	Nepaljung	31,500	39,255	48,919	DWSS responsibility;by WSSB,1985
		Kanchanpur	Mahendranagar	21,081	26,271	32,738	DWSS responsibility
		Bardia	Tribhuvannagar	16,735	20,855	25,989	DWSS responsibility
		Kailali	Dhangadhi	14,744	18,374	22,897	DWSS responsibility
West	Midlands	Kaski	Pokhara	32,000	39,309	48,287	WSSB responsibility
		Palpa	Tansen	13,755	14,102	14,458	DWSS responsibility
	Terai	Rupandehi	Bhairawa	22,500	27,375	33,306	DWSS responsibility;by WSSB,1985
		Rupandehi	Butwal	20,100	25,653	32,740	DWSS responsibility;by WSSB,1985
Central	Midlands	Kathmandu	Kathmandu	238,200	276,139	320,121	WSSB responsibility
		Lalitpur	Lalitpur	84,200	97,611	113,158	WSSB responsibility
		Bhaktapur	Bhaktapur	65,620	73,163	81,753	WSSB responsibility
		Makwanpur	Hetauda	35,500	49,791	69,834	DWSS responsibility;by WSSB,1985
		Chitwan	Bharatpur	22,568	28,124	29,370	DWSS responsibility
	Terai	Bara	Birgunj	37,000	45,016	54,769	WSSB responsibility
		Dhanusha	Janakpur	25,200	30,660	37,303	DWSS responsibility;by WSSB,1985
East	Midlands	Dhankuta	Dhankuta	11,939	13,841	16,046	DWSS responsibility
		Ilam	Ilam	9,524	11,041	12,800	DWSS responsibility
	Terai	Morang	Biratnagar	63,890	74,860	87,714	WSSB responsibility
		Sunsari	Dharan	43,050	51,130	60,726	DWSS responsibility;by WSSB,1985
		Saptari	Rajbiraj	14,095	16,740	19,882	DWSS responsibility
		Jhapa	Bhadrapur	13,330	15,453	17,914	DWSS responsibility
		Siraha	Lahan	12,462	14,801	17,579	DWSS responsibility
TOTAL URBAN POPULATIONS FOR NEPAL:				860,719	1,024,530	1,217,404	12 towns with WSSB by 1985

URBAN RATES OF INCREASE	3.55%	3.51%
TOTAL POPULATION RATES OF INCREASE	2.287%	2.317%

ANNEX 5

LOCATION OF DISTRICTS IN GEOGRAPHICAL AND DEVELOPMENT REGIONS

DEVELOPMENT REGIONS

	Far Western	Western	Central	Eastern	Total No
Hills	1. Humla 2. Mugu 3. Kalikot 4. Jumla 5. Bajura 6. Bajhang 7. Darchula 8. Dolpa	1. Manang 2. Mustang	1. Dolkha 2. Sindhupalchok 3. Rasuwa	1. Taplejung 2. Sankhuwasabha 3. Solukhumbu	16
Midlands	1. Rukum 2. Rolpa 3. Sallyan 4. Pyuthan 5. Jajarkot 6. Dailekh 7. Surkhet 8. Achham 9. Baitadi 10. Dadeldhura 11. Doti	1. Gorkha 2. Lamjung 3. Kaski 4. Parbat 5. Tanahu 6. Syangja 7. Palpa 8. Gulmi 9. Arghakhanchi 10. Baglung 11. Myagdi	1. Sindhuli 2. Ramechhap 3. Nuwakot 4. Dhading 5. Kavrepalanchok 6. Makwanpur 7. Bhaktapur 8. Kathmandu 9. Lalitpur 10. Chitwan	1. Panchthar 2. Ilam 3. Terathum 4. Dhankuta 5. Bhojpur 6. Khotang 7. Okhaldhunga 8. Udayapur	40
Terai	1. Dang 2. Banke 3. Bardia 4. Kailali 5. Kanchanpur	1. Nawalparasi 2. Kapilvastu 3. Rupandehi	1. Dhanusha 2. Mahottari 3. Sarlahi 4. Rautahat 5. Bara 6. Parsa	1. Jhapa 2. Morang 3. Sunsari 4. Saptari 5. Siraha	19
Tot. No.	24	16	19	16	

ANNEX 6

LOCATION OF TOWNS (NAGAR PANCHAYATS) IN GEOGRAPHICAL/DEVELOPMENT REGIONS

	Far West	Western	Central	Eastern	Total
Hills	-	-	-	-	0
Midlands	Birendranagar	Pokhara Tansen	Kathmandu Lalitpur Bhaktapur Hetauda Bharatpur	Dhankuta Ilam	10
Terai	Nepalgunj Mahendranagar Tribbuvannagar Dhangadhi	Bhairawa Butwal	Birgunj Janakpur	Biratnagar Dharan Rajbiraj Bhadrapur Lahan	13
Total	5	4	7	7	23

