

Sustained Drinking Water and Sanitation for all in Nepal - Sector Financing Requirements

A calculation for discussion with the Nepal Development Forum 2002 and other water supply and sanitation agencies who are invited to examine our assumptions, provide additional data and discuss the results.

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1\$ = RPS 75

ES1 Executive Summary

ES1.1 Introduction

HMGN is currently considering the targets for water supply and sanitation to be set in the 10th FY P. A paper on the Water Supply and Sanitation Sector written for discussion at the Nepal Development Forum 2002 proposes targets of 86.6% water supply coverage (85% rural and 95% urban) and 50% sanitation coverage (43% rural and 83% urban) by the end of the plan period, 2007.

Many countries, including Nepal, and donors have committed themselves to the target of halving the numbers of people world-wide that are unserved with water and/or sanitation by 2015.

HMGN is also reported to be considering two additional targets of 1) Universal water supply by 2015 and 2) Universal Sanitation by 2025.

These targets are very challenging yet also achievable. However if the targets are to be met the required resources must be available.

This report identifies all the resources currently available in the water supply and sanitation sector in Nepal, estimates the resources required to meet the targets and calculates the resource gap.

ES1.2 Summary of the report

ES1.2.1 Study Objective

The primary objective of the report is to promote discussion within the water supply and sanitation sector about the additional resources required to meet the targets. Estimates of the resource gap provide the basis for advocating for increased sector expenditure by HMGN and the international donor community. Preparations of the 10th FY P are well underway and the Nepal Development Forum is being held in February 2002. By presenting draft consultation papers on its website the Nepal Development Forum has presented civil society with an opportunity to be directly involved with the NPC and provide input into the formation of sector strategies. WaterAid welcomes the opportunity to engage with the NPC and this paper is presented in response to the Water and Sanitation paper published on the Nepal Development Forum website.

ES1.2.2 Design of Resource Gap Tool

The study proceeds through the following steps:

1. Division of Nepal into zones with regard to water supply technology used
2. Estimation of the population in the target years
3. Estimation of current drinking water and sanitation coverage
4. Presentation of the targets
5. Estimation of the unit costs
6. Estimation of the rehabilitation task
7. Calculation of the resources required to meet the targets
8. Estimation of the sector resources
9. Calculation of the resource gap

ES1.2.3 Findings and Results

Division of Nepal into zones

Nepal can be divided into 5 zones based on the water supply technologies used in these areas. When calculating sector financing requirements it is imperative to make these distinctions as coverage and per capita unit costs for water supply and sanitation vary significantly between the zones. These zones and the main water supply technologies used in these areas are presented below.

Zone	Water supply technology
Rural	
Hills and mountains	Gravity flow schemes
Terai	Shallow tube well
Terai boulder zone	Deep tube well
Urban	
Kathmandu	Piped system ; Melamchi
Small towns	Piped system

Coverage Data

An analysis of 12 sets of coverage data from the last decade showed that there are wide discrepancies in reported coverage. Without valid estimates of coverage, it is impossible to know either the magnitude of the task to achieve the targets nor what progress is being made. For the purposes of this study we estimated the following levels of coverage.

Table 1-1 Estimated Coverage

Zone	% of population	Drinking Water %	Sanitation %
Rural	85	70	20
Hills and mountains	55	65	20
Terai	40	85	20
Terai boulder zone	5	10	10
Urban	15	83	78
Kathmandu	44	87	95
Small Towns	56	80	65

District Coverage

An analysis of district coverage data indicates that the Eastern Development region has the lowest coverage of access to drinking water and the Far West has the highest coverage. Because of its extreme poverty however, any development programmes focus on the Mid and Far West Regions.

Targets

Table 1-2 details the number of additional people to serve per year in order to meet the targets.

Table 1-2 – No. of people to serve per year in order to meet the targets ('000)

Target	No. of people to serve with drinking water per year	No. of people to serve with sanitation per year
To meet proposed 10th FY P target	1,135	1,284
To halve number of people unserved with water and sanitation by 2015	717	1,084
To achieve universal water supply by 2015 and universal sanitation by 2025	950	1,270

Unit Costs

Analysis of unit costs showed that reported costs vary considerably by technology, by region, by distance from the road head, by community size, by mode of calculation and by implementing agency. We estimated the external assistance required for each additional person covered is as follows.

Table 1-3 Estimated Average Per Capita Unit Costs – external component (Rps)

	Water	Sanitation & hygiene
Rural - hills & mountains	2,600	400
Rural - terai	600	750
Rural - terai - boulder zone	2,700	750
Small towns	3,000	800
Kathmandu	23,400	800

Rehabilitation Task

Rehabilitation of water supply systems is estimated at \$ 24.46 million per year (rural \$ 20.92m and urban \$ 3.54m (excluding Kathmandu)). Due to lack of data current estimates of the rehabilitation task are weak, however initial analysis indicates that rehabilitation could be the single largest expenditure item in achieving universal access to water.

Total sector financing requirements

The average annual total sector requirement is estimated at \$117 to \$133 million, a figure which combines the costs of the Melamchi tunnel, which averages \$58.6 million over 8 years, with the annual cost estimates for different targets.

Resources

Sector investments to projects are provided from HMGN, bilateral donor grants, Development Bank loans, INGOs, community contributions, VDC and DDC allocations and by users. Annual HMGN development expenditure in the WS sector is currently estimated at \$14m. Foreign assistance has averaged \$18m per year since 1997 (63% loan and 37% grant). Community and VDC contributions vary between project and implementing agency.

Annual resources currently available and planned total \$81.05 million (rural \$18.14m, urban \$62.9m). The urban population currently 15% and increasing to 23% by 2015, will receive 78% of all sector investment.

Estimated Resource Gap

Annual and planned resources currently available total \$81.05 million. To achieve the proposed 10th FY P targets of 86.6% water supply coverage and 50% sanitation coverage by 2007 implies an additional \$52.43 million per year will be required.

Table 1-4 Resource gap profile for meeting proposed 10th FY P targets in \$m per year

	2001-08
Measurables costs	58.60
Other costs	50.41
Rehabilitation costs	24.46
Total requirement	133.47
Current and planned resources	81.05
Resource gap	52.43

Annual and planned resources currently available total \$81.05 million. To achieve the modest target of halving the unserved by 2015 implies an additional \$35.74 million per year will be required.

Table 1-4 Resource gap profile for halving numbers of unserved by 2015 in \$m per year

	2001-08	2009-15
Measurables costs	58.60	0
Other costs	33.72	33.72
Rehabilitation costs	24.46	24.46
Total requirement	116.79	58.19
Current and planned resources	81.05	22.45
Resource gap	35.74	35.74

To achieve the target of universal drinking water by 2015 and universal sanitation by 2025 an additional \$46.28 million per year is required.

Table 1-5 Resource gap profile for provision of universal drinking water by 2015 and universal sanitation by 2025 in \$m per year

	2001-08	2009-15	2016-25
Measurables costs	58.60	0	0
Other costs	44.27	44.27	44.27
Rehabilitation costs	24.46	24.46	24.46
Total requirement	127.33	68.73	68.73
Current and planned resources	81.05	22.45	22.45
Resource gap	46.28	46.28	46.28

A mid range estimate of the resource gap is thus \$44.8 million a year.

ES1.3 Data Assumptions

Due to discrepancies and uncertainties in much of the data obtained during the research process a number of assumptions have had to be made. These assumptions are explained as they appear in the main report.

The data assumptions have a considerable bearing on the estimated resource gap.

W A N invites the Nepal Development Forum 2002 to challenge the data assumptions made in the report. If alternative data assumptions are provided W A N will make a revised estimate of the resource gap.

ES1.4 Organisation of the report

The report is organised into a main section, comprising 8 chapters, and 3 appendices.

The main body of the report presents details of the research summarised above.

Section 1 describes the research methodology.

Section 2 sets the report in context and gives a brief summary of the W & S sector in Nepal.

Section 3 divides Nepal into zones with regard to water supply technology used.

Section 4 calculates the resources required to meet the targets in rural areas by estimating the population; estimating coverage; reviewing the targets and estimating the rehabilitation task.

Section 5 calculates the resources required to meet the targets in urban areas by estimating the population; estimating coverage; reviewing the targets and estimating the rehabilitation task.

Section 6 brings the rural and urban requirements together to estimate the total requirement to meet the targets.

Section 7 estimates sector resources, including HMGN expenditure, foreign assistance, community and VDC, DDC contributions.

Section 8 calculates the resource gap.

In Appendix A the location of the unserved is identified.

