COWATER
INTERNATIONAL INC.

RURAL WATER SUPPLY DISTRICT DEVELOPMENT PLANS

MATARA, RATNAPURA AND BADULLA DISTRICTS SRI LANKA

Volume I

SUMMARY

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Cowater International, Inc.
in association with
Engineering Consultants Ltd.
Sarvodaya Shramadana Inc.

National Water Supply & Drainage Board

UNDP/World Bank

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SUMMARY

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List of Acronyms and Abbreviations

ADB	Asian Development Bank
AGA	Assistant Government Agent
CBO	Community Based Organisation
CDR	Crude Death Rate
CEA	Central Environmental Authority
CIDA	Canadian International Development Agency
CPU	Community Participation Unit
DANIDA	Danish International Development Agency
DDP	District Development Plan
ESA	External Support Agency
FINNIDA	Finnish International Development Agency
GA	Government Agent
GM	Gramodhaya Mandalaya
GN	Grama Niladhari
GOSL	Government of Sri Lanka
GS	Grama Sevaka
GTZ	German Agency for Technical Cooperation
HEB	Health Education Bureau
HEO	health education officers
IDA	International Development Association (World Bank)
IDRC	International Development Research Centre, Canada
IFAD	International Fund for Agricultural Development
IMR	Infant Mortality Rate
IRDP	Integrated Rural Development Programme
IRED	*Innovations et Réseaux pour le Développement*
JEDB	Janatha Estates Development Board, Sri Lanka
Lpcd	litres per capita per day
MOE	Ministry of Education
MOH	medical officer of health
MPPI	Ministry of Policy Planning and Implementation
NIE	National Institute of Education
NGO	non-governmental organisation
NHDA	National Housing Development Authority
NORAD	Norwegian Agency for International Development
NWSDB	National Water Supply and Drainage Board, Sri Lanka
O&M	operation and maintenance
ODA	Overseas Development Administration
PHI	public health inspectors
PHMW	Public Health Midwife
PHN	Public Health Nurse
PIP	Priority Investment Programme
PS	Pradeshiya Sabha
RDHS	Regional Director of Health Services
RDS	Rural Development Society

RSC	Regional Support Centre, NWSDB
RWSSU	Rural Water Supply and Sanitation Unit
SEI	Socio-Economic Index
SIDA	Swedish International Development Agency
SLCDF	Sri Lanka-Canada Development Fund, Colombo
SLSPC	Sri Lanka State Plantations Corporation
SRTS	Sarvodaya Rural Technical Services
SSM	Sarvodaya Shramadānā Movement, Sri Lanka
TCCS	Thrift and Credit Cooperative Society
TSU	Technical Support Unit
UNDP	United Nations Development Programme
UNESCO	United Nations Economic, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VHW	Village Health Workers

Project Context

This project, which is funded by UNDP, focuses on the smaller towns, communities and hamlets in three districts. Two plans are being prepared, the first being these District Development Plans, taking the form of a strategic investment plan with a ten year horizon. The second, a Priority Investment Programme, will have a shorter time horizon and take the form of specific project preparation for external funding by the World Bank and/or other external assistance agencies.

The National Water Supply and Drainage Board within the Ministry of Housing and Construction is the key agency in executing this planning project Three organisations carried out the planning; Cowater International Inc. of Canada, Engineering Consultants Limited of Colombo, and Sarvodaya.

The plans cover the small towns, rural villages and dispersed households in all three districts. Particular attention has been given to the poorest of the communities most in need of improved services. The approach taken is in line with the government's policies on self-help and self-reliance. Maximum effort has been made to ensure that the schemes will be self-financing at least in terms of recurrent costs.

The schemes planned will bring safe drinking water by tapping springs and rivers, feeding it into piped distribution systems and delivering it to stand-pipes and house connections. Other technologies include tubewells and shallow wells for smaller villages. Sanitation will come in the form of household latrines enabling families to reduce contact with wastes and thereby improving health. Most of the schemes have been planned assuming extensive community participation in construction and management. These schemes will be owned by the communities they serve, thereby ensuring long-term sustainability of the systems.

These plans are part of a planned series of rural water supply and sanitation district development plans covering all 25 districts of the country. At the strategic level, the project objective is to define overall requirements and priorities for resource mobilisation, implementation, operation and maintenance, including technical, institutional and financial aspects. This should assist the relevant agencies in making coordinated contributions in the sector. At a more detailed level, the priority investment programmes will be drawn up in consultation with the local institutions involved, identifying key areas for investment in water supply and sanitation installations and the strengthening of institutions and groups responsible for implementation and sustained operation

The project was broken into four phases, namely, inception, survey, district development plans and priority investment plans.

The **inception phase** began on November 1, 1990, and included mobilisation, collection of secondary data and short field familiarisation visits by expatriate and local staff, in addition to the workshop held on November 20-21, 1990.

The **survey phase** began with the workshop/ pre-testing session on January 21-24, 1991 and continued until mid-March 1991. The surveys collected data on sample communities and households, water supply and sanitation status and NGO and private sector activities.

Immediately following the conclusion of the surveys, the **district development plans phase** started with a workshop in the first week of April 1991 Preliminary survey findings were discussed, as well as the major issues and possible strategies pertaining to the district development plans. During this phase the institutional framework for the proposed programme was elaborated. The institutional framework, profiles of the sector institutions, a discussion of the principal issues and recommended policy, strategy and methods are found in Volume II entitled "Institutions, Policy, Implementation Strategy." Each of the District Development Plans are found in a separate volume (Vol. III Matara, Vol. IV Ratnapura, Vol. V Badulla).

The final phase of the project, the **priority investment plans phase**, will begin in June 1991 and end with submission of the Priority Investment Programme in October 1991.

1. Background

1.1. Demography

1.1.1. Population and Population Growth

The population according to AGA division in each district was obtained from the District Report prepared by the Department of Census and Statistics based on the 1981 survey. Population projections were provided by the Kachcheri (the AGA's office in the district). These have been calculated using the district growth rates shown in Table 1. A growth rate is not available for each individual AGA Division, so the population projections to 2005 have been calculated using these district-wide growth rates. The population living in settlements administered by town and urban councils was deducted from the totals in order to give a rural population (including estates).

Table 1 District Growth Rates

District	Growth Rate
Matara	1 04%
Ratnapura	1 10%
Badulla	1 07%

The total population of the three districts in 1992 is estimated to be 2,486,000. This population is predominantly rural as can be seen from Table 2. There are 134 state owned estates in the district, and a number of smaller privately owned estates. The total population living on estates according to the 1981 census was 299,580. The 1992 estate population is estimated to be 328,000. This population is largely Indian Tamils who are the descendants of people brought from the Indian states of Tamil Nadu and Andhra Pradesh by British plantation owners to work as indentured labourers Until recently they were not entitled to Sri Lankan citizenship, and were largely restricted to working on the estates The total urban population has been calculated to include small towns even though these are usually considered part of the rural population This is because although these are small settlements, they have a high population density, a concentration of commercial activity and usually have less self reliant social attitudes than those encountered amongst typical village communities.

Table 2 Population by Sector

	Badulla		Matara		Ratnapura		Total	
	No.	%	No.	%	No.	%	No.	%
Rural	513	64%	591	82%	707	73%	1812	73%
Estate	188	24%	27	4%	132	14%	328	13%
Urban	97	12%	103	14%	128	13%	347	14%
Total	798		721		967		2486	

Table 3 Rural and estate population projections

POPULATION PROJECTIONS ('000)

District	Sector	Year									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Matara	Rural	591	597	604	610	616	623	629	635	642	649
	Estate	27	27	27	27	28	28	28	29	29	29
	Urban	103	104	106	107	108	109	110	111	112	113
	All	721	729	736	744	751	759	767	775	783	791
Ratnapura	Rural	707	721	735	750	764	779	795	810	826	842
	Estate	132	135	137	140	143	145	148	151	154	157
	Urban	128	130	133	135	138	141	144	146	149	152
	All	967	986	1005	1025	1045	1066	1086	1108	1129	1151
Badulla	Rural	513	519	524	530	536	541	547	553	559	565
	Estate	188	190	192	194	196	199	201	203	205	207
	Urban	97	98	99	100	101	102	103	104	105	107
	All	798	807	815	824	833	842	851	860	870	879
All	Rural	1812	1837	1863	1889	1916	1943	1971	1999	2027	2056
	Estate	347	352	356	362	367	372	377	382	388	393
	Urban	328	333	337	342	347	352	357	362	367	372
	All	2486	2521	2557	2593	2630	2667	2705	2743	2782	2822

MEAN VILLAGE POPULATION

District	Year									
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Matara	373	377	381	384	388	393	397	401	405	409
Badulla	343	350	357	364	371	378	386	393	401	409
Ratnapura	218	221	223	226	228	230	233	235	238	241
All	302	306	311	315	320	324	329	333	338	343

The village survey gathered information on the type of settlement. It was found that the majority of villages are traditional, unplanned communities. Many villages are "colonies", where landless people have been resettled under government programmes. Village expansion settlement types occur when people have voluntarily settled outside their original villages due to lack of land.

The distribution of population according to ethnicity based on the results of the village survey is presented in Table 4. The overwhelming majority are Sinhalese, most of whom are Buddhists. The remainder is mostly comprised of Indian Tamils who are mainly living on the estates and a scattered group of Sri Lankan Tamils, both of whom are Hindus There is a small group of Muslims who are largely engaged in commercial activity and therefore are concentrated in the towns. The survey results showed no Indian Tamils in Ratnapura, however it is known that there are Indian Tamils living on the estates. The sample size may have been too small to adequately capture this group, which is in any case very small

Table 4 Type of Settlement

	Badulla	Matara	Ratnapura
Unplanned	71%	75%	69%
Colonised	14%	4%	3%
Village expansion	4%	11%	2%

Table 5 Ethnicity

District	Sinhalese	Sri Lankan Tamils	Indian Tamils	Muslims
Badulla	86%	5%	3%	3%
Matara	93%	0%	3%	3%
Ratnapura	92%	4%	0%	1%
Overall	90%	3%	2%	3%

1.2. Economy

1.2.1. General Economy

In general, Badulla, Matara and Ratnapura are very ruralised, and exhibit the characteristics of rural areas, with heavy reliance on agriculture. Tea estates are an important part of the economy of each of the districts, and there are large areas under cultivation of paddy (largely for local consumption), coconut and spices. There are few industries.

1.2.2. Income, Occupation and Socio-Economic Status

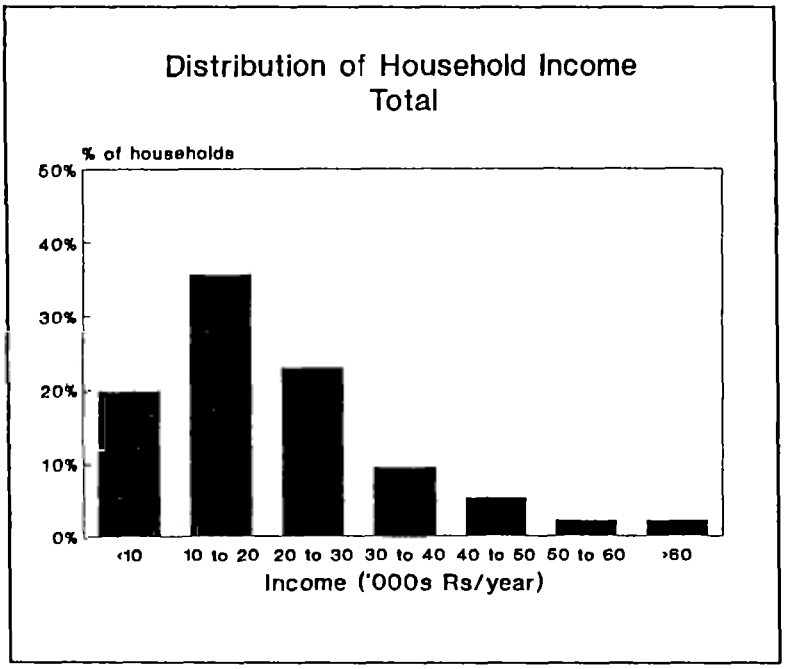
Data on household incomes, occupation and socio-economic status were obtained from the household survey. For the purposes of analyzing the economic data from the survey, the information from the 136 households surveyed in towns (defined as settlements which were previously under a town council) was taken as a separate category, as it tends to skew the data. As can be seen from the data on annual household income, in towns the mean is over 30,000 Rs per year, whereas in the strictly rural areas it is between Rs 20,000 and 23,000.

Table 6 Household and Per Capita Income

District	Household Size (persons)	Mean Household Income (Rs/year)	Mean Per Capita Income (Rs/Year)
Badulla	5 6	22,870	1,592
Matara	5 6	20,306	3,856
Ratnapura	5 5	22,955	4,591
Towns (3 districts)	5 7	30,127	5,989
Total (3 districts)	5 6	22,763	4,502

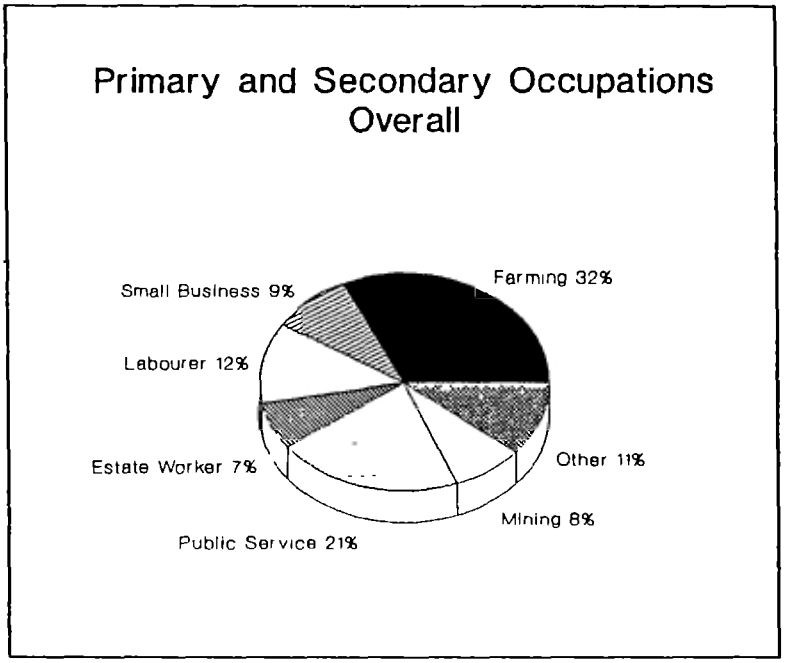
The distribution of household incomes shows a significant variation between the three districts.

Figure 1 : Distribution of Total Household Income



Farming was the most common occupation reported in the districts, followed by the public service

Figure 2 : Primary and Secondary Occupations



Unemployment in Matara is higher than the national average, and in Badulla and Ratnapura it is lower.

Table 7 Employment Rates

Description	Population ('000)		Unemployment Rate
	Employed	Unemployed	
Badulla	268 (38 6%)	25 (3 7%)	8 7%
Matara	216 (31 9%)	45 (6.8%)	17 5%
Ratnapura	307 (34 6%)	37 (4 2)%	10 8%
All Island	5 175 (32 1%)	786 (4 9%)	13 2%

1.2.3. Economic Profile of Towns

The data for the towns were analyzed separately As is to be expected, the peak in the income distribution curve occurs at a higher level (Rs 20000 to 30,000), and there is a larger percentage of households in the higher ranges than found in the rural areas. The predominant occupation in the towns is the public service, followed by small business.

Figure 3 Distribution of Household Income - Towns

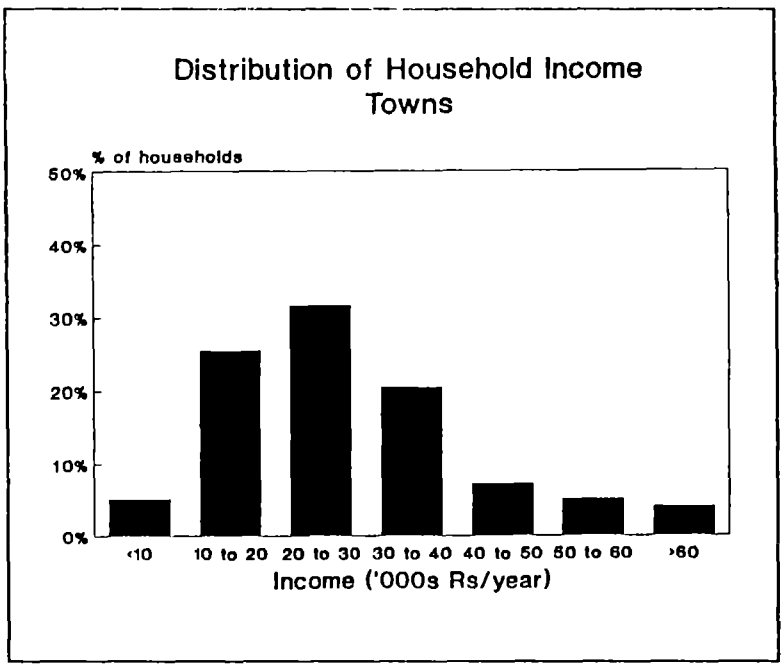
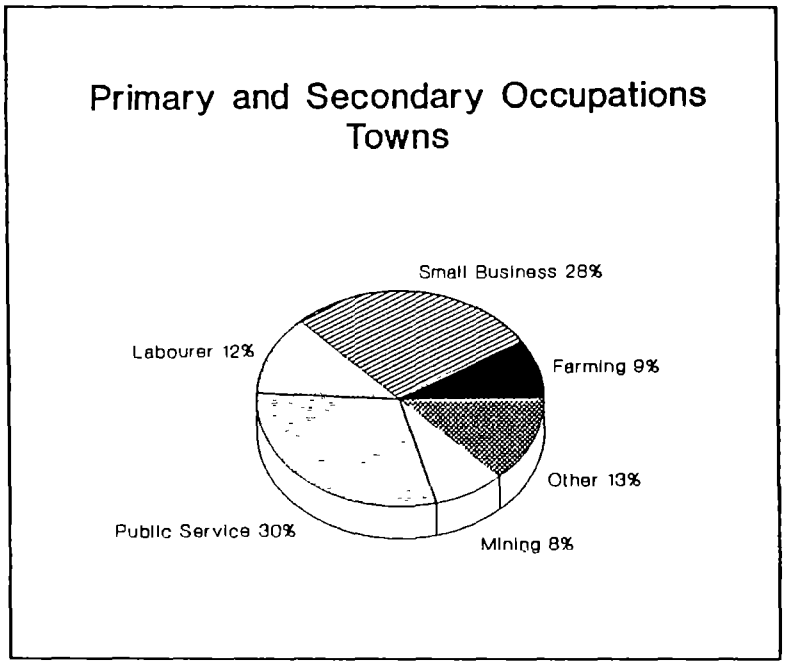


Figure 4 Primary and Secondary Occupations - Towns



1.3. Health

1.3.1. Health Indicators

The vital health statistics for the three project districts and their corresponding national figures are presented in Table 8.

Table 8 Vital Health Statistics - 3 Districts, 1989

	CBR	CDR	MMR	IMR	NNMR	%LBW
Matara	22 7	6 2	0 5	22.7	14.7	19.9
Ratnapura	24 9	5 5	0 8	33 8	22.8	24 1
Badulla	25 6	6 3	0 4	33 5	21 7	23 1
Sri Lanka	21 3	6 2	0 5	24 2	16 2	22 3

Note CBR - Crude Birth Rate, CDR - Crude Death Rate, MMR - Maternal Mortality Rate, IMR -Infant Mortality Rate, NNMR - Neo-natal Mortality Rate, %LBW - Percentage of Low Birth Weight Infants

Among the three districts, Matara has the best health indices which approximate or better than the national averages. In contrast, the health indicators for Badulla and Ratnapura show a poor standard of health compared to Sri Lanka as a whole, most notably the IMR which is approximately 40% higher than the national average. This could be attributed to the less satisfactory health and sanitary conditions in the plantation sector, as the proportion of population is higher in Badulla and Ratnapura compared to Matara

The establishment of a pre-project health status on water and sanitation related diseases is a difficult task due to lack of accurate data, and even the available statistics are not segregated on a uniform geographic pattern. The available health statistics are based on government hospital in-patient records. The prevalence of diseases in the community will therefore be many times higher than reported. In addition, it is estimated that approximately 55% of the out-patient load is catered for by the private sector, for which no data are available. In addition to routine collection of morbidity and mortality data by the statistical unit of the Ministry of Health, the Epidemiology Unit conducts surveillance of all "communicable diseases." There are 18 such notifiable diseases in Sri Lanka, out of which 4 can be identified as water and sanitation related, namely, dysentery, typhoid fever (Enteric fever), food poisoning and viral hepatitis. The major disadvantage of using data from notifiable diseases reports is the poor notification rate from medical institutions. According to the epidemiology unit, only 50 - 60% of cases of notifiable diseases are actually reported.

Selected water and sanitation related disease mortality and morbidity data for the three districts are given in Table 9. This table shows that with regard to the prevalence of intestinal infections (potentially 'water borne' diseases) which is an indication of the general hygiene status

and quality of water supply, Ratnapura to be the worst off, with Badulla and Matara somewhat better.

The national average rate appear to be much higher. The subtotals for helminthiasis (worm infections), which is a reflection of *sanitation status,* Matara has the lowest incidence (lower than the national average) whereas Badulla and Ratnapura have a higher incidence.

The figures for scabies, (a 'water washed' disease), are high in Badulla, lower in Matara and Ratnapura, but well above the national average in all three districts.

Table 9 Incidence & number of deaths due to selected water & sanitation related diseases (1989)

Diseases	Matara		Ratnapura		Badulla	
	No. of Cases	No. of Deaths	No. of Cases	No. of Deaths	No.of Cases	No.of Deaths
Intestinal infections						
Cholera	-	-	-	-	-	-
Typhoid & Paratyphoid	255	10	236	2	373	2
Shigellosis	756	31	2,879	16	1,613	40
Food poisoning	50	-	137	-	41	-
Amoebiasis W/liver abscess	16	-	90	1	46	-
Amoebiasis, others	69	-	636	-	296	-
Intestinal infections due to other specified organisms	530	-	913	12	250	1
Ill-defined intestinal infections	2,191	10	2,239	23	1,662	19
Subtotal Intestinal infections	**3,867 6.0***		**7,130 8.9***		**4,281 6.7***	
Vector-borne diseases						
Arthropod-borne encephalitis	-	-	2	-	1	1
Arthropod-borne haemorrhagic fever	2	-	-	-	-	-
Malaria	1,388	7	7,363	9	3,525	3
Filarial infections	67	-	75	-	4	-
Leptospirosis	20	3	10	-	-	-
Helminthiasis						
Hookworms	45	-	13	-	81	-
Other Helminthiasis	183	-	487	2	255	-
Subtotal Helminthiasis	**228 0.35***		**500 0.63***		**336 0.52***	
Skin infections						
Scabies	580 0 9*		725 0 9		832 1 3*	
Miscellaneous						
Acute poliomyelitis	-	-	-	-	-	1
Viral hepatitis	149	13	275	3	288	-

* Rate per 1000 population (1981 census)

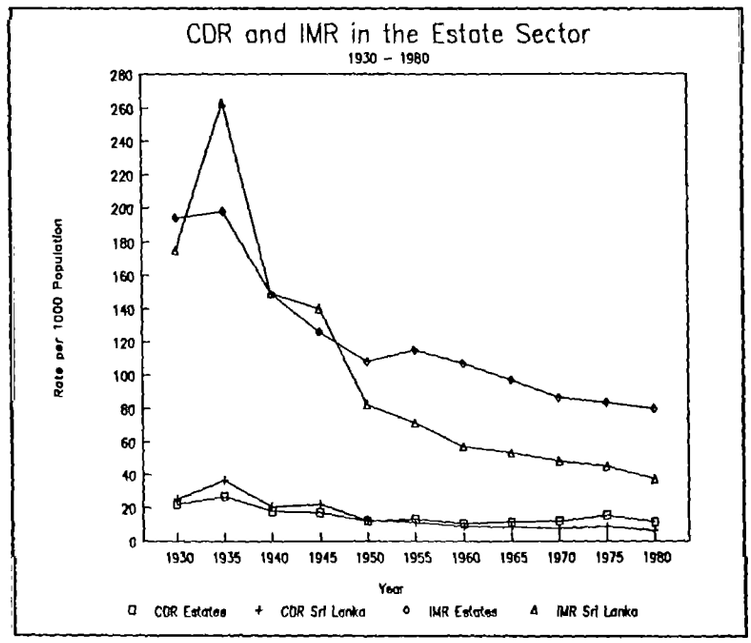
Source Medical Statistics Unit, MOH .

1.3.2. Health Status on the Estates

Health status in the estate sector, when compared with Sri Lanka in general, has been constantly lagging behind (Figure 5). The majority of the estate workers in Sri Lanka are Indian Tamils who have traditionally been economically disadvantaged and politically isolated, a pattern which began under the colonial pattern of recruitment and management. Poverty, overcrowding, poor water supply and sanitation, and inadequate health services were all reflected in the low health status of estate workers and their families. However, since nationalization in 1975, there has been considerable investment on estates and with the introduction of a uniform health policy designed to meet the needs of the estate workers, the health status in the estate sector improved dramatically. Concentrated efforts by government agencies as well as non-government agencies supported by UNICEF, have resulted in better housing, water supply, sanitation and child care.

With the nationalization of estates in 1974 and the subsequent transfer of their management to the Janatha Estates Development Board (JEDB) and the Sri Lanka Estates Plantation Corporation (SLSPC), programmes were drawn up to improve nutrition, housing, water supply and sanitation, health services, child care facilities and education. The Ministry of Health appointed a medical officer to be in charge of health services for the estates. The medical officers were appointed to conduct MCH (maternal & child health) clinics in 200 estates on a regular basis. The coverage was later increased to 400. In 1978, social development units were created in the SLSPC and JEDB, and regional staff responsible for health and welfare were appointed. Uniform health and development programmes were conducted throughout the sector, irrespective of the profitability of individual estates. In 1982-83 both the SLSPC and JEDB appointed medical officers and the level of health man-power was gradually increased.

Figure 5 CDR and IMR in the Estate Sector



State ownership and the uniform health policies which followed have had a clear impact on health status in the plantations. From 1980 there has been a dramatic decline in the IMR from 74 per 1000 to less than 50 per 1000 (Table 10). Health care facilities are being steadily improved through the initiatives of the Social Development Divisions, and IRDPs.

Table 10 Comparison of vital statistics and performance indicators of Sri Lanka and SLSPC in 1982 and 1989/1990

	Sri Lanka 1982	SLSPC 1982	Sri Lanka 1989	SLSPC 1990
Population	15 195 m	354,879	16.806 m	369,991
Crude Birth Rate	26 5	30 4	21.3	17.6
Crude Death Rate	6 1	7 8	6.2	6.4 ('88)
Infant Mortality Rate	30 5	74 0	19 4 ('88)	31.10
Neonatal Mortality Rate	18 1	45 6	16 2 ('85)	19 3
Post-neonatal Mortality Rate	12 4	28 4	8 0 ('85)	11 7
Perinatal Mortality Rate	-	98 8	-	59.0
Stillbirth Rate	21 0 (in Govt Hosp)	67 2	20 8 (in Govt Hosp)	45 6
Child Mortality Rate	-	5 5	-	1 2
Maternal Mortality Rate	0 6	1 6	0.5 ('85)	2 2

Data on the number of estates in the three districts and their corresponding population figures are presented in Table 11. Health statistics are only available for SLSPC estates in the districts. The vital health statistics for SLSPC estates in Matara, Ratnapura and Badulla are presented in Table 12.