ANNEX 7

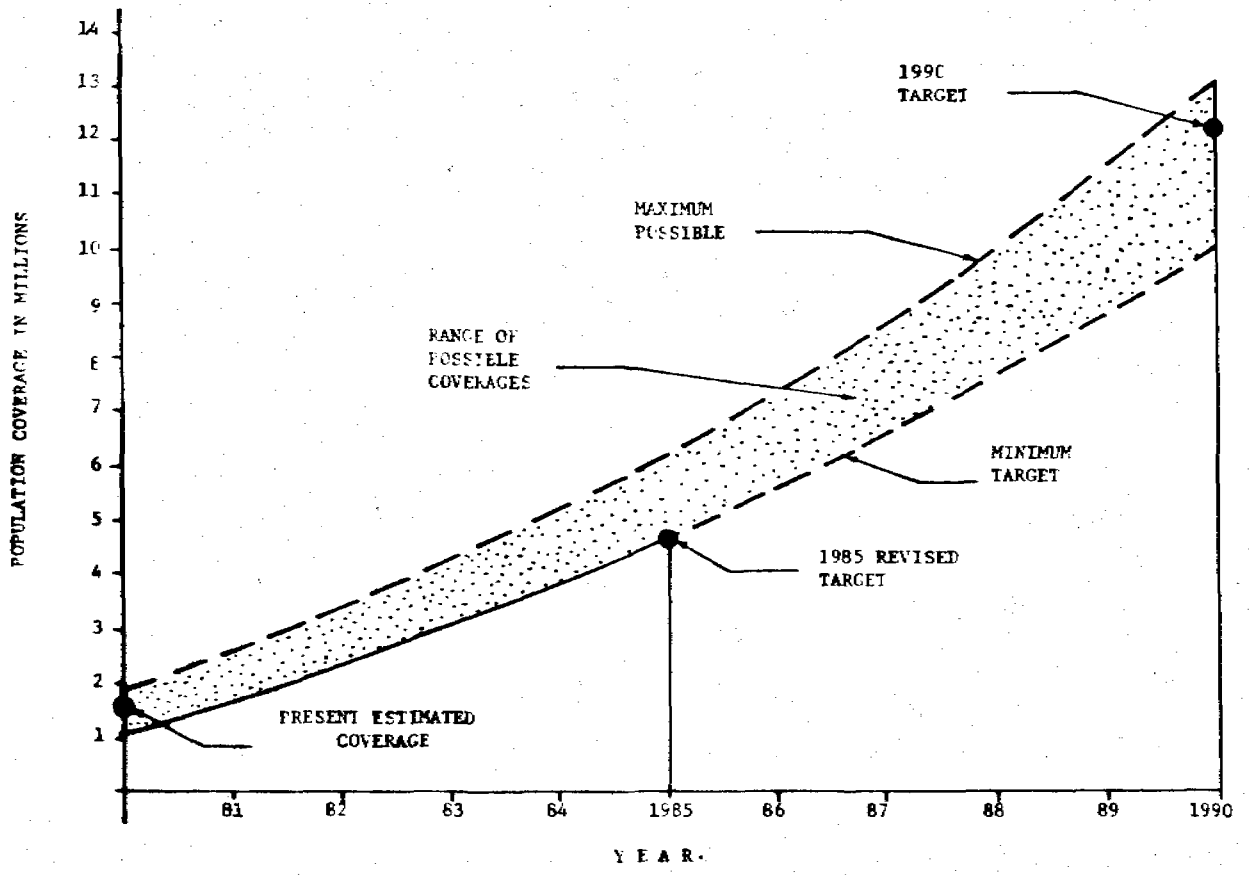
TOTAL POPULATION COVERAGE BY WATER SUPPLIES AT 1980, 1985 AND 1990: ESTIMATES

YEAR	URBAN POPULATION			RURAL POPULATION								TOTAL POPULATION		
	TOTAL POPLN	SERVED POPULATION		TOTAL POPLN	RURAL POPULATION WHICH IS SERVED IN							TOTAL POPLN	POPULATION SERVED	
					HILLS		MIDLANDS		TERAI		TOTAL			
	N'000	N'000 / TOTAL	%	N'000	N'000 / TOTAL	%	N'000 / TOTAL	%	N'000 / TOTAL	%	N'000 / TOTAL	%	N'000	N'000 / TOTAL	%
1980	860.7	714.4 / 860.7	83	13,149.3	218.8 / 1,367.3	16	544.3 / 6,803.3	8	99.6 / 4,978.8	2	862.6 / 13,149.3	7	14,010.0	1,577.0 / 14,010.0	11
1985[1]	1,024.5	911.3 / 1,024.5	89	14,662.8	429.4 / 1,507.9	28	1,445.4 / 7,493.1	19	1,935.3 / 5,661.8	34	3,810.1 / 14,662.8	26	15,687.3	4,721.4 / 15,687.3	30
1990[2]	1,217.4	1,147.0 / 1,217.4	94	16,373.1	946.4 / 1,665.5	57	3,645.7 / 8,266.0	44	6,441.6 / 6,441.6	100	11,033.7 / 16,373.1	67	17,590.5	12,180.7 / 17,590.5	69

1 Figures for 1985 listed here are minimum targets.

2 Figures for 1990 listed here are based on the necessary accelerated training programmes, availability of finance, and a number of other factors. If these constraints are not successfully removed, the stated targets will not be achieved.
(See graphical presentation of targets.)

RANGE OF TARGETS FOR WATER SUPPLY COVERAGE



RANGE OF TARGETS FOR WATER SUPPLY COVERAGE

URBAN POPULATION COVERAGE BY WATER SUPPLIES AT 1980, 1985 & 1990

SUMMARY TABLE

ACTIVITY	1980 POPULATION		1985 POPULATION		1990 POPULATION	
	TOTAL	SERVED	TOTAL	SERVED	TOTAL	SERVED
WSSB Urban Operations	698,760	608,930	829,962	755,426	988,630	925,711
DWSS Urban Operations	161,959	105,467	194,568	155,824	228,744	221,266
Combined Operations	860,719	714,397	1,024,530	911,250	1,217,404	1,146,977
Percentage Coverage	-	83	-	89	-	94

URBAN POPULATION COVERAGE BY WATER SUPPLIES AT 1980, 1985 & 1990

WSSB ACTIVITIES[1]

	TOWN NAME	1980 TOTAL POPN.	1980 SERVED POPN.	1985 TOTAL POPN.	1985 SERVED POPN.	1990 TOTAL POPN.	1990 SERVED POPN.
1	Kathmandu	238,200	237,840	276,139	276,139	320,121	320,121
2	Lalitpur	84,200	83,090	97,611	97,330	113,158	112,930
3	Bhaktapur	65,620	57,660	73,163	60,800	81,753	65,430
3A	Ktm. Valley Villages[2]	41,700	41,700	62,300	62,300	77,940	77,940
4	Pokhara						
	Nagar P.[2]	32,000	32,000	39,309	39,309	48,287	48,287
	Gram P.[2]	19,320	15,260	21,850	17,260	24,710	19,510
5	Biratnagar						
	Nagar P.[2]	63,890	31,950	74,860	48,661	87,714	65,788
	Gram P.[2]	9,840	100	15,620	9,370	21,900	18,620
6	Birgunj	37,000	27,750	45,016	45,016	54,769	54,769
7	Dharan	43,050	40,900	51,130	51,130	60,726	60,726
8	Janakpur	25,200	18,900	30,660	26,145	37,303	37,303
9	Hetauda	35,500	17,750	49,791	29,875	69,834	45,392
10	Bhairawa	22,500	16,860	27,375	23,274	33,306	33,306
11	Butwal	20,100	17,060	25,653	24,375	32,740	32,740
12	Nepalgunj	31,500	26,630	39,255	33,372	48,919	48,919
Total Gram P.		70,860	57,060	99,770	88,930	124,550	116,070
Total Nagar P.		698,760	608,930	829,962	755,426	988,630	925,711
Total G & N P.		769,620	665,450	929,732	844,356	1,113,180	1,041,781

1 Not all towns listed here are currently under the responsibility of WSSB. These towns should all, however, be so by 1985. See also the remarks on Annex 4.

2 WSSB also supplies a small number of rural communities where this is compatible with the Board's main activities. These are included in the list for information.

URBAN POPULATION COVERAGE BY WATER SUPPLIES AT 1985 & 1990

DWSS ACTIVITIES[1]

	TOWN NAME	AT 1985			AT 1990		
		TOTAL POPN.	EST. % COVERAGE	SERVED POPN.	TOTAL POPN.	EST. % COVERAGE	SERVED POPN.
13	Birendranagar	14,966	50	7,483	19,101	85	16,236
14	Tribhubannagar	20,855	90	18,770	25,989	100	25,989
15	Dhangadhi	18,374	90	9,187	22,897	100	22,897
16	Mahendranagar	26,271	90	23,644	32,738	100	32,738
17	Tansen	14,102	90	12,692	14,458	100	14,458
18	Bharatpur	28,124	90	25,312	29,370	100	29,370
19	Dhankuta	13,841	75	10,381	16,046	90	14,441
20	Ilam	11,041	75	8,281	12,800	90	11,520
21	Rajbiraj	16,740	90	15,066	19,882	100	19,882
22	Bhadrapur	15,453	90	13,908	17,914	100	17,914
23	Lahan	14,801	75	11,100	17,579	90	15,821
	Total	194,568	(80)	155,824	228,744	(96.7)	221,266

1 The figures in this table represent rough estimates of percentage coverage, only. Coverage at 1980, DWSS urban activities, has been taken from previous estimates. (See summary table, Annex 8)

ANNEX 9

URBAN POPULATION COVERAGE BY SEWERAGE AT 1980, 1985 & 1990

(INDIVIDUAL SYSTEMS ALSO NOTED)

	TOWN[1]	1980 POPULATION IN'000			1985 POPULATION IN'000			1990 POPULATION IN'000		
		TOTAL	SERVED BY		TOTAL	SERVED BY		TOTAL	SERVED BY	
			SEWERAGE	INDIVIDUAL SYSTEMS		SEWERAGE	INDIVIDUAL SYSTEMS		SEWERAGE	INDIVIDUAL SYSTEMS
1.	Kathmandu[2]	322,400	37,000	12,000	373,750	67,000	28,000	433,279	104,000	35,000
2.	Lalitpur[2]									
3.	Bhaktapur[3]	65,620	10,300	-	73,163	22,000	-	81,753	33,000	-
4.	Pokhara	32,000	-	11,200	39,309	-	14,300	48,287	14,070	14,060
5.	Biratnagar	63,890	-	11,700	74,860	-	18,700	87,714	9,920	15,100
6.	Birgunj	37,000	-	14,430	45,o16	-	17,160	54,769	15,700	9,700
7.	Dharan	43,050	-	9,200	51,130	-	12,400	60,726	7,200	9,000
8.	Janakpur	25,200	-	5,000	30,660	-	8,760	37,303	6,800	6,800
9.	Hetauda	35,500	-	7,230	49,791	-	13,100	69,834	6,330	14,150
10.	Bhairawa	22,500	-	4,500	27,375	-	7,830	33,306	4,550	9,100
11.	Butwal	20,100	-	4,020	25,653	-	7,710	32,740	6,560	4,920
12.	Nepalgunj	31,500	-	6,300	39,255	-	9,300	48,919	6,540	8,720
	TOTAL:	698,760	47,300	85,580	829,962	89,000	137,260	988,630	214,670	126,550
	COVERAGE:	-	6.77%	12.25%	-	10.72%	16.54%	-	21.71%	12.80%