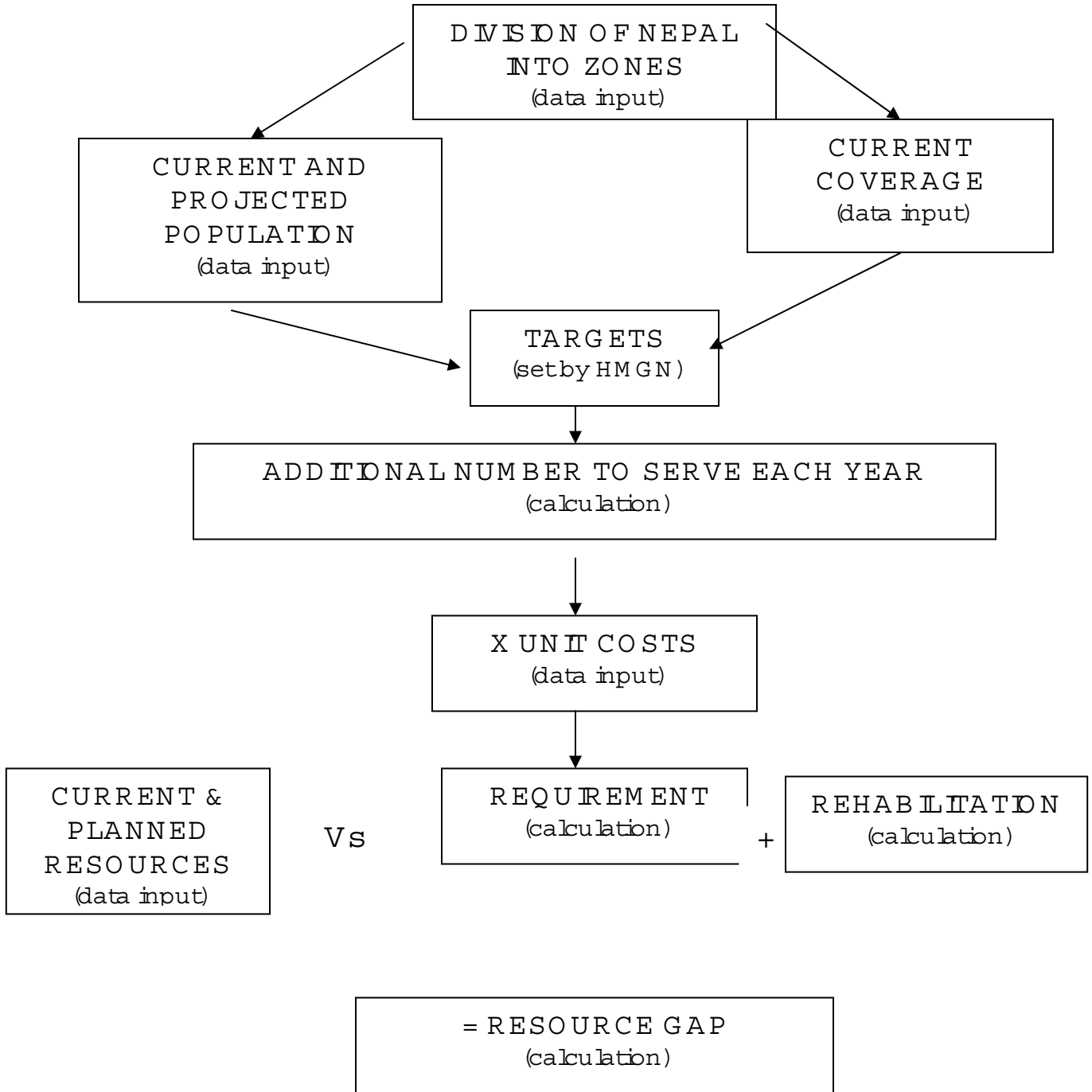
In Appendix B donor loan/grant data is presented.

Appendix C has a list of abbreviations and acronyms.

1 Methodology

The framework for the resource gap calculation, is illustrated below.

Figure 1-1 Resource Gap Calculation Framework



Nepal was divided into five zones dependent upon the water supply technology used in these areas. Estimates of future populations and current coverage were used to calculate the additional number of people that need to be served in order to meet the targets. The resultant estimated number of people to serve was multiplied by the estimated unit costs for provision of water supply and sanitation. This figure plus the estimated annual rehabilitation cost is the sector resource required to meet the targets (the requirement). Current sector resources were calculated and subtracted from the requirement in order to identify the estimated resource gap.

Data for each of the input areas in the framework (population; coverage; unit costs and resources) were sought from a range of sources – HMGN Economic Surveys; UNDP Development Cooperation Reports; World Bank reports; NGO reports and INGO reports.

Excel spreadsheets were developed for each of the areas. These sheets were linked to calculate the final resource gap. The sheets have been designed in such a way as to recalculate the gap as revised data is obtained and entered.

2 The drinking water, sanitation and hygiene sector in Nepal

2.1 Sector institutions

There are at least a dozen different HMGN agencies with an interest in drinking water and sanitation. The main responsibility for provision is assigned to two departments – for rural and some small towns the Department of Water Supply and Sewerage (DWSS) and for five urban areas in Kathmandu valley and another nine towns (with an urban population of 40,000 or more in 1991) the Nepal Water Supply Corporation (NWSC). Both are within the Ministry of Housing and Physical Planning. There are approximately a dozen bilateral and multilateral agencies working in the sector.

3 Division of Nepal into zones

Nepal can be divided into 5 zones based on the water supply technologies used in these areas. When calculating sector financing requirements it is imperative to make these distinctions as coverage and per capita unit costs for water supply and sanitation vary significantly between the zones. These zones and the main water supply technologies used in these areas are presented below.

Table 2.1 Water supply technologies used in various zones

Zone	Water supply technology
Rural	
Hills and mountains	Gravity flow schemes
Terai	Shallow tube well
Terai boulder zone	Deep tube well
Urban	
Kathmandu	Piped system ; Melamchi
Small towns	Piped system

4 Rural Requirements

By making estimates of population, coverage, unit costs and the rehabilitation task and reviewing the targets this section estimates the financing requirements to meet the various targets in rural Nepal.

4.1 Population

In order to estimate the number of people that require W & S provision if the targets are to be met, current and future populations must be predicted. In 1999 Water and Energy Commission Secretariat (WECS), using MOPRE data, estimated the rural population as 19.417 million. Based on the percentage increase predicted by WECS of 1.165% for the rural population, the population in the target years can be estimated. For the purposes of this paper the rural population has been split 55:40:5 between hills and mountains : Terai : Terai boulder zone.

Table 4.1 Estimated rural population in target years ('000)

Year	Total population	Total rural population	Hills and mountains (55%)	Terai (40%)	Terai boulder zone (5%)
1999	22,709	19,417	10,679	7,767	971
2001	23,482	19,872	10,930	7,949	994
2007	26,065	21,302	11,716	8,521	1,065
2015	30,261	23,370	12,854	9,348	1,169
2025	37,174	26,240	14,432	10,496	1,312

4.2 Coverage

Estimates of coverage

Estimates of water supply and sanitation coverage, vary widely as can be seen from the different results from 10 surveys and summaries made during the past decade.

Table 4.2 Estimates of water supply and sanitation coverage in rural Nepal

Date	Source	% Rural water	% Rural sanitation
1991	Nepal Family Health Survey	43	16.3
1996	Nepal Family Health Survey	61.4	17.5
1996	Nepal Living Standards Survey	68.8	17.7
1997	HMGN Achievement of 8th FY P	60.9	16
1997	World Bank	59	
1999	WECS Water Resources Strategy Nepal	66	
2000	DFID - Addressing the Water Crisis	60	18

2000	GWSS Assessment Report	80	20
2000	BCHMES/UNICEF	78.1	23
2002	HMGN Expected Achievement of 9th FY P	71.3	20

Without valid estimates of coverage, it is impossible to know either the magnitude of the task to achieve the targets nor what progress is being made.

Coverage estimate

For the purposes of this study the following levels of coverage are estimated.

Table 4.3 Estimated coverage by zone - Rural

Zone	% of rural population	Drinking Water %	Sanitation %
Rural hills and mountains	55	65	20
Rural - terai	40	85	20
Rural - terai boulder zone	5	10	10
Total rural coverage		70	20

4.3 Targets

Coverage Targets to 2002

The 9th Five-year Plan (1997-2002) laid out ambitious targets for the sector - safe water for all and sanitation for 36% of the rural population.

Table 4.4 Eighth and Ninth Plan coverage targets and achievements

Date	Source	% rural water	% rural sanitation
1992	Targets for 8 th FY P		
1997	Achievement of 8 th FY P	60.9	16
1997	Targets for 9 th FY P	100	36
2002	HMGN Expected Achievement of 9 th FY P	71.3	20

As the plan period comes to an end it is clear that the ambitious 9th FY P targets will not be met.

Coverage targets for the next decade and beyond

Many countries, including Nepal, and donors have recently committed themselves to the ambitious but achievable target of halving the numbers of people world-wide that are unserved with water or sanitation by 2015.

HMGN is also reported to be considering two additional targets of 1) Universal water supply by 2015 and 2) Universal Sanitation by 2025.