Table 11 Estates and Population - Badulla 1990

	SLSPC	JEDB	Total
No of Estates	16	39	55
Population	25854	74703	100557
% Population	3 3%	9.7%	13%

Table 12 Vital Health Statistics of SLSPC Estates - 3 Districts, 1990

	CBR	CDR	MMR	IMR	NNMR	% LBW	% IB
Matara	20 6	NA	3 5	23 6	12 7	16 4	88 8
Ratnapura	16 2	NA	2 1	32 6	24.5	17.2	91 0
Badulla	18 3	NA	4 6	25 0	11 9	7 8	97 2
Sri Lanka	17 6	6 4	2 2	31 1	19.3	14.8	90.2

Source . Social Development Division, SLSPC

CBR - Crude Birth Rate, CDR - Crude Death Rate, MMR - Maternal Mortality Rate, IMR - Infant Mortality Rate, NNMR - Neo-natal Mortality Rate, % LBW - Low Birth Weight, % IB - Institutional Birth

The notable differences are in reference to maternal mortality rates (MMR) and percentage of Institutional Births (IB). The estate population in Badulla has a higher MMR (4.6) compared to the national average of SLSPC estates which is 2.2, despite a considerably higher rate of IB (97.2%) compared to the national average (90.2%). This implies that although the *coverage* of maternal health services is satisfactory, the level (quality) of institutional care is not satisfactory. The comparatively better performance of Badulla in terms of IMR, NNMR and %LBW indicate that nutrition and child care programmes have been successfully implemented.

The health indices for Matara shows that the IMR and NNMR are comparatively better than the national average for SLSPC estates. Percentage of institutional births and the MMR have poorer figures compared to the national average, implying inadequate maternity care.

Except for NNMR and %LBW, the health indicators for estates in Ratnapura follow the same pattern as the national averages for SLSPC estates. The comparatively higher NNMR and %LBW figures indicate poor maternal nutrition, poor pre and post natal care.

1.4. Water Resources

The approach to assessing water resources for rural water supply in mostly small and scattered villages must be fundamentally different from that adopted in relation to major water supply schemes and irrigation projects This arises from the fact that only quite small quantities of water are required, in the order of a few tens of cubic metres per day, to serve any individual settlement. It is thus very difficult to identify suitable sources from information generally available, which is on a macro scale, as opposed to the location of sources on the micro scale of villages. The approach adopted here has therefore been to estimate the potential for finding different types of water sources, and from this to estimate the likely distribution between different types (eg. springs, shallow groundwater, deep groundwater) when sources are individually identified for villages during project implementation.

The topographical, climatological, geomorphological and hydrogeological features of the project area have been analysed to assess the relative potential for different water source types. This has been supplemented by data from the surveys which confirmed the general accuracy of the assessments made. This was done on the basis of zones defined according to the features mentioned above, consisting of one or more AGA divisions.

The AGA divisions making up these zones are presented in Table 13 along with some of their main characteristics. Figure 6 shows the zonal boundaries.

The physiographical, geological and hydrometeorlogical characteristics of each zone are analysed in detail in the respective district plans. Within each zone, areas of good potential for gravity shallow groundwater, deep groundwater and pumped (surface water) sources were delineated according to the analysis made. This was then translated into an estimate of the proportion of different water source types to be used for planning purposes.

Figure 6 Demarcation of Zones

1.4. Water Resources

The approach to assessing water resources for rural water supply in mostly small and scattered villages must be fundamentally different from that adopted in relation to major water supply schemes and irrigation projects. This arises from the fact that only quite small quantities of water are required, in the order of a few tens of cubic metres per day, to serve any individual settlement. It is thus very difficult to identify suitable sources from information generally available, which is on a macro scale, as opposed to the location of sources on the micro scale of villages. The approach adopted here has therefore been to estimate the potential for finding different types of water sources, and from this to estimate the likely distribution between different types (eg. springs, shallow groundwater, deep groundwater) when sources are individually identified for villages during project implementation

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Figure 6 Demarcation of Zones

WATER RESOURCES PLANNING ZONES

BADULLA DISTRICT		RATNAPURA DISTRICT		MATARA DISTRICT	
AGA DIVISIONS	ZONE	AGA DIVISIONS	ZONE	AGA DIVISIONS	ZONE
MAHIYANGANA	A	EHELIYAGODA	A	KOTAPOLA	A
RIDIMALIYADDE	B	KURUWITA		PITABEDDARA	
MIGAHAKIULA		RATNAPURA		PASGODA	
KANDAKETIYA		IMBULPE	B	BENGAMUWA	
UVA PARANAGAMA	C	BALANGODA		MULATIYANA	B
HALIELA		PELMADULLA	C	HAKMANA	
SORANATOTA		NIVITIGALA		AKURESSA	
PASSARA		AYAGAMA		KAMBURUPITIYA	
BADULLA		KALAWANA		MALIMBODA	
ELLA	D	ATAKALANPANNA	D	THIHAGODA	
BANDARAWELA		WELIGEPOLA		WELIGAMA	C
WELIMADA		KOLONNA		MATARA	
HAPUTALE		EMBILIPITIYA		DEVINUWARA	
HALDUMULLA	E			DIKWELLA	

FIGURE 6
DEMARCATION OF ZONES

Table 13 Zonal Characteristics

District	Zone	AGA Division	Mean Annual Rainfall (mm)	Maximum Elevation (m)	Minimum Elevation (m)	River Network
Matara	A	Kotapola Pitabeddara Pasgoda Bengamuwa	3443	1340	61	Heavy
	B	Mulatiyana Hakmana Akuressa Kamburupitiya Malimbada Thihagoda	1486	457	31	Light
	C	Weligama Matara Devinuwara Dickwella	1711	183	31	Light
Ratnapura	A	Ehcliyagoda Kuruwita Ratnapura	3958	-	61	V.Heavy
	B	Imbulpe Balangoda	2169	2157	92	V Heavy
	C	Pelmadulla Nivitigala Ayagama Kalawana	3408	-	-	Heavy
	D	Atakalanpanna Weligepola Kolonna	2120	1312	61	Medium
Badulla	A	Mahiyangana	1967	305	92	Light
	B	Ridimaliyadde Migahakiula Kandeketiya	1846	1220	92	Medium
	C	Uva Paranagama Hali Ela Soranatota Passara Badulla	1777	1677	305	Heavy
	D	Ella Bandarawela Welimada Haputale	1738	2286	305	V Heavy
	E	Haldumulla	1796	1830	153	Medium

2. Existing Sector Status

2.1. Water Supply

2.1.1. Types of Water Supply

The major sources of data on existing water supply sector status are the household and village surveys carried out for the District Development Plans. The household survey collected data on nine major types of water sources. These are:

- protected wells — wells with an apron and parapet.
- unprotected wells — wells with no protection to stop runoff water from entering.
- spring — naturally occurring water source, understood locally to mean hillside springs
- underground spring — spring which wells up from the ground.
- stream
- river
- gravity water schemes — piped systems, usually constructed by local government or NGOs, providing a system of public standpipes & house connections
- roof catchment — harvesting of water from roofs, collected by gutters and stored in household tanks
- pumped — piped systems, usually constructed by local government, bringing water from surface sources, dug wells or tubewells to a pressurized distribution system of public standpipes and house connections.
- other

Wells can be both shallow hand dug wells and drilled tubewells. The depth of shallow wells varies from 4 metres to 10 metres. Over 60% of the wells covered in the village survey had depths to the water level in the dry season of less than 3 m. Tubewells have an average depth of 50 m in the three districts and there is very little variation between districts.

Protected wells are those which have an apron, a parapet and proper drainage. The apron prevents water spilled by users around the well from entering the well and carrying contamination. The parapet varies in height, but in general is between 0.2 m - 0.8 high, and cemented. Some wells are fitted with a windlass, but this is not common. Dedicated buckets are not usually used, and the introduction of a multitude of buckets, which have often come into contact with the ground, is a major source of contamination. Near to the well there is sometimes a stick on which a bucket can be balanced in order to keep it off the ground. Unprotected wells are often little more than a hole in the ground, dry by hand, often unlined with nothing to stop runoff and water spilled around the well from entering.

Gravity water schemes exist where a spring has been tapped and brought through a network of pipes and reservoirs to a system of standpipes in the community. In some areas house connections have also been provided with gravity systems.

Rainwater roof catchment through gutters and storage tanks is not common in the three districts, but does exist in Ratnapura, particularly in certain AGA divisions and to a small extent in Badulla. Approximately 70% of houses in each district have roofing materials suitable for the harvesting of rainwater, such as tiles or corrugated iron.

2.1.2. Bacteriological Quality

The bacteriological tests carried out for the DDPs show that protected springs are the least likely to be contaminated with faecal coliforms (100 % below 10 E. coli/100 ml). Protected springs are natural springs which have been capped. Water was sampled from these before it entered the distribution system, if one existed. Taps (gravity and pumped systems) gave the next best bacteriological quality (100% below 25 E. coli/100 ml). This indicates that whereas water at a protected spring may be of high quality, there is contamination taking place in the distribution networks which bring water to the taps. Both protected and unprotected wells showed high levels of contamination by E. coli.

These findings are borne out by a study carried out in 1987 in Kurunegala District which analysed 1378 samples of water from a variety sources, and found that 95% of samples from protected wells were contaminated with faecal coliforms.

This study found that there were seasonal variations in the level of pollution, especially in water drawn from traditional sources, including protected wells. The geometric mean of faecal coliforms peaked in December during the monsoon rain. The proportion of positives peaked earlier, at the beginning of the rains in September. Pollution which peaks during the early rain is usually attributed to run-off and is most likely to affect unprotected water holes. (Mertens,T.E., M.A. Fernando, T.F. de C. Marshall et.al, 1990).

Data collected for district development plans in Kegalle, Kalutara and Moneragala found similar levels of contamination in both protected and unprotected wells, which is consistent with water quality studies carried out in other countries. These findings suggest that contamination is still entering protected wells despite protection against surface runoff, probably through the use of dirty buckets. Hygiene education may be effective in reducing this.

Table 14 Percentage of Specimens with Faecal Coliforms, Kurunegala District

Piped Supply	Handpump	Protected Well	Unprotected Well
77%	52%	95%	98%

(source. Mertens,T E , M A. Fernando, T.F de C Marshall et al, 1990)

2.1.3. Source Availability and Coverage

The table below shows the availability of each of these types of water sources. The totals add to more than 100% as many households have access to more than one supply.

Table 15 Availability of types of water sources
(% of households)

	Protected Well	Unprotected Well	Spring	Underground Spring	Stream	River	Gravity System	Roof Catchment	Pumped System	Other
Badulla	7%	12%	70%	2%	27%	0%	14%	1%	1%	1%
Matara	47%	57%	5%	1%	13%	10%	4%	0%	20%	3%
Ratnapura	30%	49%	16%	0%	37%	5%	11%	6%	9%	7%
Total	28%	39%	30%	1%	26%	5%	9%	2%	10%	4%

Acceptable coverage has been defined as a function of both water source type and the distance to the source. The definitions are as follows:

low service level
- protected wells at 250 m or less
- wells with handpumps at 250 m or less
- piped systems.

high service level
- wells with handpumps at 150 m or less
- pumped systems.

The districts have been divided into zones based in the water resource characteristics (see section 1.4). The urban areas and the estates have been calculated separately. Urban areas in this context include both large and small towns. The coverage in each of these zones and areas is presented in Table 16.

Table 16 Water Supply Coverage

District	Zone					Estate	Urban	TOTAL
	A	B	C	D	E			
Badulla								
High Service Level	3%	8%	14%	33%	10%	38%	74%	28%
Low Service Level	7%	23%	23%	36%	10%	38%	83%	34%
Matara								
High Service Level	15%	14%	47%	-	-	50%	90%	36%
Low Service Level	31%	44%	76%	-	-	75%	91%	59%
Ratnapura								
High Service Level	11%	18%	26%	22%	-	34%	84%	30%
Low Service Level	32%	37%	45%	39%	-	44%	88%	46%
Grand Total								
High Service Level						37%	83%	31%
Low Service Level						43%	87%	46%

Coverage overall is 31% for the high service level and 46% for the low service level. Of the three districts, Badulla has the lowest level of coverage. Two thirds of households do not have access to even the low service level sources. In Matara the district with the highest coverage, over 40% of households do not have access to low service level sources.

Of the covered population, 18% are being served by pumped supplies, 13% by protected wells and 11% by gravity schemes. Only a very small percentage are covered by wells with handpumps.

Technology Mix

Technology Mix	Matara		Ratnapura		Badulla		Estate		Urban		Overall	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Gravity Schemes	5	5	12	12	17	17	37	37	-	-	11	11
Wells with hp 150	1	-	1	-	-	-	0	-	-	-	1	-
Tubewells 150	0	-	0	-	1	-	-	-	-	83	1	-
Pumped	29	29	17	17	9	9	-	-	83	-	18	18
Wells with hp 250	-	1	-	1	-	-	-	6	-	-	-	1
Tubewells 250	-	1	-	1	-	4	-	-	-	-	-	2
Protected wells	-	22	-	15	-	3	-	-	-	5	-	13
Coverage	36	59	30	46	28	34	37	43	83	87	31	46

It can be seen that wells required water collectors to travel the furthest distance. Of the three districts, residents of Badulla recorded the highest distances to source.

Table 18 Mean Distance to Source (m)

District	Source	Unprotected Well	Protected Well	Spring	Stream /River	Gravity Scheme	Pumped Scheme
Three Districts	1	127	105	103	137	55	87
Three Districts	2	194	208	252	253	345	217

The time spent collecting water was accordingly higher for Badulla than the other districts, and water consumption was lower. On average, each household spends 1.7 hours per day in the wet season on water collection and this rises to 2.2 hours during the dry season. Water consumption is 25 L/c-d in the wet season and 27 in the dry. It is noteworthy that there is little variation in consumption from one season to another in each district (see Table 19).

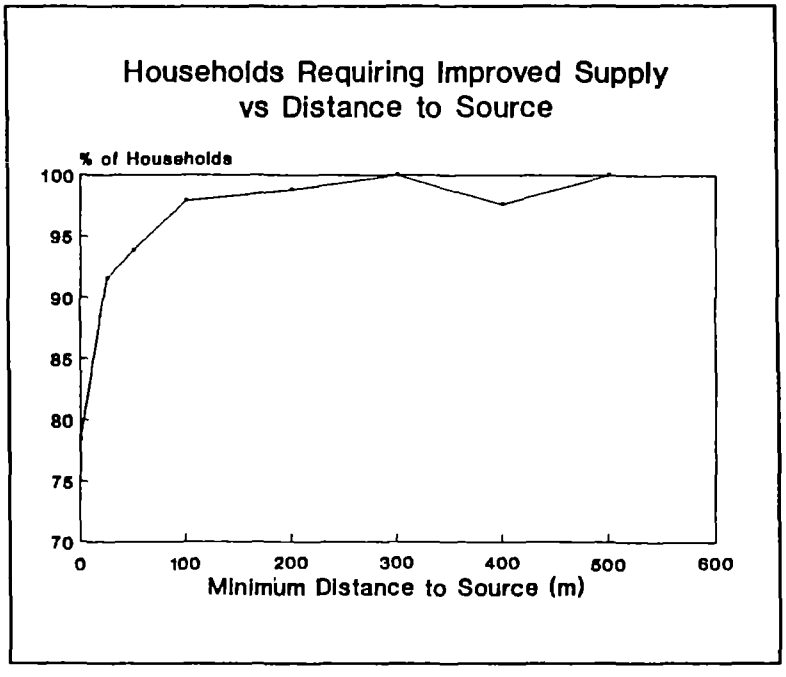
Female water collectors were considerably more likely than male water collectors. On average were 2 male and 13 female collectors for every 10 houses.

Table 19 Water Consumption

	Wet Season	Dry Season	Collection Wet Season	Time Dry Season
Matara	34	35	1.8	2.4
Ratnapura	23	26	1.1	1.6
Badulla	19	20	2.2	2.7
Total	25	27	1.7	2.2

The majority of respondents said they required an improved water supply. Overall, whether or not a household expressed a desire for an improved water source was influenced by the distance to the existing source. Where the distance was 0 to 25 m, 78% said they wanted an improved source. This rose dramatically as distance to source increased, and reached close to 100% where the minimum distance to the source was over 100 m.

Figure 7 Households requiring improved supply vs. distance to source



2.1.4. Construction and Maintenance of Water Supply Schemes

The village survey revealed that about a third of the existing water sources had been built by private builders, that is, the household themselves had arranged construction, perhaps hiring a mason or other skilled worker. Another 20% had been built by a government agency. Very few had been built by an NGO (3%) or the NWSDB (4%). Six percent had been built by the village. The funding institutions also reflect this breakdown; a third of systems were funded by private households, another third by government agencies. Four percent were funded by the village. A substantial number of respondents (25%) did not know the funding source. Ownership of the schemes followed a similar pattern, except that in 8% of cases it was reported that the village owned the scheme, even though the percentage of schemes built or funded by the villages is lower than this. It is of note that in 23% of cases the survey respondents did not know who the scheme belonged to.

In keeping with the proportion of privately built and owned systems, 34% of systems were also privately maintained. Government agencies maintained 16%, and villages 18%. Funding institutions for operation and maintenance followed an almost identical pattern. In 25% of cases, the respondents did not know who maintained the system, and in 31% of cases they did not know who funded maintenance.

2.1.5. Wells

During the village survey the surveyors visited existing wells in the villages in order to gather information on their characteristics and how they were built. The majority of wells visited are protected (67%), but only 5% have handpumps. Electric pumps are even more unlikely, and were found in slightly more than 2% of cases. Excess water is properly drained off in 57% of cases. Of the wells visited, 59% had been built privately. In practically all cases no training had been given to villagers when the wells were built

a) Well Maintenance

Open wells, for all their simplicity, still require regular maintenance. This usually consists of an annual emptying and cleaning to remove accumulated debris such as dead leaves and silt. Because of the manpower required, this has to be a communal activity. In the case of private wells, other families using the well may carry out this task as a quid pro quo for the use of the well. With communal wells, a sufficiently strong organisation is required to organise the necessary group work As ever, the importance of upstream community involvement in well construction is crucial.

Simple protected wells, which formed the bulk of those surveyed, had a mean annual maintenance cost (calculated across all districts) of Rs.237.00, corresponding to Rs.16.50 per family per year, or less than Rs.1.50 per month, based on the average number of well users. Repairs, when carried out, cost an average of about Rs.800.00. The frequency of such activities is about once in 12 years, giving an overall mean monthly recurrent cost per family of around Rs.1.75.

Handpump maintenance is estimated by the FINNIDA project in Kandy district to cost Rs.500.00 per well per year, whilst actual costs for a mixture of dug and tube wells in Matale and Polonnaruwa, from the DANIDA project, show a mean of Rs 800.00 This latter figure may include some allowance for borehole maintenance costs, estimated in Kandy at Rs.5,000.00 every five years These figures are therefore in good agreement, and suggest total recurrent costs of around Rs.3.00 per family per month for handpump dug wells, and a little under Rs.9.00 for tubewells.

2.1.6. Piped Schemes

The village surveyors examined 157 existing piped schemes in the three districts. Most schemes offer service 24 hours per day. The mean number of failures is 8 times a year, although this can be a high as 60 failures per year. Downtime before repair is 10 days on average, although this also varies considerably and is as much as 50 days in some cases. Standpipes are at a mean distance of 45 m, and a maximum distance of 200 m.

a) Gravity Scheme Maintenance

Operation and maintenance of gravity piped systems is mostly well within the capabilities of villagers who have received basic training. It does, however, require a strong CBO to back up this capacity, and a well-developed community spirit to use the system responsibly, generated by full participation in the planning, design and construction of the system. The main activities required are replacement of taps, annual clearing of roots which have grown into tanks and spring catchments, and periodic flushing of the silt box or small dam at the spring catchment. Conservation of the area immediately upstream of the catchment is also important, but is of a more preventative nature: avoiding clearance of vegetation and faecal pollution. Activities usually beyond the capacity of community members would be repairing major pipe bursts and repairing cracked masonry tanks.

b) Pumped Scheme Maintenance

Pumped schemes are generally the responsibility of the NWSDB, who carry out maintenance and recover costs through water tariffs. The NWSDB have full responsibility for headworks and treatment, and communities are occasionally responsible for maintenance of distribution systems.

c) Piped Scheme Maintenance Costs

Data on piped systems in the project area obtained from the NWSDB show mean O&M costs of Rs.29.00 per family per month for gravity schemes and Rs.74.00 for pumped supplies. Costs of community-based maintenance with volunteer or piece-work labour should be substantially lower than this. Data on repair costs for gravity schemes, obtained from the village survey, show a mean of Rs.8.00 per family per month. As repairs make up the majority of maintenance costs in such systems, a working figure of about Rs.10.00 per family may be appropriate.

2.1.7. Operation and Maintenance Costs

The operation and maintenance costs for each type of technology on a monthly basis per household are found in Table 20. These costs were calculated using the data collected on existing schemes.

2.1.8. Town and Urban Schemes

There are 29 settlements in the three districts which can be categorised as towns. They range in size from 3000 to 45,000 inhabitants All of them have piped water supply schemes, but many of these require expansion or rehabilitation. The oldest schemes date from 1975. In most cases design population of the older schemes has been exceeded by the current population. It has been estimated that any of the schemes which were constructed before 1985

Table 20 Operation and Maintenance Costs

Scheme Type	O&M Rs./household.month
Gravity	10.00
Handpump shallow well	3.00
Tubewell	9.00
Protected well	1.75
Pumped, piped	50.00

will require rehabilitation. Some of these schemes, mostly in the larger towns, are presently being rehabilitated by the NWSDB with ADB or USAID funds (see Table 21). Of the remaining systems in 17 towns with a total population of 113,400, there are 15 systems requiring rehabilitation, and 14 new schemes or extensions are required. In terms of population, 69,490 people are in need of a rehabilitated scheme (59%) and 24,810 (22%) require a new scheme (see Table 22). Overall urban coverage from piped schemes in the towns not scheduled for assistance from other projects is thus 19%. However some of the population which is not served by a piped system has access to protected wells.

Table 21 Towns Covered by Other Agencies

District	AGA	Town	Type	Agency	Estimated Population
Badulla	Badulla	Badulla	MC	NWSDB/ADB	42,000
	Bandarawela	Bandarawela	UC	NWSDB/ADB	14,000
	Bandarewela	Diyatalawa		NWSDB/ADB	10,750
Matara	Devinuwara	Devinuwara	EX-TC	NWSDB/ADB	9,000
	Dikwella	Dikwella		NWSDB/ADB	6,000
	Kamburupitiya	Kamburupitiya		Gam Udawa 1991	3,600
	Matara	Matara	UC	NWSDB/ADB	45,000
	Weligama	Weligama	UC	NWSDB/ADB	20,000
Ratnapura	Atakalanpanna	Kahawatta	EC-TC	NWSDB/USAID	7,200
	Balangoda	Balangoda	UC	NWSDB/ADB	17,000
	Ehcliyagoda	Ehcliyagoda		NWSDB/USAID	7,200
	Ratnapura	Ratnapura	MC	NWSDB/ADB	45,000
Total		12			226,750

Table 22 Towns not covered by other agencies

AGA	Town	Estimated Population	Year of Constructio n	Design Pop.	Rehab.	New
Badulla						
Ella	Ella	3600	1980	3000	3000	600
Haldummulla	Haldummulla	3000	1986	2200		800
Haliela	Haliela	3600	1977	3700	3700	
Mahiyangana	Mahiyangana	7200	1969	6000	6000	1200
Passara	Lunugala	3700	1976	2000	2000	1700
Passara	Passara	4600	1975	3240	3240	1360
Welimada	Welimada	6500	1975	2900	2900	3600
Welimada	Keppetipola	9500	1980	5700	5700	3800
Haputale	Haputale	4000	1979	2500	2500	1500
Total	9	45700		31240	29040	14560
Matara						
Akuressa	Akuressa	9000	1975	7650	7650	1350
Hakmana	Hakmana	4200	1980	3700	3700	500
Kotapola	Deniyaya	5500	1981	4700	4700	800
Total	3	18700		16050	16050	2650
Ratnapura						
Atakalanpanna	Rakwana	3000	1975	2000	2000	1000
Embilipitiya	Embilipitiya	20000	1985	20000		
Kuruwita	Kuruwita	8000	1975	2400	2400	5600
Nivitigala	Nivitigala	8000	1980	11000	11000	
Palmadulla	Palmadulla	10000	1976	9000	9000	1000
Total	5	49000		44400	24400	7600
Grand Total	17	113400		91690	69490	24810

2.2. Sanitation

2.2.1. Sanitation Coverage

The survey results show that the number of households with latrines is very high in the three districts, amounting to 81% overall. A small number (1%) of houses had two latrines.

The survey showed that water seal latrines are the most common, although pit latrines are frequently found as well. A very small number of households have a cistern flush toilet. These were only found in villages in Ratnapura, and are most probably in the homes of relatively wealthy gem miners.

Table 23 Households with Latrines

District	With Latrine	Without Latrine
Badulla	74%	26%
Matara	87%	13%
Ratnapura	85%	15%
Three Districts	81%	18%

Table 24 Type of Latrine

District	Dughole	Pit	Waterseal	Cistern Flush
Badulla	4%	38%	58%	0%
Matara	11%	28%	65%	0%
Ratnapura	18%	34%	47%	1%
Three Districts	11%	33%	57%	0%

These findings are borne out by similar findings in other areas. In Kalutara and Moneragala, a survey carried out in 1991 found between 69% and 84% of households with latrines.

Table 25 Percentage of Households with Latrines, 1991

District	With Latrine	Single pit with water seal	Single pit with slab	No slab
Kalutara	84%	74%	10%	15%
Moneragala	69%	15%	29%	56%

(source Haskoning Engineering Consultants Ltd)

Similarly, a survey in Anuradhapura to assess the UNICEF water supply and sanitation project found 50% to 72% coverage.

Table 26 Percentage of Households with Latrines, Anuradhapura District, 1990

AGA Division	With Latrine	Water Seal	Direct Pit
Meddawachchiya	50%	83%	13%
Kekirawa	72%	77%	20%

(source Impact Assessment of UNICEF-assisted Water Supply and Sanitation Project)

The 1981 census also shows between 70% to 80% of households with latrines.

Table 27 Sanitation Coverage, Rural and Estate Sectors, Sri Lanka, 1981

District	With Latrines	Pit	Water Seal	Flush Toilet	Bucket Type
Badulla	70 5%	68 6%	24 7%	5.2%	1 5%
Matara	80 8%	73 5%	24 6%	1 7%	0.2%
Ratnapura	74 8%	76 7%	20 1%	2 7%	0.5%

Source 1981 Census

These sources of data show that in most districts, water seal latrines are the type most often found.

The large majority of latrines are owned by the household itself, although a small percentage (3%) are shared. Two percent of latrines are estate owned, as almost all housing on plantations belongs to the estate. Almost 60% of latrines are under 6 years old, but a substantial number (18%) are over 12 years old. In most cases the latrine had been built by a mason, although families often build their own latrines.