1 Only 12 towns are listed since no plans exist for sewerage in the remaining towns of Nepal.

2 WSSB has negotiated IDA loans for these towns' sewerage. The remaining towns are presently under feasibility study.

3 Financed with German Government support.

RURAL SANITATION PROGRAMME AND GOVERNMENT SUBSIDY COSTS[1]

TABLE 1

Date	Estimated Rural Population (Thousands)				Proposed Population Coverage (Percentage)			
	Terai	Midlands	Hills	Total	Terai	Midlands	Hills	Total
1980	4,979	6,803	1,367	13,149	0	0	0	0
1985	5,662	7,493	1,508	14,663	5	2	0	2.95
1990	6,442	8,266	1,665	16,373	20	10	2	13.12

TABLE 2

Period	Latrine Units Required (Thousands)				Cost of Government Subsidy[2] (Millions of Nepalese Rupees, 1980 prices)			
	Terai	Midlands	Hills	Total	Terai	Midlands	Hills	Total
1980-1985	47.18	24.98	0.00	72.16	14.15	7.49	0.0	21.64
1985-1990	167.55	112.79	5.55	285.89	50.27	33.84	1.67	85.79

1 Based on Chapter V of "Health for All" Planning Document.

2 All prices should be raised by 15% to include for engineering services.

DISTRICT H-Q PROGRAMME & HMG SUBSIDY COSTS

TABLE 3

PERIOD	NUMBER OF DISTRICT HEADQUARTERS	ASSUMED POPULATION	GOVERNMENT[A] SUBSIDY 1980 PRICES
1980-1985	5	20,000	Rs 1.0 million
1985-1990	10	40,000	Rs 2.0 million
1990-1995	15	60,000	Rs 3.0 million
1995-2000	15	60,000	Rs 3.0 million
	45	180,000	Rs 9.0 million

NOTE: ASSUMPTIONS -
(i) Average population per District Headquarters is 4,000.
(ii) Subsidy - Rs 50 per caput.
(iii) Approximately 10 District Headquarters not included by 2000.

SCHOOLS SANITATION PROGRAMME AND HMG SUBSIDY COSTS

TABLE 4

PERIOD	NUMBERS OF SCHOOLS	ESTIMATED NUMBER OF CHILDREN (THOUSANDS)	NUMBERS OF UNITS REQUIRED	GOVERNMENT SUBSIDY (1980 PRICES)
1980-1985	1,500	225	4,500	Rs 9.0 million
1985-1990	6,000	900	18,000	Rs 36.0 million
1990-1995	10,500	1,575	31,500	Rs 63.0 million
1995-2000	B	B	B	B
Total	18,000	2,700	54,000	Rs108.0 million

A All prices should be raised by 15% to include for engineering services etc.

B After 1995, all schools should have latrines. Any new schools to be built will be obliged to include latrines at the time of construction.

SUMMARY OF COST ESTIMATE[1]

S.No.	Programme	HMG Subsidy Cost in million of Rupees during decade		
		1980-85	1985-90	Total
1.	Rural Sanitation Programme	24.89	98.65	123.54
2.	District Headquarters Programme	1.15	2.30	3.45
3.	Schools Sanitation Programme	10.35	41.40	51.75
	Total	36.39	142.35	178.74

1 This does not include the cost of the sewerage/sanitation programme in urban areas under WSSB.

This table includes 15% for engineering services.

MEMBERSHIP AND TERMS OF REFERENCE OF HMG'S NATIONAL GROUP[1]

The membership of the National Group is as follows:

1.	Mr H.J. Malla	Chief Engineer, DWSS
2.	Mr S.B. Rai	Director-General, LDD
3.	Mr S.N. Sharma	Deputy Chief Engineer, DWSS
4.	Mr Bal Gopal K.C.	Under-Secretary, Foreign Aid Division, Ministry of Finance
5.	Mrs Chapala Pandey	Under-Secretary, National Planning Commission
6.	Mr Rabindraman Shrestha	Representative, WSSB
7.	Mr R.L. Joshi	Representative,
8.	Mr Lekh Man Singh	Actg. Senior Engineer, LDD
9.	Mr N. Saravanapavananthan	WHO Sanitary Engineer (Invited to attend)

[1] As constituted at the meeting held on 19th March 1979.

TERMS OF REFERENCES FOR NATIONAL GROUP

(As originally presented)

1 Structure

- Composition. The Group should have an inter-agency, inter disciplinary character. Its composition will vary from country to country, due consideration being given to Ministries and Agencies with responsibilities in urban and rural water supply and sanitation.
- Internal organization to be established within DWSS, this will include necessary staff and facilities.

2 Responsibilities

The Group's functions might include some or all of the following advisory and/or operational responsibilities:

- General planning for the sector in the context of preparation for and implementation of the International Drinking Water Supply and Sanitation Decade.
- Development of viable sector strategies, and formulation of proposals in the form of short and long term water supply and sanitation programmes with a view to their inclusion in the national development plan and in external cooperation programme.
- Coordination, monitoring and evaluation or progress in the sector.
- Overseeing programme planning and implementation.
- Enlisting national and/or external technological support to operational programmes.

DWSS ACTIVITIES FROM 1980 TO 1990

PLAN : YEARS	NUMBER OF HILLS PROJECTS EXECUTED	NUMBER OF MIDLANDS PROJECTS EXECUTED	NUMBER OF SHALLOW TUBE-WELLS PLACED	POPULATION COVERAGE IN THOUSANDS IN				
				HILLS[1/]	MIDLANDS[1/]	TERAI HAND-PUMPS	TERA DEEP TUBE-WELLS	TOTALS
SIXTH PLAN : 1980-85	31	144	5,000	63.7	322.7	1,000.0	87.9	1,474.3
SEVENTH PLAN: 1985-90	118	537	12,250	242.1	1,202.6	2,449.4	100.0	3,994.1
DECADE INCREMENTAL TOTAL	149	681	17,250	812.4[2/]	1,558.9[2/]	3,449.4[2/]	200.0[2/]	5,520.7[2/]
	830							

1/ Design Parameters: (Per project)
Hills Projects : Immediate coverage 1990 popu.; 15 yr design 2678 popu.
Midlands Project: Immediate coverage 2172 popu.; 15 yr design 2923 popu.

2/ Includes natural increase in population upto 1990.

MLD ACTIVITIES FROM 1980 TO 1990

PLAN : YEARS	NUMBER OF HILLS PROJECTS EXECUTED	NUMBER OF MIDLANDS PROJECTS EXECUTED	NUMBER OF SHALLOW TUBE-WELLS PLACED	POPULATION COVERAGE IN THOUSANDS IN			
				HILLS[1/]	MIDLANDS[1/]	TERAI HAND-PUMPS	TOTALS
SIXTH PLAN : 1980-85	137	363	4,190	124.4	443.7	838.0	1,406.1
SEVENTH PLAN: 1985-90	253	683	9,770	230.1	837.1	1,954.0	3,021.2
DECADE INCREMENTAL TOTAL	390	1,046	13,960	367.5[2/]	1,327.0[2/]	2,792.0	4,486.5[2/]
	1,436						

1/ Design Parameters: (Per project)
Hills Projects : Immediate coverage = 876; 15 yr. design 1179 population.
Midlands Projects: Immediate coverage = 1180; 15 yr. design 1588 population.

2/ Includes natural increase in population upto 1990.