The Water Supply and Sanitation Sector paper to be presented at the Nepal Development Forum 2002 proposes coverage targets for the 10th FY P (2002 to 2007) and for the FY P medium term (2002 to 2005). These targets are summarised in the table below.

Table 4.5 Proposed 10th FY P rural coverage targets

Target	Date	% rural water	% rural sanitation
10 th FY P	2007	85	43

In order to calculate the resource gap it is necessary to break these targets down into coverage by zone which we do in Table 4.6.

Table 4.6 Coverage by zone at end of 10th FY P period - rural

Zone	% of rural population	Drinking Water %	Sanitation %
Rural hills and mountains	55	85	49
Rural - terai	40	90	35
Rural - terai boulder zone	5	40	40
Total rural coverage		85	43

Additional rural population to be served to meet the targets

Based on population and coverage estimates detailed above the implications of these various targets for rural Nepal can be calculated.

Table 4.7 Additional rural population to be served to meet the targets

Row	Rural water	Hills and mountains water (55% of rural pop'n)	Terai water (40% of rural pop'n)	Terai-boulder zone water (5% of rural pop'n)	Rural sanitation	Hills and mountains sanitation (55% of rural pop'n)	Terai sanitation (40% of rural pop'n)	Terai-boulder zone sanitation (5% of rural pop'n)	
2001									
1	Estimated population	19,872	10,930	7,949	994	19,872	10,930	7,949	994
2	Current estimated % coverage	70	65	85	10	20	20	20	10
3	Current estimated number served	13,960	7,104	6,756	99	3,875	2,186	1,590	99
4	Current estimated number unserved	5,912	3,825	1,192	894	15,997	8,744	6,359	894
2007 (end of 10th FY P period)									
5	Estimated population	21,302	11,716	8,521	1,065	21,302	11,716	8,521	1,065
6	Target coverage	85	85	90	40	43	49	35	40
7	Target number served	18,107	9,959	7,669	426	9,160	5,741	2,982	426
2015									
8	Estimated population	23,370	12,854	9,348	1,169	23,370	12,854	9,348	1,169
9	Target number unserved (1/2 of row 4)	2,956	1,913	596	447	7,999	4,372	3,180	447
10	Number served (row 8 less row 9)	20,414	10,941	8,752	721	15,372	8,482	6,169	721
11	% coverage	87%	85%	94%	62%	66%	66%	66%	62%
To reach 10th FY P target									
12	Add'l no. to serve in 5 years (row 7 less row 3)	4,147	2,854	912	327	5,285	3,555	1,393	327
13	Add'l no. to serve each year (row 12/5)	829	571	182	65	1,057	711	279	65
To halve no. unserved by 2015									
14	Add'l no. to serve in 15 years (row 10 less row 3)	6,454	3,837	1,996	622	11,497	6,296	4,579	622
15	Add'l no. to serve each year (row 14 /14)	461	274	143	44	821	450	327	44
To achieve universal water supply coverage by 2015									
16	Add'l no. to serve in 15 yrs (row 8 less row 3)	9,410	5,749	2,592	1,069				
17	Add'l no. to serve each year (row 16 /14)	672	411	185	76				
To achieve universal sanitation coverage by 2025									
18	Estimated population in 2025					26,240	14,432	10,496	1,312
19	Add'l no. to serve in 25 yrs (row 18 less row 3)					22,365	12,246	8,906	1,213
20	Add'l no. to serve each year (row 19 /24)					932	510	371	51

Table 4.8 Number of people to serve each year to meet rural targets

Number of people to serve each year	Water	Sanitation
To reach 10th FY P target	829	1,057
To halve no. unserved by 2015	461	821
To achieve universal water supply by 2015 and universal sanitation by 2025	672	932

This estimate indicates that in rural Nepal the proposed 10th FY P targets are more ambitious than the targets to halve the unserved by 2015 and provide universal water supply by 2015 and universal sanitation by 2025.

4.4 Unit Costs

Rural Water Supply Costs

Reported costs vary considerably by technology, by region, by distance from the road head, by community size, by mode of calculation and by implementing agency. Only partial information has been assembled to date but this does illuminate some of the differences and some of the challenges in comparing different data. In the figures below, costs per beneficiary are broken out by region, technology and agency. They suggest a cost per person served by a gravity flow scheme of Rps 2,932 (\$39) for NEW AH, which is some 40% more than the costs associated with DW SS which is Rps 2,175 (\$29) per person.

For NEW AH, these are the 2000-01 costs for 44 projects, expressed as cost per person for the current population served. These costs include water supply, sanitation promotion and hygiene education, which are divided 70% /17% /13% respectively. When the total costs have been adjusted to show water supply cost only (i.e. 70% of the total cost), then average cost is Rps 2,052 (\$27).

For DW SS, the data are based on costs per design population, which is estimated on average as a 20 year life with population growing at 2.1% -i.e. current population plus 52%, taken from projects constructed throughout the 1990s. They include only water supply costs, as the DW SS approach does not include sanitation and hygiene. The DW SS costs have been adjusted to reflect per capita costs at current population estimates. A verage adjusted cost is Rps 3,306 (\$44).

Table 4.9 Unit Costs by agency, region and technology - rural (Rps)

	NEW AH	NEW AH adjusted	DW SS	DW SS adjusted	GW S	FINNIDA	IV Rural Water Supply Project	Fund Board
Region								
Gravity Flow								
Eastern	3,174	2,222	2,490	3,785				
Central	2,737	1,916	1,695	2,576				
Western	2,737	1,916	2,300	3,496				
Mid Western	3,035	2,125	2,215	3,367				
Far Western	3,164	2,215	2,175	3,306				
Average	2,932	2,052	2,175	3,306	3,100	2,155	2,560	2,663
Region								
Shallow Tube Well								
Eastern	1,203	842						
Central	671	470						
Western		0						
Mid Western	1,379	965						
Far Western		0						
Average	1,084	759				268		
Deep Tube Well			1,760	2,675				
STW /HP			120	182				
DTW /HP			215	327				
Dug well			595	904		302		

Notes:

- 1) STW = shallow tube well, GF = gravity flow, DTW = deep tube well, HP = hand pump, GW S = Guikha Welfare Scheme
- 2) Adjusted NEW AH cost per person = 70% of the total cost of project divided by current population served (source NEW AH, 2000)
- 3) Adjusted DW SS cost per person = total cost of project divided by design population after 20 years (source W ECS, 2001)
- 4) IV Rural Water Supply Project funded by ADB - Per capita cost = Rps 2,560 (source Water Supply and Sanitation paper for Nepal Development Forum 2002)
- 5) Rural Water Supply and Sanitation Fund Development Board - Total per capita cost Rps 3580. Total cost includes cost of support programme (source Water Supply and Sanitation paper for Nepal Development Forum 2002). 25% overhead costs have been subtracted as they are added later in the calculation

A blended estimate of sector costs

Based on the data in Table ??? our best estimate of the external assistance required for each additional person covered is as follows.

Table 4.10 Estimated Per Capita Unit Costs – external component (Rps) - rural

	Water	Sanitation & hygiene
Rural - hills & mountains	2,600	400
Rural - terai	600	750
Rural - terai - boulder zone	2,700	750

In some cases, these are not total costs as users will also make significant contributions: rural latrines 50% of the total cost is covered by users. In addition, there are organisational overhead costs that might add between 15% and 40% to the above costs, depending on scale of operations, remoteness, organisational efficiency, etc.

4.5 Rehabilitation Task

Drinking water facilities deteriorate with use, time and geological movement. Typical design lives for drinking water schemes are 20 years. Hence approximately 5% of projects need replacement or rehabilitation every year.

Very little information is available on the rehabilitation task in Nepal. A recent survey of tube wells in the terai region by ENPHO and the Red Cross suggests that over 50% of wells have become microbiologically contaminated and require rehabilitation. Initial analysis of all DWS Water Supply and Sanitation Profiles indicates that on average 76% of existing piped schemes require either rehabilitation or major repair.

Table 4.11 Number of piped schemes requiring rehabilitation or major repair (source DWSS Water Supply and Sanitation Profiles 2000)

District	No. of piped systems	No. of schemes requiring rehabilitation	No. of schemes requiring major repair	No. of schemes requiring minor repair	Total no. of schemes requiring rehabilitation or major repair	Percentage of schemes requiring rehabilitation or major repair
Bhojpur	248	141	69	7	210	85%
Dadeldhura	262	33	179	6	212	81%
Dailekh	256	31	150	4	181	71%
Dang	96	15	56	7	71	74%
Darchula	367	100	229	7	329	90%
Dhankhuta	216	33	119	1	152	70%
Doti	232	47	176	1	223	96%
Ilam	433	69	267	16	336	78%
Kalikot	96	36	43	1	79	82%
Khotang	464	58	256	7	314	68%
Pythan	367	36	236	25	272	74%
Rolpa	295	29	168	4	197	67%
Rukum	164	13	86	13	99	60%
Sankhuwasava	293	98	172	3	270	92%
Solukhumbu	207	21	131	5	152	73%
Surkhet	333	41	181	6	222	67%
Taplejung	304	46	165	8	211	69%
Tehathum	190	81	80	3	161	85%
Udayapur	312	44	176	5	220	71%
Total	5,135	972	2,939	129	3,911	76%

Table 4.12 makes a crude estimate of the rehabilitation task for use in the resource gap calculation, based on an assumption that the annual rehabilitation task is full replacement of 2% of all water supply facilities and repair/partial replacement (costing 50% of full cost) of 3% of all facilities.