2.2.2. Latrine Condition

In general, latrine superstructures are built of bricks or corrugated sheets, but a number are made of thatch, wattle and unburned bricks. Latrines floors are cement in most cases, rather than mud. Latrine pans, when they are present, are usually ceramic. About a third of latrines have no pit lining, and another third have linings of brick or stone. The remainder are lined

with rock or planks, or the respondents did not know what the lining material was. Vents are largely absent.

Although the number of households with latrines is high, many latrines are in a poor state of repair. In the opinion of the surveyors, based on observation, 45% of latrines were in poor condition, 21% in fair condition, and only 32% in good condition. The public latrines in particular tended to be in poor condition (71% of public latrines were in poor state of repair). The cleanliness of public latrines was fair, however. Most estate latrines were in a fair or poor state of cleanliness. Of the household owned latrines, 44% were clean, and 42% were in a fair condition of cleanliness, defined as the minor presence of faecal material around the bowl). The shared latrines showed a similar pattern of cleanliness as the household owned latrines. Over 50% of latrines had 5 users or less.

2.2.3. Sanitation Coverage

When the condition and type of latrine are taken into account, coverage is considerably lower. Including only latrines which are in good or fair condition, and water seal or pit type, coverage is 39% overall.

Table 28 Sanitation Coverage

District	With latrine	Latrine in good or fair condition	Waterseal or pit latrine	Coverage
Badulla	74%	61%	96%	43%
Matara	87%	56%	93%	45%
Ratnapura	85%	43%	81%	30%
Total-Three Districts	81%	53%	90%	39%

2.2.4. School Latrines

The majority of schools have latrines, although over 25% of the schools in Ratnapura do not. Several sanitation programmes (NWSDB CPU pilot project, plantations, Mahila Samithi projects) have experimented with pre-school and children's latrines, which typically have a smaller hole and an open roofless superstructure or no superstructure at all.

Table 29 School Latrines

District	Total Number of Schools	Number for which data are available	Number with latrines	Percent with latrines
Badulla	550	452	413	91.4%
Matara	397	395	371	93 9%
Ratnapura	590	558	414	74 2%

Source Ministry of Education, Facilities Mapping Survey, 1989

3. Existing Institutional Framework and Principal Issues

3.1. Existing Framework

3.1.1. Sector Policy and Legislation

a) Global Sector Policy

Sri Lanka was one of the 115 countries which adopted the New Delhi Statement at the Global Consultation on Safe Water and Sanitation for the 1990s held in New Delhi in September 1990. This statement stressed the need for institutional, economic and social changes to create the right conditions for accelerated progress in water supply and sanitation coverage. In particular, the need was identified for reductions on the costs of services through increased efficiency and use of low cost appropriate technologies, and the mobilisation of additional funds from new sources, including the consumers.

The "guiding principles" recommended by the Global consultation are:

- protection of the environment and safeguarding of health through the integrated management of water resources and liquid and solid wastes
- institutional reforms promoting an integrated approach including changes in behaviour, and the full participation of women at all levels in sector institutions
- community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programmes
- sound financial practices, achieved through better management of existing assets, and widespread use of appropriate technologies

b) NWSDB Legislation and Policy

Legislation

The National Water Supply and Drainage Board was brought into being through the enactment of the National Water Supply and Drainage Board Law, No. 2 of 1974. According to this law, the Board has the duty to develop, provide, operate and control an efficient, coordinated water supply and to distribute water for public, domestic or industrial purposes, and to establish, develop, operate and control an efficient sewerage system. The Board has this responsibility only in its areas of authority, which are declared as such through an Order of the Minister (Minister of Housing and Construction). These areas were defined through Gazette notification in 1982 to be the entire island.

Policy

The NWSDB recently released a draft version of its 1991 Corporate Plan, which includes a recommended new national strategy for the water supply and sanitation sector. The corporate plan points out that overall in Sri Lanka, satisfactory service levels are in the order of 22% for the urban population, 29% for the rural population, and 28% overall, where satisfactory services levels are defined as 24 hour per day service for piped water, a functioning handpump providing water of acceptable quality, or an open well with an apron, bucket and windlass. While the NWSDB has the responsibility for disbursing approximately 90% of the total national sector capital expenditure, by virtue of the fact that it concentrates on piped supply schemes (primarily in the urban sector) and to a lessor extent on handpumps, it serves only about 20% of the Sri Lankan population in terms of water supply, and a negligible proportion in terms of sanitation facilities. The rural sector and sanitation have not been one of the Board's priority areas.

The Board now faces a potential serious problem, as the recent water tariff increase will inevitably make consumers more critical of the quality of service they receive. Therefore, unless more emphasis is placed on system rehabilitation there is a real danger that there will be opposition to paying the enhanced rates, a situation which would have disastrous effects on the financial viability of NWSDB The Board has thus decided to make the rehabilitation of existing piped supply facilities its number one priority, thereby upgrading service quality and securing consumer satisfaction.

The new national sector strategy puts the emphasis on the rural sector, and stresses the New Delhi philosophy, including community management, the strengthening of local institutions, and an integrated approach. This philosophy implies that future emphasis must be on rural and peri-urban sectors As the NWSDB is of little significance in the priority rural sector, the new strategy recognises the limitations of NWSDB, and proposes that its role be limited to implementation only in the urban areas, for integrated schemes serving more than one local authority, for schemes with full treatment, and for institutional consumers. For the rural sector, NWSDB would play an advisory role only, if requested The Board would also advise on matters relating to technical guidelines, wastewater management and drainage works. It would be responsible for monitoring water quality supplied in piped schemes, and will establish a national water supply/sanitation sector database for monitoring purposes. The Board will also have a monitoring role to play in the coordination of sector inputs. It will be responsible for agency coordination, carried out through regular liaison meetings involving national implementing organizations (both governmental and non-governmental) and external support agencies.

c) Legislation Governing Pradeshiya Sabhas

The Pradeshiya Sabhas are elected local authorities and were created by the passing of the Pradeshiya Sabhas Act in April 1987, with "a view to providing greater opportunities for the people to participate effectively in decision-making process relating to administrative and development activities at a local level". Political unrest in Sri Lanka delayed the election of

the councils until May 1991. It is as yet unclear how they will function, although it is evident that the President plans to devolve power to these local bodies.

According to the Act, the Pradeshiya Sabhas have broad responsibilities with regard to water supply and sanitation. It is the duty of the council to take effective measures to secure that adequate and proper latrine accommodation is provided for all houses, buildings and lands, to provide public latrines as is necessary within all places of public resort, and to ensure that latrines are maintained in proper condition. The council has the right to require that an owner build a latrine, water closet or bathroom on his property, and may levy a fine if the owner does not comply. The council also has the right to step in and carry out maintenance of a latrine or water closet if necessary, and recover the costs from the owner.

The Pradeshiya Sabha is not required by the Act to provide a water supply to the inhabitants of the area, but is given all necessary powers under the Act to do so, including entering into contracts, hiring and leasing equipment, constructing premises, and levying a water rate.

The Act is permissive, rather than restrictive, that is the Pradeshiya Sabhas may establish water supply schemes, but this power has not been granted to them exclusively. The rights that Pradeshiya Sabhas will have, for instance, to water sources on public (state) land is not clear. In the past tapping of water sources for community supplies was almost always carried out by the state, through the AGA. Pradeshiya Sabhas are not viewed as the state per se, but rather as a local authority, and their status has been further undermined by their politicization. It may be that Pradeshiya Sabhas will view water projects initiated and carried out by communities and NGOs without their involvement as undermining their authority, and will seek to interfere with them or deny them access to public water sources. However, collaboration with NGOs and a source of direct funding could also help the Pradeshiya Sabhas themselves become the independent, democratic, responsive organisations they were envisaged to be.

d) Provincial Councils Legislation

The Provincial Councils were established in 1988 by the 13th Amendment to the Constitution of the Republic of Sri Lanka and the Provincial Councils Act No. 42 of 1987. The Provincial Councils appear to have come into being because of a political need to respond to the demands of minority ethnic groups for autonomy. Provincial power groups did not actually exist, and this has made the process of power sharing and administrative devolution slow.

The ninth schedule of the constitution specifies the devolved functions which Provincial councils are empowered to carry out. However, to a large extent these powers have not in fact been devolved as most of the enabling legislation has not been worked out.

e) Current Legislation Governing NGOs

At present there is no general legislation by which voluntary service organizations in Sri Lanka are regulated. The two main pieces of current legislation relating to such organizations are the Societies Ordinance (Chapter 124), and the Voluntary Social Service Organizations

(Registration and Supervision) Act No. 31 of 1980, which came into operation from February 1982. In order to be registered under this Act, organisations must already have legal status.

There are four ways in which NGOs can obtain legal recognition ;

- by an Act of Parliament (incorporation)
- under Section 106 of the Trust Ordinance
- under the Societies Ordinance
- under the Companies Act

The provisions of numerous other Acts enforced in Sri Lanka also have their effects on the activities of NGOs. An example of this is the Inland Revenue Act No. 11 of 1963 by which a certain degree of control is placed on the funds of the NGOs. In addition such other Ordinances as the Customs Ordinance, the Finance Act and legislation such as the Finance Companies Act No. 73 of 1988 and the Finance Company Act No. 78 of 1988 also have a bearing on NGO activities, especially on credit programmes. Societies that are mainly involved in credit programmes come under the jurisdiction of the Cooperatives Societies Law No 5 of 1972 and No 37 of 1974.

At present, a special Presidential Commission has been appointed to look into all aspects of the activities of NGOs functioning in Sri Lanka. This commission is to make such recommendations as are deemed necessary for the regulation of NGOs and also to make recommendations with regard to such remedial measures as it deems necessary. The commission has been conducting an exhaustive investigation of the activities of NGOs. It appears that new legislation may be expected for increased government monitoring and regulation of the NGOs.

f) Legislation Governing the Estates

The two parastatals controlling the tea, rubber and coconut plantations both have their own legislation. The Sri Lanka State Plantation Corporation was created by the Ceylon State Plantations Corporations Act of 1957 and the Janatha Estates Development Board (JEDB) was created by the State Agricultural Corporation Act of 1972. Each organisation reports to its own Ministry They are both divided into a number of Regional Boards, and these are set up under the State Agricultural Corporations Act. The two corporations were nationalised under the Plantations Industries Act of 1974.

The Medical Wants Ordinance of 1912 places the responsibility for the safeguarding of workers' health on the estate superintendent. This legislation should be enforced by the Ministry of Health, but is currently not enforced. The ordinance was revised in 1976 and renamed the Estate Health Law, but the revisions have not been passed by parliament.

g) Legislation Regarding Water Use and Water Rights

The majority of Sri Lankan legislation regarding water deals with its use for irrigation. Use of water for domestic purposes has had low priority in legislative enactments. In general, responsibility for domestic water supply rests with local authorities.

An important legislative enactment relating to the law of property in Sri Lanka is the Crown Lands Ordinance, which vests the right to use, manage, and control water in any public lake or stream with the state. However exercise of this right is subject to restrictions such as rights conferred by any other law, rights of the occupiers of the banks of lakes and streams and holders of permits. Permits may be granted by the state (by the GA) to allow water to be diverted from a public lake or stream. The GA is required to consider the rights of riparian proprietors in issuing permits.

In practice, local authorities obtain permits to use water sources for domestic use from the GA without difficulty. Communities, through recognised CBOs and NGOs also have the right to approach the GA for permits. Occasionally an advisory board is appointed by the Minister to assist the GA in granting permits, but this is usually done in the case of permits for use of water for irrigation.

In addition to the CLO, legislative enactments such as the Waste Lands Ordinance, the Encroachments on Crown Lands Ordinance, the Land Settlement Ordinance and the Land Acquisition Ordinance also have relevance to water use and rights, usually relating to irrigation works.

h) Likely Developments in Local Government

Local bodies have played an important role in the polity of Sri Lanka since independence. However, during the 1980s much of their power eroded as the demand for decentralisation of administration and devolution of power led to the creation of District Development Councils, which in effect usurped the powers of Village, Town and Municipal Councils. This politically inspired action made the local bodies ineffective and over time special commissioners were appointed to administer these bodies in the absence of elected representatives.

However, Government commitment to decentralising administration to local bodies continued to be part of the political rhetoric, and in the 13th amendment to the Constitution and the Pradeshiya Sabha Act, found legal form. Provincial Councils came into being soon after Provincial Council elections in 1988 and the Pradeshiya Sabhas were elected in May 1991.

Provincial Councils as they are constituted, while exercising a wide range of activities, have two major weaknesses. Firstly, they represent an administrative structure which has become just another bureaucratic layer, in the absence of anticipated devolution from the centre, which still holds all non devolved and line ministry functions, and secondly, the interpretation of the 13th Amendment is heavily weighted against the Provincial Councils acquiring genuine power.

These limitations on powers range over whole areas of apparent provincial competence from law and order and public services to education, transport, planning and development.

The limitations of the Provincial Councils are built into the legal framework from which they came into being. The reserved list which gives the centre complete authority for National Policy on all subjects and functions and the concurrent list which overlaps with the Provincial Council list are some of the fundamental problems which will take several years to clarify.

However in the creation of the Pradeshiya Sabhas the Government has endeavoured to take its administration arm at the district level, the Kachcheri system, to a lower level at the Assistant Government Agent's (divisional) level. AGAs are now expected to play a key role at the divisional level as they have now been designated as Additional Government Agents of the Centre, Divisional Secretaries of the Provincial Council and Secretaries to the respective Pradeshiya Sabhas.

For the local bodies to have autonomy, whether they are Provincial Councils or Pradeshiya Sabhas they must have independent powers to collect revenue. However the pattern that has been adopted so far is simply one of grants from the Treasury for recurrent and capital expenditure. It is unlikely in the near future that the Provincial Councils or Pradeshiya Sabhas would substantially increase their revenue to be able to independently finance development projects planned by them.

The casualty of the new decentralised system is the administrative structure that existed at the District level with the Government Agent at the apex. Most of the day-to-day functions of the Government Agent have been either taken over by the Provincial Council or by the AGAs.

Whatever happens to the Provincial Councils, it seems clear that the Pradeshiya Sabhas and the divisional administrative structures are taking hold because there is political will at the centre to decentralise administration. On the political level it is at the Pradeshiya Sabhas that leadership is identifiable because both members of Provincial Councils and MPs are elected by proportional representation, thereby blurring on a district basis the original idea of a constituency represented by a member. Pradeshiya Sabha members, however, are the old elite in the Village and Town Councils and now exercise power in the divisions. It can be expected that Pradeshiya Sabhas and the divisional administration will be strengthened in the future as the administrative functions of the Government begin to be decentralised.

3.1.2. Institutional Roles & Responsibilities

a) Overview

There is a wide variety of institutions working in the rural water supply and sanitation sector, either as direct implementing institutions or as supporting institutions. These include:

- government institutions
- non-government organisations, both indigenous and international
- community based organisations
- the private sector

Each of the organisations active in the sector has been examined in depth in terms of organisation, activities, staffing and capacity. A profile of each is included in Annex 1 of Volume II(Institutions, Policy, Implementation Strategy).

Government Implementing Agencies

The current major government implementing agencies in the sector are·

- The National Water Supply and Drainage Board (NWSDB)
- plantations (SLSPC and JEDB)
- Integrated Rural Development Projects (IRDPs)

The NWSDB has the mandate for water supply in Sri Lanka, but is increasingly recognising its limitations in rural water supply. Although NWSDB expenditure in water supply and sanitation is high (the highest of all the institutions) the number of beneficiaries is low, being restricted primarily to the urban population. The Board plans look to local authorities and NGOs to carry out rural water supply projects in the future. It has proposed, as part of this policy shift, to promote the establishment of a national coordinating committee to oversee rural water supply and sanitation, and to assist it with draft policy formulation and planning.

The plantations have been the recipients of large amounts of donor funding to improve the living conditions of resident estate workers, which have historically been notoriously low. A part of this funding is for water supply and sanitation, which has made the plantation sector one of the larger implementing agencies.

Each of the project districts has an Integrated Rural Development Programme which acts as an intermediary for channelling funds to water and sanitation projects as part of overall rural development. They are thus not strictly implementing agencies, but have ventured into the rural communities with change agents (mobilisers) in the absence of other agencies to do this. They are funded to a large degree by external donor agencies, with funds being channelled through the MPPI. They are the main agencies with an overall rural development strategy in their districts, combined with the funds to carry this out.

The expenditure of these organisations on water supply and sanitation in the three districts is as follows:

Table 30 Expenditure in Rs. M

Institution	1986	1987	1988	1989	1990
NWSDB	n/a	n/a	76 5	22.7	79.1
Plantations (SLSPC/JEDB)	18 9	14 6	15 6	8.0	8 9
IRDP	13.9	12 2	8 0	8 5	20.1

Non-government Organisation Implementing Agencies

The largest NGO active in the sector is Sarvodaya, which is also the largest NGO in Sri Lanka. Sarvodaya has a Rural Technical Service (SRTS) which carries out a variety of rural works projects in villages in 14 districts. SRTS plans to carry out Rs. 11.0 million of rural projects in 1991, of which Rs 2.72 million is for water supply and sanitation projects in Badulla, Matara and Ratnapura SRTS initially proposed a considerably larger budget to its major donor, which would have had the organisation execute Rs. 17.9 million of projects, of which Rs 4.1 would have been for water supply and sanitation projects.

In Badulla, PLAN International has a large programme, and water supply and sanitation is a component. PLAN spent 1.145 million rupees on water supply and sanitation in 1990/91, and plans to spend 2.0 million in 1991/92

The Thrift and Credit co-operative Society is a large organisation with extensive network of societies at village level. TCCS is active in all three districts. The society has carried out water projects in a few of its villages, and is interested in carrying out more. It is an established, well organised organisation and as such has high potential as an implementing agency in the future. TCCS and one of its water projects are described in Annex 1.

There are many smaller NGO groups which sometimes carry out water projects as part of their programmes. These include Mahila Samithi (a women's organisation), Satyodaya, Saukyadana, Uvagram and others. These organisations tend to carry out very small scale projects, often restricting their activities to one particular area, such as latrine construction or health education. Many of these are inactive, but this type of small organisation is responsive and can mobilise if funding is available. Their capacity is low, however, and is limited to a few small projects in a restricted geographical area.

Community Based Organisations

Community based organisations are numerous in Sri Lanka, and are found throughout the Grama Sevaka Divisions and villages of the three districts. These small organisations include the Rural Development Societies, Gramodaya Mandalayas, Youth Clubs, Young Farmers'

Clubs, and religious societies. Some of them have been involved in the past in water supply and sanitation projects, often initiating the request to an implementing agency and organising local inputs such as communal labour. The wide variety of CBOs is an indication of the capacity for community organisation and mobilisation, including organising communal labour and the collection and management of funds.

Service Organisations

Service organisations are those which can offer assistance and services, primarily training, to implementing agencies. They are mostly NGOs, although there are a few government service organisations.

Facilitating Institutions

There are a few other institutions which are instrumental in sector activities. The private sector is dynamic and healthy, and through it goods and services are readily available. There are small banks such as the Co-operative Rural Banks and TCCS which make credit available to households wishing to construct their own water supply and sanitation improvements.

b) Institutional Coordination

There is little formal coordination of the institutions working in the sector. Each of the major government implementing agencies falls under a different ministry (NWSDB - Ministry of Housing and Construction; Plantations - Ministry of Plantations and Plantation Industries; IRDPs - Ministry of Policy and Plan Implementation). A government policy of decentralisation has resulted in devolution of many government activities to the Provincial level in 1987. The administrative level below this is that of the Pradeshiya Sabhas, which have yet to be fully established as they have only recently been elected. The Gas at District Level previously coordinated the activities in their districts, but now have much less authority vis-a-vis line ministries controlled by central government. The District Level administration may be phased out as Pradeshiya Sabhas take up their broad mandates.

There is no coordination of NGOs, as most of them are so small as to make coordination unnecessary. Sarvodaya has good relationships with the AGAs and Gas of the areas in which they work, and PLAN works with MPPI, but both plan their programmes independently. The NGO programmes are also very much dictated by the funding and priorities of the donors.

c) Strengths and Weaknesses of the Institutional Framework

The NWSDB and the Ministry of Health hold the mandates for the provision of water supplies and sanitation respectively. The recent policy statements by the NWSDB have restricted its effective role in the rural sector to overall policy, monitoring, technical guidelines and standards, and direct project implementation primarily only under contract to other agencies. This does not put it in an effective position to provide the driving force and coordination required with the multiple agency approach necessary to mobilise sufficient capacity for sustainable project implementation. The Ministry of Health's official role is perhaps better

suited to this approach, and it has successfully cooperated on various sanitation (and water) projects with other agencies. The split in responsibilities for water and sanitation between two Ministries does, however, greatly hamper the integration of water and excreta disposal improvements to maximise health benefits from sector investments.

Mandates of the other sector agencies mentioned in the previous sections are usually primarily directed towards different ends, and include water supply and sanitation as a subsidiary element in their programmes. Thus, the prime objectives of the NGOs and IRDPs are social and economic development, whilst the plantation sector corporations and agricultural development agencies are oriented towards agricultural production. Water supply and sanitation can, and should, be viewed in this wider context. However, methodological and technological advances can be overlooked, and duplication of effort occur in the absence of effective coordination of the water supply and sanitation sector as a whole.

The greatest proportion of sector expenditure is taking place through the government implementing agencies, which for the most part do not have the emphasis on sustainability and community management that the NGOs have. The focus of both the NWSDB and the plantations is provision of services to beneficiaries who are passive recipients, rather than on promotion of services which are actually largely implemented and managed by the community itself. IRDPs have an increasingly stronger community management approach derived from their now substantial experience of channelling funding for projects in small communities, where the role of CBOs in particular as a link between project and people has been recognised. They have, however, been somewhat constrained by a tendency to implement projects through government agencies, rather than NGOs, who have the necessary experience in working with CBOs.

The plantations are limited by their lack of capacity to supervise scheme construction, as all responsibility for implementation falls on the estate superintendent. Estate schemes are implementing water supply and sanitation improvements with little community participation and no cost recovery for either capital expenditures and operation and maintenance, due to the traditional nature of the estates. While resident workers are being gradually covered by new or upgraded schemes, non-resident workers are often left out. Both plantation corporations have carried out trial schemes with non-resident workers, but on a small scale. The estates and the donors who fund the estate social development programmes recognise the need to serve these people, but it is unclear how the plantations could undertake this given their unfamiliarity with community mobilisation and organisation.

NGOs exist in all three districts, and have an interest in implementing water supply and sanitation schemes in order to satisfy basic human needs of rural inhabitants and improve health status, but also in order to contribute to community development and empowerment through participatory development. This is the driving force behind these NGOs, and as such their implementation methods tend to be very different. NGOs also do not have the capacity to take on responsibility for on-going operation and maintenance, and therefore promote projects which are self-sustaining. NGOs are usually limited, however, by lack of funds, lack of trained personnel (especially technical personnel), lack of logistical support (offices, vehicles, equipment etc.)and lack of management expertise. The NGOs, in particular the small

ones, need to work within a structured programme in order to avoid the rather ad-hoc nature of their past projects.

NGOs also need to work in a supportive environment which fosters collaboration between government and non-government organisations. The current atmosphere of suspicion regarding both indigenous and international NGOs is hampering NGO activity.

CBOs are found in nearly all villages, and are the essential last link in the chain that stretches from the external donor agencies to individual project beneficiaries. As they mostly have little capacity to generate their own funds, they rely to a great extent on agencies from outside the community to achieve their objectives, resulting in many of them existing in little more than name. CBOs which are primary societies of larger NGOs (eg. TCCS or Sarvodaya) are generally the most active as they have ready access to outside support.

3.2. Principal Issues

3.2.1. Sustainability

a) Operations and Maintenance

Any proposed investments in infrastructure, such as rural water supply and sanitation facilities, is meaningless without provision for ensuring its continued usefulness. Indeed, the cost-effectiveness of such investments is affected as much, if not more, by their useful lifetime than any savings made on initial capital costs. Effective operation and maintenance systems are thus a prerequisite for successful projects.

It was notable during the field surveys that all gravity systems which had been constructed with a high degree of community participation and a clear sense of ownership by the community were in reasonable working order, whilst all the vandalised or broken down systems had been planned and constructed by non-participatory methods. The importance of community participation in the planning, construction and maintenance of this type of system is greater than with wells since it is a facility common to the whole community rather than for a smaller group sharing a single water point (well). However, the UNICEF-funded handpump programme in Anuradhapura and Kalutara also found that the establishment of an effective maintenance system was much easier in those cases where the community had been involved fully in the project planning and implementation prior to using the facilities. In these cases of sustained operation and maintenance, the bulk of responsibility lies with the community.

The management of an operations and maintenance system aims to minimise the interruptions in service. The main prerequisites for achieving this are:

- regular preventive maintenance
- effective reporting and rapid response to breakdowns
- availability of spares and materials

The first two of these factors depend heavily on personnel motivation, whilst the third depends more strongly on the availability of funds. The successful examples observed in Sri Lanka achieve motivation through financial incentives (private sector maintenance) or peer pressure (village-based maintenance). The collection of funds is also much easier when they are managed by the community, rather than paying an outside organisation over which it has little control, and which may or may not provide the services. Agency inputs into the management of such systems would include training village-level technicians, assistance to the community in setting up its own management machinery (water committee or consumer society), keeping stocks of necessary spares readily available, arranging for major repairs/maintenance as required and monitoring system effectiveness.

b) Finance

Recurrent expenditure can be financed by a variety of methods, including regular tariffs or water charges, through general taxation or supplementary water taxes, or on an ad-hoc basis. Of these methods, taxation is perhaps the least appropriate, as it does not encourage consumers to use their systems wisely, and has a high potential for the diversion of the funds to alternative uses. Most community-managed systems collect recurrent funds on an ad-hoc basis, often maintaining a small fund of a few thousand Rupees for use as required. For systems where an appreciable agency input into maintenance is required, such as handpumps or motor-pumped systems, regular water charges are more effective. Regular charges should also be encouraged for systems with a higher degree of community management, since they will allow the generation of a surplus over the early years of system operation which will help to cover higher expenditures later on as the system ages.

Sri Lankan policy in the sector states clearly that operation and maintenance costs should be covered completely by water consumers The NWSDB is achieving this by a large cross-subsidy from Colombo to other systems, based on a politically imposed national tariff. For schemes outside NWSDB jurisdiction, this national tariff does not apply. Subsidy for community-based operation and maintenance is in any case impractical, and the benefits in terms of more appropriate designs and better system use of a scheme-specific charging policy make it the obvious choice. The most effective method of collecting such charges is through the community group responsible for the water supply.

One important move being made towards capital cost recovery is the requirement for community contributions in kind (labour and basic materials available or manufactured in the community) to construction. This also has an important spin-off in helping to raise community awareness and interest in the system. It has been successfully applied by Sarvodaya, amongst others, and typical contributions range from 15%-30% With adequate training and orientation for other agencies in community participation methodologies, there is no reason to suppose that this is not replicable.

The principle of cash cost recovery is, however, less well established, if at all. A few small schemes have been constructed by community groups on their own initiative, and TCCS has expressed an interest in using its expertise in providing finance to rural people for this purpose. The welfare mentality engendered by successive government policies is, however, still prevalent, and is a great impediment to moving towards sustainability in capital funding. With this in mind, it would be appropriate at this stage to establish the principle of at least a token cash cost recovery, which could be developed over time.

c) Consumer Involvement

The importance of consumer involvement from planning through design and construction to operation and maintenance can be clearly identified as one of the most important factors leading towards sustainable progress in the sector. The key to this, and to the question of sustainability, is in making the consumers the driving force rather than passive recipients of

services. For the implementing agencies this implies the generation of maximum community participation at all stages, and a sensitive and responsive attitude. In terms of management systems, accountability to the consumers must be maximised, which can be achieved by devolving management functions to the community whenever possible.