PROFESSIONAL/TECHNICAL MANPOWER REQUIREMENTS [1] : 1980-1990

SUMMARY OF DECADE REQUIREMENTS FOR ENGINEERS AND OVERSEERS

(ANNUAL ADDITIONAL REQUIREMENTS)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	DECADE TOTAL
ENGINEERS											
WSSB OPERATIONS	10	6	3	0	10	0	0	0	0	0	29
DWSS OPERATIONS	10	5	4	10	14	19	26	28	8	6	130
MLD OPERATIONS	-	1	1	4	3	0	1	2	1	0	13
MLD REPLACEMENTS	-	0	0	0	0	2	3	4	3	2	14
TOTAL	20	12	8	14	27	21	30	34	12	8	186
OVERSEERS											
WSSB OPERATIONS	12	12	6	0	6	0	0	0	0	0	36
DWSS OPERATIONS	29	9	26	18	26	32	48	52	14	12	266
MLD OPERATIONS	-	18	4	17	13	9	6	13	3	4	87
MLD REPLACEMENTS	-	0	0	0	10	10	10	0	0	0	30
TOTAL	41	39	36	35	55	51	64	65	17	16	419

Note: These totals are simply additional personnel required, and do not take into account natural wastage, which might be from 10% to 15%.
Hence total requirements during the Decade are:

(i) Engineers Approx. 210 (42 for each of 5 years)

(ii) Overseers Approx. 470 (67 for each of 7 years)

1/ This does not include manpower for the sanitation programme, which is still at proposal stage. See Annex 14, Page 5.

PROFESSIONAL/TECHNICAL MANPOWER REQUIREMENTS : 1980-1990

WATER SUPPLY AND SEWERAGE BOARD

	DESCRIPTION	GRADE	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1.	General Manager		1	1	1	1	1	1	1	1	1	1	1
2.	Manager[1/]	GI	3	4	4	4	4	6	6	6	6	6	6
3.	Divisional Engineer	GII	7	12	12	12	12	18	18	18	18	18	18
4.	Assistant Engineer	GIII	16	21	27	30	30	34	34	34	34	34	34
	TOTAL ENGINEERS		23	33	39	42	42	52	52	52	52	52	52
5.	Chief Chemist	GII	-	-	1	1	1	1	1	1	1	1	1
6.	Senior Chemist	GIII	2	3	3	3	3	3	3	3	3	3	3
7.	Chemist	NGI	4	6	6	6	6	6	6	6	6	6	6
	TOTAL CHEMISTS		6	9	10	10	10	10	10	10	10	10	10
8.	Overseers	NGI											
	TOTAL OVERSEERS		26	38	50	56	56	62	62	62	62	62	62
9.	Draftsmen	NGI	6	12	12	12	12	18	18	18	18	18	18
10.	Technicians (Snr)	NGI	8	16	18	18	18	20	20	20	20	20	20
11.	Tracers	NGII	2	8	11	14	14	14	14	14	14	14	14
12.	Lab. Technicians	NGII	5	10	13	16	16	16	16	16	16	16	16
ADDITIONAL ANNUAL REQUIREMENTS													
	A. ENGINEERS		-	10	6	3	0	10	0	0	0	0	0
	B. OVERSEERS		-	12	12	6	0	6	0	0	0	0	0
	C. DRAFTSMEN TECHNICIANS		-	14	2	0	0	8	0	0	0	0	0

1/ Managers may, in some instances, be engineers.

PROFESSIONAL/TECHNICAL MANPOWER REQUIREMENTS: 1980-1990

DEPARTMENT OF WATER SUPPLY AND SEWERAGE[1/]

	DESCRIPTION	GRADE	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1.	Chief Engineer	GI	1	1	1	1	1	1	1	1	1	1	1
2.	Deputy Chief Engineer	GI	1	1	1	1	1	1	1	1	1	1	1
3.	Superintending Engineer	GI	2	5	5	5	5	5	5	5	5	5	5
4.	Divisional Engineer	GII	7	10	10	10	10	12	14	16	18	20	20
5.	Assistant Engineer	GIII	51[2/]	55	60	64	74	86	103	127	153	159	165
	TOTAL ENGINEERS		62	72	77	81	91	105	124	150	178	186	192
6.	Overseers	NGI	65[3/]	94	103	129	147	173	205	253	305	319	331
7.	Draftsmen	NGI	10	12	15	18	22	25	30	34	37	38	38
8.	Drillers	NGI	1	2	2	2	2	2	2	3	3	3	3
	ADDITIONAL ANNUAL REQUIREMENTS												
	A. ENGINEERS		-	10	5	4	10	14	19	26	28	8	6
	B. OVERSEERS		-	29	9	26	18	26	32	48	52	14	12
	C. DRAFTSMEN		-	2	3	3	4	3	5	4	3	1	0

1/ Requirement for chemist(s) not included.

2/ 11 posts vacant.

3/ 1 post vacant.

PROFESSIONAL/TECHNICAL MANPOWER REQUIREMENTS: 1980-1990

MINISTRY OF LOCAL DEVELOPMENT

	DESCRIPTION	GRADE	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1.	Superintending Engineer	GI	-	1	1	1	1	1	1	1	1	1	1
2.	Deputy Superintending Engineer	GII	-	4	4	4	4	4	4	4	4	4	4
3.	Engineers (Hills & Midlands)	GI - GIII	22	23	24	25	29	32	32	33	35	36	36
4.	Engineers (Terai)		-	2	2	2	2	2	2	2	2	2	2
	Total Engineers[1/]		22	25	26	27	31	34	34	35	37	38	38
5.	Supervisors/Overseers		-	53	59	60	72	80	80	82	87	88	90
6.	Maintenance Overseers		-	24	24	24	28	28	32	32	32	32	32
7.	Tubewell Supervisors		-	4	16	19	20	25	30	34	42	44	46
	Total Overseers		-	81	99	103	120	133	142	148	161	164	168
8.	Water Supply Technicians		-	134	147	153	183	203	209	247	260	264	268
9.	Workshop Mechanics		-	4	7	7	7	7	9	9	12	14	14
	ADDITIONAL ANNUAL REQUIREMENTS												
	A. ENGINEERS		-	-	1	1	4	3	0	1	2	1	0
	A.A REPLACEMENT OF "VACANCIES" OR VOLUNTEER ENGINEERS		-	-	0	0	0	0	2	3	4	3	2
	B. OVERSEERS		-	-	18	4	17	13	9	6	13	3	4
	B.B. REPLACEMENT OF "VACANCIES" OR VOLUNTEER OVERSEERS		-	-	0	0	0	10	10	10	0	0	0
	C. W/S TECHNICIANS		-	-	13	6	30	20	6	38	13	4	4

1/ At present MLD has 8 national engineers. Other positions are either vacant or filled by volunteer engineers. 44 noted volunteers are taken as 14 engineers and 30 overseers.

PROFESSIONAL/TECHNICAL MANPOWER REQUIREMENTS: 1980-1990

COMBINED SANITATION COVERAGE

The following manpower requirements are crude estimates and are based on:

- Overall requirements (i.e. No agency split), which implies that the programme will be run by one agency.
- That two engineers per region will be required; overseers at the rate of one per 2000 latrine units per year; and sub-overseers at twice that number.
- That one mason can make 3 water seals per day for 166 days per year = 500 units/mason/year.

MANPOWER REQUIREMENTS: SANITATION PROGRAMME

YEAR	ENGINEERS	OVERSEERS	SUB-OVERSEERS	MASONS
1981	2	2	4	5
1982	4	6	12	12
1983	5	8	16	25
1984	6	10	20	40
1985	7	12	24	70
1986	8	15	30	92
1987	8	20	40	110
1988	8	22	44	120
1989	8	23	46	124
1990	8	23	46	125

ANNEX 15

TRAINING REQUIREMENTS: ENGINEERS & OVERSEERS: 1980-1990

(ALL AGENCIES)

ITEM	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	DECADE TOTALS
ENGINEERS											
ADDITIONAL ANNUAL REQTS. W/S	20	12	8	14	27	21	30	34	12	8	186
ADDITIONAL ANNUAL REQTS. SANITATION	2	2	1	1	1	1	0	0	0	0	8
TOTAL	22	14	9	15	28	22	30	34	12	8	194
POSSIBLE AVAILABILITY OF ENGINEERS TRAINED IN LARGE NUMBERS (EXCLUDING WASTEAGE)	-	-	-	-	25	30	40	45	54	-	194
INCREASE OR DECREASE TO BE FILLED/VACATED BY VOLUNTEERS OR OTHERS	22	14	9	15	3	-8	-10	-11	-42	8	0
NUMBERS TO START ON UNDER-GRADUATE TRAINING (INCLUDING WASTEAGE)	28	34	45	51	61	-	-	-	-	-	219
OVERSEERS											
ADDITIONAL ANNUAL REQTS. W/S	41	39	36	35	55	51	64	65	17	16	419
ADDITIONAL ANNUAL REQTS. SANITATION	2	4	2	2	2	3	5	2	1	0	23
TOTAL	43	43	38	37	57	54	69	67	18	16	442
POSSIBLE AVAILABILITY[1/] OF OVERSEERS TRAINED IN LARGE NUMBERS (EXCLUDING WASTEAGE)	-	-	-	50	65	80	90	90	67	0	442
INCREASE OR DECREASE TO BE FILLED/VACATED BY VOLUNTEERS OR OTHERS	43	3	38	-13	-8	-26	-21	-23	-49	16	0
NUMBERS TO START ON OVERSEER TRAINING	56	73	90	101	101	75	-	-	-	-	496

1/ This does not take into account any immediate availability of suitable trained overseers.