The table displays a calculation that shows the total population of rural zones, the unit cost per person at current prices and the total cost to serve the rural population. Based on this the rehabilitation cost is calculated.

Table 4.12 Estimated rural rehabilitation task

	Rural - Mountains & Hills	Rural - Terai	Rural - Terai Boulder Zone	Total	Total cost plus 25% overhead	Rehabilitation cost (\$m)
Population in 2001 ('000)	10,930	7,949	994	19,872		
Unit cost in Rps	2,600	600	2700			
Cost of universal coverage (Rps millions)	28,417	4,769	2,683	35,869		
Total in \$m millions @ Rps75=\$1	378.89	63.59	35.77	478.25	597.82	
Cost of full replacement of 2% of all schemes						11.96
Cost of partial replacement (50% of full cost) of 3% of all schemes						8.97
Total annual rehabilitation cost						20.92

This results in an annual rural rehabilitation task of \$20.92m. This calculation assumes we have 100% coverage now. However this overestimation is roughly compensated for by the fact that construction during the Panchayat era was poor and therefore the life of schemes constructed during this period is expected to be less than 20 years.

It appears that the rehabilitation task may well turn out to be the largest single expenditure item in achieving universal access to water. WaterAid will continue to gather data on this subject, increase its understanding of the task and produce a separate paper.

4.6 Sector financing requirement - rural

In Table 4.11 the unit costs and unserved population estimates are combined to produce the financing requirements for the different targets for urban Nepal.

Table 4.13 Sector financing requirements rural

	Rural hills & mountains	Rural terai	Rural terai boulder zone	Rural hills and mountains	Rural terai	Rural terai boulder zone	Total
	Water			Sanitation			
1 Cost per ben (Rps)	2,600	600	2,700	400	750	750	
. To achieve 10th FY P target							
2 Addnl no. to serve each year (in thousands)	570.89	182.44	65.34	710.99	278.50	65.34	1,873.50
3 Annual cost (row 1 * row 2) Rps million	1,484.30	109.47	176.41	284.40	208.88	49.00	2,312.45
4 Annual cost (\$ million)	19.79	1.46	2.35	3.79	2.79	0.65	30.83
To halve no. unserved by 2015							
5 Addnl no. to serve each year (in thousands)	274.06	142.54	44.43	449.71	327.06	44.43	1,282.23
6 Annual cost (row 1 * row 5) Rps million	712.55	85.52	119.96	179.88	245.30	33.32	1,376.54
7 Annual cost (\$ million)	9.50	1.14	1.60	2.40	3.27	0.44	18.35
To achieve universal water supply coverage by 2015							
8 Addnl no. to serve each year (in thousands)	410.68	185.12	76.37				
9 Annual cost (row 1 * row 8) Rps million	1,067.76	111.07	206.20				1,385.03
10 Annual cost (\$ million)	14.24	1.48	2.75				18.47
To achieve universal sanitation coverage by 2025							
11 Addnl no. to serve each year (in thousands)				510.26	371.10	50.53	
12 Annual cost (row 1 * row 11) Rps million				204.10	278.32	37.90	520.32
13 Annual cost (\$ million)				2.72	3.71	0.51	6.94

To these estimates need to be added some overhead costs, which we estimate at 25% , and the rehabilitation task. At 2000 prices the annual requirement for reaching the targets are thus estimated as follows:

Table 4.14 Annual requirement to meet the rural targets

	Cost of water and sanitation	25% overhead cost	Rehabilitation	Total
To achieve 10th FY P target	30.83	7.71	20.92	59.46
To halve no. unserved by 2015	18.35	4.59	20.92	43.87
To achieve universal water supply by 2015 and universal sanitation by 2025	25.40	6.35	20.92	52.68

5 Urban Requirement

By estimating population, coverage, unit costs and the rehabilitation task and by reviewing the targets this section estimates the financing requirements to meet the various targets in urban Nepal.

5.1 Population

In order to estimate the number of people that require W & S provision if the targets are to be met, current and future populations must be predicted. In 1999 Water and Energy Commission Secretariat (WECS), using MOPE data, estimated the urban population to be 3,292 million. Based on the percentage increase predicted by WECS of 4.725% for the urban population the population in the target years has been estimated. For the purposes of this paper the urban population is split 44.56 between Kathmandu : small towns.

Table 5.1 Estimated urban population in target years ('000)

Year	Total population	Total urban	Kathmandu (44%)	Small towns (56%)
1999	22,709	3,292	1,448	1,844
2001	23,482	3,610	1,589	2,022
2007	26,065	4,763	2,096	2,667
2015	30,261	6,891	3,032	3,859
2025	37,174	10,934	4,811	6,123

5.2 Coverage

Estimates of coverage

Estimates of water and sanitation coverage, vary widely as can be seen from the different results from 11 surveys and summaries made during the past decade.

Table 5.2 Estimates of urban water and sanitation coverage

Date	Source	% Urban water	% Urban sanitation
1991	Nepal Family Health Survey	90	69.8
1996	Nepal Family Health Survey	84.7	73.4
1996	Nepal Living Standards Survey	95.6	73.7
1997	HMGN Achievement of 8th FYP	62.5	51
1997	World Bank	61	
1999	WECS Water Resources Strategy Nepal	66	
2000	DFID - Addressing the Water Crisis	88	63

2000	GWSS, Assessment Report	85	75
2000	BCHMES/UNICEF	92.3	73
2001	WSP Willingness to Pay Study (Kathmandu only)		94
2002	HMGN Expected Achievement of 9th FY P	72.6	53

Without valid estimates of coverage, it is impossible to know either the magnitude of the task to achieve the targets nor what progress is being made.

Coverage estimate

For the purposes of this study the following levels of coverage are estimated.

Table 5.3 Estimated coverage by zone - Urban

Zone	% of urban population	Drinking Water %	Sanitation %
KTM	44	87	95
Small Towns	56	80	65
Total urban coverage		83	78

5.3 Targets

Coverage Targets to 2002

The 9th Five-year Plan (1997-2002) laid out ambitious targets for the sector - safe water for all and sanitation for 60% of the urban population.

Table 5.4 Eight and ninth plan coverage targets and achievements - urban

Date	Source	% urban water	% urban sanitation
1992	Targets for 8 th FY P		
1997	Achievement of 8th FY P	62.5	51
1997	Targets for 9 th FY P	100	60
2002	HMGN Expected Achievement of 9 th FY P	72.6	53

As the plan period comes to an end, it seems from the data provided in the coverage section above (Table 5.2) that only the urban sanitation target will have been met, probably due to substantial investments by urban households and some support by donor projects.

Coverage targets for the next decade and beyond

Many countries, including Nepal, and donors have recently committed themselves to the ambitious but achievable target of halving the numbers of people world-wide that are unserved with water or sanitation by 2015.

HMGN is also reported to be considering two additional targets of 1) Universal water supply by 2015 and 2) Universal Sanitation by 2025.

The Water Supply and Sanitation Sector paper to be presented at the Nepal Development Forum 2002 proposes coverage targets for the 10th FY P (2002 to 2007) and for the plan's medium term (2002 to 2005). These targets are summarised in the table below.

Table 5.5 Proposed 10th FY P urban targets

Target	Date	% urban water	% urban sanitation
10th FY P	2007	95	83

In order to calculate the resource gap it is necessary to break these targets down into coverage by zone, which we do in Table 5.6.

Table 5.6C Coverage by zone at end of 10th FY P period - urban

Zone	% of urban population	Drinking Water %	Sanitation %
Kathmandu	44	95	95
Small towns	56	94	73
Total urban coverage		95	83

Population to serve to meet the targets - urban

Based on population and coverage estimates detailed above the implications of these various targets for urban Nepal can be calculated.