Both these factors require the existence of strong CBOs to act on the community's behalf and to stimulate direct participation by consumers. The CBOs are also necessary to act as a link between people and agencies. Development of existing CBOs, or support for the formation of new ones, is thus an essential element of the work to be undertaken by implementing agencies.

d) Capacity of Implementing Agencies and CBOs

The foregoing discussion shows that, in addition to technical factors, appropriate management systems and community mobilisation are crucial to sustainable progress. Capacity within implementing agencies is lacking in all three of these fields, particularly the last-mentioned. This lack of capacity is a greater constraint to the achievement of programme targets than the availability of funds, with present annual capacity corresponding to only about 3% of the need for new and rehabilitated facilities. In order to make a significant improvement in the existing situation, these capacities must be tripled or quadrupled.

Such ambitious targets must be approached gradually; over-rapid expansion can often lead to failure of an organisation, which must consolidate itself as it grows. A prime example of this is the severe problems faced by TCCS as a result of a rapid and major expansion to on-lend funds for housing loans. Nevertheless, over a 4-5 year timespan, and allowing the agencies involved to apply their own internal system to the task in hand, it is possible to dramatically increase capacity to something near the levels required.

A particularly difficult area will be the Pradeshiya Sabhas, set up by the government to play a pivotal role in development projects, but presently being built up from more or less zero. Additionally, a government "corporate culture" that has only recently started to recognise the importance of community participation will require extensive reorientation. It will be essential to draw to the maximum on agencies with successful experience in the sector to help develop the others.

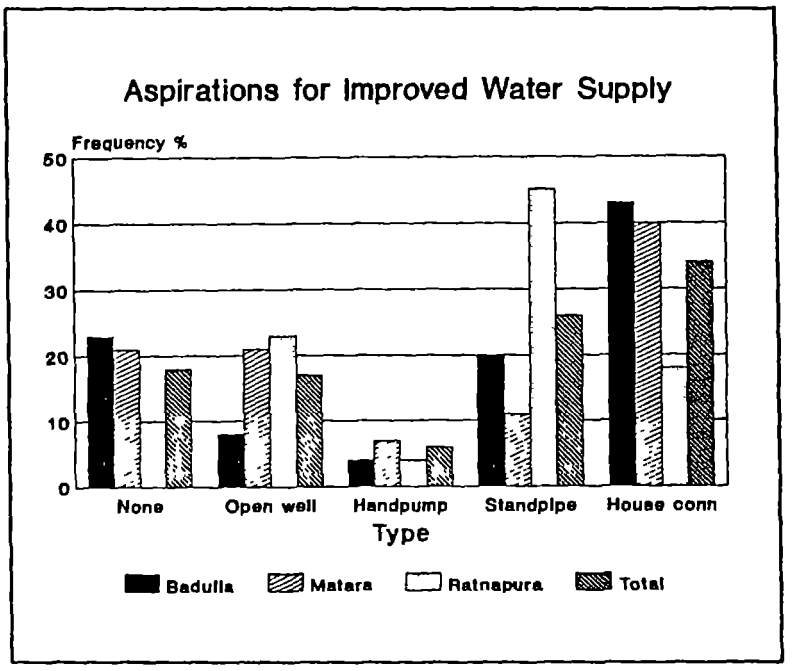
The existing CBOs are also far from sufficient to the task. Many of the poorest communities have no strong organisations, and many existing CBOs represent richer communities, or the interests of the richer members of one community. Of the existing CBOs, many are moribund and are not actively seeking assistance for new activities. A major element of implementing agency activity in the early stages of a project will have to be the support and development of CBOs to a position where they are strong enough to take on the management functions which have to be devolved to community level for sustainable operation.

3.2.2. Affordability and Willingness to Pay

a) Willingness to Pay

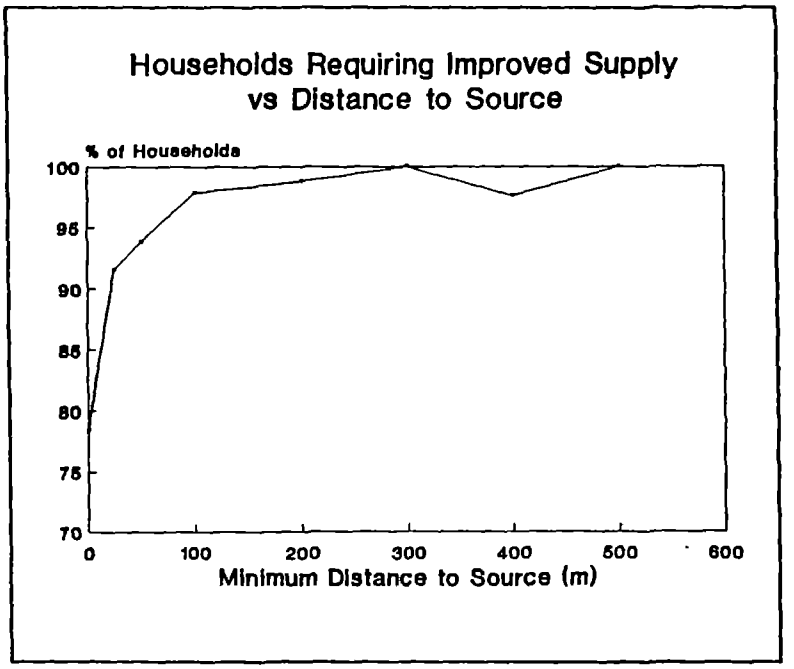
The household survey questioned people about their willingness to pay for improved water supply and sanitation, both for the costs of construction and for on-going operation and maintenance.

Figure 8 Aspirations for improved water supply



It was clear that there was a felt need for water supply improvements, as overall 83%of households stated that they required improved water supply (77% in Badulla, 81% in Matara and 91% in Ratnapura. In the order of stated preference the type of water supply desired was house connections, standpipes and protected wells (Figure 8) It is interesting to note that in Ratnapura, desire for a house connection is lower than desire for a standpipe. This may be due to the perception that the service from house connections is unreliable and expensive.
A simple plot of percentage of households requiring improved supply vs distance to source (Figure 9) shows that the desire for an improved supply is more common among households whose present supply is more distant. Requirement for an improved supply reaches close to 100% at distances above 100 m.

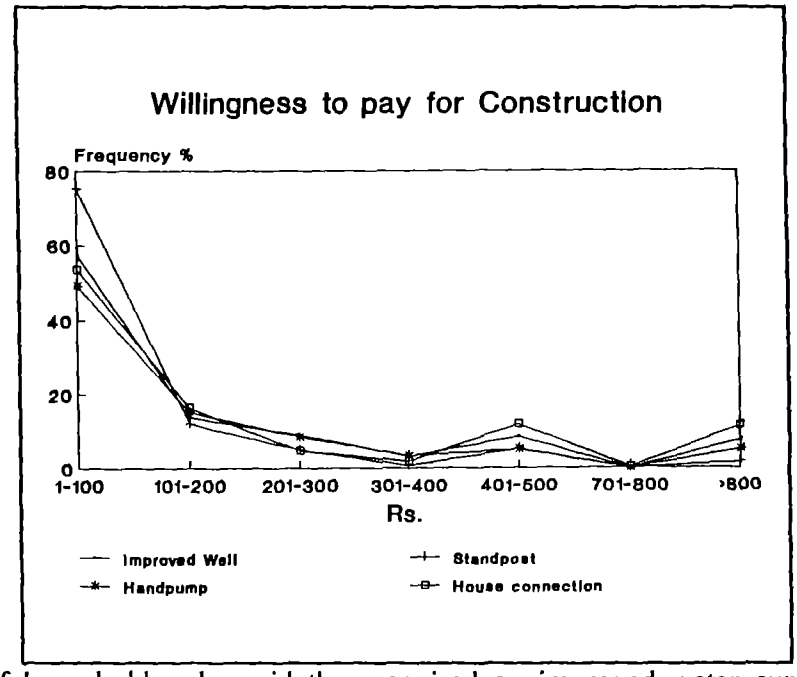
Figure 9 Households requiring improved supply vs distance to source



Approximately two thirds of respondents stated their willingness to contribute labour or materials to water supply projects. Only 6% of households are currently paying for water (4.4% for house connections, 1.2% for water from water vendors, and 0.2% other).

Over 60% of households were willing to pay up to Rs. 100 for construction, and some households were willing to pay over Rs 800 (Figure 10).

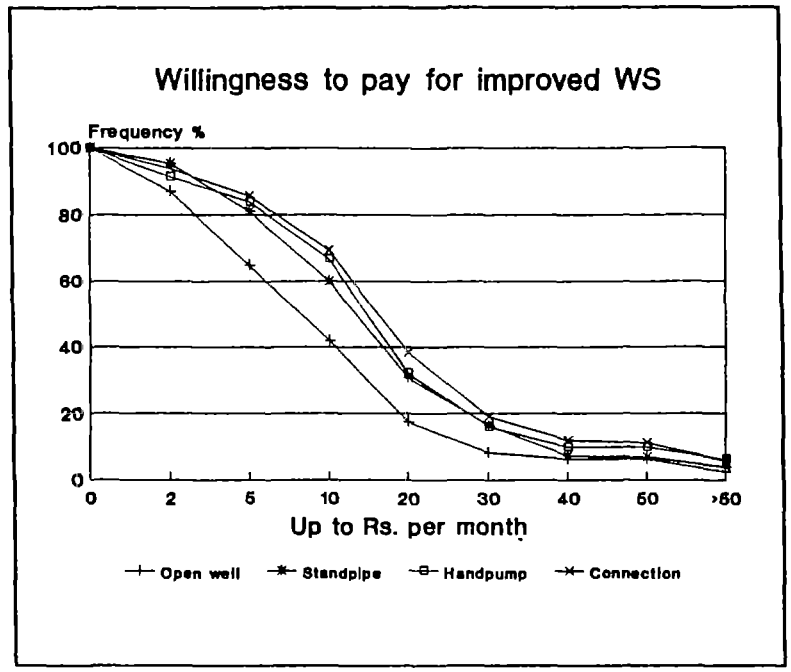
Figure 10 Willingness to pay for construction



About 60% of households who said they required an improved water supply stated their willingness to pay up to 10 Rs/month for operation and maintenance costs. If the payment is reduced to 5 Rs/month, nearly 80% of households are willing to pay. The distribution of willingness to pay is presented in Figure 11. The willingness to pay for open wells is significantly lower than for other water source types.

In an attempt to analyze the motivation behind willingness to pay, multiple regression analysis was carried out on the household survey data. Regression of willingness to pay for construction was carried out on the variables household income, socio-economic index, house area, household size and average distance to source (see Table 31). It was found that the socio-economic index has a positive impact on willingness to pay in all areas except the towns. Willingness to pay was influenced by household income in Matara, Ratnapura and the rural category. Only in Badulla was the distance to source a factor. This may be due to the fact that of all districts, Badulla has both the highest distances to sources and the greatest amount of time spent on collection.

Figure 11 Willingness to pay by type of supply



Although regression equations were developed, two factors indicate that they may not be reliable; the equations have different and sometimes conflicting patterns from one data category to another, and the pair-wise correlation between the dependent and independent variables is weak. In several data categories, the assumption of linearity and homogeneity of data variance was not valid. However, these regressions were all significant at the 95% level or above.

Table 31 Factors Influencing Willingness to Pay for Construction

District	Distance	SES	Household Income	House Area	Household Size
Badulla	+	+			
Matara		+	+		
Ratnapura		+	+		
Towns				+	-
Rural		+	+		

Note + Positive correlation
- Negative correlation

b) Experiences With Cost Recovery

There are several projects in Sri Lanka which have had positive experiences with cost recovery. The FINNIDA project in Kandy experimented with cost recovery on a scheme designed to serve an area which had an existing distribution system which had never given adequate service. FINNIDA indicated it was willing to finance improvements to the scheme if the beneficiaries were willing to pay all O&M costs and 15% of the capital costs, with 12% interest. Some of the labour for pipe laying was to be contributed by the community. The community agreed, aware that the tariff would be fairly steep, and that no allowance would be made for an initial free allotment, like other schemes. Water is progressively more expensive under the tariff structure as consumption goes up. The tariff starts at Rs 4/m^3 for the first 5 m^3 and goes up to Rs 12/m^3 for consumption over 30 m^3. Standpost supplies are priced at Rs 1.5/m^3. If a family carefully conserves water, the monthly cost of a house connection will be in the order of Rs 80 to 100.

The community was organised into 14 Water Consumer and Sanitation Societies to carry out community labour and to ensure that tariffs are paid. Societies were also formed to represent the standpost users, which are responsible for collectively paying for the water used at the standpost as recorded on the meter. Each society has about 7 to 9 members and a constitution.

Operation and maintenance is to be carried out by the Pradeshiya Sabhas, using money collected by them through tariffs. FINNIDA has trained Pradeshiya Sabha staff, and has purchased a computer and software for billing.

A system set up in Kalutara and Anuradhapura districts with UNICEF assistance is showing promising results for maintenance of wells and handpumps by consumer societies. Under this system, the tubewells are handed over to the Pradeshiya Sabha, which in turn supports the formation of consumer societies for individual wells.
Few households are currently paying for water either in the form of tariffs for house connections or to water vendors. Where payment to water vendors is being made, however, it can be substantial. Households in Matara, where salinity intrusion causes well water to be brackish, especially during the dry season, purchase river water delivered by water vendors. These households pay approximately Rs 15 to 25 per month, but in extreme cases such as in Weligama AGA Division the monthly amount may be as high as Rs. 130. Some households reported a vendor water price of Rs 1 per gallon.

The household survey showed that 81% of households had latrines, despite the fact that few households had received any financial assistance to build them. Only 6% of households surveyed had received assistance through the MOH latrine subsidy programme. This programme in any case provides only Rs 1000 (previously Rs 750), whereas latrines cost on average Rs 3000 to build, and may cost as much as Rs 5000 or more.

Communities have demonstrated their willingness to contribute labour and materials as well as cash. Sarvodaya usually raises 15 to 30% of total project costs through labour and in-kind

contributions. The household surveys showed that 74% of those people who said they required an improved water supply were willing to make this type of contribution.

c) Objectives of the Programme

One of the objectives of the programme with respect to willingness to pay is to achieve 100% community financing of operations and maintenance. Community management of maintenance will be a strategy of the programme, and it is envisaged that this will enhance willingness to pay as people will be aware that the money they contribute is being used directly for repairs of their own system. If community user societies which are open and whose dealings are familiar to the entire community are the bodies who collect and use funds, households will be more willing to make contributions. Likewise, payments for capital costs must be perceived as repayments on a loan for which the community has responsibility. Payment for system rehabilitation or replacement may be more problematic, as households may be unwilling to pay into a fund which will be used at some unspecified point in the future for major system overhaul. The community may also not have the skill or discipline to manage such a fund. For this reason, it may be necessary to make financing, possibly in the form of a revolving fund, available on a loan basis to communities requiring money for rehabilitation. These loans would then be paid off over time through payments from the community, using money from household contributions

d) Affordability

Willingness to pay may be higher among some individuals in a community than others, and willingness to pay for certain service levels may also be higher. For this reason, households desiring and willing to pay for a higher level of service should be allowed to do so, provided the full additional cost is recovered from the household. This could come about, for example, in the case of a household which requires a house connection from a system of standposts, or a household or group of households who wish to add a handpump to an open well. In addition, there may be communities who have as a group a higher willingness to pay. Communities who are willing to make a larger contribution in order to be provided with a higher level of service should be allowed to do so. This community willingness to pay could be a criterion for selection of communities, and those willing to pay enough to reduce the cost of the scheme significantly could be given priority in project selection. This must, however, be balanced by project selection criteria which also give priority to poor villages which are greatly in need of water supply and sanitation improvements.

Affordability of schemes has been assessed by comparing the expected monthly cost with mean monthly household income as reported during the household survey. The capital cost has been estimated by assuming recovery over 10 years at 15% interest. This is in addition to contributions in labour or in kind at the time of scheme construction, which have been deducted from the total cost

Table 32 Scheme Costs as a Percentage of Monthly Income

Type of supply	O&M Costs Rs/month	Contribution in Kind	Capital Rs/month		Total Rs/month		% of Mean Monthly Income	
			% Cash Recovery		% Cash Recovery		% Cash Recovery	
			10%	100%	10%	100%	10%	100%
Protected Wells	1 8	26%	2 6	26.4	4 4	28 1	0 2%	1 5%
Handpump Dug Wells	3 0	23%	5 1	51.2	8 1	54 2	0.4%	2 9%
Handpump Tubewells	9.0	10%	7.9	78.9	16 9	87.9	0.9%	4 6%
Gravity Schemes	10.0	19%	9.7	97.2	19.7	107.2	1.0%	5.7%
Pumped Schemes	50 0	5%	23.7	237 2	73.7	287.2	3 9%	15 1%

With 10% recovery of the capital cost, the amounts for operation, maintenance and cost recovery are seen to be affordable, especially as there is evidence that income was often under-reported during the surveys. The highest level of service (pumped schemes) does not exceed 4% of the mean monthly income of Rs 1900.

If 100% cost recovery is to be obtained, shallow wells, at less than 3% of mean monthly income, still look affordable. Gravity schemes and tubewells at around 5% are less affordable, and pumped schemes are definitely not affordable.

3.2.3. Water Resources & Environmental Protection

a) Forests

Rainfall

Rainfall data recorded at a number of rainfall stations located in and around the 3 districts have been analysed. For each station, the 10 year moving averages of annual rainfall were computed and plotted against time These plots show very conclusively that the trend in the period between 1960 to 1989 is for the rainfall to decrease from year to year. The magnitude of this decrease varies from 0 088% per year in the case of R.F. station Welimada Group to 2.53% per year in the case of R.F. station Horaborawewa. Forest cover has also been reducing at a steady rate of approximately 1% of total land area per year from about 1950 to date. It is highly probable that these two phenomena are related.

Rainfall and Runoff

Another consequence of forest degradation which has a direct impact on the water supply to human settlements is the increase in runoff in streams and rivers. A watershed with a well developed canopy of forest cover slows down the runoff process and provides better chances for the rainfall to infiltrate into the ground, thereby substantially increasing the groundwater storage. Another study was therefore carried out by plotting the annual runoff/rainfall ratio obtained each year against the year of record, for a few selected flow measuring stations located in and around the three districts. The results are plotted and presented in Vol. II. The runoff/rainfall ratio tends to increase with time, thereby confirming that the situation could become dangerous if left unchecked. Further research on this subject is warranted.

A further factor that was noted during the field surveys was that replanting areas with fast-growing trees (conifers and eucalyptus) was said by local residents to deplete groundwater resources in wells and springs This could be expected, since this type of forest draws much more water from the soil than natural forest, with a high proportion of slow-growing hardwoods. This is clearly an important factor to consider when formulating policy on forest management with relation to water resources.

Forest Conservation Measures

The importance of forest conservation for maintaining water resources emerges clearly from the foregoing discussion. A wide variety of forestry-related projects is being carried out at present, and it is not the place of a domestic water supply project to make great investments in the forestry sector. However, it must be very clearly emphasised that present efforts are by no means enough, and that substantial improvements must be made in order to conserve the fragile water resources base without which water supply programmes become meaningless.

The importance of the right type of forest cover also needs emphasis. This may bring the water supply sector into conflict with the efforts being made to increase rates of reafforestation, since the economically high-yielding fast-growing trees seem to have the same impact on groundwater resources as deforestation The solutions to these problems must be sought both at national level, in terms of policy, and at the village level, in terms of tree planting and other conservation measures. This should be taken up by the agency nationally responsible for water supply, and the water supply implementing agencies respectively.

b) Overpumping of Groundwater

The problem of the long-term lowering of groundwater tables by exploitation for water supply has been raised by various agencies. However, closer examination of these concerns showed that they stem from instances, mostly in the dry zone and therefore outside the project area, where tubewells have been used with motorised pumps for piped water supplies. This is unlikely to be required except in a very few cases in the project area, and so should not arise. It can be prevented by careful assessment by responsible professionals in the field, and resisting political pressures that may arise to use this type of system where it is inappropriate. This underlines the need for independence of action by water supply agencies.

The use of handpump tubewells, as proposed for a proportion of the communities to be served, will have no detrimental effects on groundwater levels.

c) Salinity of Water in Coastal Areas

Salinity intrusion into the groundwater in the coastal areas is an unavoidable environmental hazard, although a few pockets of fresh water do exist in the coastal strip, where the groundwater is reasonably palatable. In some instances, controlled tapping of the groundwater at shallow levels enables the extraction of palatable water. In these same locations deeper groundwater is saline and should not be disturbed while the shallow fresh water layers are being tapped.

Any tapping of deep groundwater for settlements close to the sea coast must necessarily be carried out from sources substantially away from the coastline, so as to avoid extracting saline water. Shallow fresh water aquifers close to the coast may, however, be exploited, provided the water lifting devices are limited to hand pumps. The possibility of using wind mills to tap these aquifers may also be explored.

d) Fertilisers and Pesticides

The use of agro-chemicals is increasing rapidly as a result of new farming methods and increased pressure on the land. Runoff from treated land and washings from crop-spraying equipment is thus increasingly polluted with these chemicals, some of which are highly toxic.

Particular issues to be addressed are education and control to prevent point-source pollution arising from irresponsible discharge of hervicies and pesticides, and action to monitor and prevent the build-up of nitrates in groundwater.

e) Industrial Effluents

The effluent from tea, rubber and other industries contains pollutants that can seriously affect water quality downstream of the location where it is discharged. Similarly, effluents discharged into catchpits gradually pollute the groundwater.

Under the National Environmental Act No.47 of 1980, the industries concerned should obtain a licence from the Central Environment Authority (CEA). However, this agency is still relatively weak, and pollution, particularly from factories and cottage industries associated with the plantation sector, will undoubtedly continue It may be possible to make some progress in this regard through the plantation corporations, especially if they can be brought into the main stream of a better-coordinated water supply sector

3.3. Institutional Roles and Responsibilities

3.3.1. Coordination

As there are a large number of agencies working independently in the sector without a coherent plan, there is an inequitable and wasteful distribution resources. Thus there is a need for a rationally planned framework which sets out clearly the areas of activity for each institution in the sector, matching requirements and capacities. This becomes even more important in the context of recent moves by the government towards decentralization. To achieve proper coordination in such a 'multi-agency approach' in rural water supply and sanitation , an *apex organization* with sufficient political weight is required to enable it to call on other agencies to conform to the plan and carry out their allotted tasks. The coordination at the *divisional level* could be more informal and related to the day to day activities of the programme. An *intermediary level* may also be required for the purpose of bringing the decision making process closer to the implementation activities. These three levels of coordination need to be built into any programme for rural water supply and sanitation in Sri Lanka.

3.3.2. Integration of Water Supply, Sanitation, and Hygiene Education

It has been proven that the health benefits of integrated water supply, sanitation and hygiene education projects are far greater than those arising from any of these interventions alone. Without proper hygiene education for example, any health benefits derived from an improved water supply will be nullified as it has been revealed in the village survey that substantial contamination takes place during water collection, storage, and usage. It was found that important gaps in hygiene knowledge also exist particularly with regard to child excreta. Integration however, is not easy to achieve. Implementing agencies have their own limitations as well as expertise in a given intervention. This is further complicated by the fact a water supply system is implemented on a community basis and requires a slow process of community mobilization, whereas sanitation improvements are often implemented by individual households. The degree of emphasis on a particular intervention also differs from one community to another. In a community that has been effectively served with water supply but requiring new or upgraded latrines, social marketing and hygiene education will have to be targeted to reach all in the community, while water supply will be restricted to a smaller target group of communities.

3.3.3. Women's Roles in the Water Sector

In Sri Lanka, although women have been the traditional carriers and primary users of domestic water, the implementing agencies have hardly consulted or involved them in planning, construction, and maintenance of water supply projects. Development programmes in general have placed women to play only a marginal role, and even then it is often welfare oriented.

The success of a water supply, sanitation and hygiene education programme depends largely on how complex social,cultural, and economic factors are taken in to consideration in the planning of such projects. Women play a decisive role in this process, in their ability to organize and function as social mobilizers. The sector institutions studied do not have a proportionate representation of women planners, engineers, managers or extension workers. However, there is potential in almost all agencies to ensure effective women's participation if necessary conditions are created. Training has been recognized as an important element to sensitize government and NGO extension workers towards women's issues.

Considering the multidimensional roles women play in and out of their homes, they could be participant-beneficiaries of integrated development programmes. Water use leads to health, hygiene, sanitation, nutrition, child care, education, and land use activities. Women's involvement in water supply and sanitation either water committees and in operation and maintenance, will enhance their self esteem and thus their social status. Strategies for women's involvement may include:

* Organizing women in small groups to draw out full participation of women from all social classes in the community.

* Use of social mobilizers to make home visits to encourage women to participate and eliminate their initial hesitations or fears.

* Utilizing existing village-based women's organizations for credit schemes, training, extension services, and project monitoring.

* Including questions on women's issues on pre project survey questionnaires.

* As child and health care are considered high priority areas by women, ensuring that these needs are met would enhance women's participation.

3.3.4. Private Sector Potential

Private sector in Sri Lanka is already actively involved in the water sector by providing goods and services.

The recognition of the potential of the private sector in the delivery of goods and services has been an important issue during the last decade. The private sector in Sri Lanka does not lack innovation and ingenuity, and is already playing an important role in the water sector. Both institutions and private households make use of private sector services in constructing schemes. Retailers make such materials as pipe and cement available at local level. Local manufacturers produce components such as latrine pans, pumps and concrete blocks at low cost, and are responsive to demand for new products. However the real strength of the private sector is in its artisans; masons, carpenters, mechanics, welders and well-diggers who permeate the urban and rural areas, and who provide efficient services at low cost. These artisans may also

actively market their services, further creating demand for water supply and sanitation improvements.

Many households have carried out water supply and sanitation improvements on an individual basis, either financed by themselves or through local lending institutions, and using the products and services of the private sector. The village survey showed that funding for both water supply and sanitation often comes from the household, reflecting the significant number of households who finance their own small systems, particularly wells. The household was the funding organisation in 44% of water supplies. The household survey showed that latrines were predominantly a private undertaking; 78% of latrines had been built with household financing. The village survey revealed that about a third of the existing water sources had been built by private builders, that is, the household themselves had arranged construction, perhaps hiring a mason or other skilled worker. Wells were more likely to have been built privately; over half of wells surveyed had been built by private builders. Latrines were more often built by a mason than by the family itself. A mason had been hired in 59% of cases. Masons, carpenters, mechanics and well-diggers are found in most villages.

3.3.5. NGO Potential

Sri Lanka has a large number of NGOs which have long histories of implementing a variety of voluntary, religious and development activities A number of international NGOs such as Save the Children's Fund (UK), CARE, and PLAN International, are also active in Sri Lanka. These NGOs have a vast potential for implementing programmes because of their community based approach and credibility among the people. NGOs have developed methodologies for community managed projects, and their inherent decentralization allows them to work in close proximity with rural people. They also exhibit flexibility and responsiveness in operations. The genuine desire of the committed workers of NGOs to improve the living standards of the less privileged is one of the factors that keep project overheads at a minimum. However, although they have proven abilities in community development, NGOs often lack technical and management expertise, a factor which is especially evident among smaller NGOs. In addition cumbersome CBO registration procedures may hinder the successful implementation of community projects. In order to draw upon the considerable experience and resourcefulness of NGOs it is necessary to provide institutional strengthening.