SELECTED UNIVERSITY ENTRANCE QUALIFICATIONS: ENGINEERS

BARODA: FACULTY OF TECHNOLOGY AND ENGINEERING

BACHELOR ENGINEERING - (FULL TIME)

MINIMUM REQUIREMENT FOR ADMISSION: A pass in the Higher Secondary (XII Standard) exam of the Gujarat State with Sc subjects with 55 percent marks each in theory and practical. Duration: 4 years (8 semesters). Branches: Chem; Civil; Elect; Mech; Metallurgy.

JADAVPUR: FACULTY OF ENGINEERING AND TECHNOLOGY

BACHELOR'S DEGREE - (FULL TIME)

MINIMUM REQUIREMENT FOR ADMISSION: A pass in the Higher Secondary (12 years) exam in Science or Technical stream of the Board of Secondary Education West Bengal or an exam recognised as equivalent thereto with Phy., Chem., Maths & Eng. All candidates have to appear at the Entrance exam conducted by the "West Bengal Board of Examination for admission to Engineering Degree Colleges". Duration: 4 years (8 semesters) (for BArch and Production Engg - 4 1/2 years). Branches: Arch (BArch); Chem (B Ch E); Civil (BSE); Elect (BEE); Electronics & Telecommunication (BE Tel E); Mech. (BME); Metallurgy (B Met E); Production Engg.

BACHELOR'S DEGREE - (PART TIME)

The course is open to diploma holders in Engineering who are in service. Duration: 5 years. Branches: Civil (BCE); Elect. (BEE); Mech (BME).

MADRAS: FACULTY OF ENGINEERING

BACHELOR OF ENGINEERING - (FULL TIME)

MINIMUM REQUIREMENT FOR ADMISSION: A pass in the Pre-Univ. exam of the univ. with Phy, Chem and Maths or any other equivalent exam. Duration: 5 years (10 semesters). Branches; Civil; Elect; Electronics & Communications; Mech; Metallurgical; Production.

BACHELOR OF ENGINEERING (PART TIME)

MINIMUM REQUIREMENT FOR ADMISSION: A pass in the Diploma exam in the repective Engg. branch from the State Board of Technical Education, Tamil Nadu or any other equivalent exam. Duration: 3 1/2 years (7 semesters). Branches: Civil; Elect; Mech.

ROORKEE: FACULTY OF ENGINEERING

BACHELOR OF ENGINEERING - (FULL TIME)

MINIMUM REQUIREMENT FOR ADMISSION: A pass in the Inter exam. with Maths; Phy & Chem. or Geol. or its equivalent esam. recognised by the univ. Duration: 4 years (8 semesters). Branches: Chem; Civil; Elect; Electronics & Communication: Indl; Mech; Metallurgy.

SRI VENKATESWARA (MYSORE): FACULTY OF ENGINEERING

BACHELOR OR TECHNOLOGY - (FULL TIME)

MINIMUM REQUIREMENT FOR ADMISSION: A pass in the Intermediate exam. conducted by the Board of Inter Edn. Andhra Pradesh with Maths and Physical Sciences or an exam recognised as equivalent thereto. Duration: 5 years (1o semesters). Branches: Chem; Civil; Elect; Electronics Communication; Mech.

BACHELOR OF TECHNOLOGY - (PART TIME)

MINIMUM REQUIREMENT FOR ADMISSION: A pass in the diploma exam. in Civil, Elect or Mech Engg of the State Board of Technical Edn. Andhra Pradesh or an equivalent exam with 2 years professional experience. Duration: 4 years (8 semesters). Branches: Civil; Elect; Mech.

SOURCE OF INFORMATION

UNIVERSITIES HANDBOOK - INDIA, 1979
Association of Indian Universities,
Deen Dayal Upadhyaya Marg
New Delhi-110002
INDIA

ESTIMATES FOR TRAINING OF ENGINEERS AND OVERSEERS

These estimates are based on informal information from CPHEEO, GOI (Central Public Health and Environmental Engineering Organisation, Government of India). They represent an order of magnitude only, and should not be taken as definitive. The costs of training engineers and overseers in India is assumed to be nearly equal, when taken on an annual basis.

TRAINING COSTS — NEP RS/ANNUM

(i) Engineers Training in the Region:

Tuition Fees (Range I.Rs 400-800)	1,200
Books and Equipment	3,000
Board and Lodging	6,000
Stipend (Personal Allowance)	1,800
Camps, field trips (I.Rs 3000/4 years)	1,125
Travel, and other contingencies	1,875
NEP RS.	15,000

Cost to train one engineer (4 years) NEP RS. 60,000

(ii) Overseers Training in Nepal:

This training to be provided to batches of 48 students by special arrangement with the Institute of Engineering. Course duration 5 semesters (i.e.) 30 months.

Institute charge for providing the facilities for a special course for batch of 48 for 5 semesters — NEP RS 600,000

Student stipend at the rate of Rs 400 per month; cost for 1 batch for 2 1/2 years — NEP RS 576,000

NEP RS. 1,176,000

Cost to train 10 batches of 48 overseers NEP RS. 11,760,000

SUMMARY

Cost to train 210 engineers	-	NEP RS. 12.6 million
Cost to train 10 batches of 48 overseers	-	NEP RS. 11.76 million
Decade Total	-	NEP RS. 24.36 million

(1980 based prices)

TABLE OF OUTLAYS FOR WSSB URBAN ACTIVITIES FOR THE DECADE

ALL SUMS ARE IN THOUSANDS OF NEP RUPEES

IDA FINANCED PROJECTS (WSSB)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
FIRST PROJECT	24 088	-	-	-	-	-	-	-	-	-
SECOND PROJECT	65 700	49 016	-	-	-	-	-	-	-	-
THIRD PROJECT	26 070	80 167	129 033	100 530	37 066					
FOURTH PROJECT	-	-	-	-	-	34 960	107 500	173 030	134 810	49 700
TOTAL DURING DECADE	115 858	129 183	129 033	100 530	37 066	34 960	107 500	173 030	134 810	49 700
	EXPENDITURE DURING THE SIXTH FIVE YEAR PLAN NEP RS 511,670,000					EXPENDITURE[1] DURING THE SEVENTH FIVE YEAR PLAN NEP RS 500,000,000				

[1] This expenditure is a rough estimate, based on ecpenditure during the 6th Five Year Plan, and discussions with IDA officials. The distribution of the total sum follows that during the Third IDA Project, to stimulate design, tender and construction expenditures.