Table 5.7 Population to serve to meet the targets - urban ('000)

Row		Urban water	KTM (44% of urban population)	Small towns (56% of urban population)	Urban sanitation	KTM (44% of urban population)	Small towns (56% of urban population)
	2,001						
1	Estimated population	3,610	1,589	2,022	3,610	1,589	2,022
2	Current estimated % coverage	83	87	80	78	95	65
3	Current estimated number served	2,997	1,382	1,617	2,816	1,509	1,314
4	Current estimated number unserved	614	207	404	794	79	708
	2007 (end of 10th FY P period)						
5	Estimated population	4,763	2,096	2,667	4,763	2,096	2,667
6	Target coverage %	95	95	94	83	95	73
7	Target number served	4,525	1,991	2,507	3,953	1,991	1,947
	2015						
8	Estimated population	6,891	3,032	3,859	6,891	3,032	3,859
9	Target number unserved (1/2 of row 4)	307	103	202	397	40	354
10	Number served (row 8 less row 9)	6,584	2,929	3,657	6,494	2,992	3,505
11	% coverage	96%	97%	95%	94%	99%	91%
	To reach 10th FY P target						
12	Additional no. to serve in 5 years (row 7 less row 3)	1,528	609	890	1,137	482	633
13	Additional no. to serve each year (row 12/5)	306	122	178	227	96	127
	To halve no. unserved by 2015						
14	Additional no. to serve in 15 years (row 10 less row 3)	3,587	1,547	2,039	3,677	1,483	2,191
15	Additional no. to serve each year (row 14 /14)	256	110	146	263	106	156
	To achieve universal water supply coverage by 2015						
16	Additional no. to serve in 15 yrs (row 8 less row 3)	3,894	1,650	2,241			
17	Additional no. to serve each year (row 16 /14)	278	118	160			
	To achieve universal sanitation coverage by 2025						
18	Estimated population in 2025				10,934	4,811	6,123
19	Additional no. to serve in 25 yrs (row 18 less row 3)				8,118	3,302	4,809
20	Additional no. to serve each year (row 219/24)				338	138	200

Table 5.8 Number of people to serve to meet the urban targets

Number of people to serve each year	Water	Sanitation
To reach 10th FY P target	306	227
To halve no. unserved by 2015	256	263
To achieve universal water supply by 2015 and universal sanitation by 2025	278	338

5.4 Unit Costs

Urban Water Supply Costs

Costs for urban residents must distinguish between the Kathmandu valley and small towns elsewhere. In the capital, the current estimate for the Melamchi tunnel and associated components is \$468 million, to serve an estimated current population of about 1.5 million. Cost per capita is thus Rps 23,400 or \$312.

Outside the Kathmandu valley, the best estimate found to date is that made by WECSS of Rps 3,000 (\$40) per capita for water supply. The total per capita cost of the Small Town Water Supply and Sanitation Project funded by ADB, which is a service upgrading cost, works out to be Rps 3,350 (source source Water Supply and Sanitation paper for Nepal Development Forum 2002).

A blended estimate of sector costs

Based on this data our best estimate of the external assistance required for each additional person covered is as follows.

Table 5.9 Estimated Per Capita Unit Costs – external component (Rps) - Urban

	Water	Sanitation & hygiene
Small towns	3,000	800
Kathmandu	23,400	800

In some cases, these are not total costs as users will also make significant contributions: urban latrines 60% of the total cost is covered by users. In addition, there are organisational overhead costs that might add between 15% and 40% to the above costs, depending on scale of operations, remoteness, organisational efficiency, etc.

5.5 Rehabilitation Task

Drinking water facilities deteriorate with use, time and geological movement. Typical design populations for drinking water schemes are 20 years. Hence approximately 5% of projects need replacement or rehabilitation every year.

Table 5.10 makes a crude estimate of the rehabilitation task for use in the resource gap calculation, based on an assumption that the annual rehabilitation task is full replacement of 2% of all water supply facilities and repair/partial replacement (costing 50% of full cost) of 3% of all facilities. These estimates are based on the design life of rural systems. Estimates of the urban rehabilitation task are weaker than those for rural rehabilitation. WaterAid will undertake further study to gain a better understanding of the urban rehabilitation task and will produce a separate paper on the subject.

The table displays a calculation that shows the total population of small towns, the unit cost per person at current prices and the total cost to serve the urban population (excluding Kathmandu). Based on this the rehabilitation cost is calculated.

Table 5.10 Estimated urban rehabilitation task

	Small Towns	Total cost plus 25% overhead	Rehabilitation cost (\$m)
Population in 2001 ('000)	2,022		
Unit cost in Rps	3,000		
Cost of universal coverage (Rps millions)	6,066		
Total in \$ millions @ Rps75=\$1	80.87	101.09	
Cost of full replacement of 2% of all schemes			2.02
Cost of partial replacement (50% of full cost) of 3% of all schemes			1.52
Total annual rehabilitation cost			3.54

This results in an annual urban rehabilitation task of \$3.54m (excluding Kathmandu). This calculation assumes we have 100% coverage now. However this overestimation is roughly compensated for by the fact that construction during the Panchayat era was poor and therefore the life of schemes constructed during this period is expected to be less than 20 years.

5.6 Sector financing requirements - urban

In Table 5.10 the unit costs and unserved population estimates are combined to produce the financing requirements for the different targets for urban Nepal.

Table 5.11 Sector financing requirements - urban

Row		Small towns	KTM	Small towns	Total
		Water	Sanitation		
1	Cost per ben (NPR)	3,000	800	800	
	To achieve 10th FY P target				
2	Addnl.no, to serve each year (in thousands)	177.95	96.35	126.58	400.89
3	Annual cost (row 1 * row 2) Rps million	533.86	77.08	101.27	712.21
4	Annual cost (\$ million)	7.12	1.03	1.35	9.50
	To halve no. unserved by 2015				
5	Addnl.no. to serve each year (in thousands)	145.65	105.93	156.48	408.07
6	Annual cost (row 1 * row 5) Rps million	436.96	84.75	125.19	646.89
7	Annual cost (\$ million)	5.83	1.13	1.67	8.63
	To achieve universal water supply coverage by 2015				
8	Addnl.no. to serve each year (in thousands)	160.10			160.10
9	Annual cost (row 1 * row 8) Rps million	480.29			480.29
10	Annual cost (\$ million)	6.40			6.40
	To achieve universal sanitation coverage by 2025				
11	Addnl.no. to serve each year (in thousands)		137.57	200.36	337.93
12	Annual cost (row 1 * row 11) Rps million		110.06	160.29	270.35
13	Annual cost (\$ million)		1.47	2.14	3.60

To these estimates need to be added some overhead costs, which we estimate at 25%. At 2000 prices the annual requirement for the targets in urban Nepal, excluding Kathmandu urban water supply, are thus estimated as follows:

Table 5.12 Urban requirements to meet the targets

	Cost of water and sanitation (excluding KTM water)	25% overhead cost	Rehabilitation	Total
To achieve 10th FY P target	9.50	2.37	3.54	15.41
To halve no. unserved by 2015	8.63	2.16	3.54	14.32
To achieve universal water supply coverage by 2015 and universal sanitation coverage by 2025	10.01	2.50	3.54	16.05

6 Total sector financing requirements

If we bring together the rural and urban requirements to meet the various targets we can estimate the total sector financing requirement.

Table 6.1 Total Sector Requirement (\$ million)

Targets	Rural water annual cost	Small Town water annual cost	Rural sanitation cost	Small town sanitation cost	Ktm sanitation annual cost	Total annual cost (\$ million)	25% overheads (\$m million)	Rehabilitation	M elam chi	Total
To meet 10th FY P target	23.60	7.12	7.23	1.35	1.03	40.33	10.08	24.46	58.60	133.47
To halve the number unserved by 2015 - water and sanitation	12.24	5.83	6.11	1.67	1.13	26.98	6.74	24.46	58.60	116.79
To achieve universal water coverage by 2015 and universal sanitation coverage by 2025	18.47	6.40	6.94	2.14	1.47	35.41	8.85	24.46	58.00	126.73

The M elam chi tunnel to serve Kathmandu valley urban residents will dominate sector investments for the next decade. Total cost is estimated at \$ 328 million, spread over 8 years. There will be an accompanying project to rehabilitate and upgrade the existing water supply system (\$ 140 million over 8 years). The total cost of these reforms, \$ 468 million, will be divided 70% (\$329 million) foreign and 30% HM GN (\$ 139 million). Annual HM GN expenditures are estimated as \$8.3 million, equivalent to 59% of its average expenditure in the drinking water sector since 1998. Additional HM GN support will be in the form of taxes and duties forgone. Foreign support is planned to be divided 84% loans (\$277 million) and 16% grants (\$53 million).

The average annual total sector requirement is thus estimated at \$116.79m - \$133.47m, a figure which combines the costs of M elam chi, which average \$58.6 million over 8 years with the annual cost estimates for different targets.