3.3.6. Issues in Community Mobilization

Community mobilization is not an easy process. Projects may be severely hampered by an assumption that all communities require the same inputs to achieve the same results in terms of levels of motivation, commitment, and ability to carry projects through to completion. Communities which approach an implementing agency for assistance are generally those communities in which there is initiative , and where community members are aware of the existence of agencies who can assist them and are organized enough to identify and express it In contrast, communities which are remote, disorganized, unable to express their needs, controlled by small factions, and apathetic are often overlooked by implementing agencies.

These communities are usually the poorest and most in need. Agencies must also identify and target these villages, as otherwise the tendency will always be to fall back to working with the "easy" villages. Some agencies such as Sarvodaya have already recognized this shortcoming and have started to modify their strategies accordingly.

The factors that make a community easy or difficult to mobilize are complex and often difficult to comprehend . A variety of factors have been identified by field workers. Communities which lack cohesiveness in the form of informal leadership are considered easier to organize. A great deal of control is exerted on the community by influential middlemen, landowners or money lenders who forcefully opposed any programs that would empower the ordinary masses. Bureaucracy associated with carrying out projects, such as arranging approvals , permits, or permission to use land or water resources also hinder community participation.

If agencies are to approach communities with which they have previous had no contact, and which, in the normal course of events, would not be part of their programme, to undertake projects which by their nature require a high degree of community mobilization, they must be provided with institutional strengthening, logistical support and staff training to assist them in overcoming some of these obstacles.

3.4. Hygiene

3.4.1. Hygiene Knowledge, Beliefs, Attitudes and Practices

In Sri Lanka, water and sanitation related beliefs, attitudes and practices are diverse and vary among different geographic areas, ethnic and socio-economic groups. The surveys conducted in the project areas revealed certain health behaviour patterns. However it is worthwhile to first explore the health awareness in relation to water, sanitation and hygiene practices in the Sri Lankan society in general, so that these findings can be interpreted in a more broad context.

By and large Sri Lankan society is health conscious. The satisfactory status of health in Sri Lanka compared to other socio-economically similar developing countries cannot be attributed solely to efforts of the health sector. This achievement has been the outcome of a broader social, cultural, and political process that has evolved over time. Health awareness has developed in a predominantly Buddhist culture which gives a central place to the alleviation of suffering and the protection of life. The indigenous systems of medicine which emphasize moderation and harmony with nature further promote intelligent awareness for health. However, there are also elements in the traditional culture which have negative bearing on health, such as superstitious beliefs, dietary taboos and ignorance of the microbiological causation of disease.

3.4.2. Sanitation

Many studies done earlier reveal that most villagers do not perceive an association between diarrhoeal diseases and open defecation practices. Helminth infection, particularly round worm and hookworm, are not perceived to have been due to defecation practices either. It was revealed in a recent survey that the people believed proper disposal of excreta was necessary only for aesthetic reasons and to avoid social embarrassment. In each community studied, possession of a TV, motor cycle or refrigerator was considered to be a higher priority need than improved excreta disposal. (Kariyawasam, 1988) Fathers of girls of marriageable age are often interested in construction of a latrine in order to preserve the dignity and prestige of their daughters.

Children's excreta disposal is of particular importance, as it is children who are the most likely to suffer from diarrhoeal diseases and therefore excrete pathogens. In general young children and pre-schoolers use backyards and other places within the household premises for defecation. Although it was found in the village survey that the children are toilet trained between 2-4 years of age, the habit of open defecation before that age was common, as people felt that these children are not mature enough to use latrines.

3.4.3. Water Storage and Handling

A study carried out in Kurunegala district in 1987 examined the factors, including handling and storage methods, affecting water quality. Of the 3006 stored water samples analyzed, 24.6% were of stored water which was claimed to have been boiled, and 75.2% was of unboiled water. Among households where the respondent claimed the water was boiled, the percentage of positive samples as well as the average level of contamination in the samples were much lower than in samples taken from other households, even though about 50% of samples were still positive after boiling (this was felt to be due to allowing the water to cool for several hours before consumption). This would indicate that boiling has a considerable effect on water quality, and also that when the respondent claimed the water was boiled, this was true. Therefore, it can be concluded that approximately 25% of people in this area boiled their water.

The other behaviourial factors associated with lower levels of contamination were:

- the use of different vessels for collection and storage (which was found to be more common when the water was boiled)
- storage inside the house. The most common arrangement was inside the house with a cover, and 87% of boiled water samples and 75% of unboiled water samples came from water stored this way. There was no evidence that failure to use a cover was associated with contamination, although very few households stored water outside, uncovered.
- use of non-earthenware container for storage, which occurred in 42% of cases

The order of importance of these factors was

1. boiling
2. use of different vessel for storage
3. storage inside

Contamination of water may also be due to the shape of 'kalaya' (a clay pot widely used for water storage in rural Sri Lanka) which does not contain a handle and inherently allows (or requires) the user's hands to have contact with the water inside it.

The effect on water quality is evident from the lower percentage of samples found to contain faecal coliforms handled using "good" practices. A large impact on water quality can thus be achieved through correct handling and storage methods. These should be incorporated into hygiene education messages. The re-contamination of water during collection and storage is of great concern as this nullifies any health benefits of improved water supply

Table 33 Percentage of specimens with faecal coliforms for water handled and stored in different manners

	Piped supply	Handpump	Protected well	Unprotected source
Good	32%	20%	40%	39%
Middle	38%	38%	56%	82%
Poor	87%	87%	93%	98%

(source: Mertens,T E., M.A Fernando, T F de C Marshall et al, 1990)

3.4.4. Survey Findings

The household survey conducted in the district contained ten questions on health related beliefs and practices in order to assess the general health awareness among the population. The responses are summarized in Boxes 1 and 2.

Box 1

Beliefs
Majority believe that;
* Adult excreta is more harmful than infants
* Worms in children are normal but considered bad for health
* Worms enter the body through dirty food
* Diarrhoea is caused by dirty food
* Water is best cleaned by boiling
* Garbage cause water to be polluted

Box 2

Practices
* The majority of children begin toilet use between ages 2-4
* The mother is the person who almost always picks up infant's excreta
* The majority dispose of child's excreta in the latrine, however a significant percentage also dump in the compound

The conclusion that could be drawn from these findings is that gaps exist in hygiene knowledge, particularly with regard to child excreta and worm infection

The main source of health information for people in the 3 project districts is the health staff, followed by "friends,". This signifies the important role played by government grass roots health workers in hygiene education. The results also stress the importance of informal group dynamics in hygiene education.

Box 3

Main sources of health information, average ranking for Matara, Ratnapura & Badulla
* Health staff
* Friends
* Radio
* Elders/newspapers
* School
* Television

3.4.5. Current Hygiene Education Status

Hygiene education activities in the districts are carried out by various agencies at different levels. The main agencies are the Ministries of Health & Education, UNICEF, IRDPs, and NGOs.

a) Ministry of Health

There are Health Education Officers (HEOs) attached to the RDHS office in each district. Each officer is in charge of 2-3 MOH divisions. Under the guidance of the Health Education Bureau, HEOs are responsible for providing technical support for health education programmes of MOHs, Public Health Mid-Wives (PHMWs), Public Health Nurses (PHNs) and Public Health Inspectors (PHIs). They use a variety of materials provided by the HEB which include flip charts, posters, pamphlets and video films.

Grassroots level health workers carry out hygiene education as part of their routine work. PHMWs for example conduct regular health education sessions at ante-natal clinics. PHIs conduct hygiene education campaigns in schools and participate in demonstration projects.

The health education offices also facilitate school health programmes by conducting 4 day training courses for teachers They also organize seminars on food hygiene for food handlers in all PHI areas.

Recognizing the need for improved health services in the estate sector, the health education officers are now planning to train Estate Health Workers, Welfare Supervisors and estate midwives in health education.

Among the problems identified by the HEOs is the implementation of their health education programmes are lack of transport facilities to carry out field programmes, lack of equipment (audio visual) and updated software such as relevant video films and other audio visual material, and lack of a clearly defined plan of activity.

b) UNICEF

UNICEF has been actively involved in many water and sanitation projects in Sri Lanka. In hygiene education especially there have been recent efforts to closely collaborate with Ministries of Health and Education and NGOs to upgrade on-going hygiene education programmes. UNICEF has mainly contributed in the form of the production of audio visual materials and the training of health workers. These material include flip charts, posters, video and audio programmes.

c) Ministry of Education

Even though there is no separate division in the Ministry of Education that deals with health and sanitation, it collaborates closely with the Ministry of Health in developing curricula, implementing school health programmes and in the provision of sanitary facilities in schools. At district level the Public Health Inspectors (PHI) who are responsible for school health programmes, conduct health education seminars, campaigns and exhibitions in schools and coordinate with HEOs in organizing training programmes for teachers.

d) NGOs

The main national NGOs that are active in hygiene education in the district are the Sarvodaya movement, PLAN International, and Saukyadana movement.

Sarvodaya adopts an integrated approach towards community health, wherein the fulfilment of basic human needs through collective action is sought to bring about social change resulting in better standard of health. Thus it does not have a separate "health education" programme. Hygiene education is incorporated into numerous training programmes and community development activities. However there are a few Sarvodaya programmes which have strong hygiene education elements.

PLAN International is involved in health education, community development, and skills development programmes. Health education is carried out by trained health volunteers. These are usually young women of around 16-18 years of age who have finished schooling. The volunteers are trained by the Ministry of Health using a curriculum developed in collaboration with the PLAN health coordinator and financed by PLAN. PLAN's aim is to train at least two volunteers per hamlet and to have a volunteer for every 20 families. The volunteers are expected to visit the families regularly and focus their attentions on teaching mothers about maternal and child health, breast feeding and hygiene. In addition their training also covers areas related to household improvements such as building smokeless stoves, dish racks, compost pits and improved toilets, for which PLAN also provides financial support.

Saukyadana movement is active mainly in Ratnapura, where it conducts medical camps during festivals, schools health programmes, immunization, maternal and child health activities, health education and home gardening. These activities are done through trained health volunteers organized as divisional and school based Saukyadana units.

4. Implementation Policy, Strategy, Methods

4.1. Policy

The programme will be rooted in a community-based approach which places emphasis on community development and empowerment as well as achieving explicit project objectives. *The overall objective is to make projects self-sustaining.* Community participation will be an inherent part of the programme, and will take the form, not only of provision of labour and materials, but of decision making and planning. Projects will be largely community initiated, and there will be a component of community self selection, as communities will be made aware of the conditions under which they will become part of the programme, and will be expected to adhere to them. This will include taking on responsibility for financing and management of all on-going operation and maintenance, and funding part of capital costs, both through cash and in kind (labour and materials) contributions.

The programme will take an adaptive approach to planning, as experience has shown that "blue-print" planning is ineffective and marginalises the community

A substantial part of the programme will be implemented through NGOs, because of their existing experience and capacity, and because of their close proximity to rural people. Despite the fact that NGOs often need considerable institutional strengthening in order to be able to participate in a programme such as this, it is preferable to use these existing, trusted and effective institutions rather than create new ones. Likewise, the capacity of the existing private sector will be strengthened and harnessed

4.2. Strategy and Methods

4.2.1. Project Selection

There is a need for coordinated planning in order to maximise project inputs to the sector. In order for planning to be effective it has to take place in an environment free from political interference. Project selection must follow the criteria set out by the programme in order to ensure that coverage is increased starting in the areas where the need is most acute or the willingness of communities to contribute is greatest. This process must not be hampered by selection of projects based on political objectives or the influence of individuals.

Individual projects will be selected using a transparent selection process The programme will have clear and published criteria The objective of the criteria is to give priority to those communities and areas where the need for improved water supply and sanitation is greatest, and also to those where potential for community mobilisation is highest. Need will be determined on the basis of the level of service offered by existing facilities, in terms of quality,

reliability, and distance Potential for community mobilisation will be determined by the level of organisation in a community (existence of an active CBO, formation of a users' group etc.) and willingness to pay a proportion of up-front costs.

Communities should be made aware of the programme through publicisation and through the field workers of the implementing agencies in their areas. As much as possible the initiative for projects should come from the community, rather from external agencies. This will provide a degree of community self-selection and ensure that only those communities which are genuinely interested in working towards improvements are involved. It will also foster a sense of ownership of the project. This may be in a constraint in remote and disorganised villages where people are unlikely to be aware of programmes and agencies, and where organisational capacity is low. Building awareness in these communities will be a particular challenge of the programme.

A transparent process will be established whereby communities are made aware of the availability of assistance, and make applications for this assistance (perhaps through the implementing agency). The applications will be assessed by the RWSSU at district level. The will be considered in light of the project selection criteria and the capacity of the implementing agency.

The criteria for providing higher levels of service than the basic ones within the programme will be willingness to pay the full incremental costs. Both communities and individuals will be given the opportunity to do this

4.2.2. Resource Mobilisation and Cost Recovery

Operation and maintenance costs are to be covered completely by water consumers. A portion of capital costs will also be recovered, both through in-kind contributions (labour and materials) and through cash payments to cover what are essentially loans taken out for the construction of the facilities. This will require community-based methods of tariff collection and funds management. The overall strategy is to keep communities aware that the money they pay for both capital cost recovery and operation and maintenance is used directly for their own systems, and any default or mismanagement is a problem for the whole community. Self reliance in this area is extremely important. Community user groups will be responsible for collection of funds and operation and maintenance of the water supply, plus repayment of any loans taken out to cover capital costs. The user group will be directly accountable to the community for use and management of the funds. Repairs or preventative maintenance will be carried out either by the community members themselves or by hiring private sector artisans.

Methods of cost recovery will vary from agency to agency. In the case of lending institutions such as TCCS, cost recovery methods are already in place and effective, as these agencies are run on a strict cost recovery basis Other agencies, however, will have to establish the principal of cost recovery and institute methods for ensuring that it takes place. This will be done through users' groups in most cases The groups will collect funds on a monthly basis (or time collection to coincide with the harvest or other times when money is more abundant

if they wish) and maintain bank accounts. Members of users' groups will be elected, and the accounts will be open to scrutiny by anyone in the community.

Training for private sector artisans in handpump repair and maintenance of other systems will be provided in order to make communities self sufficient, and not dependent on external agencies for maintenance. Spare parts will also be made available through the most efficient route possible, either commercially or through local authorities.

4.2.3. Mechanisms for Community Participation

Communities will be mobilised using participatory techniques which bring all sectors into the planning and implementation process - the poor, women, members of low caste groups etc. Wherever possible, user societies will be formed, and will take responsibility for making decisions regarding service level type, organising communal labour and material inputs, carrying out construction, operating the scheme, collecting money for maintenance and carrying out repairs when necessary.

Each agency identified has its own mechanism for working with communities, depending on its objectives and vision. Agencies will be expected to continue working with communities in their usual manner, but with increased understanding of the dynamics of water projects and training in new methodologies Each agency will continue to start from its own entry point (welfare of children in the case of PLAN, small credit cooperatives in the case of TCCS, pre-schools in the case of Sarvodaya etc.). Agencies will not be required to bypass their usual community selection and mobilisation techniques (as, for instance, TCCS found itself doing for the NHDA programme). They will, however, be trained in community mobilisation skills which are particularly appropriate to water projects, such as community mapping exercises to identify water sources and environmental problems in the village and the formation of users' groups.

Agencies with expertise and experience in a specific area, such as hygiene education or the promotion of latrines will continue to work in that area, and through planning and coordination mechanisms to be established, will complement the efforts of other agencies. The linkages created between institutions will be valuable, especially between NGOs and government. The programme will create opportunities for institutions to work together and thus learn about each other's strengths and weaknesses

Health and hygiene education will be an important part of mobilisation, as the programme will seek to raise awareness and demand through a greater understanding of the health aspects of water supply. The impact of water supply and sanitation on health, well hygiene, improved water handling and storage and the benefits of better personal hygiene will be components of hygiene education.

The considerable potential of the private sector has been discussed previously. Many households can be mobilised to implement their own water supply and sanitation improvements, particularly the construction of latrines. Demand stimulation on the form of health education and social marketing will be effective in harnessing this potential.

Demand on a community basis will be stimulated by social marketing and health education, and also by the work of community mobilisers and by witnessing the experiences of other villages who undertake successful projects. This type of demand stimulation will be the task of the implementing agencies.

As women will be important participants, special techniques which bring them into the planning and implementation process will be introduced. This may involve forming women's groups, ensuring that women are represented on committees, approaching women in their own homes, and organising activities around issues which women already consider a high priority, such as child health and alleviation of drudgery.

4.2.4. Institutional Strengthening

Institutional development will take the form of training of implementing agency staff. Training will be in such skills as technical design and needs assessment, but will also cover community mobilisation techniques and the fundamentals of community-based projects. This type of institutional strengthening will be particulary important in the institutions which have not traditionally used this approach, for instance the NWSDB, the Pradeshiya Sabhas and the plantations.

NGOs will require managerial and technical training, as well as training in community mobilisation techniques appropriate to water projects As capacity of existing organisations is to be expanded considerably, there will be the additional staff for these institutions to train, as well as existing staff to orient and train.

Technical assistance will thus largely take the form of training in order to increase the capacity of implementing agencies to carry out projects using the methods described. Training in technical matters will be required, in order to ensure systems which meet acceptable design standards. Training of trainers in needs assessment, water resource identification and evaluation, system design and constriction supervision will be carried out. Community mobilisation techniques will be researched through visits to other projects in other areas and countries. Community management models, including operation and maintenance systems, will also be examined. Training in community mobilisation techniques will be carried out, and a cadre of trainers prepared to assist implementing agencies in the future formed.

Training in management at both implementing agency and community level will be part of the programme. This will include accounting, information management and personnel management (development of incentive systems, improving staff morale etc).

A social marketing programme will also be researched and developed, and the necessary training done to ensure that it is put into use. Likewise health education materials already available in Sri Lanka will be examined, and additional ones developed to fill any gaps. The materials will be produced in sufficient quantities and distributed to health education fieldworkers in the various agencies, who will be trained in their use.

In addition to the above direct technical assistance, a proportion of the technical assistance package will be dedicated to the development of structures from national to local level to run and coordinate their sector activities.

4.2.5. Involvement of Women

The full and meaningful participation of women is vital to the sector. The centre of demand for water is the woman of the household, who is the primary user of water. Women must be involved not only as beneficiaries, but as agents of development. The particular interest in family health which women have (especially the health of children) will be harnessed. Women already bear most of the responsibility for safeguarding the health of the family, and will usually collaborate enthusiastically with projects which aim to assist them. They have shown themselves to be excellent "frontline" workers in health and hygiene education, and also in operation and maintenance. Women must be given the opportunity to participate fully in public meetings, and be given support to build their self esteem and confidence. They must also be given opportunities to work as professionals in the sector, as mobilisers, planners, engineers and trainers.

There are a variety of strategies to involve women. Each agency has its own experiences in this area, and its own approach. Some agencies have been considerably more successful than others, and their methods should be researched as models and their experiences disseminated to other organisations.

The strategies already in use include organizing women's groups to participate in the planning, implementation and operation of water facilities; training women as pump and well caretakers, and mobilizing women through health education focussed on their particular concerns.

Involvement of women during the initial planning stages, and ensuing their representation on committees and other decision making bodies is essential.

4.2.6. Sanitation

As the demand for latrines has been demonstrated to be high, and the large majority of existing latrines have been built with no external assistance, but with funds raised by the household, the strategy of the programme is to continue and support this tradition of self help in the area of sanitation. Arranging access to credit and support, if necessary, to the private sector (masons, latrine pan manufacturers etc.) are the inputs of the programme in this area. Despite large numbers of households with latrines, many are of unacceptable type or in poor condition, and require replacement or upgrading. Promotion of the desirability of a good, clean latrine will be carried out through social marketing and health education.

In order to facilitate the building of latrines, a revolving fund at village level will be established. The fund will be administered by a CBO or implementing agency, and will provide households with part of the cost of the construction of a latrine as a loan at soft interest rates (in the order of 5 to 6%). Peer pressure will play a large factor in the repayment of this loan, as other families will be waiting to use the money for their latrines.

5. Proposed Implementing Institutions

5.1. Options for an Institutional Framework

5.1.1. General

Analysis of the institutional background to the sector has shown that much can be improved in the mechanisms for increasing coverage by rural water supplies and sanitation. The rationale and some of the basic principles underlying an appropriate institutional framework were examined and applied to the existing situation to develop a series of models for selection of the best option.

Funds have to be channelled from external support agencies (ESAs) and the Ministry of Finance down to the level of individual communities to provide the required services, in a way that ensures their sustainability. The first two actors in this chain have just been named and need no further description at this point.

The next link in the chain is what has been termed an *intermediary organisation*. This has the responsibility for overall control of the programme, and must be accountable financially to both the GOSL and the ESA, and to the community at large for delivering the programme effectively.

Following this comes the *implementing agency*. This is the institution which actually builds the facilities according to the programme and norms set up by the intermediary organisation, thus bringing the service to the community.

The community itself may be represented by a *CBO* (community based organisation or water committee) which acts as the interface between the implementing agency and the community.

Not all institutional models comprise all these different elements. For instance, a classical and widely used model has the intermediary and implementation functions being carried out by a single specialised water supply and sanitation agency which has a direct, if remote, contact with the community without the mediation of a CBO. At another extreme, multiple agencies may exist at all levels below the Ministry of Finance, acting in parallel.

In order to develop a working model from these basic elements, a set of criteria were applied so as to identify which existing or planned institutions can best fulfil the functions outlined above in the specific context of the proposed project area. Five main groups of considerations were evolved for this purpose, and are discussed below.

a) Programme Accountability

A major reason for formulating the District Development Plans is the existence of many different agencies in the sector, responding to many different motivations and pressures. The plan aims to reduce inefficiency, wastage and inequitable distribution of resources in the sector by analysing it as a whole and clearly defining what needs to be done where and with what order of priority. The institutions involved must therefore be willing and able to *conform to the plan*, despite any outside pressures that may be brought to bear, and mechanisms must exist for *feedback* through the system from the communities served, to whom they are accountable. Also included under this heading is the maintenance of adequate *technical standards*, or, in other words, that whatever is done be done properly. If many different implementing agencies are to be involved, then *coordination* will be another essential task in ensuring the satisfactory execution of the programme.

b) Financial Accountability

All those contributing to the programme will obviously require that funds are being properly utilised. This *financial accountability* works in both directions; contributions will be made by the ESAs and GOSL, but also a proportion by the communities served. The main expenditure will be by the implementing agencies, sandwiched in the middle of the chain of responsibility. Essential to achieving this type of accountability are effective *financial controls* which must be built into the system. Linked to this question is the factor of *cost effectiveness*, in terms of expenditure both on actual facilities and also on the institutions involved. Finally, elements of *cost recovery* will be built into the system, and the main financial contributors, the ESAs and GOSL, will be most concerned that this is as effective as possible.

c) Sustainability

All the proposed programme will be in vain unless both the institutional structure providing the services, and the facilities themselves continue to function. The analysis in the previous sections has highlighted the fundamental importance of *community participation* as an indispensable precondition for sustainable use of the facilities built under the programme. This participation must therefore be built into the system. Sustainability on the institutional side means that any proposed system must be inherently feasible and within the *capacities of the organisations* involved, even if this means making some compromises with the overall objectives of the programme.

d) Management

This factor links back to some of those already covered, and is obviously crucial to programme success. All the individual institutions involved require effective internal *organisation* and external *coordination* to function efficiently and cost-effectively. Their personnel management must also be such that it provides the incentives, working

conditions and training required to *maximise the human resource potential* available. An intangible but important factor is what might be called *corporate culture*, even if applied to a CBO. This comprises the general attitudes and outlook of institutions, and has particular relevance to financial management and community participation.

e) Replicability

Finally, in the particular context of this project, the feasibility of extending the approach recommended for the three districts to the sector island-wide needs to be examined. The NWSDB has recently produced a new corporate plan in which it withdraws from direct involvement in most of the rural sector, so the need for a new national institutional structure in the sector has been recognised, and this is a first attempt to address the questions that must be answered.

The simplest form of the institutional model could be referred to as the single agency model. Typically, this agency might be the NWSDB, but could be another, to the exclusion of all others. However, the model fails at the first hurdle, since the analysis of needs compared to capacity in the sector clearly shows that no single agency has the required capacity at present, or is capable of growing at a sufficient rate to generate the required capacity within an acceptable time frame. This analysis shows, rather, that the critical lack of implementation capacity in the sector is probably the single biggest impediment to achieving a significant impact at present To overcome this constraint, all possible implementing capacity has to be mobilised, brought into the system and developed.

A second simple model considered and rejected is the devolution of responsibility to the private sector, which probably does have the required capacity. However, expertise in promoting community participation is notably lacking, and the incentives for this type of activity with social rather than profit objectives are not there.

Therefore, a model with one intermediary and multiple implementing agency was chosen. Multiple intermediaries were rejected on the basis that the coordination required to ensure programme accountability would then have to be carried out at the level of the Ministry of Finance which clearly lacks the mandate and specialised expertise to coordinate such a programme directly. Options for intermediary and implementing agencies were assessed using the criteria set out above

5.1.2. Implementing Agencies

At a workshop held in April 1991 (see Annex 2) with representatives of many of the possible implementing and intermediary agencies, together representing hundreds of years' experience in the sector, the options for implementing agencies were closely examined, and were used as a starting point in the analysis. This is presented in detail in Vol. II.

The main conclusions reached were that all of the four main agencies or groups of agencies (NGOs, Pradeshiya Sabha, NWSDB and JEDB/SLSPC) should be included in the institutional

model recommended, subject to receiving specified technical assistance in technical, financial and social skills. NWSDB activities would be restricted to urban areas and extensions of piped schemes in rural areas, whilst the JEDB/SLSPC would work on the estates or in villages with non-resident estate workers.

The major importance of CBOs was recognised, as was the need to support and strengthen them.

5.1.3. Intermediaries

Selection of the right intermediary organisation is critical to the success of the programme. It must have the appropriate orientation towards the participatory methodology to be adopted, be supportive of the idea of working with NGOs and measure up to all the criteria listed above. Following extensive discussions with sector personnel, a short list of three was prepared for analysis. These are the Janasaviya Trust Fund, a new organisation being established with World Bank funding, that will channel funds to a multiplicity of grass roots "partner organisations", the IRDP programme of the MPPI, selected as being the existing organisation whose procedures are closest to those proposed for the programme, and the NWSDB, which still has nominal overall responsibility for the water supply (though not the sanitation) sector.

Due to the scale of the proposed programme, and its potential expansion into a national operation, it is envisaged that the intermediary agency would host a Rural Water Supply and Sanitation Unit (RWSSU), which, although fully integrated into the agency's structure, would maintain an identity and meet regularly to discuss issues related specifically to the sector.

One particular problem was that the JSTF is an essentially new organisation (although built on the foundations of the old National Development Fund) and, as such, difficult to assess, as it has no track record. The assessment made was based on the project documents describing the Trust, and extensive discussions with its top management.