DWSS INVESTMENT REQUIREMENTS: 1980 - 1990

1. DWSS Programme of Development Works 1980 - 1985 (6th Five Year Plan)

		MILLIONS OF NEP RS
a)	Rural HILLS projects (31 No.) for a 15 year hence population of 2678 per project, 1980 based per capita cost of 350/-	29.06
b)	Rural MIDLANDS projects (144 No.) for a 15 year hence population of 2923 per project 1980 based per capita cost of 350/-	147.32
c)	Rural TERAI DEEP TUBEWELLS. 1985 population coverage of 90,570. Per capita cost assumed to be 250/-, 1980 based	22.64
d)	Rural TERAI SHALLOW TUBEWELLS. Population coverage 1,000,000 by 1985; one handpump total cost assumed to be 3000/-, 1980 based and one pump per 200 persons (Total 5000 pumps required)	15.00
e)	Provisional sum for extensions or augmentations to existing urban projects. Rs 5 million per annum	25.00
	SUB TOTAL	239.02
	Add 15% for engineering services, survey, design, administration etc.	35.85
	DWSS 6th F.Y.P. Cost	274.87

2. DWSS Programme of Development Works: 1985 - 1990
(7th Five Year Plan)

		MILLIONS OF NRP RS
a)	Rural HILLS projects (118 No.) for a 15 year hence population of 2678 per project. 1980 based per capita cost of 350/-	110.60
b)	Rural MIDLANDS projects (537 No.) for a 15 year hence population of 2923 per project. 1980 based per capita cost of 350/-	549.38
c)	Rural TERAI DEEP TUBEWELLS. 1990 population coverage of 100,000. Per capita cost of 250/-, 1980 based	25.00
d)	Rural TERAI SHALLOW TUBEWELLS. Population coverage of an additional 2,450,000 by 1990. One handpump total cost assumed 3000/-, 1980 based and one pump per 200 persons (Total 12,250 pumps required)	36.75
e)	Provisional sum for extensions or augmentations to existing urban projects. Rs 5 million per annum, 1980 based	25.00
	SUB TOTAL	746.73
	Add 15% for engineering services, survey, design, administration etc.	112.01
	DWSS 7th F.Y.P. Cost	858.74
	DWSS Decade Cost	1133.61

M.L.D. INVESTMENT REQUIREMENTS: 1980-1990

1. MLD Programme of Development Works 1980 - 1985 (6th F.Y.P.)

		MILLIONS OF NEP RS
a)	Rural HILLS projects (137 No.) for a 15 year hence population of 1179 per project. 1980 based per capita cost of 200/-	32.30
b)	Rural MIDLANDS projects (363 No.) for a 15 year hence population of 1588 per project. 1980 based per capita cost of 200/-	115.29
c)	Rural TERAI SHALLOW TUBEWELLS. Population coverage 838,000 by 1985. One handpump per 200 (= 4190 handpumps) 1980 cost of one handpump = 3000/-	12.57
	SUB TOTAL	160.16
	Add 15% for engineering services, survey, design, administration etc.	24.02
	MLD 6th F.Y.P. Cost	184.18

2. MLD Programme of Development Works 1985 - 1990 (7th F.Y.P.)

a)	Rural HILLS projects (253 No.) for a 15 year hence population of 1179 per project. Per capita cost of 200/-, 1980 based	59.66

		MILLIONS OF NEP RS
b)	Rural MIDLANDS projects (683 No.) for a 15 year hence population of 1588 per project. Per capita cost of 200/-, 1980 based	216.92
c)	Rural TERAI SHALLOW TUBEWELLS. Population coverage an additional 1,954,000 at the rate of 1 pump per 200 persons (= 9770 handpumps at the rate of Rs 3000/- each)	29.31
	SUB TOTAL	305.89
	Add 15% for engineering services, survey, design, administration etc.	45.88
	MLD 7th F.Y.P. Cost	351.77
	MLD Decade Cost	535.95

ANNEX 20

SUMMARY OF PLANNED CAPITAL OUTLAY : 1980-1990

SECTOR	SERVICE	AGENCY	CAPITAL OUTLAY IN MILLIONS OF NEP. RUPEES		
			6th F.Y.P.	7th F.Y.P.	Total
URBAN	Water Supply) (Core Area Sewerage)	WSSB	511.67	500.00[2]	1011.67
	Alternative Sanitation	WSSB	-	-	-
	Water Supply	DWSS	28.75	28.75	57.50
	Alternative Sanitation	DWSS	-	-	-
RURAL	Water Supply	DWSS	246.12	829.99	1076.11
	Sanitation) [1]	DWSS	36.39	142.35	178.74
	Sanitation) [1]	MLD			
	Water Supply	MLD	184.18	351.77	535.95
		CAPITAL[3] TOTALS	1007.11	1852.86	2859.97
	Engineer & Overseer Training	WSSB) DWSS) MLD)			24.36

1 Includes rural areas, schools and district HQs.

2 This figure is a crude estimate, but represents the order of magnitude expected of the "Fourth IDA Project" for WSSB, based on expenditures 1980-1985, and discussions with IDA

3 These figures do not include alternative sanitation in urban areas, nor overall promotional and health education costs for the sanitation programme.

ANNEX 21

HMG AND EXTERNAL FUND REQUIREMENTS: DEVELOPMENT

(All prices are 1980 based)

ITEM[1]	Estimated Cost in Millions of Rupees		
	HMG Contribution	External Funds	Total
SIXTH FIVE YEAR PLAN: 1980/85			
URBAN			
WSSB Budget[2]	127.92	383.75	511.67
DWSS Budget	13.80 - 7.19	14.95 - 21.56	28.75
RURAL			
DWSS Budget	126.87 - 66.08	137.44 -198.23	264.31
MLD Budget	97.14 - 50.60	105.24 -151.78	202.38
SEVENTH FIVE YEAR PLAN: 1985/90			
URBAN			
WSSB Budget[2]	125.00	375.00	500.00
DWSS Budget	13.80 - 7.19	14.95 - 21.56	28.75
RURAL			
DWSS Budget	432.56 -225.29	468.60 -675.87	901.16
MLD Budget	203.02 -105.74	219.93 -317.21	422.95
DECADE TOTALS			
URBAN			
WSSB Budget[2]	252.92	758.75	1011.67
DWSS Budget	27.60 - 14.38	29.90 - 43.12	57.50
RURAL			
DWSS Budget	559.43 -291.37	606.04 -874.10	1165.47
MLD Budget	300.16 -156.34	325.17 -468.99	625.33
TOTAL	1140.11 -715.01	1719.86 -2144.96	2859.97

1 Training costs not included.

2 Does not include alternative sanitation programme costs.

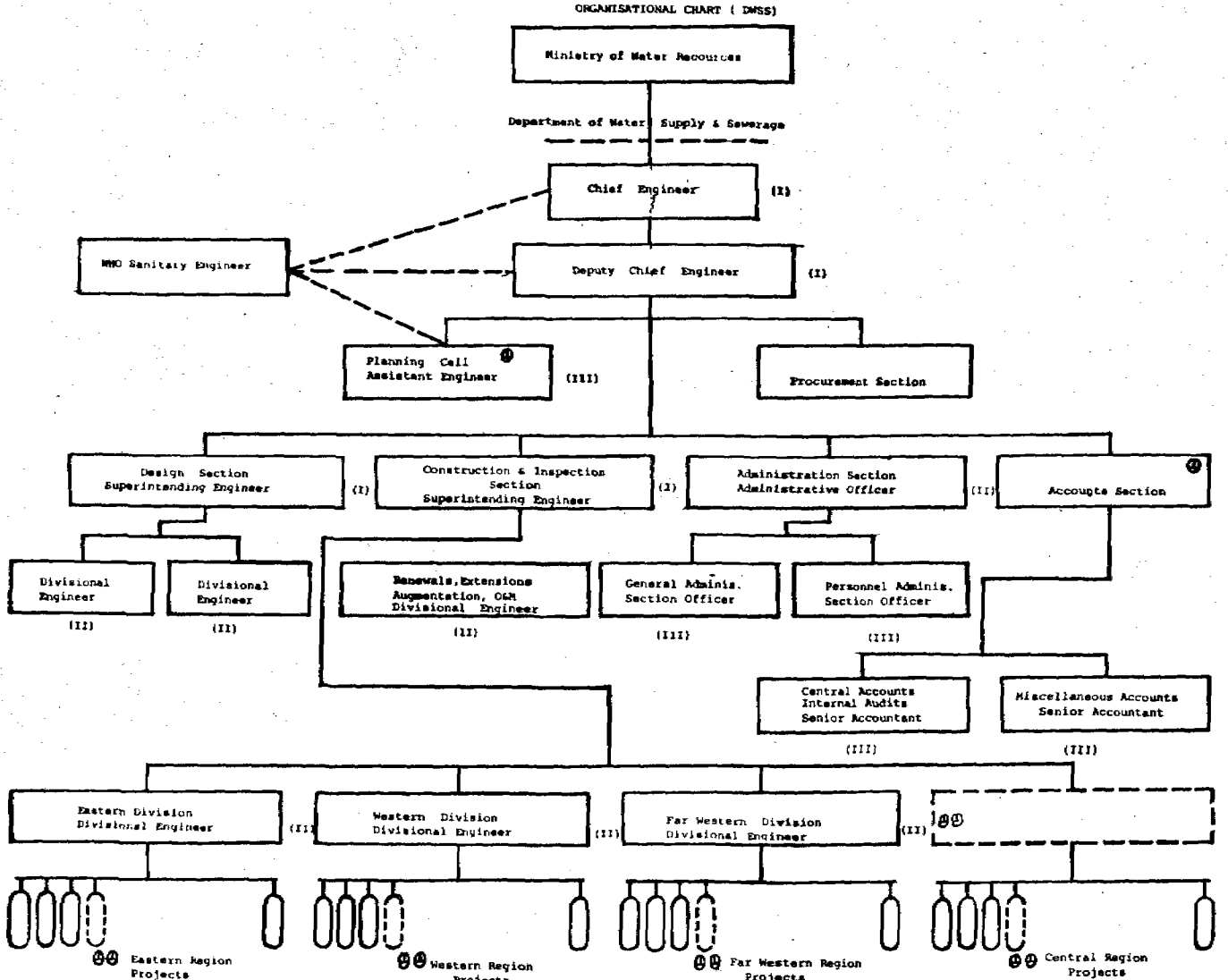
NATIONAL AND AGENCY BUDGETS: 1975/1976 TO 1979/1980