7 Resources

7.1 Sector Financing

Sector investments to projects are provided from 7 sources:

1. HM GN budget allocations to DW SS, NW SC, the M elam chi Project and other agencies or projects.

2. Bilateral donor grants to a small number of large NGOs (e.g. DFID grants to NEWAH and Gurkha Welfare Scheme) or to a bilateral project (e.g. Finnida's grant to MLDC and to DDCs in the Lumbini Zone).
3. Development Bank loans (Asian Development Bank loans to DWSS, 4 phases 1980-2000, phase 4 \$19 million; World Bank / IDA loan of \$19 million to the Fund Board 1996 - 2002).
4. NGO (e.g. WaterAid, ActionAid, CECI, Helvetas) grants to local NGOs.
5. Community contributions in cash or labour or other supports (e.g. land).
6. VDC and DDC allocations from their common fund.
7. Household investments - many urban households and some rural will make substantial personal investments in meeting their water and sanitation needs.

7.2 HMGN expenditure

HMGN allocates between 5 and 7% of its budget to drinking water - significantly below hydropower (20%), which is seen as crucial to long term national prosperity, as well as irrigation (9%), important for the agricultural core of the economy. HMGN expenditures for drinking water are estimated to be currently about \$14m.

For the purposes of this report the data on HMGN expenditure have been taken from the Economic Survey for the fiscal year 2000/2001 produced by the Ministry of Finance. The survey details total expenditure in the W & S sector, a combination of both HMGN and donor contributions. In order to obtain the HMGN contribution the donor contribution, as provided by UNDP in the Development Cooperation Reports, is subtracted from the overall sector expenditure.

Table 7.1 Total W & S sector expenditure (\$ millions)

	95	96	97	98	99	1997-99	
						Total	Average
1 Total development expenditure	23.24	23.41	28.79	28.68	35.50	92.97	30.99
2 Donor contribution (UNDP data)	10.70	12.70	14.90	17.30	18.80	51.00	17.00
3 HMGN contribution (1-2)	12.54	10.71	13.89	11.38	16.70	41.97	13.99

The average HMGN contribution since 1997 is \$13.99 million per year.

HMGN have committed \$8.3m a year to the Melamchi project. This represents 59% of HMGN average annual expenditure since 1997. For the purposes of this report the balance of the HMGN expenditure, \$5.69m, has been split 56:15:15:14 between rural water supply and sanitation, rural rehabilitation, urban rehabilitation and small towns water supply and sanitation.

7.3 Foreign assistance

Foreign assistance support to the sector has averaged \$16.8 million per year over the past 9 years, displaying large fluctuations in the early 1990's between \$10 and \$26 million but stabilising over the period 1997-1999 at around \$18 million per year.

For the purposes of the resource gap calculation we have taken the average of all foreign assistance since 1997 and broken it down into rural and urban. Foreign assistance to rehabilitation and institutional support has been split 50:50 between rural and urban.

Table 7.2 Annual average foreign assistance 1997-99

Urban		
Kathmandu	1,384.75	8%
Melamchi	1,212.33	7%
Small towns	254.83	1%
Rehabilitation	220.95	1%
Institutional	792.71	4%
Total	3,865.58	22%
Rural		
Rural	13,090.43	73%
Rehabilitation	220.95	1%
Institutional	792.71	4%
Total	14,104.09	78%
Grand total	17,969.67	100%

7.4 Community Funding

Community contributions differ depending on executing agency. Generally the community are required to make a contribution in terms of materials, labor and a cash lump sum.

Table 7.3 Community contributions to rural water supply by agency

Agency	Community contribution to capital costs		O & M
	Cash	Kind	
NEW AH	0%	all unskilled labour and local material and sand collection and portage if < 8 hrs; total about 30% in hills and 5% in terai	100%
FUND BOARD	Hills - 2.5% of capital; Terai - 20% of capital	all unskilled labour, local materials; total about 30%	100% of O & M costs estimated at 3% of capital in hills and 4% in terai
FINNIDA	Rps 1,500 per tap stand	all unskilled labour and local materials and portage	Rps 1,500 per tap stand
DWSS	min Rps 1,000 per tap stand	all unskilled labour and local materials and portage total of 27% of construction cost	
CARE		all unskilled labour and local materials and portage (project subsidy available)	Rps 50 per HH

HELVETAS	49% of construction cost	Rps 225 perHH
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Community contributions to the ADB funded Small Towns Water Supply and Sanitation programme are reported to be 20% (source Water and Sanitation Sector Paper for the Nepal Development Forum 2002)

The unit prices used in the calculation of the resource gap do not include the community contribution and hence the estimated resource gap is above and beyond the community contribution.

7.5 VDCs, DDCs allocations

VDCs and DDCs contribute to W & S through their common fund. The only data available to date is for NEW AH projects. During 1999-2000 VDCs contributed \$30,000 to 52 NEW AH projects.

Table 7.4 VDC contributions to NEW AH projects in 1999-2000

Dev Region	Far West	Mid West	Western	Central	Eastern	Total
VDC funding	490,000	370,000	398,800	902,000	583,127	2,253,927

FINNIDA request that VDCs make a contribution of Rps 300 per capita (13% of total cost) for drinking water projects (gravity flow) and pay 50% of the total cost of institutional latrines. We have decided not to draw conclusions based on this partial data and therefore VDC and DDC contributions are not included in the resource gap calculations.

7.6 Total Sector Resource

Annual resources currently available and planned total \$81.04 million (rural \$18.14m, urban \$62.9m). The urban population currently 15% and increasing to 23% by 2015, will receive 78% of all sector investment.

Table 7.5 Sector resources (\$ millions) - rural

Rural Resources	\$ millions per year
Rural	
56% of balance of HMGN current expenditure on drinking water	3.19
Foreign loans & grants	13.09
Rehabilitation	
15% of balance of HMGN current expenditure on drinking water	0.85
50% of foreign loans and grants for rehabilitation	0.22
Institutional	
50% of foreign loans and grants for rehabilitation	0.79
Total	18.14

Table 7.6 Sector resources (\$ millions) - urban

Urban Resources	\$ million per year
Melamchi and Rehabilitation & Upgrading of existing systems in KTM	
HMGN Melamchi commitment	8.3
Other HMGN inputs (\$72.6 million taxes forgone over 8 years)	9.1
Foreign loans for Melamchi (\$276.5 million over 8 years)	34.6
Foreign grants for Melamchi (\$52.5 million over 8 years)	6.6
Rehabilitation	
15% of balance of HMGN current expenditure on drinking water	0.85
50% of foreign loans and grants for rehabilitation	0.22
Institutional	
50% of foreign loans and grants for rehabilitation	0.79
KTM sanitation	
Foreign loans & grants	1.38
Small Towns	
14% of balance of HMGN current expenditure on drinking water	0.80
Foreign loans & grants	0.25
Total	62.90

8 Resource Gap

8.1 Estimated resource gap

To achieve the proposed 10th FY P target an additional \$52.43m per year will be required.

Table 8.1 Resource gap for reaching proposed 10th FY P targets (\$ millions)

	Rehabilitation	Small Towns	Rural	KTM sanitation	Melamchi	Institutional	Total
Resource	2.15	1.05	16.28	1.38	58.60	1.59	81.05
Requirement	24.46	10.59	38.54	1.28	58.60		133.47
Gap	22.31	9.53	22.26	-0.10	0.00		52.43

To achieve the modest target of halving the unserved by 2015 implies an additional \$35.74 m per year will be required.

Table 8.2 Resource gap for target of halving the unserved by 2015 (\$ millions)

	Rehabilitation	Small Towns	Rural	KTM sanitation	M elam chi	Institutional	Total
Resource	2.15	1.05	16.28	1.38	58.60	1.59	81.05
Requirement	24.46	9.37	22.94	1.41	58.60		116.79
Gap	22.31	8.32	6.67	0.03	0.00		35.74

To achieve the target of providing universal drinking water by 2015 and universal sanitation by 2025 an additional \$46.28 m per year is required.

Table 8.3 Resource gap for target of providing universal drinking water by 2015 and universal sanitation by 2025 (\$ million)

	Rehabilitation	Small Towns	Rural	KTM sanitation	M elam chi	Institutional	Total
Resource	2.15	1.05	16.28	1.38	58.60	1.59	81.05
Requirement	24.46	10.68	31.76	1.83	58.60		127.33
Gap	22.31	9.62	15.48	0.45	0.00		46.28

A midpoint estimate is thus an additional \$44.8 million is required each year.

Appendix A

A1 Where are the unserved?

A1.1 District Coverage

A 1996 CIMOD report breaks down the percentage coverage data by district, using DWSS data. Using district population estimates from the District Development Profile of Nepal, 2001, numbers of people without access to drinking water can be estimated. Districts have been ranked in terms of number of people unserved with 75 having the lowest number of unserved and 1 having the largest number of unserved.