5.1.4. Coordination

Before going on to the relative evaluation of the three potential intermediary agencies, the issue of coordination was examined Poor coordination is probably the second most important factor responsible for poor sector performance, after the lack of suitable implementing capacity. The ability of the intermediaries to engender the required degree of coordination is thus critical.

Three levels of coordination were identified as being necessary to achieve efficient programme implementation. These are the national level, the divisional level and an intermediate level, perhaps more appropriately district level, but which could also be at provincial level.

5.2. Proposed Model

The analysis shows a variety of implementing agencies which will be able to perform satisfactorily, each within its allotted target group and level of technology. Considerable technical assistance will be required, particularly in developing community mobilisation and technical skills, as well as overall capacity building. However, this is considered feasible on a scale commensurate with the scope of the proposed programme.

Of the three potential intermediary agencies considered, the NWSDB is the least appropriate to the aims and methods to be employed in the programme, and therefore received no further consideration. The balance between the other two (JSTF and MPPI/IRDPs) is fine, and further complicated by the need to compare an organisation with an established track record with a new venture, the intentions of which are undoubtedly excellent, but which will inevitably have to compromise on some of them as it establishes its field operations. Table 34 sets out a summary comparison of the two agencies, based on a points system. This is inevitably somewhat arbitrary, but given the uncertainty associated with the comparison of two unlike bodies is considered at least not to add to this uncertainty.

Table 34 Comparison of JSTF and IRDP as Intermediaries

Criterion	Max. score	JSTF	IRDP
Programme accountability			
Conform to plan	5	4	5
Feedback	5	5	4
Technical	5	4	3
Coordination	5	4	5
Financial accountability			
Accountability	5	5	4
Control	5	5	4
Cost-effectiveness	5	4	4
Cost recovery	5	5	4
Sustainability			
Community participation	5	5	4
Capacity	5	3	4
Management	5	5	4
Replicability	5	3	4
Total	60	52	49

Scores: 5 - very good, 4 - good, 3 - fair, 2 - adequate, 1 - poor

As can be seen, there is little to choose between the agencies, the main difference being due to better projected financial accountability in the JSTF. This has therefore been selected as the proposed intermediary agency. Due to the narrow difference between the two, however, it is recommended that a final decision be based on policy discussions within GOSL, and a further appraisal of the JSTF once it has commenced project execution in earnest.

An overall organisation chart is presented in Figure 12.

5.2.1. Institutional Strengthening Required

This is discussed in the sections evaluating the various institutions. The required training will be provided by the service organisations described elsewhere in this volume, consisting mostly of NGOs. This training will take both formal and informal forms, the latter including the sharing of experiences between agencies by exposing trainees to their working methods in the field. Seminars and workshops will also be held for the exchange of experience, particularly for more senior staff and politicians. Provision is also made for study tours in the region to gain from the experiences of other countries.

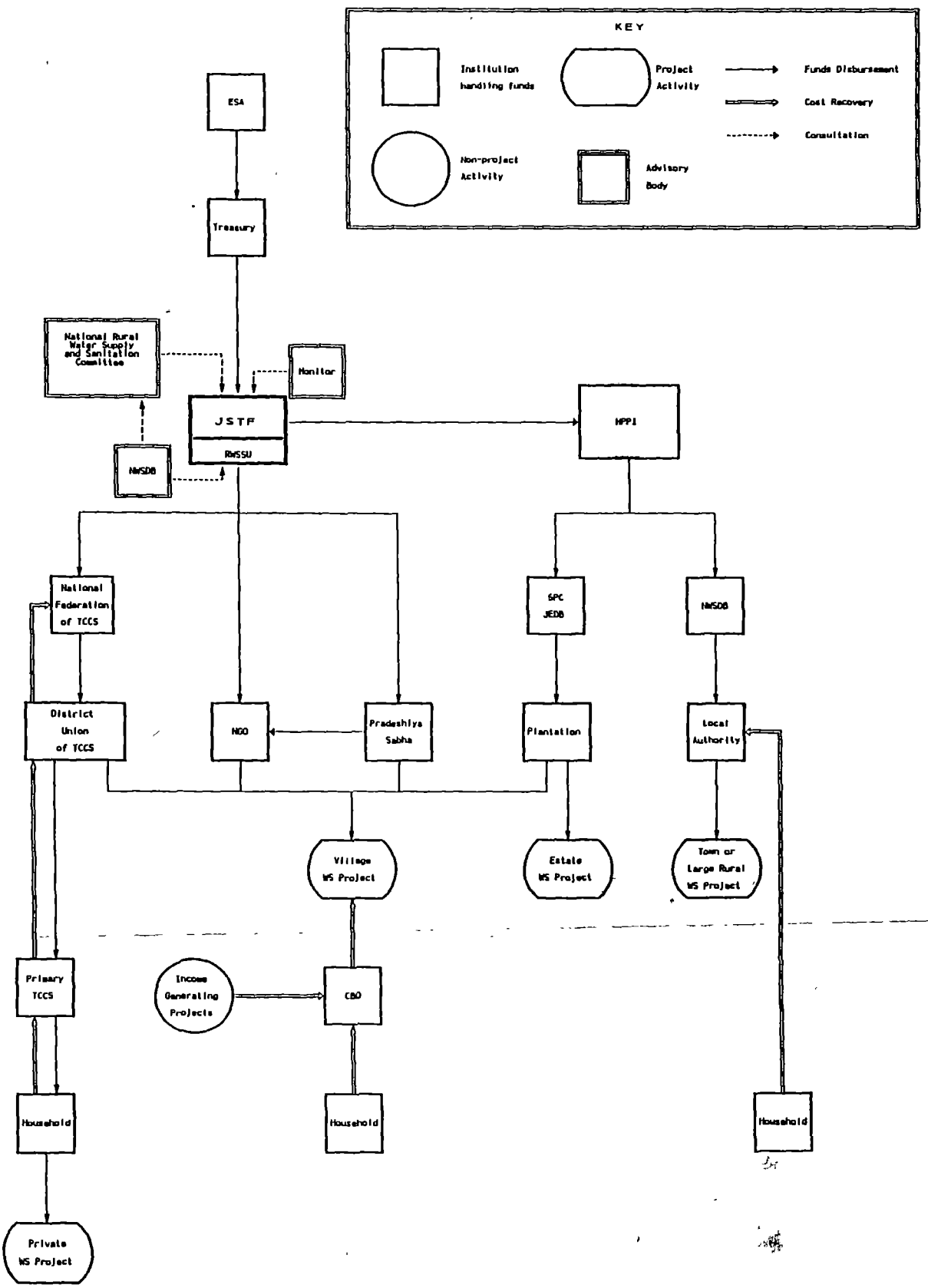
5.2.2. New Institutions Required

It has been an objective when planning the new institutional structure to avoid the formation of new organisations wherever possible, but rather to build on existing ones. However, given the ambitious nature of the proposed rural water supply and sanitation programme, both in terms of the application of innovative community participation methodologies and the level of investment in comparison with what has gone before, it is clear that there must be an agency in overall charge of the sector. This does not at present exist, so the formation of a Rural Water Supply and Sanitation Unit (RWSSU) is proposed, and is mentioned in the discussion above.

The RWSSU will be embedded in the JSTF structure at national level, in the form of a small team of professionals with associated support staff. Five professionals are proposed, being an engineer, a training specialist, a specialist in social marketing, health education and community mobilisation, an MIS specialist and an accountant The engineer and MIS specialist will be incorporated into the Community Projects division, the software personnel into the Human Resources and Institutional Development division, and the accountant in the finance division. They will, however, meet formally at least once a week to coordinate their activities, and informally from day to day as the need arises.

The engineer and MIS specialist will be responsible for ensuring the smooth operation of the implementation programme, and monitoring physical progress and technical standards. The software specialists will liaise with outside agencies (service organisations) to procure training and materials according to identified needs, and will be involved in promoting information exchange at the official, implementing agency and community levels. They will also organise the training of trainers as required. The accountant will be in overall charge of project

Figure 12 Proposed Institutional Structure


KEY
Institution handling funds
Project Activity
Funds Disbursement
Cost Recovery
Consultation
Non-project Activity
Advisory Body
ESA
Treasury
National Rural Water Supply and Sanitation Committee
Monitor
JSTF
RWSSU
NWSDB
HPPI
National Federation of TCCS
SPC JEDB
NWSDB
District Union of TCCS
NGO
Pradeshiya Sabha
Plantation
Local Authority
Village WS Project
Estate WS Project
Town or Large Rural WS Project
Primary TCCS
Income Generating Projects
CBO
Household
Household
Household
Private WS Project

expenditure and cost recovery procedures. The group as a whole will discuss and draft policy and overall plans for the sector.

At district level, the RWSSU will be represented by an engineer and a software specialist. They will be on hand to visit projects and agencies in the field, to monitor and arrange support where necessary. They will liaise with the centre to ensure the efficient flow of information in both directions. Two technical assistants and an accounts assistant will support each district unit. It is not quite clear yet as to which organisation they will be attached, since the JSTF is still formulating plans for its own district engineers.

In addition to the RWSSU, the need has been identified for coordinating committees to take on an advisory and information exchange role at national, district and divisional levels. These are discussed in the section on coordination, and summarised here.

Divisional Coordinating Committee (monthly)

Members:
- Implementing agencies
- Pradeshiya Sabha officials
- CBOs and citizens

Functions:
- Exchange of information
- Resolution of operational problems
- Setting of relative priorities between villages
- Identifying possibilities for extension of piped schemes
- Assessment of small NGOs

District Coordination Committee (quarterly)

Members:
- RWSSU
- Representatives from divisions
- Implementing agencies
- Provincial Council

Functions:
- Distribution of resources between divisions
- Resolution of operational problems and disputes
- Obtaining official cooperation when required from district and provincial level agencies
- Assessment of projects against selection criteria
- Ensuring conformity with local government policy

National Steering Committee (bi-annually)

Members:

- Ministries of:
  - Finance
  - Policy Planning and Plan Implementation
  - Public Administration, Provincial Councils and Home Affairs
  - Housing and Construction
  - Plantation Industries
  - NWSDB
  - SLSPC
  - JEDB
  - Sarvodaya
  - TCCS (Sanasa)
  - RWSSU

Functions:

- Review physical and financial performance
- Policy decisions (targets for coverage and service levels, subsidies, funding arrangements)
- Agree technical standards
- Ensure compatibility of government agency policies

5.2.3. Projected Capacity

The projection of implementing agency capacity according to present capacity and assessed potential for growth is a fundamental part of the development of the district plans. It will be further refined during preparation of the priority investment plan on an institution by institution basis. The overall inputs by the different agencies are built into the individual district development plans (Vols. III-V).

The capacity of each institution was estimated based on a variety of factors. The existing expenditure was examined, and any district-wise variation taken into consideration. Several organisations have high capacity to implement schemes, but using traditional technology-oriented methods, which merely provide services to passive recipients and do not incorporate community participation, cost recovery or on-going community management. The participation of these institutions was scaled back, and a low level of increase in their expenditure assumed, as they will take time to learn and effectively implement the proposed strategies and methodologies.

The differences in coverage require that 44% of expenditure be in Ratnapura. This will make institutional strengthening of implementing agencies in that district a priority.

The percentage of the total programme by district and institutions is summarised in Table 35.

Table 35 Percentage of Total Programme by District and Institution

Institution	Badulla	Matara	Ratnapura	Total
SRTS	21	22	26	23
TCCS	10	18	18	15
PLAN	12	0	0	5
Small NGOs	2	3	3	2
NWSDB	15	40	16	20
Pradeshiya Sabhas	13	13	22	17
JEDB/SLSPC	28	3	15	18
Total	37	19	44	100

5.3. Technical Assistance Package

5.3.1. General

Technical assistance would be provided by an expatriate-staffed technical Support Unit (TSU).

The first task of the (TSU) will be the setting up of the RWSSU, to which it will act as counterpart in the early part of the project, providing technical orientation, advice and training. Programme quality would be maintained by these activities, in addition to the monitoring of programme outputs. In order to ensure effective monitoring, and channelling of TSU inputs to the many agencies involved in the field, the team would divide its time between the districts where the programme is being implemented and the central RWSSU. Its main functions can be divided into three areas: training, technical assistance and monitoring.

5.3.2. Training

Direct training will be carried out by the TSU in the operation of the accounting systems set up, so as to ensure adequate financial control. Training will also be provided for managers in project and institutional management. In addition, a series of seminars and workshops will be held for the various groups of officials and politicians involved with the programme to educate them on and refine the objectives and methods employed. The TSU will also arrange for workers of different implementing agencies to learn from the successful experiences of others (particularly the NGOs).

The team will also carry out training of trainers within the implementing agencies or "service NGOs" (those providing training services to other implementing agencies). This will focus on both technical aspects of scheme design, construction and operation, and software skills for those working on community mobilisation, social communications and marketing, hygiene education, and sanitation promotion.

5.3.3. Technical Assistance

As mentioned above, an important early task for the TSU will be the setting up of the RWSSU. This will comprise the establishment of the overall organisational framework so as to ensure good coordination, efficiency, control and accountability. In parallel, systems and procedures to back this up will be developed. Related to this activity will be the establishment of relationships betwen the RWSSU, the implementing agencies and third parties such as the service NGOs or the Health Education Bureau.

The long-term sustainability of any programme depends upon the motivation and performance of those contributing to it The establishment of good personnel management, incentive systems and working conditions, in addition to training, have a major role to play here. The TSU will be able to apply this directly to the establishment of the RWSSU, and should try to promote improvements in this sphere in the implementing agencies, although scope may be limited.

A third major area for technical assistance will be the provision of resource materials, such as manuals and flip charts, for use by the implementing agencies. Much of this already exists, and needs only to be discovered and channelled to where it is required. In other cases, the need may be identified for new materials, the production of which would be supervised by the TSU.

The establishment of an effective MIS will be important, and although included in the remit of the JSTF, the technical assistance would allow for a few months of input from an outside consultant to help set up the system, and check its operation at a later stage.

The establishment of overall planning and programme management methods will be a joint task of the TSU and RWSSU.

5.3.4. Monitoring

Because of the new approaches to be employed, there will be a substantial lag time at the beginning of the project while the institutional development activities are building up implementation capacity. The TSU will play the key role in generating and maintaining momentum in this period and will effectively have overall responsibility for project management. As time passes and the tempo of implementation picks up, the main responsibility for project management will pass to the RWSSU. Simultaneously, the TSU will take on an increasing load of monitoring work as the implementation programme grows.

Effective monitoring is vital to the success of the programme, especially considering the many agencies which will be involved, so the team should be given ample time to set up and consolidate the monitoring systems before it is phased out.

Besides this internal monitoring system, it is recommended that an independent monitor be appointed to make periodic visits and provide an outside assessment to the RWSSU and the funding agency.

5.3.5. Timing

It is considered that it will take at least four years to properly establish the RWSSU, given the slow buildup of capacity in the field, and the need to forge new relationships between sector organisations. The two main TSU members should thus stay for at least this period. The services of the training specialist will be required for about two years to establish the necessary programmes to suit the various implementing agencies. It is considered that one year will be sufficient to set up and train staff in the use of the accounting and financial control systems, and hand over to the RWSSU accountant. Four months have been estimated in two visits for the MIS specialist, two months for the external monitor (two weeks per year) and six months as required by individual specialists, most probably in the software field.

6. The Programme

The basic objective of the district development plans is to set out a realistic investment plan for sustainable progress in the rural water supply and sanitation sector over a ten year period. The main decision variables are the levels of service to be provided, the population to be served at those levels (coverage) and the amount and type of investment in institutional development to overcome the existing severe constraints on implementation capacity in the sector. The recommended investment programme should attempt to define the optimum mix of these three variables to ensure both feasibility and maximum impact. A computer model has therefore been constructed in which the interaction of these factors can be examined.

In modelling the overall coverage targets, a coverage level target is specified for each sector (urban/rural/plantation) by district for each year of the programme. Investments are then calculated to bring the coverage level in those zones/sectors where coverage is lower, up to the specified target. Zones/sectors where coverage is higher receive no investment. This corresponds to the physical model to be adopted during implementation of initially targeting a limited number of AGA divisions where needs are highest, and gradully broadening the area of project activity to the whole district by the end of the implementation period.

When using the model, it quickly became apparent, as was intuitively to be expected from general knowledge of the sector status, that the main limitation on achieving improved coverage is implementation capacity. Therefore, the targets adopted in the recommended programme have been calculated according to estimates of this capacity.

6.1. Technology Mix for Water Supply

The technology to be applied in any given settlement depends on the water resources available and the service level selected. Water resources data are presented and interpreted in terms of the potential for different types of water supply facilities in the various zones. From this, estimates of the percentage coverage by different technology types for 100% population coverage have been estimated, and are presented in Table 36.

This has been done for two levels of service. The high service level allows for high quality water from piped schemes or handpumps, available within 150m of the house. Provision for house connections is not made, since these would be installed on a full cost recovery basis for individual households and so do not sensibly affect the overall size of the project investment programme. The low service level relaxes the requirements on water quality by including protected wells as an option, and increasing the maximum water collection journey to 250m.

The abbreviations used are as follows:

Column headings

High/Low S/L	High/Low Service Level
1992	Present coverage at relevant service level
100%	Projected coverage to reach full service

Row headings

G	Gravity piped supply
HPW1	Handpump Shallow Wells < 150 m from houses
HPW2	Handpump Shallow Wells < 250 m from houses
TW1	Handpump tubewells < 150 m from houses
TW2	Handpump tubewells < 250 m from houses
PW2	Protected open wells < 250 m from houses
P	Piped, pumped supply
Cov	Overall coverage

Table 36 Technology Mix

TECHNOLOGY MIX AND TARGETS (%)

District	Sector	Service Level						
		High				Low		
		Type	1992	100%		Type	1992	100%
Matara	Rural	G	5	12		G	5	10
		HPW1	1	49		HPW2	1	3
		TW1	0	16		TW2	1	10
		P	29	23		PW2	22	53
		Cov1	36	100		P	29	23
						Cov2	59	100
Ratnapura		G	12	27		G	12	22
		HPW1	1	41		HPW2	1	2
		TW1	0	21		TW2	1	15
		P	17	10		PW2	15	51
		Cov1	30	100		P	17	10
						Cov2	46	100
Badulla		G	17	26		G	17	25
		HPW1	0	48		HPW2	0	1
		TW1	1	23		TW2	4	31
		P	9	2		PW2	3	41
		Cov1	28	100		P	9	2
						Cov2	34	100
All	Estate	G	37	88		G	37	79
		HPW1	0	12		PW2	6	21
		Cov1	37	100		Cov2	43	100
	Urban	P	83	100		PW2	5	7
		Cov1	83	100		P	83	93
						Cov2	87	100
	All	G	11	22		G	11	20
		HPW1	1	46		HPW2	1	2
		TW1	1	20		TW2	2	19
		P	18	11		PW2	13	48
		Cov1	31	100		P	18	11
						Cov2	46	100

6.2. Sanitation

The strategy adopted in the proposed programme for sanitation calls for the establishment of revolving funds at village level for use by individual families to construct basic latrines or improve existing units, and for a programme of latrine construction and upgrading in schools and preschools, which will also serve as a catalyst and example to the nearby population. As the requisite skills exist in all villages, this element of the programme revolves simply around the channeling of financial resources to the villages and schools in question, along with the accompanying social marketing and health education messages. This element has thus been included in the programme model as a line item of expenditure, with a disbursement profile compatible with the buldup of the water supply element.

6.3. Environmental Impact

Three potential areas of negative environmental impact can be identified for the proposed project: depletion of water resources, sullage disposal and environmental pollution problems arising from increased water use, and groundwater pollution by latrines.

a) Depletion of Water Resources

In some of the dry areas of Sri Lanka, excessive pumping of water from tubewells has been blamed for lowering the water table. This only applies to high-yielding boreholes used with motorised pumping for piped distribution. The amounts abstracted by handpumps have insignificant effects in this regard. The widespread availability of surface water sources in the generally wet project area offers a more cost-efffective alternative for larger pumped schemes, so the problem should not arise.

One problem which was observed in the field surveys concerns the exploitation of springs for gravity piped systems. As most of these sources have rather low flowrates, they may be diverted almost 100% to the water supply system, thus depleting streams and re-emergent springs downstream. This interferes with existing uses of the water, commonly for paddy irrigation. Particularly in the case of re-emergent springs it may be difficult to assess this effect prior to tapping the spring. This is a primarily social rather than environmental problem, and must be resolved where it arises by community dialogue, which will in any case be promoted by the project emphasis on community participation. This participation in planning may also be the best way of assessing the likely downstream effects of tapping springs. It is considered that inclusion of this factor in guidelines for gravity schemes will be a sufficient response to the problem.

b) Sullage Disposal

The survey showed little effect of the distance to the water source on consumption, so it is unlikely that improved access to supplies collected from outside the household compound will significantly increase the volumes of sullage generated. Localised problems in the areas immediately surrounding standpipes are easily resolved by a combination of maintenance and responsible use of the system (prevention of running taps), and sound design incorporating drainage arrangements.

Significant increases in water usage can, however, be expected where house connections are installed. This will only be a significant factor in the urban areas destined for coverage by piped supplies. In these cases, project designs should include suitable arrangements for wastewater drainage as part of the overall package.

c) Groundwater Pollution

With latrine coverage at 80% already, extension to full coverage is unlikely to have any significant impact. The question remains as to whether the existing coverage is causing problems. This is hard to measure definitively, and this has not been attempted under the present study. Potential for groundwater pollution by latrines is highest where pits penetrate or reach down to within 2m of the water table. As areas of high water table are almost always exploited for paddy fields, this is unlikely to occur except in low-lying zones. In these areas, latrine promotion campaigns should take due account of this factor, and guidelines on latrine-well seperation should be more stringently applied.

7. District Development Plan Programme Costs

7.1. Programme Scenarios

The computer model outlined in the previous section was used to test various possible criteria defining an overall programme. The base case, against which the others are compared, is presented as scenario 1 (see Table 37). After evaluation of the various scenarios it was selected as the recommended programme, and is designated as such. This scenario was developed by adjusting the target coverage levels so as to match the required investments with the estimated implementing agency capacities. It leads (completely fortuitously) to essentially 100% coverage at the end of 10 years.

Scenario 2 (see Table 38) was developed to assess the effect of the estimates made of implementing agency capacity. Whilst scenario 1 is based on what are considered to be realistic estimates of present capacity, the ability of the agencies to grow, and the speed with which this can be accomplished, it is instructive to estimate the effect of less optimistic assumptions. This has been done by halving the estimated capacities of all agencies except the NWSDB, which has proven capacity in the field of pumped, piped supplies, to which its role will be restricted. This model leads to about 80% coverage across the three project districts after 10 years. Coverage in Badulla is slightly lower than this, at around 75%, due to higher present service levels in Matara, where the reduced implementation capacity estimate still leads to 90% coverage in 10 years.

A third scenario was developed initially for 100% coverage after 10 years, in accordance with GOSL targets, but is not included as it corresponds almost exactly to scenario 1.

Finally, scenario 4 (see Table 39) presents the effect of aiming for a higher service level. The base case is calculated on the basis of providing gravity supplies where possible, protected open wells within 250m of houses as a second priority, and tubewells where neither of these will be possible. Additionally, a small increase in handpump shallow wells is allowed for, as may be required by some communities, and NWSDB pumped, piped supplies also increase at a marginal rate. For the high service level scenario, protected wells are discounted as a source, being substituted by a combination of handpump shallow wells and tubewells, within 150m of houses. Pumped, piped supplies are assumed for all of the urban sector. Overall coverage for the three districts under this scenario comes to 60% after 10 years, whilst for Badulla it is higher at around 70%. This arises from the high potential for gravity supplies in the district, which are a cost-effective way of providing a high service level.

The base case scenario has thus been adopted, as being considered feasible in terms of implementing agency capacity, and pitched at a service level which allows this capacity to serve almost the entire population.

IMPLEMENTATION PROGRAMME - SCENARIO 1
RECOMMENDED PROGRAMME

Table 37 Programme Scenario 1

Targets (% coverage)

District	Sector	Year									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All	Rural		36	41	47	56	67	79	88	95	98
	Urban		89	91	93	94	95	96	97	98	100
	Estate		50	59	68	79	89	96	99	100	100
	All		45	50	56	64	74	83	90	96	98

Expenditure (1991 Rs.M)

										Total	
										Rs.M	%
NWSDB	11.78	12.70	13.78	14.63	18.63	27.62	18.31	15.19	10.81	5.22	148.66	20
Plantations	16.27	18.75	21 63	24.94	24.84	14.52	8.15	0.52	0.52	0.52	130.67	18
SRTS	4.30	6.88	11 11	18.30	30.53	30.51	26.33	22.76	12.80	8.77	172.28	23
TCCS	3.20	4 99	8 01	12.50	19.72	19.71	16.30	13.43	8.40	5.76	112.00	15
PLAN	2.01	2 99	4 51	4.49	4.51	4.50	4 50	4.43	0.00	0.00	31 94	4
Small NGOs	0.90	1.50	2.40	2.40	2.40	2.40	2.02	1.69	1.00	0.69	17.39	2
PS	6.90	8.28	10.51	13.09	16.41	20.50	18.03	15.91	9 50	6.51	125.65	17
Total	45.37	56.09	71.95	90.35	117.03	119.75	93.63	73.92	43.02	27.47	738.59	

IMPLEMENTATION PROGRAMME – SCENARIO 2
LOW IMPLEMENTATION CAPACITY

Table 38 Programme Scenario 2

Targets (% coverage)

District	Sector	Year									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All	Rural		31	37	40	45	51	57	63	69	74
	Urban		89	90	91	93	94	95	96	97	99
	Estate		47	51	56	61	67	73	79	85	90
	All		41	46	49	53	59	64	70	75	80

Expenditure (1991 Rs M)

										Total	
										Rs.M	%
NWSDB	8 99	7.35	8.34	9.37	11 55	11.98	12.07	16.37	19.51	14.25	119.78	22
Plantations	8.23	9.44	10.95	12.43	14.26	14 30	14.30	14.33	10.81	7 27	116.32	22
SRTS	2.17	3.47	5.55	9.21	15.26	15.34	15.28	15.28	15.29	15.26	112.12	21
TCCS	1.61	2.52	4 00	6.29	9.86	9.90	9.87	9.87	9.88	9 86	73.66	14
PLAN	1.01	1.51	2.25	2.27	2.25	2.27	2.25	2.25	2.25	2.26	20 56	4
Small NGOs	0.45	0.75	1.20	1.21	1.20	1.21	1.20	1.20	1 20	1.20	10.83	2
PS	3.47	4.19	5.25	6.59	8.20	10.31	10.28	10.27	10.28	10.26	79.09	15
Total	25.93	29.22	37.56	47.37	62.58	65.30	65.26	69.58	69.23	60.36	532.37	

IMPLEMENTATION PROGRAMME – SCENARIO 4
HIGH SERVICE LEVEL

Targets (% coverage)

District	Sector	Year									
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All	Rural		13	17	20	24	28	33	37	41	45
	Urban		85	86	88	90	92	94	95	97	99
	Estate		43	48	55	63	71	80	88	96	97
	All		27	30	34	38	43	47	52	56	60

Expenditure (1991 Rs.M)

											Total	
											Rs.M	%
NWSDB	11.73	12.33	12.87	13.43	14 49	15.03	15.29	15.47	15.68	12.60	138 92	15
Plantations	16 33	18.80	21.70	24.88	28.54	28.53	28.39	28.22	2.71	0.52	198 61	22
SRTS	4 09	6.65	10.78	17.88	29.95	29.94	29.95	29 96	30.43	30.51	220.14	24
TCCS	3 08	4.86	7.82	12.28	19.41	19.40	19.41	19.41	19.66	19.70	145.04	16
PLAN	1.82	2 77	4 23	4.25	4.28	4.29	4.29	4.30	4.47	4.50	39.20	4
Small NGOs	0.86	1 45	2.35	2.35	2.36	2.36	2.36	2.36	2.39	2.40	21.26	2
PS	6.61	8 03	10.24	12.83	16.11	20.13	20.14	20.15	20.46	20 51	155.20	17
Total	44.52	54.89	69.99	87.90	115.14	119.69	119.82	119.87	95.80	90.75	918.38	

7.2. Coverage Targets

7.2.1. Water Supply

Based on the base case scenario 1 discussed above, the following tables show the percentage of people to be served by different technologies over 10 years, including existing coverage, the numbers of people to be served by year and the number of villages (in the estate sector, divisions) to be served each year. Note that Table 42 does not include the urban sector since the numbers are insignificant by comparison with the rural and estate sectors. The urban sector will be served on a case by case basis according to detailed plans developed later in the project cycle. This sector is, however, included in Table 40 and Table 41.