ITEM	ANNUAL BUDGET ALLOCATIONS IN THOUSANDS OF RUPEES				
	1975/1976	1976/1977	1977/1978	1978/1979	1979/1980
NATIONAL BUDGET					
Regular	691,086	823,437	938,526	1,104,962	1,214,284
Development	1,455,847	1,783,183	2,148,898	2,647,862	2,969,594
Total:	2,146,933	2,606,620	3,087,424	3,752,824	4,183,878
WSSB BUDGET					
Development	45,074	50,989	63,661	55,000	52,705
Total:	45,074	50,989	63,661	55,000	52,705
DWSS BUDGET					
Regular					
Urban O&M	661	745	893	1,864	2,382
Other	365	383	448	457	536
Development					
Invest. & Design	1,000	1,095	800	1,000	948
Urban renewals etc	1,510	2,095	2,000	2,810	2,483
Other	12,601	18,438	22,095	26,309	26.446
Total	16,137	22,756	26,236	32,440	32,795
MLD BUDGET					
Development					
Water Supply only	4,500	6,650	8,700	9,703	17,292
Total:	4,500	6,650	8,700	9,703	17,292

COMPARISON OF DWSS DEVELOPMENT AND O&M BUDGETS
(TAKING 1975/76 AS A BASE)

YEAR	PERCENTAGE INCREASES IN		
	O & M	URBAN DEVELOPMENT	TOTAL DEVLT. BUDGET
1975/1976	-	-	-
1976/1977	13	38	43
1977/1978	35	33	65
1978/1979	182	86	99

ORGANISATIONAL CHART (DWSS)