Table A 1-1 District Coverage and ranking of numbers unserved per district

District	1991 population (census)	2001 population projection	population increase 1991-2001	Estimated Population in 1996 (1991 population plus 5/10 increase)	DWSS estimated access to water in 1996 in %	Number unserved	Rank
Eastern							
Taplejung	120,053	145,714	25,661	132,884	53.72	61,498	50
Sankhuwasabha	141,903	172,234	30,331	157,069	41.98	91,131	40
Solukhumbu	97,200	117,976	20,776	107,588	57.30	45,940	58
Panchthar	175,206	212,656	37,450	193,931	36.86	122,448	28
Ilam	229,214	278,208	48,994	253,711	44.04	141,977	24
Dhankuta	146,386	177,675	31,289	162,031	80.06	32,309	65
Tehrathum	102,870	124,858	21,988	113,864	56.08	50,009	54
Bhojpur	198,784	241,273	42,489	220,029	30.32	153,316	20
Okhaldhunga	139,457	169,265	29,808	154,361	52.22	73,754	45
Khotang	215,965	262,127	46,162	239,046	43.42	135,252	25
Udayapur	221,256	268,549	47,293	244,903	20.77	194,036	12
Jhapa	593,737	720,646	126,909	657,192	47.36	345,946	2
Morang	674,823	819,064	144,241	746,944	45.70	405,590	1
Sunsari	463,481	562,548	99,067	513,015	57.69	217,056	11
Saptari	465,668	565,203	99,535	515,436	52.31	245,811	6
Siraha	470,746	571,366	100,620	521,056	46.56	278,452	4
Total	4,456,749	5,409,362	952,613	4,933,056	47.4%	2,594,526	
Central							
Dolakha	173,236	210,265	37,029	191,751	57.87	80,784	41
Sindhupalchok	261,025	316,818	55,793	288,922	60.75	113,402	31
Rasuwa	36,744	44,598	7,854	40,671	78.52	8,736	71
Sindhuli	223,900	271,758	47,858	247,829	27.93	178,610	16
Ramchhap	188,064	228,262	40,198	208,163	48.38	107,454	35
Kavrepalanchok	321,329	390,012	68,683	355,671	47.47	186,834	13
Nuwakot	245,260	297,683	52,423	271,472	38.19	167,797	18
Dhading	278,068	337,504	59,436	307,786	28.70	219,451	8
Makawanpur	314,599	381,843	67,244	348,221	37.15	218,857	9
Dhanusa	543,672	659,880	116,208	601,776	63.35	220,551	7
Mahottari	440,146	534,226	94,080	487,186	98.21	8,721	72

Sarlahi	492,798	598,132	105,334	545,465	79.61	111,220	32
Rauthat	414,005	502,497	88,492	458,251	52.45	217,898	10
Bara	415,718	504,576	88,858	460,147	59.68	185,531	14
Parsa	372,524	452,150	79,626	412,337	70.24	122,711	27
Chitwan	354,488	430,258	75,770	392,373	32.81	263,635	5
Lalitpur	257,086	312,037	54,951	284,562	60.93	111,178	33
Bhaktapur	172,952	209,920	36,968	191,436	50.29	95,163	38
Kathmandu	675,341	819,693	144,352	747,517	59.87	299,979	3
Total	6,180,955	7,502,112	1,321,157	6,841,534	57.3%	2,918,513	
Western							
Manang	5,363	6,509	1,146	5,936	97.87	126	75
Mustang	14,292	17,347	3,055	15,820	98.01	315	74
Gorkha	252,524	306,500	53,976	279,512	47.07	147,946	22
Lamjung	153,697	186,549	32,852	170,123	76.02	40,795	61
Tanahu	268,073	325,373	57,300	296,723	41.58	173,346	17
Syangja	273,526	331,991	58,465	302,759	40.40	180,444	15
Kaski	292,945	355,561	62,616	324,253	85.14	48,184	55
Miyagi	100,552	122,045	21,493	111,299	89.71	11,453	69
Paabhat	143,502	174,175	30,673	158,839	67.13	52,210	53
Baglung	232,486	282,179	49,693	257,333	37.19	161,631	19
Gulmi	266,331	323,258	56,927	294,795	56.64	127,823	26
Palpa	236,313	286,824	50,511	261,569	57.50	111,167	34
Arghakhanchi	180,884	219,547	38,663	200,216	46.89	106,334	36
Nawalparasi	436,217	529,457	93,240	482,837	74.74	121,965	29
Rupandehi	522,150	633,758	111,608	577,954	86.84	76,059	43
Kapilvastu	371,778	451,244	79,466	411,511	82.81	70,739	46
Total	3,750,633	4,552,317	801,684	4,151,475	65.5%	1,430,536	
Mid Western							
Dolpa	25,013	30,359	5,346	27,686	64.04	9,956	70
Jumla	75,964	92,201	16,237	84,083	36.94	53,022	52
Kalikot	88,805	107,787	18,982	98,296	51.76	47,418	56
Mugu	36,364	44,137	7,773	40,251	54.05	18,495	66
Humla	34,383	41,732	7,349	38,058	60.00	15,223	68
Pyuthan	175,469	212,975	37,506	194,222	61.77	74,251	44
Roopa	179,624	218,018	38,394	198,821	53.30	92,849	39
Rukum	155,554	188,803	33,249	172,179	73.82	45,076	59
Salyan	181,785	220,641	38,856	201,213	47.89	104,852	37
Sukhet	225,768	274,025	48,257	249,897	73.43	66,398	47
Dalekh	187,400	227,456	40,056	207,428	26.42	152,626	21
Jajarkot	113,958	138,316	24,358	126,137	62.72	47,024	57
Dang	351,413	426,526	75,113	388,970	63.33	142,635	23
Banke	285,604	346,651	61,047	316,128	89.62	32,814	63
Bardiya	290,313	352,366	62,053	321,340	87.56	39,975	62

Total	2,407,417	2,921,993	514,576	2,664,705	64.6%	942,614	
Far West							
Bajura	92,010	111,677	19,667	101,844	92.57	7,567	73
Bhajang	139,092	168,822	29,730	153,957	49.59	77,610	42
Darchula	101,683	123,417	21,734	112,550	70.87	32,786	64
Dadkhani	198,188	240,550	42,362	219,369	70.02	65,767	48
Doti	167,168	202,900	35,732	185,034	69.94	55,621	51
Dadeldhura	104,647	127,015	22,368	115,831	86.81	15,278	67
Baitadi	200,716	243,618	42,902	222,167	46.06	119,837	30
Kailali	417,891	507,214	89,323	462,553	86.10	64,295	49
Kanchanpur	257,906	313,032	55,126	285,469	84.80	43,391	60
Total	1,679,301	2,038,245	358,944	1,858,773	74.1%	482,152	
National Total	18,475,055	22,424,029	3,948,974	20,449,542	59.1%	8,368,340	

It is interesting to note that in terms of average % access to drinking water the Eastern Development region has the lowest coverage and the Far West has the highest coverage. This is also reflected in the HMGN assessment of coverage at the end of the Eighth Plan (1997).

Table A 1-2 Coverage at the end of the Eighth Plan ('000)

Dev Region	Rural			Urban			Total		
	Popln	%	Rank	Popln	%	Rank	Popln	%	Rank
Eastern	2,273.0	49.77	5	333.2	55.29	4	2,606.2	50.41	5
Central	3,287.0	56.49	4	1,014.8	69.16	1	4,301.8	59.05	4
Western	2,508.3	64.57	3	292.1	58.55	3	2,800.4	63.88	3
Mid Western	1,836.8	70.36	2	142.4	66.45	2	1,979.2	70.07	2
Far Western	1,433.6	81.86	1	98.1	43.33	5	1,531.7	77.45	1
Total	11,338.7	60.86		1,880.6	62.49		13,219.3	61.08	

This pattern was also reflected in the Cowater International/ASDB coverage data (1994) detailed below, which analysed the population covered by agency and region.

Table A 1-3 Coverage data 1994

Rank		Eastern	Central	Western	Mid West	Far West	Total	%
1	Private Sector	1204.5	1340.4	840.2	414.2	348.3	4147.6	21.53
2	DW SS	460.4	1069.2	482.3	490.2	346.6	2848.7	14.79
3	UNICEF-DW SS & HELVITAS-DW SS	200.8	114.2	294	110.3	115.9	835.2	4.34
4	NWSC	90	557.3	114	23.5		784.8	4.07
5	MLD/IRD	53.9	206.8	10.4	78.3	27.4	376.8	1.96
6	ADB-DW SS	46			159.5	168.6	374.1	1.94
7	NGO	46.4	90.9	171.9	7.6		316.8	1.64
8	DDC	40.9	101.9	55.8	38.5	32.9	270.1	1.40
9	Others	11.2		43.2			54.4	0.28
	Total Covered	2154.1	3480.7	2011.8	1322.1	1039.7	10008.5	52.01
	Total Population	4615.1	6476.1	3897.6	2509.2	1767.9	19265.9	
	% Covered	46.68%	53.75%	51.62%	52.69%	58.81%	52.01%	
	Rank	5	2	4	3	1		

A 1.2 Ranking of districts in terms of numbers of people served

District coverage data can be used to calculate the estimated number of people unserved in each district and the % of the total unserved. In table A 1-4 districts have been ranked in terms of number of people unserved with 75 having the lowest number of unserved and 1 having the largest number of unserved.