Abbreviations used in the tables to designate the type of technology are as follows:

G	Gravity supply
HPW2	Handpump shallow wells <250m from houses
TW2	Tubewells <250m from houses
PW2	Protected open wells <250m from houses
P	Pumped, piped supply
Cov2	Total coverage by all types

Table 40 Coverage by Technology and Year (%)

District	Sector	Type	Year									
			1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Matara	Rural	G	4	4	5	6	7	8	10	10	10	10
		HPW2	2	2	2	2	2	2	3	3	3	3
		TW2	2	2	3	3	4	6	9	10	10	10
		PW2	25	27	29	32	36	42	50	53	53	53
		P	20	20	20	20	21	21	23	23	23	23
		Cov2	53	55	58	63	70	81	94	100	100	100
Ratnapura		G	10	10	11	11	12	14	16	18	19	21
		HPW2	1	1	1	1	1	1	2	2	2	2
		TW2	1	1	2	3	4	6	8	10	12	14
		PW2	18	19	21	22	25	30	34	39	43	48
		P	8	8	9	9	9	9	9	10	10	10
		Cov2	39	41	43	46	52	60	69	77	86	94
Badulla		G	12	13	14	15	17	19	21	23	25	25
		HPW2	0	0	0	0	0	1	1	1	1	1
		TW2	6	7	9	11	15	19	23	27	31	31
		PW2	3	7	8	11	16	22	29	35	41	41
		P	1	1	1	1	1	1	2	2	2	2
		Cov2	23	27	32	39	49	61	74	87	100	100
All		G	9	9	10	11	12	13	15	17	18	19
		HPW2	1	1	1	1	1	1	2	2	2	2
		TW2	3	3	4	5	7	10	12	15	17	17
		PW2	16	18	20	22	26	32	38	42	46	48
		P	10	10	10	10	10	11	11	12	12	12
		Cov2	39	42	45	50	57	67	78	87	94	98
	Estate	G	37	43	48	55	63	70	76	78	78	78
		PW2	6	8	10	13	16	19	20	21	21	21
		Cov2	43	50	59	68	79	90	96	99	100	100
	Urban	PW2	5	5	5	5	6	6	6	6	6	7
		P	83	85	86	88	89	89	90	91	92	93
		Cov2	87	89	91	93	95	95	96	97	98	100
	All	G	11	13	14	15	17	20	22	23	24	25
		HPW2	1	1	1	1	1	1	1	1	1	1
		TW2	2	2	3	4	5	7	9	11	12	13
		PW2	13	15	17	19	22	27	31	35	37	39
		P	18	18	19	19	19	20	20	21	21	21
		Cov2	46	49	53	58	65	74	83	90	96	98

Table 41 Population to be Served by Technology and Year

District	Sector	Type	Year									
			1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Matara	Rural	G	3253	3526	4660	6567	8826	8475	3834	0	0	0
		HPW2	238	411	627	883	1859	3142	1422	0	0	0
		TW2	2158	3272	4836	6815	11970	17172	7769	0	0	0
		PW2	7759	12286	18364	25879	38938	45786	20714	0	0	0
		P	157	597	1023	1441	4280	8842	4000	0	0	0
Ratnapura		G	3301	2752	4497	7937	12897	13776	13805	13864	13902	9556
		HPW2	201	246	391	618	1005	1073	1075	1080	1083	744
		TW2	2357	3942	6131	9012	14645	15643	15676	15743	15786	10852
		PW2	8511	8504	13293	20764	33743	36040	36118	36271	36372	25002
		P	230	375	648	1180	1918	2049	2053	2062	2067	1421
Badulla		G	1829	4709	6748	8378	11057	11621	11657	11511	0	0
		HPW2	266	212	355	543	716	753	755	746	0	0
		TW2	6755	9210	13173	16303	21517	22613	22683	22400	0	0
		PW2	16061	8888	15576	24970	32956	34635	34743	34309	0	0
		P	509	330	585	947	1250	1313	1318	1301	0	0
All		G	8383	10987	15905	22881	32781	33871	29296	25375	13902	9556
		HPW2	705	869	1373	2044	3580	4968	3252	1826	1083	744
		TW2	11270	16424	24140	32129	48132	55428	46129	38143	15786	10852
		PW2	32331	29678	47233	71612	105637	116462	91575	70579	36372	25002
		P	897	1302	2256	3568	7447	12204	7371	3363	2067	1421
	Total rural		53585	59260	90907	132236	197577	222933	177623	139285	69211	47575
	Estate	G	17807	20582	23894	27707	28560	19177	10633	285	288	291
		PW2	7205	8400	9735	11316	10618	4053	2414	428	432	437
	Total estate		25012	28982	33630	39023	39178	23230	13046	713	720	728
	Urban	PW2	1043	1058	1014	869	588	573	573	875	1005	259
		P	5226	5300	4907	4035	2234	2149	2143	4531	3550	1293
	Total urban		6269	6358	5921	4904	2822	2721	2716	5406	4555	1552
	All	G	26190	31569	39800	50589	61340	53048	39929	25660	14190	9848
		HPW2	705	869	1373	2044	3580	4968	3252	1826	1083	744
		TW2	11270	16424	24140	32129	48132	55428	46129	38143	15786	10852
		PW2	40579	39136	57983	83797	116843	121088	94562	71882	37809	25697
		P	6123	6602	7163	7603	9681	14353	9514	7894	5617	2715
Grand total			84866	94600	130458	176163	239577	248885	193386	145404	74486	49855

Grand Total for 10-Year Programme: 1437679

Table 42 Villages to be served by Technology and Year

District	Sector	Type	Year									
			1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Matara	Rural	G	8	9	12	17	23	22	10	0	0	0
		HPW2	1	1	2	2	5	8	3	0	0	0
		TW2	5	9	13	19	31	43	19	0	0	0
		PW2	19	33	51	71	104	118	53	0	0	0
		P	0	2	3	4	11	22	10	0	0	0
Ratnapura		G	10	10	15	24	39	41	40	39	39	26
		HPW2	1	1	1	2	3	3	3	3	3	2
		TW2	6	11	16	23	37	39	38	38	37	25
		PW2	23	25	37	56	89	93	92	90	89	60
		P	1	1	2	3	6	6	6	6	6	4
Badulla		G	14	26	37	46	60	62	62	60	0	0
		HPW2	1	1	2	2	3	3	3	3	0	0
		TW2	15	42	60	74	97	101	100	98	0	0
		PW2	34	28	56	100	131	136	135	132	0	0
		P	1	1	2	4	5	6	6	5	0	0
All		G	32	46	65	87	121	124	111	100	39	26
		HPW2	2	3	4	7	11	14	10	6	3	2
		TW2	27	62	90	116	165	183	158	135	37	25
		PW2	76	86	144	227	324	348	280	222	89	60
		P	2	4	7	12	22	33	21	11	6	4
	Total rural		139	201	310	448	643	702	579	474	173	116
	Estate	G	40	46	53	61	59	33	19	2	2	2
		PW2	20	23	26	30	27	9	6	3	3	3
	Total estate		60	69	79	90	86	42	25	6	6	6
	All	G	73	92	118	148	181	158	131	102	41	29
		HPW2	2	3	4	7	11	14	10	6	3	2
		TW2	27	62	90	116	165	183	158	135	37	25
		PW2	96	109	170	256	350	357	286	225	92	63
		P	2	4	7	12	22	33	21	11	6	4
Grand total			199	270	389	538	729	744	604	480	178	122

Grand Total for 10-Year Programme: 4254

7.2.2. Sanitation

Table 43 shows estimated requirements for domestic latrines over the 10 year planning period. It is based on full coverage by pit or pour-flush (water seal, designated as PF in the table heading) latrines, and upgrading of existing pit and pour-flush latrines according to the proportions (75% and 20% respectively) found to be in poor condition during the field survey. This amounts to about 335,000 units to be built or upgraded, in the 6,000 villages of the three districts, or about 50-60 units per village. The proposed village-level revolving funds have been estimated with a two-year turnover of the Rs.1,000.00 loans, giving a mean fund size of about Rs.11,000.00 per village. This is considered small enough to risk in the first instance; villages which show good activity and repayment records may qualify for more.

Data on the existing situation in schools indicate 223 schools without latrines. A unit cost of Rs.7,000.00 is allowed for the construction of permanent good-quality facilities in these schools, at a rate of 6 units each, for a total expenditure of 1991 Rs.9.37M. In the other 1,314 schools, allowance has been made for upgrading 6 units in half of them, at a unit cost of Rs.3,000.00, for a total of Rs.11.83M. Finally, for an estimated 1,000 pre-schools, Rs.10M has been allowed for construction of two preschool latrines at a unit cost of Rs.5,000.00.

The total schools sanitation programme is thus estimated to cost Rs.31.2M, whilst revolving funds for domestic latrines will amount to Rs.70M.

Table 43 Domestic Latrine Requirements

LATRINE REQUIREMENTS OVER 10 YEARS

District	Zone	Coverage %				Required to 2001	
		None	Hole	Pit	PF	Cov %	Units '000
Badulla	a	44	16	25	16	81	18.41
	b	48	19	20	13	84	13.57
	c	22	2	33	43	57	21.26
	d	26	0	31	43	58	16.32
	e	25	2	12	62	48	2.01
	estate	80	0	0	20	84	32.17
	urban	13	3	33	50	51	10.88
	total						114.63
Matara	a	10	22	25	43	60	16.87
	b	10	8	27	55	49	26.48
	c	18	1	20	62	46	21.15
	estate	21	0	0	79	37	2.17
	urban	7	10	26	57	48	10.83
	total						77.49
Ratnapura	a	13	16	21	50	55	25.85
	b	18	13	39	30	66	13.30
	c	6	17	38	38	60	26.26
	d	25	13	26	35	65	37.56
	estate	66	0	0	34	73	22.02
	urban	8	17	31	44	57	17.59
	total						142.58
Grand Total Units Required ('000)							334.70

7.3. Technical Assistance

The potential capacities of the implementing agencies were estimated on the basis of present programmes and staffing. An assessment was also made of their capacities to grow; some institutions, particularly in the NGO sector, already have extensive experience with the participatory methods to be adopted, whilst others would have to grow more slowly as they gradually built up experience. A second factor in assessing feasible growth rates is the ability of the expanded organisation to consolidate, something that was overlooked in the disastrous programme of lending by the NHDA through TCCS. This was based on the past experience of the institution concerned (if any) with such rapid expansion for specific projects, and a general assessment of the strength of the institution.

Training requirements were worked out on the basis of this sustainable growth rate, and found to be on a feasible scale, using available resource organisations. The projected expenditures of the various agencies, their overheads, and training costs are presented in the next section.

Other programme overheads also included are costs for the proposed RWSSU for its central and district operation, and the proposed TSU which will provide external technical assistance to the RWSSU and, through them, the implementing agencies. The TSU allows for 4 years inputs from one engineer and one software specialist who will concentrate on social marketing, community mobilisation techniques and health education. Two years are allocated for a training specialist who will be involved with the training of trainers for the service NGOs which will train the implementing agency staff. One year is allotted for consultant support in setting up accounting procedures and associated training materials, and a further 12 months for short-term inputs into specialised aspects of the software programme and MIS development.

7.4. Implementation Plan Costs

Table 44 sets out the base costs (net of overheads) by technology and year, for water supplies, based on the recommended implementation scenario, and the costs presented in section 5.1. This shows a rise towards the middle of the 10 year programme, in line with increasing implementing agency capacity, falling away again in the latter half of the period as full coverage is reached.

Overall programme costs have been calculated for the three districts together, as they include common factors in the form of the national level RWSSU and the technical assistance afforded by the TSU. Budget costs for these are given in Table 45, Table 46, Table 47 and Table 48.

Training costs are discussed below. They have been calculated in detail for Sarvodaya, TCCS and Plan, and an analysis of these costs used to develop a unit cost for training according to projected increases in implementation capacity.

Table 49 sets out the base costs for the three districts water supply programme over the planning period, broken down by implementation agency. Table 50 shows the associated overhead costs. These, and the other programme costs, are set out by activity and agency in Table 51 and Table 52. The costs by activity are also represented graphically in Figure 13, and show the water supply element peaking at the middle of the period, with sanitation expenditure peaking slightly earlier, since a proportion of this is in the form of revolving funds which will continue to assist people over the following years. Technical assistance starts high and fades away over the planning period as capacity is established, whilst the costs arising from the management functions of the RWSSU settle down to a steady Rs.9M per year.

The breakdown between agencies was calculated according to their estimated capacities, also constrained by their respective target groups. The NWSDB was restricted to tubewells and pumped, piped supplies in accordance with its recently-stated policy of withdrawing from any involvement in the implementation of simple rural systems. The bulk of the input for piped systems is in the urban sector (including small towns) and the densely populated, salinity-affected coastal strip in Matara A small component is directed to the expansion of existing piped schemes in the rural sector. Installation of tubewells will be done on a contract basis in cooperation with NGOs, which would be responsible for community mobilisation and coordination. The plantation corporations are similarly restricted to inputs in the plantation sector. This does not take account of projected projects for non-resident workers, but this is compensated by the inclusion of private estates in the estate sector population. The remainder of the programme is allocated to the combined forces of the other implementing agencies, and consists of the villages in the rural sector.

The breakdown between agencies shows 37% of the water supply programme being handled by the NGOs, 19% by the Pradeshiya Sabhas, 20% by the estate sector corporations and 23% by the NWSDB. This distribution reflects the need to utilise all available and potential capacity to achieve significant improvements in the sector

Table 44 Water Supply Costs by Technology and Year

SCHEME COSTS BY TECHNOLOGY AND YEAR (1991 Rs.M)

District	Sector	Type	Year									
			1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All	Rural	G	7.83	10.86	15.62	21.81	30.82	31.73	27.83	24.43	11.54	7.87
		HPW2	0.23	0.34	0.53	0.77	1.20	1 40	1.05	0.76	0.54	0.37
		TW2	4.59	8 34	12.40	16.49	24.41	26.39	23.37	20.77	11.90	8.18
		PW2	4.53	4.96	7.88	11.60	17.06	18.03	14.86	12.15	7.59	5.27
		P	1.73	2.50	4.34	6.87	14.33	23.48	14.18	6.47	3.98	2.73
	Rural total		18.91	27.01	40.76	57.54	87.82	101.03	81.28	64.58	35.55	24.42
	Estate	G	15.05	17.33	19.98	23.03	23.06	13.90	7.79	0 47	0.47	0.47
		PW2	1.22	1.42	1.65	1.92	1.78	0 62	0.36	0 05	0.05	0.05
	Estate total		16.27	18.75	21.63	24.94	24.84	14.52	8.15	0.52	0.52	0.52
	Urban	PW2	0.13	0.13	0.13	0.11	0.07	0.07	0.07	0.11	0.12	0.03
		P	10.05	10.20	9.44	7.76	4.30	4.13	4.12	8.72	6.83	2.49
	Urban total		10.18	10.33	9.57	7.87	4.37	4.21	4.19	8.83	6.95	2.52
	Total	G	22.88	28.19	35.59	44.83	53.88	45 63	35.62	24.90	12.01	8.34
		HPW2	0.23	0 34	0 53	0.77	1.20	1 40	1.05	0.76	0.54	0.37
		TW2	4.59	8.34	12.40	16.49	24 41	26.39	23.37	20.77	11.90	8.18
		PW2	5 88	6.52	9 65	13.63	18.92	18 71	15.29	12.31	7.77	5 36
		P	11.78	12 70	13.78	14.63	18.63	27.62	18.31	15.19	10.81	5.22
Grand Total			45.37	56.09	71.95	90.35	117.03	119.75	93.63	73.92	43.02	27.47

Grand Total for 10-Year Programme: 738.59

Table 45 Budget Costs for the RWSSU (National Level) (1991 Rs. '000)

	No.	Unit Price	Project		GOSL	Total
			Foreign	Local		
Capital						
Vehicles	2	800.0	1600.0			
Computers	3	100.0	300 0			
Printer	1	80.0	80.0			
Photocopier	1	160.0	160 0			
Office equipment	item				100.0	
Total capital			2140.0		100.0	2240.0
Recurrent (annual)						
Engineer	1	180.0			180.0	
Training specialist	1	180.0			180.0	
Soc. marketing spec.	1	180.0			180.0	
MIS specialist	1	120.0			120.0	
Accountant	1	150.0			150.0	
Secretary	3	60.0			180.0	
Total staff salaries					990.0	
Staff overhead 40%					396.0	
Per diem for field	150	0.2			30.0	
Subtotal personnel cost					1416.0	1416.0
Software budget	item			3000.0		
Vehicle operation	item				300.0	
Consumables	item				360 0	
Communications	item				60.0	
Miscellaneous	item				150.0	
Subtotal				3000.0	870.0	3870.0
Total recurrent expenditure				3000.0	2286.0	5286.0

Table 46 Budget Costs for the TSU (1991 Rs. '000)

Item	No.	Unit	Unit Price	Project		GOSL	Total
				Foreign	Local		
Engineer	4	Year	8000.0	32000.0			
Software Spec.	4	Year	8000 0	32000.0			
Trainer	2	Year	8000.0	16000.0			
Accountant	1	Year	10000.0	10000.0			
Short-term Cons.	12	Month	1000.0	12000.0			
Per Diem for STC	360	Day	6.0	2160.0			
Total TSU				104160 0			104160.0

Table 47 Budget Costs for the RWSSU (District Level)

	No.	Unit Price	Project		GOSL	Total
			Foreign	Local		
Capital						
Vehicles	1	800.0	800.0			
Motorcycles	2	100.0	200.0			
Computers	1	100.0	100.0			
Printer	1	40.0	40.0			
Office equipment	Item				50.0	
Total capital			1140.0		50.0	1190.0
Recurrent (annual)						
Engineer	1	120.0			120.0	
Soc. marketing spec.	1	120 0			120.0	
Accounts Asst.	1	60.0			60.0	
Technical Asst.	2	50.0			100.0	
Secretary	1	60.0			60.0	
Total staff salaries					460.0	
Staff overhead 40%					184.0	
Per diem for field	250	0 2			50.0	
Subtotal personnel cost					694.0	694.0
Vehicle operation					250.0	
Consumables					240.0	
Communications					25.0	
Miscellaneous					50.0	
Subtotal					565 0	565 0
Total recurrent expenditure					1259.0	1259.0

PROJECT OVERHEADS BY YEAR (1991 Rs.M)

Item	Year										10-Year Totals
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
RWSSU National											
Capital											
Project forex	2.14					1.07					
GOSL	0.10					0.05					
Recurrent											
Project local	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	
GOSL	2.29	2.29	2.29	2 29	2.29	2.29	2.29	2.29	2.29	2.29	
RWSSU District											
Capital											
Project forex	3.42					1.71					
GOSL	0.15					0.08					
Recurrent											
GOSL	3.78	3.78	3.78	3.78	3.78	3.78	3 78	3 78	3.78	3.78	
TSU											
Recurrent											
Project forex	29.25	29.25	16.25	16.25							
Total	44.12	38.31	25.31	25.31	9.06	11.97	9.06	9.06	9.06	9.06	190.35
Project forex	34 81	29.25	16.25	16.25	0.00	2.78	0.00	0.00	0.00	0.00	99.35
Project local	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	30.00
GOSL	6.31	6.06	6.06	6.06	6.06	6.19	6.06	6.06	6.06	6.06	61.01

BASE EXPENDITURES BY AGENCY (1991 Rs.M)

Implementing Agency	Year										Total	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Rs.M	%
SRTS	4.3	6.9	11.1	18.3	30.5	30.5	26.4	22.9	12.5	8.5	171.9	23
TCCS	3.2	5.0	8.0	12.5	19.7	19.7	17.1	14.8	8.0	5.5	113.5	15
PLAN	2.0	3.0	4.5	4.5	4.5	4.5	3.9	3.4	1.8	1.3	33.4	5
Small NGOs	0.9	1.5	2.4	2.4	2.4	2.4	2.1	1.8	1.0	0.7	17.5	2
PS	6.9	8.3	10.5	13.1	16.4	20.5	17.7	15.4	8.4	5.7	122.9	17
JEDB/SPC	16.3	18.8	21.6	24.9	24.8	14.5	8.2	0.5	0.5	0.5	130.7	18
NWSDB	11.8	12.7	13.8	14.6	18.6	27.6	18.3	15.2	10.8	5.2	148.7	20
Total	45.4	56.1	72.0	90.4	117.0	119.8	93.6	73.9	43.0	27.5	738.6	

Table 49 Water Supply Costs by Agency

OVERHEAD COSTS BY AGENCY (1991 Rs.M)

Impl. Agency	Rate (%)	Year										Total	
		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Rs.M	%
SRTS	40	1.72	2.75	4.45	7.32	12.21	12.20	10.56	9.15	4.98	3 41	68.8	19
TCCS	40	1.28	1.99	3.20	5.00	7.89	7.88	6.82	5.91	3.22	2.21	45.4	13
PLAN	40	0.80	1.20	1.80	1.80	1.80	1.80	1.56	1.35	0.74	0.50	13.3	4
Small NGO	30	0.27	0.45	0.72	0.72	0.72	0.72	0.62	0.54	0.29	0.20	5.3	1
PS	55	3.80	4.55	5.78	7.20	9.03	11.28	9.76	8.46	4.61	3.16	67.6	19
JEDB/SPC	55	8.95	10.31	11.89	13.72	13.66	7.99	4.48	0.29	0.29	0.29	71.9	20
NWSDB	55	6.48	6.99	7.58	8.05	10.24	15.19	10.07	8.35	5.94	2.87	81.8	23
Total	47.9	23.3	28.2	35.4	43.8	55.6	57.1	43.9	34.1	20.1	12.6	354.0	

Table 50 Water Supply Overhead Costs by Agency

OVERALL PROJECT COST SUMMARY (1991 Rs.M)

Table 51 Overall Programme Costs by Activity

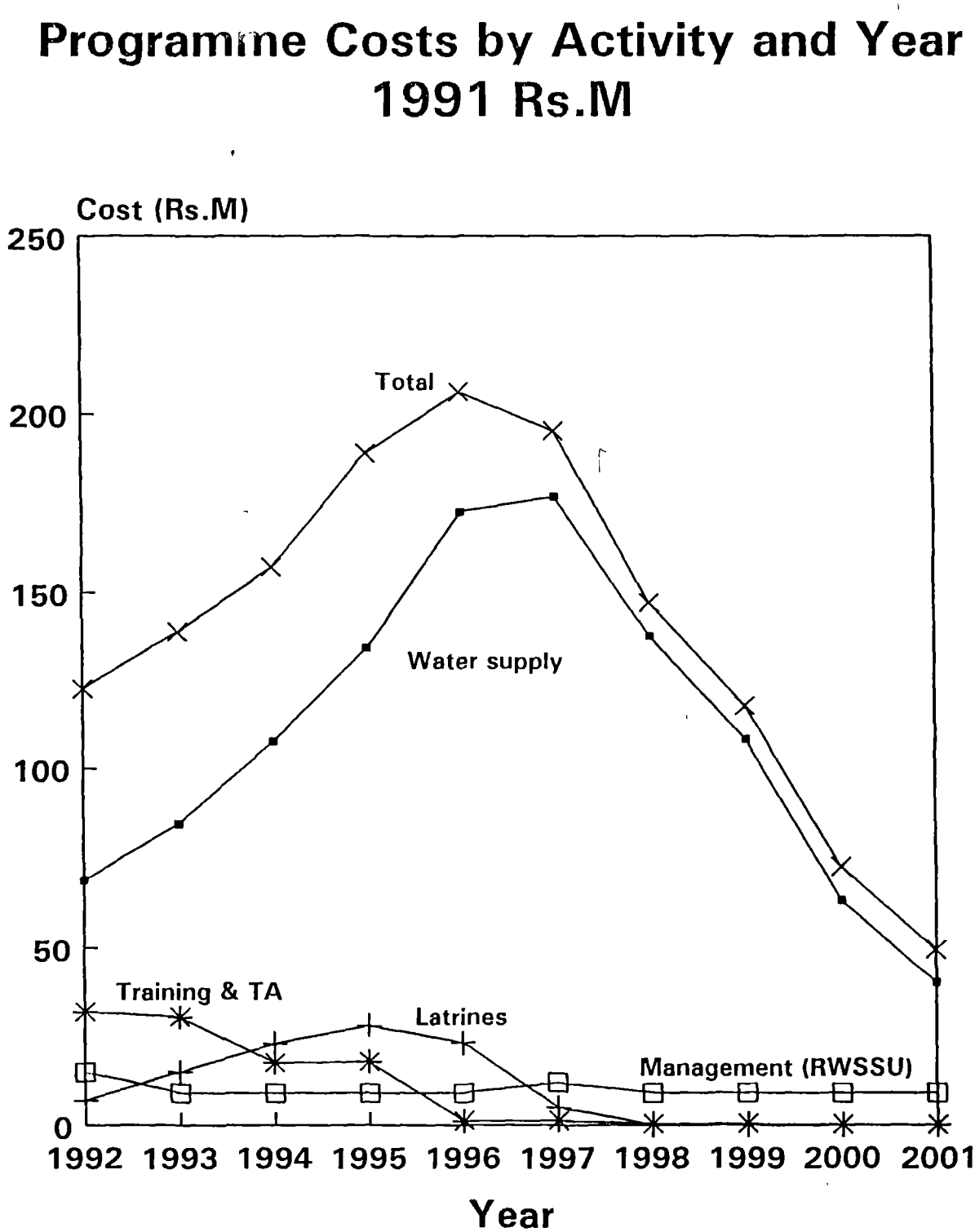
	Year										Total	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Rs.M	%
Water Supply												
- Base Cost	45.37	56.09	71.95	90.35	117.03	119.75	93.63	73.92	43.02	27.47	738.6	53
- Overhead	23.30	28.24	35.43	43.80	55.55	57.06	43.88	34.05	20.07	12.64	354.0	25
Sanitation												
- Rev. funds	5.00	10.00	15.00	20.00	15.00	5.00					70.0	5
- Schools	2.00	5.00	8.00	8.00	8.20						31.2	2
Institutions												
- Training	2.11	0.59	0.76	0.94	1.26	1.41	0.47	0.37	0 22	0.14	8 3	1
- TSU	29.25	29.25	16.25	16.25							91.0	7
- RWSSU	14.87	9.06	9.06	9.06	9.06	11.97	9.06	9.06	9.06	9.06	99.3	7
- Study Tours	0.60	0.60	0.60	0.60							2.4	0
Total	122.5	138.8	157.1	189.0	206.1	195.2	147.0	117.4	72.4	49.3	1394.8	
(US$ Equivalent)	3.06	3.47	3.93	4.73	5.15	4.88	3.68	2.94	1.81	1.23	34.87	

SOURCES OF FUNDS BY AGENCY (1991 Rs.M)

Table 52 Overall Programme Costs by Agency

Agency	Year										Total	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Rs.M	%
Community												
- Kind	2.8	3.5	5.2	7.4	10.6	11.1	9.4	8.0	4 3	3.0	65.1	5
- Cash 10%	1.9	2.7	4.1	5.8	8.8	10.1	8.1	6.5	3.6	2.4	53.9	4
Project	99.8	113.2	126.3	152.2	161 7	151.4	112.7	91.0	54.5	35.6	1098.3	79
Govt. Agencies	18.1	19.5	21.5	23.7	25.0	22.6	16.8	12.0	10.0	8.3	177.5	13
Total	122.5	138.8	157.1	189.0	206.1	195.2	147.0	117.4	72.4	49.3	1394.8	
(US$ Equivalent)	3.06	3.47	3.93	4.73	5.15	4.88	3.68	2.94	1.81	1.23	34.87	

Figure 13 Overall Programme Costs by Activity and Year



7.5. Priority Investment Programme

The main lesson learned from the foregoing analysis is that major increases in implementation capacity, through developing existing institutions in the sector, will be required to make sustainable progress. This development of implementation capacity must be the first priority of any investment programme in the sector. The discussions in Volume II of the report also point to the critical need for developing institutional mechanisms to achieve overall coordination in the sector, which should be the second priority of the investment programme. Only as these two priority objectives become fulfilled can funds be channelled into the sector to achieve greater service coverage.