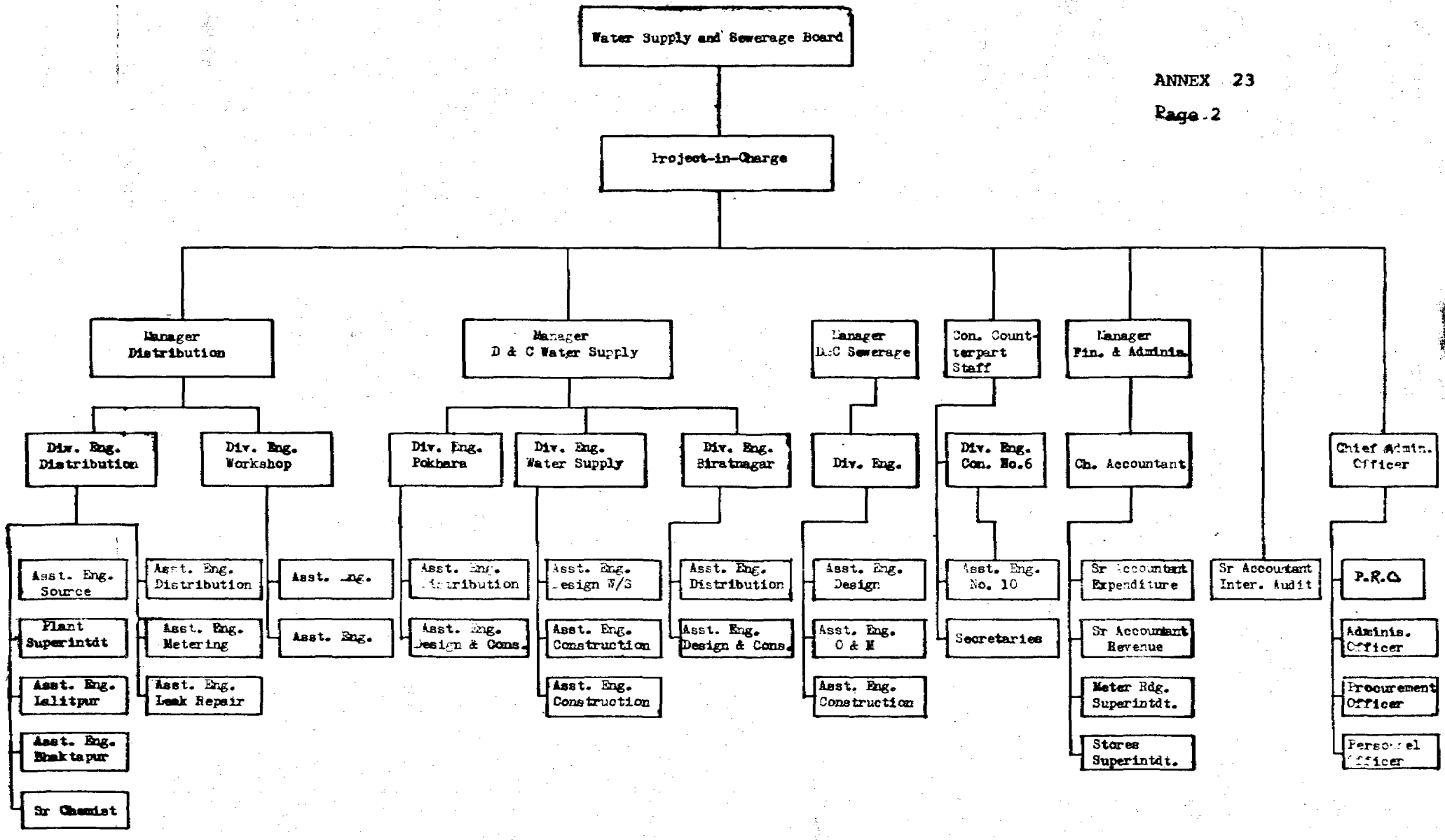


Note

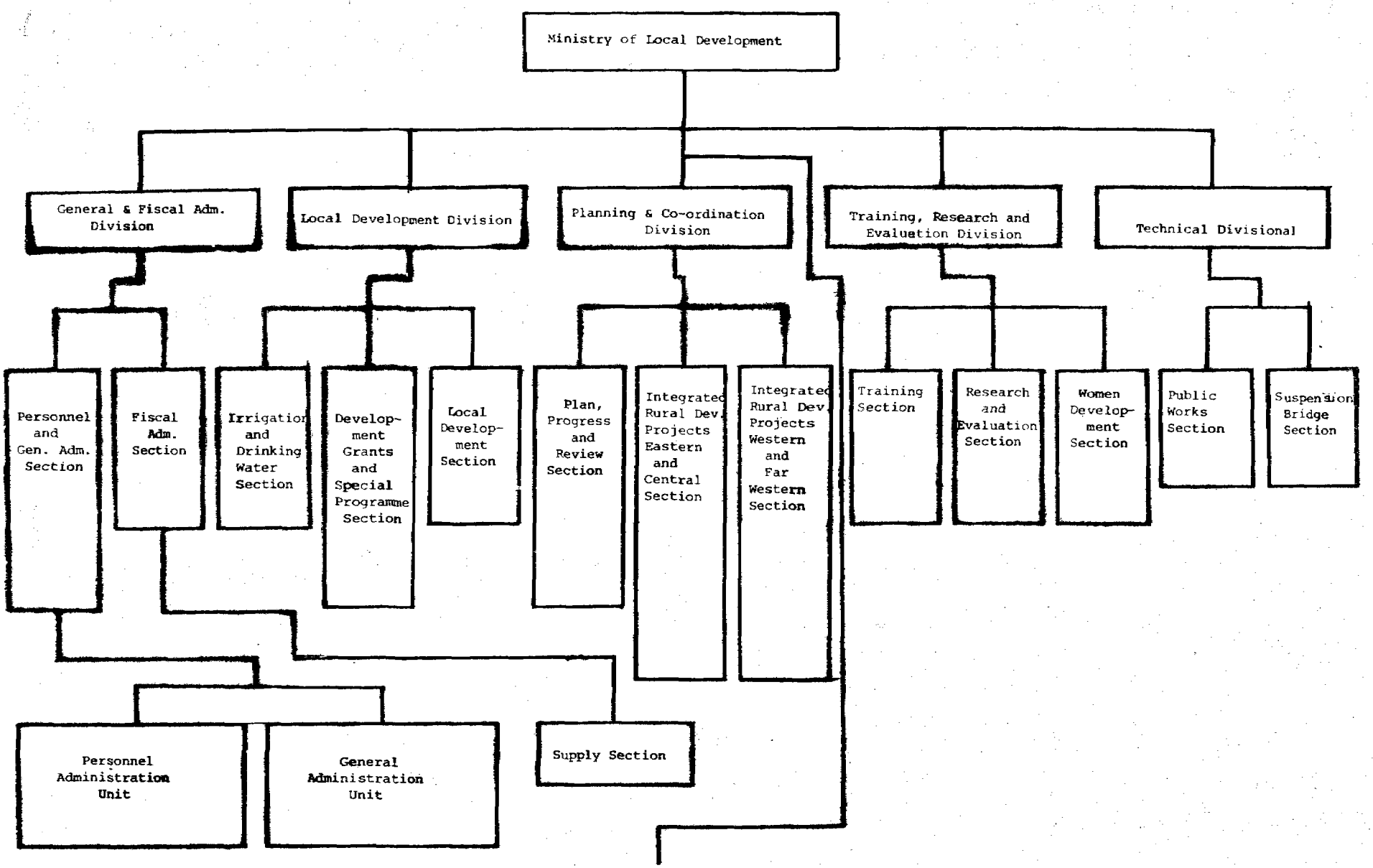
① Additional positions of a Divisional Engineer II (Planning Cell), a Divisional Engineer II, Central Division, a Chief Accounts Officer II (Accounts Section) and some Assistant Engineer III (Pool)) are requested for.

②② Project officers are generally headed by an assistant engineer from departmental Pool. There are 43 assistant engineers in the pool at present.

ORGANISATIONAL CHART



ORGANISATIONAL CHART OF MLD



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10. List of Village & Town Panchayats in the Kingdom with populations, L.K. Dakal, August 1979.

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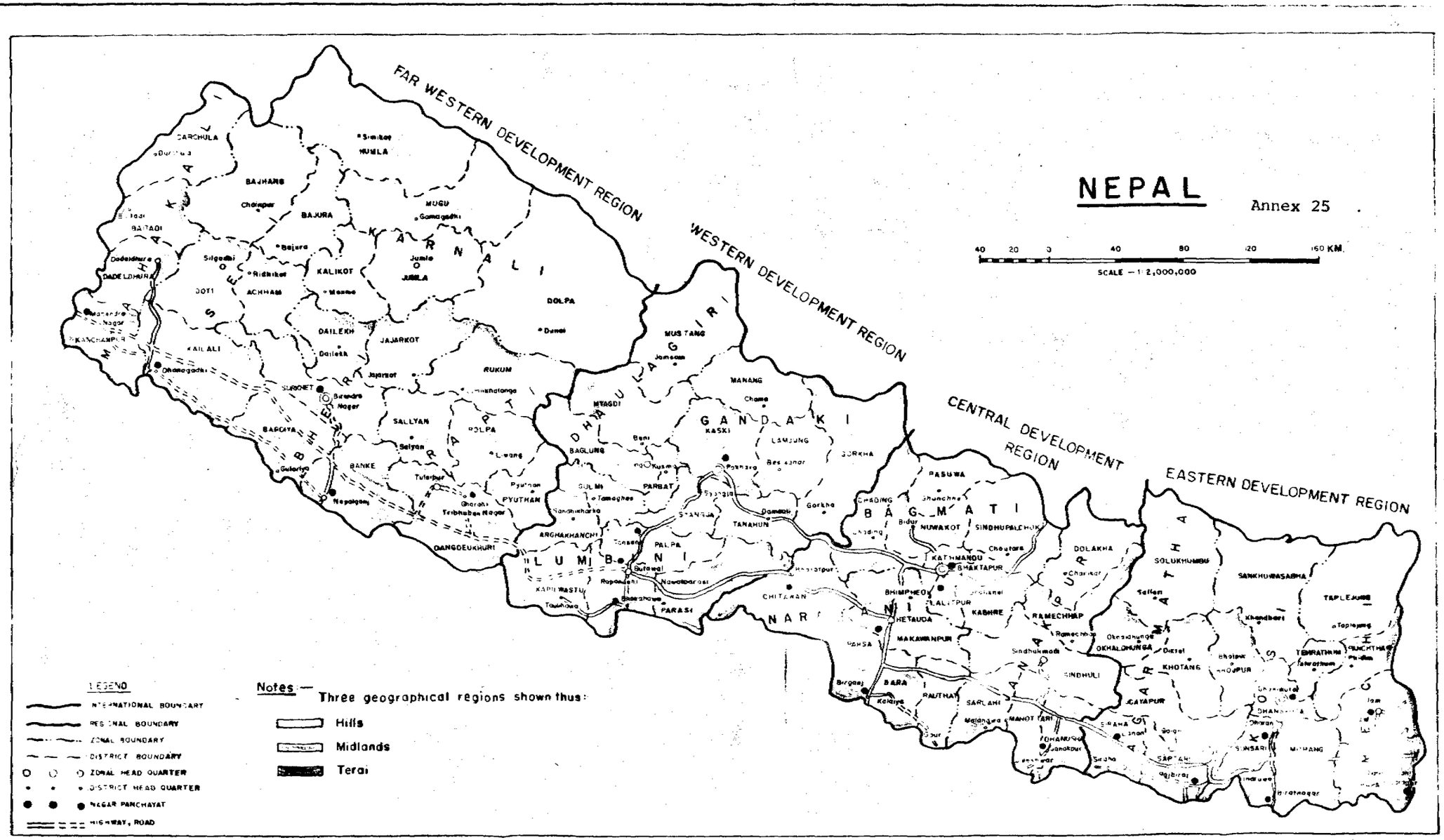
13. Country Report, Community Water Supply and Sanitation; HMG, May 1980.


NEPAL
Annex 25
FAR WESTERN DEVELOPMENT REGION
WESTERN DEVELOPMENT REGION
CENTRAL DEVELOPMENT REGION
EASTERN DEVELOPMENT REGION
40 20 0 40 80 120 160 KM.
SCALE — 1: 2,000,000
KARNALI
SETI
MAHAKALI
BHERI
RAPTI
DHAULAGIRI
GANDAKI
LUMBINI
NARAYANI
BAGMATI
KOSHI
MECHI
MAHAKALI
LEGEND
INTERNATIONAL BOUNDARY
REGIONAL BOUNDARY
ZONAL BOUNDARY
DISTRICT BOUNDARY
ZONAL HEAD QUARTER
DISTRICT HEAD QUARTER
NAGAR PANCHAYAT
HIGHWAY, ROAD
Notes:— Three geographical regions shown thus:
Hills
Midlands
Terai
DWSS.