Table A 1-4 Ranking of districts in terms of numbers unserved

Rank	District	Dev Region	Estimated number of unserved in 1996	% of total unserved	Cumulative % of total unserved
1	Morang	E	405,590	4.847%	4.847%
2	Jhapa	E	345,946	4.134%	8.981%
3	Kathmandu	C	299,979	3.585%	12.565%
4	Siraha	E	278,452	3.327%	15.893%
5	Chitwan	C	263,635	3.150%	19.043%
6	Saptari	E	245,811	2.937%	21.981%
7	Dhanusa	C	220,551	2.636%	24.616%
8	Dhading	C	219,451	2.622%	27.239%
9	Makwanpur	C	218,857	2.615%	29.854%
10	Rautahat	C	217,898	2.604%	32.458%
11	Sunsari	E	217,056	2.594%	35.051%
12	Udayapur	E	194,036	2.319%	37.370%
13	Kavrepalanchok	C	186,834	2.233%	39.603%
14	Bara	C	185,531	2.217%	41.820%
15	Syangja	W	180,444	2.156%	43.976%
16	Sindhuli	C	178,610	2.134%	46.110%
17	Tanahu	W	173,346	2.071%	48.182%

18	Nuwakot	C	167,797	2.005%	50.187%
19	Baglung	W	161,631	1.931%	52.119%
20	Bhojpur	E	153,316	1.832%	53.951%
21	Dailekh	MW	152,626	1.824%	55.774%
22	Gorkha	W	147,946	1.768%	57.542%
23	Dang	MW	142,635	1.704%	59.247%
24	Ilam	E	141,977	1.697%	60.943%
25	Khotang	E	135,252	1.616%	62.560%
26	Gulmi	W	127,823	1.527%	64.087%
27	Parsa	C	122,711	1.466%	65.554%
28	Panchthar	E	122,448	1.463%	67.017%
29	Nawalparasi	W	121,965	1.457%	68.474%
30	Baitadi	FW	119,837	1.432%	69.906%
31	Sindhupalchok	C	113,402	1.355%	71.261%
32	Sarlahi	C	111,220	1.329%	72.590%
33	Lalitpur	C	111,178	1.329%	73.919%
34	Palpa	W	111,167	1.328%	75.247%
35	Ramchhap	C	107,454	1.284%	76.531%
36	Arghakhanchi	W	106,334	1.271%	77.802%
37	Salyan	MW	104,852	1.253%	79.055%
38	Bhaktapur	C	95,163	1.137%	80.192%
39	Roipa	MW	92,849	1.110%	81.302%
40	Sankhuwasava	E	91,131	1.089%	82.391%
41	Dolokha	C	80,784	0.965%	83.356%
42	Bhajang	FW	77,610	0.927%	84.284%
43	Rupandehi	W	76,059	0.909%	85.192%
44	Pyuthan	MW	74,251	0.887%	86.080%
45	Okhaldhunga	E	73,754	0.881%	86.961%
46	Kapilbastu	W	70,739	0.845%	87.806%
47	Surkhet	MW	66,398	0.793%	88.600%
48	Achham	FW	65,767	0.786%	89.386%
49	Kailali	FW	64,295	0.768%	90.154%
50	Taplejung	E	61,498	0.735%	90.889%
51	Doti	FW	55,621	0.665%	91.554%
52	Jumla	MW	53,022	0.634%	92.187%
53	Paibat	W	52,210	0.624%	92.811%
54	Tehrathum	E	50,009	0.598%	93.409%
55	Kaski	W	48,184	0.576%	93.984%
56	Kalikot	MW	47,418	0.567%	94.551%
57	Jajarkot	MW	47,024	0.562%	95.113%
58	Solukhumbu	E	45,940	0.549%	95.662%
59	Rukum	MW	45,076	0.539%	96.201%
60	Kanchanpur	FW	43,391	0.519%	96.719%
61	Lamjung	W	40,795	0.487%	97.207%
62	Bardiya	MW	39,975	0.478%	97.684%
63	Banke	MW	32,814	0.392%	98.077%
64	Darchula	FW	32,786	0.392%	98.468%
65	Dhankuta	E	32,309	0.386%	98.854%

66	Mugu	M W	18,495	0.221%	99.075%
67	Dadeldhura	FW	15,278	0.183%	99.258%
68	Humla	M W	15,223	0.182%	99.440%
69	Myagdi	W	11,453	0.137%	99.577%
70	Dolpa	M W	9,956	0.119%	99.696%
71	Rasuwa	C	8,736	0.104%	99.800%
72	Mahottari	C	8,721	0.104%	99.904%
73	Bajura	FW	7,567	0.090%	99.995%
74	Mustang	W	315	0.004%	99.998%
75	Manang	W	126	0.002%	100.000%

These data, whose accuracy is uncertain, indicate that 50% of the unserved are located in 24% of all districts (i.e. 18 of 75), none of which are located in Mid or Far Western Regions.

Appendix B

B1 Donor grant and loan information

During 1999, the latest year for which detailed UNDP data are available, there were 22 different development co-operation projects involving 12 different donors. Of the \$18.76 million spent, 62% were loans, which came from ADB (\$6.71 million) and IDA (\$4.96 million).

UNDP data record ten agencies that made grants totalling \$7.1 million in 1999.

Table B1-1 Agencies providing grants in W & S sector - 1999

Donor	US\$ '000
NORAD	1,928
FINNIDA	1,786
EU	923
DFID	887
UNICEF	771
USAID	337
HELVETAS	336
CIDA	63
WHO	55
UNESCO	1
TOTAL	7,087

In addition to the donors listed above there are a number of other organisations working in the W & S sector in Nepal and not reporting expenditure to UNDP. WaterAid's contributions to the sector have not been reported to UNDP, although the EU grant in 1999 was support channelled through WaterAid. Other expenditures excluded in the above data include ActionAid (total of 308 Community Projects), CECI (total of 78 Community Projects) and other INGOs. Where data on programme expenditure is known this has been included in the resource gap calculation.

All loans and one third of the grants were allocated to 4 HMGN agencies: DWSS, the Melamchi Development Board, NWSC and the Fund Board. Together these four agencies received \$14.26 million or 76% of all foreign aid.

Table B1-2 Grants and Loans to HMGN agencies (US\$ '000)

	Grants	Loans	Total
DWSS	607	5,005	5,612
MW SDB	1,928	1,709	3,637
NWSC	55	2,542	2,597
RW SSFDB		2,417	2,417
Total	2,590	11,673	14,263

As all HMGN expenditure (\$13.99 million a year) is disbursed by HMGN agencies, total annual expenditure by HMGN agencies is estimated at slightly over \$28 million. This represents 90% of all sector expenditures and demonstrates the dominant role of HMGN agencies in the sector.

Appendix C

ABBREVIATIONS AND ACRONYMS

ASDB	- Asian Development Bank
BCHMES	- Before Census Household Information Monitoring & Evaluation Survey
CECI	- Canadian Centre for International Studies & Co-operation
CHDP	- Community Health and Development Project
CIDA	- Canadian International Development Agency
DDC	- District Development Committee
DFID	- Department For International Development
DTW	- Deep tube well
DWSS	- Department of Water Supply and Sewerage
EU	- European Union
FINNIDA	- Finnish International Development Agency
FYP	- Five-year Plan
GF	- Gravity flow
GPS	- Gorkha Welfare Scheme
HELVETAS	- Swiss Development Agency
HH	- Household
HMG	- His Majesty's Government of Nepal
HP	- Hand pump
ICIMOD	- International Centre for Integrated Mountain Development
IDA	- International Development Assistance (World Bank)
INGO	- International Non Government Organisation
KTM	- Kathmandu
LWF	- Lutheran World Fellowship
MLD	- Ministry of Local Development
MWSD	- Melamchi Water Supply Development Board
NEWA	- Nepal Water for Health
NGO	- Non Governmental Organisation
NORAD	- Norwegian Agencies For Development
NPC	- National Planning Commission
RPS	- Nepali Rupees
NWSC	- Nepal Water Supply Corporation
O&M	- Operations & Maintenance
RWSSFB	- Rural Water Supply Sanitation Fund Development Board
SNV	- The Netherlands International Development Co-operation Agencies
SPW	- Students Partnership Worldwide
STW	- Shallow tube well
UMN	- United Mission to Nepal
UNDP	- United Nations Development Programme
UNESCO	- United Nations Education, Science & Cultural Organisation
UNICEF	- United Nations Children's Fund
USAID	- United States Agency For International Development
VDC	- Village Development Committee
W&S	- Water and Sanitation
WAN	- Water Aid Nepal
WECS	- Water and Energy Commission Secretariat
WHO	- World Health Organisation
WS	- Water Sanitation