The analysis of needs and projected capacity in the sector shows that a high level of coverage can be achieved by this approach, if the standards of service are set at a realistic level. This is very much in tune with the New Delhi statement on safe water and sanitation, to which the GOSL has subscribed. A key factor in technological terms is the acceptance of protected shallow wells as domestic water sources, and ways of improving the water quality obtained from these need urgent investigation.

Little correlation was found between economic status and service levels for water, although poorer people tend to have poorer sanitation facilities, so it is difficult to clearly identify any particular priority target group. However, in order to generate the full community participation necessary for sustainability, more intensive work will be required amongst poorer communities, so this should be considered as one factor among others in defining communities to be served with Priority Investment Programme (PIP) funding.

Certain areas have been found to have generally poorer water supply coverage, as defined for the development programme, so further work for the preparation of the PIP will be concentrated there. Five AGA divisions have been identified for this PIP preparation phase, namely, Haldumulla, Haliela, Mahiyangana, Migahakiyula and Soranathota. Five AGA divisions in each district (detailed in the respective district plans) have been selected for this purpose, according to the survey results and general assessments made by local personnel working in the sector.

The seven-year timespan of the PIP implementation will allow for other divisions to be served subsequently, but these are proposed for initial study under this project.

The proposed involvement of NGOs to carry out more than a third of the investment programme is perhaps a departure from previous norms, but is important, both in terms of exploiting implementation capacity, and also the NGOs' expertise in working closely with communities, which must be tapped to achieve project sustainability.

7.6. Summary of Unit Costs

Table 53 sets out in summary form the unit costs used in estimating programme costs. Note that the figure for gravity schemes is indicative only, since costs applied to the individual zones are based on their respective mean settlement sizes. Protected well costs are differ between Badulla and the other two districts. The figures for % community contribution apply only to rural schemes, since urban and estate sector schemes will generally be constructed by agencies which do not use community participation methods. Rehabilitation costs are estimated at half the total cost.

The estimates are considered to be within a margin of error of 10%-15%.

Table 53 Summary of Unit Costs

System Type	Cost		Community Contribution
	per Unit	per Household	
Water Supply			
Pumped		10,582 00	0%
Gravity (1)		4,838.00	19%
Tubewell & handpump	52,500.00		0%
Dug well & handpump	37,859 00		23%
Protected dug well (Matara and Ratnapura)	17,039 00		26%
(Badulla)	25,000.00		26%
Latrines			
Dug hole		766 00	100%
Pit		1,272 00	100%
Water Seal		3,871 00	(2)

Notes (1) Based on mean village size
(2) Generally 100%, but may be subsidised

7.7. Overheads

The only agency for which an accurate estimate of overhead costs is available is Sarvodaya. In this case, they amount to 40% of direct costs, and include design, technical support and community mobilisation costs, together with an element for the overall organisation's costs. Comparing Sarvodaya's operation with that of other possible large NGO implementing agencies, this figure can reasonably be applied to all of them. The small NGOs, which generally have no offices or full time staff, obviously have lower overheads, estimated at 30% for the purposes of programme costing.

The NWSDB charges an overhead of one third on contract work, but as outlined above, this may be a low estimate. Government agencies all over the world have high overheads, and recent problems with shedding staff at the NWSDB indicate that the situation is no different in Sri Lanka. The best estimate of the NWSDB's real overhead costs is in the range of 50%-60%. For the purposes of programme cost estimation, the 33% charge-out figure is adopted as a project-funded overhead, whilst an extra 22% is included as a hidden government subsidy.

Local authorities (Pradeshiya Sabhas) are a somewhat unknown quantity, having been recently formed, and still lacking staff and operational experience in water supply and sanitation project execution. Again, as government agencies, they are likely to have higher costs than the NGOs. Based on observation of their current financial status, their overheads probably lie in the range of 50%-60%. As they will be treated similarly to the NGOs as regards project implementation, 40% is allowed as project-funded overhead, with a further 15% as subsidy.

An overhead of 55% has also been estimated for the estate sector corporations, in line with the other public sector agencies and the investigations carried out in this study. For accounting purposes when receiving grants from outside organisations they charge only 5% of the direct costs as overhead, which is clearly unrealistic. The difference, 50%, is considered as the plantation corporations' contribution.

Finally, there will be overall project overheads attributable to the costs of the RWSSU. These are considered as a separate cost item in the programme cost estimation.

7.8. Training

Training costs (see Table 54)were approximated by examining the existing staffing of the implementing agencies and estimating future staffing needs over the period of the project. In the case of some organizations, this required creating new posts (TCCS, for instance, has no technical staff at present, but training of both coordinating engineers and field technical supervisors was budgeted for).

It was assumed that all staff would be recruited with basic academic qualifications only (in the case of mobilizers, A levels or a degree in the social sciences, in the case of technicians, an engineering diploma or degree) but in fact many organizations recruit from within their own ranks, and new staff actually have several years experience.

Technical training was costed at Rs.500 per day per trainee, and it was estimated that a 4 week training course was required for new staff. Training of mobilizers was costed at Rs.200 per trainee per day, and 8 weeks of training was budgeted for. This training is likely to be broken up over several months, with practical experience between residential sessions. These estimates for both training duration and cost were based on information from FOD, PIDA & CHD. Detailed estimates of training costs for field staff were also received from Sarvodaya.

It was found, based on these estimates, that start up technical assistance costs were fairly high, but declined over time, as the marginal cost of adding expenditure onto existing programmes declined. There was some variation between agencies, but the average TA cost is roughly Rs.50,000 for every Rs.1M of construction expenditure.

TRAINING COSTS BY AGENCY (1991 Rs.M)

Implementing Agency	Year										Total	
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Rs.M	%
SRTS	0.02	0.16	0.29	0.42	0.52	0.15	0.13	0.11	0.06	0.04	1.9	23
TCCS	0.23	0.09	0.08	0.15	0.22	0.50	0.09	0.07	0.04	0.03	1.5	18
PLAN	0.07	0.07	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.3	3
Small NGOs	0.05	0.03	0 05	0 01	0.01	0.01	0.01	0.01	0 00	0.00	0.2	2
PS	0.35	0.07	0.11	0.13	0.17	0.20	0.09	0 08	0 04	0.03	1.3	15
JEDB/SPC	0.81	0.12	0.14	0.17	0.12	0.07	0.04	0.00	0.00	0.00	1.5	18
NWSDB	0.59	0 05	0.05	0 04	0.20	0.45	0.09	0.08	0.05	0.03	1.6	20
Total	2.1	0.6	0.8	0.9	1.3	1.4	0.5	0.4	0.2	0.1	8.3	

7.9. Funding and Cost Recovery

The needs for funding have been defined above. Table 62 gives the breakdown by agency. The communities served will contribute where appropriate, with labour and materials, as is practised in projects implemented by several agencies already. This amounts to only 5% of the total cost of the 10 year development plan, but in cash terms makes up a considerable Rs.65M across the three districts. Included in this scenario is another 4% (Rs.54M) which represents recovery of 10% of the cash cost of community-managed water supplies. This is discussed more fully in Volume II. Suffice it to say here that this cash recovery element of project funding will be in the form of revolving funds maintained by the implementing agencies. Beneficiary communities will sign contracts committing them to repayment of this money over ten years at a rate of interest sufficient to allow for inflation, administration (service charge) and a minimal level of default. Soft interest rates will only confuse the issue by bringing in hidden subsidies, so cost recovery and affordability objectives will be balanced by periodic review of the percentage recovery factor to be applied.

Contributions by government agencies can be divided into two parts. About two thirds consists of hidden subsidies by way of government funding of institutional costs in public sector organisations, resulting from actual overheads being higher than charge-out rates. The other one third are expenses incurred for programme management by the RWSSU, amounting to about Rs.6M per year.

Costs designated in Table 62 as project costs are those attributable to funding for the hardware and software elements of the programme, and the technical assistance and training. These amount to nearly Rs.1,100M over ten years (equivalent to US$27.5M) in constant 1991 prices. They will be covered by a combination of external donor funds and GOSL's own development funds, according to any agreements reached between GOSL and the donors.

8. Targets and Policy Framework

8.1. National Policy & Legislation

8.1.1. Policy Implications

The most major implications of the proposed programme for GOSL policy are in the field of institutional structures. A concerted effort to establish a national framework along the lines recommended will involve the taking of a clear decision on responsibility for the rural water supply and sanitation sector. It is doubly important that this be done now, so as to fill the institutional vacuum left by the formal withdrawal of the NWSDB from the rural sector.

It is also of prime importance to realise that the inclusion of many different implementing agencies in the rural water supply and sanitation programme, particularly NGOs, is essential if sustained progress is to be made in the sector. This will require shifts in attitude, and possibly enabling legislation, to simplify CBO registration procedures and facilitate the use of government funds by NGOs.

It is generally agreed that subsidies to the water supply and sanitation sector must be reduced, if not entirely phased out. This requires political will on the part of the government, which has a long tradition of giving away such services free of charge, often in an arbitrary way which does not reflect needs in the sector. This phasing out should be gradual, however, and take account of beneficiaries' financial capabilities.

The recommended approach has two elements. Firstly, direct cost recovery from community inputs in kind should be maximised, and possible "up-front" capital contributions from communities encouraged, even if for only a token amount. Where communities or individuals are willing to pay the extra costs of higher service levels (house connections instead of standpipes, for instance), and it is technically feasible, they should be encouraged to do so. This encouragement could take the form of giving increased priority for programme funding. Secondly, capital cost recovery through loans given by the implementing agencies to beneficiaries should be instituted. The repayments would enter a revolving fund held by the implementing agency, the value of which, allowing for 10% default, would be deducted from future funding through the agency. In order to avoid erosion of the funds, realistic interest rates should be charged, to take account of inflation and service costs. The proportion of total cost to be repaid would be reviewed periodically against repayment records and affordability. In the first instance, a target of 10% cash cost repayment might be suitable.

8.1.2. Legislative Implications

a) NWSDB

Under the NWSDB legislation, the area of authority for the Board was declared in 1982 to be the entire island. In light of the new policy of the NWSDB to prioritise the existing urban schemes, and largely leave the rural areas to other agencies, this area of authority should be changed.

b) Provincial Councils

The enabling legislation which is required for the Provincial Councils to take on their devolved functions has not been enacted. This should be done as soon as possible to make the councils fully operational. The registration of societies has been effectively halted because of the delay in establishing the responsibilities of the Provincial Councils, and this prevents NGOs and CBOs from acquiring official recognition and legal status.

c) Plantations

The impending privatisation of the plantations will have a major impact on the way social development and infrastructure improvement projects are carried out. Legislation does exist to guarantee that estate superintendents, on both private and state owned estates, take responsibility for the resident workers' welfare. As it stands, the revisions to the Medical Wants Ordinance (renamed the Estate Health Law) have not been passed by parliament, and in any case the previous ordinance was not enforced. This situation should be remedied, and effective, enforceable legislation put in place to ensure estate workers' well-being.

d) Water Rights

The legislation regarding rights to use of water for domestic purposes is not clear. Communities wishing to use public water sources will be required to apply to the GA for permission. Government policy should facilitate the granting of this permission and ensure that the process is not onerous and prone to delay, especially as the organisations applying (CBOs and NGOs) often have limited capacity to go through long and bureaucratic procedures.

e) Pradeshiya Sabhas

Although Pradeshiya Sabhas have a mandate to carry out water supply and sanitation improvements and establish new facilities, they must not view this as an exclusive right, and government policy must make it clear that other organisations, such as NGOs and CBOs have the right to undertake water projects and that their participation in the sector should be facilitated.

f) NGOs

There is evidence that new legislation to control and monitor NGOs may be proposed shortly. If this legislation is overly restrictive it will hamper the NGOs in their activities. Controls may be implemented on the way that NGOs receive funds from external agencies, requiring that such funds flow through government. This may result in a situation where government effectively controls all NGO operations.

While NGOs have worked well with the GAs, AGAs and IRDPs, it is not clear how they will interact with the newly elected Pradeshiya Sabhas. It will be difficult to establish good collaborative links in the atmosphere of suspicion that exists regarding NGOs at the moment, and even more difficult if NGOs are working under strict government control, caught in a web of bureaucracy.

8.2. Targets & Service Levels

There are three main elements that can be used to define water supply service levels, namely, quality, reliability and accessibility. These have to be balanced according to available resources, perceived needs, and estimated impact (benefits).

As this is a strategic planning exercise, data are not available at the level of detail required to carry out detailed analyses of the above factors, which apply only to a specific set of circumstances. In any case, the calculation of benefits from water supply and sanitation projects is speculative at best, and can only give general guidance which must be backed up by informed judgement.

The approach adopted was to set an order of priority for the selection of different technologies for water supply and then to fine tune it according to the existing situation. This was done for two different service level scenarios. The factor of reliability was taken into account by admitting only reliable sources, and was reflected in the proportions of populaton served by different technologies.

The basic order of priority is headed by gravity piped supplies. These have a high potential in the study area, and combine the virtues of quality, reliability and accesssibility. Shallow wells were given second priority, as being the cheapest type of supply. Tubewells (boreholes) with handpumps were ranked third, being a more expensive substitute when shallow wells were not possible. Pumped, piped supplies are the most expensive and were restricted to special environments such as towns (where piped coverage is already standing at 83% in the study area), and areas such as the coastal belt where other options are not feasible.

Two accessibility levels were considered. Initially these were set at a maximum distance to source of 200m and 400m for high and low service level respectively. However, further analysis of the data showed that very few people (less than 10%) use sources at more than 400m, so these standards were revised to 150m and 250m, the latter being a standard yardstick used in the water supply sector in Sri Lanka.

The major variable differentiating the two service levels was, however, quality. All the sources considered have a generally high level of quality, with contamination by faecal coliforms usually limited to well under 10 per 100ml, except for protected shallow wells, where contamination, apparently from unhygienic use of the well, is much higher. The two service level scenarios examined were thus as follows:

High Service Level	*Low Service Level*
Gravity, < 150m	Gravity, < 250m
Handpump shallow well, < 150m	Open shallow well, < 250m
Handpump tubewell, < 150m	Handpump tubewell, < 250m
Pumped, piped, < 150m	Pumped, piped, < 250m

In addition, allowance was made for marginal increases in coverage by piped schemes and handpump wells caused by other factors (eg. political imperatives).

Applying these criteria to the data on existing sector status and water resources availability was performed assuming that areas where overall coverage is lowest would be served first. Coverage targets were set by adjusting expenditure required on facilities to the implementing capacity available. The results of this analysis are presented in the district plans, chapter 4.

Three scenarios are presented, and show that, with the estimated implementing capcity, coverage of effectively 100% can be reached over 10 years at the low service level, while only 60% coverage can be achieved for the high service level. If a pessimistic estimate of implementing capacity is made, by halving the baseline estimate, about 80% coverage is achieved in the 10-year planning frame for the lower service level. On the basis of this analysis, the lower service level was adopted as being more appropriate to the resources available.

The inclusion of open protected wells as a source type has been the subject of some debate, as the water quality is not good. However, better access to water sources in itself has significant health benefits, whilst the benefits of a clean water supply are hard to realise without intensive health education, leading to behavioural change. Such intensive education may well have potential to improve open well water quality, and should be explored.

Service levels for latrines were defined as one pit or water seal (pour flush) unit per household, considered the minimum necessary to bring about improvements in environmental hygiene. Upgrading of these latrine types when in poor repair was also included.

8.3. Project Selection Criteria

8.3.1. Objectives

Project selection criteria are required in order to ensure that coverage is increased starting in the areas where the need is most acute or the willingness of communities to contribute is greatest.

In order to prevent political interference in project selection, a transparent process is needed, using clear and published criteria. The criteria will give priority to those communities and areas where the need for improved water supply and sanitation is greatest, and also to those where potential for community mobilisation is highest. The community itself, with the assistance of the implementing agency, is expected to illustrate that the proposed project fits the criteria. The investigation of the community in the process of preparing the proposal is a form of needs assessment, and should be carried out in a participatory manner.

Communities should be made aware of the programme and its selection criteria through publicisation and through the field workers of the implementing agencies in their areas. As much as possible the initiative for projects should come from the community, rather from external agencies. This may be in a constraint in remote and disorganised villages where people are unlikely to be aware of programmes and agencies, and where organisational capacity and the ability to research and write proposals is low. Assisting these communities to obtain assistance will be a particular challenge of the programme.

Project proposals will be simple documents, probably handwritten and a few pages in length, and the implementing agencies will assist communities to prepare them. The project proposals will be assessed by the RWSSU at district level.

8.3.2. Need Criteria

Need will be determined on the basis of the level of service offered by existing facilities, in terms of quality, reliability, and distance.

a) Quality

Quality will be assessed by examining the potential for bacteriological contamination. This is largely determined by type of source; rivers, streams and unprotected wells being the most prone to contamination.

b) Reliability

Reliability will be determined according to whether sources provide year-round coverage or dry up during certain times of the year.

c) Distance to source

Distance to source is an indicator of the drudgery associated with water collection and the time required. Communities using sources which are very distant or over rough terrain will be considered as being in greater need than those with sources nearby and easily accessible.

8.3.3. Community Mobilisation Criteria

Potential for community mobilisation will be determined by the level of organisation in a community and willingness to pay a proportion of up-front costs.

a) Level of Organisation

The level of organisation will be assessed by examining the groups and activities of the community. The existence of community based organisations such as Death Donation Societies, RDS, Mahila Samithis, Youth Clubs or Young Farmers Clubs (even if these groups have not carried out any water or sanitation projects) will be considered an indication of the ability of the community to organize itself and take action. The track record of the groups will be examined to see if they have planned activities and carried them out according to plan and collected funds and managed them correctly.

b) Willingness to Pay

The willingness of communities to pay for capital costs is an important criteria for two reasons; firstly if communities pay a greater proportion of costs the overall programme will be able to reach more communities, and secondly, willingness to pay is a good indication of real commitment to the project. Communities will be required to indicate their willingness to pay the pre-determined a capital cost contribution, which will range from 10 to 15% of capital costs. In addition, communities must commit themselves to providing labour and materials. This in-kind contribution is estimated to be between 5% and 30% of project costs.

The criteria for providing higher levels of service than the basic ones within the programme will be willingness to pay the full incremental costs. Both communities and individuals will be given the opportunity to do this.

The project proposal should indicate how the community intends to operate and maintain the system once it is built, and to explain how funds will be raised and managed. It should also indicate what assistance the community needs in setting up an operation and maintenance management system, and the training required for community members to run it.

8.3.4. Pre-Project Activities

It is envisaged that some communities will propose projects which it is obvious they do not have the capacity to implement. In these villages, pre-project activities will be initiated. these will take the form of community awareness building, health and hygiene education and sanitation projects.

Community awareness building will be carried out using the implementing agency's methods. Most NGOs use a variation on the change agent programme, which emphasises community based assessment of needs, identification of possible action, and self-reliance.

Health and hygiene education is carried out both by the government through schools and health units, and by NGOs. There are some NGOs which specialise in health education, such as Saukyadana and they should be mobilised to provide hygiene education.

Small sanitation projects, carried out on an individual household basis using a revolving fund established at village level, will help communities to organise on a small scale. successful implementation of these projects will build management capacity, raise confidence, and prepare communities for larger water projects.

9. Economic Justification

9.1. National Affordability

The proposed programme will generate a variety of benefits, including:

- health
- time saving for women
- employment
- stimulation of private sector manufacturing enterprises

Most, if not all, of these are unquantifiable, so it is hard to define exactly what the country will be getting for its money. The social objective of improving water supply and sanitation is, however, very clear, and has a certain political priority.

The proposed expenditure on the three districts' programme was compared to overall GOSL development expenditure, and to sector expenditure, to see if it would significantly skew the existing situation. Total planned development expenditure for 1992 is about Rs.40,000M, whilst total water supply and sanitation expenditure is planned at Rs.2,000M. Thus planned expenditure on the programme will amount to only 0.1% of total development expenditure and 2.3% of sector expenditure in the first year of the programme. If total development and sector expenditures are assumed to rise with the rate of inflation, the programme would amount to 0.5% of total development and 10% of sector expenditure respectively in the fifth year of the programme, when expenditure peaks. The equivalent figures aggregated over the whole ten years are 0.3% and 7% respectively. As the rural population of the area is more than 10% of the country's total population, it can be seen that the expenditures proposed are very reasonable, and reflect only the giving of due priority to the rural sector.

9.2. Non-quantifiable Benefits

Water supply and sanitation improvements provide many benefits which are difficult or impossible to quantify. As well as quantifiable benefits such as time saved, there are benefits such as improved health, environmental protection, spin-off economic development and improvements in the status of women.

The job of fetching water is primarily the responsibility of women. Women water collectors outnumbered men by approximately 6 to 1 overall, and by 10 to 1 in some areas. Women often walk long distances to fetch water, and carry heavy loads. There is some evidence that water carrying over many years can lead to adverse effects on the skeleton. It is believed that miscarriages and premature births are sometimes due to the general levels of exhaustion

common among women. Women are unable to rest sufficiently during and after pregnancy as they must continue to fetch water. Improvements in the availability of water and in the distance to the source will considerably lessen the burden on women.

As well as the health benefits which accrue from reduced morbidity and mortality due to cleaner drinking water, better personal hygiene and improved excreta disposal, improvements in health may also be realised because women have more time and energy to spend on caring for children and improving the household environment. Increased water supply and easier access will allow women to provide a cleaner environment in their homes, to wash their children more often, wash their own and their children's hands after defecation and to keep the kitchen clean. Greater availability of water will allow women to raise their own level of personal hygiene, and being able to accomplish these things will contribute to raising women's self esteem. Improved sanitation facilities provide greater privacy for men and women alike.

An emphasis on community participation that includes the involvement of everyone in the community, including women and other normally marginalised members (such as low caste members) can change the perception these people have of themselves. Meaningful involvement in a successful project will give people confidence and self esteem. This type of project may break down barriers between otherwise isolated groups and overcome petty jealousies and rivalries. Effective mobilisation techniques will bring the very poor into community activities, and give them confidence and experience with which to tackle other projects.

Implementing projects using participatory methods exposes many more community members to the planning, construction, operation and maintenance processes. This results in the acquisition of skills, as community members are shown how to identify their needs, plan a system, carry out simple construction tasks, and operate the system on a long term basis. Many of these skills can be used on other projects in different sectors. Health education aimed at improving water use and excreta disposal practices will instill an understanding of disease transmission routes and other general health subjects.

The reduced burden of fetching water will also result in more time for small projects such as vegetable growing, and for which improved availability of water will be a contributing factor. The advantages of this will be both improved nutritional status and possibly increased income. It is an important consideration that the income from this type of small activity usually stays in the hands of housewives, who are more likely to spend it on food, medicine or the needs of their children.

As many of the schemes to be implemented are gravity supplies, there will be an emphasis on protection of the water catchment area. This may take the form of encouraging local residents to plant trees in catchment areas and protect them from deforestation. This in turn will have a positive influence on erosion and other forms of environmental degradation.

At the household level, environmental improvements will be brought about by better sanitation facilities, reducing faecal contamination of soil and water. Proper drainage of the areas around wells will prevent ponding of water and reduce the number of insect breeding sites.

9.3. Cost Benefit Analysis

A cost-benefit analysis of the ten year development programme was carried out using the following factors:

shadow unskilled labour rate:	90%
tax component of costs:	15%

Operation and maintenance costs are found in Table 55.

Table 55 Operation and Maintenance Costs

Scheme Type	O&M Rs./household.month
Gravity	10.00
Handpump shallow well	3.00
Tubewell	9 00
Protected well	1 75
Pumped, piped	50.00

Using the costs set out in the preceding sections, economic costs were calculated for the whole programme as were the monthly benefits per household required to give different internal rates of return over a 20-year period. The same exercise was carried out using only the programme costs directly related to water supply, assuming that the institutional strengthening and technical assistance element will have a lasting value through continued application to other populations, and excluding the sanitation element also, so as to allow evaluation of time savings through shorter water collection journeys.

Table 56 sets out the required benefits per household per month for differing internal rates of return for the whole programme and the water element only.

Table 56 Required Benefits for Project Justification

Internal Rate of Return	Benefits per Household per Month (Rs)	
	Whole Programme	Water Only
5%	40 00	33 00
10%	51 00	42 00
15%	63.00	51.00
20%	76.00	61 00

At a rate of 10%, which would give a strong justification, the programme needs to generate benefits of just over Rs 50.00 per month, decreasing to around Rs.40.00 for a 5% internal rate of return.

The required benefits were translated into values of water collectors' time by comparing the distances travelled to existing improved and unimproved water sources. This is a conservative assumption as about a quarter of existing improved sources are at distances above the 250m maximum adopted in setting service levels. The mean distance to improved sources was 90m, while the figure for unimproved sources was 119m. The proportional reduction in mean collection journey time per household per day comes to just under half an hour. Applying this to the figures in Table 56 yields the implied values for womens' time presented in Table 57.

Table 57 Implied Value of Womens' Time

Internal Rate of Return	Values for Womens' Time (Rs./hr)	
	Whole Programme	Water Only
5%	2.80	2.30
10%	3.60	2.90
15%	4.40	3.60
20%	5.30	4.30

These values compare favourably to the mean hourly wage rate for women derived from the survey of around Rs.5.00 per hour. Assuming the real value is around half of this, the internal rate of return would be around 7% for the water expenditure only case, which is a satisfactory value.

10. PIP Preparation

10.1. Work Programme for Preparation of PIP

The starting point for developing the PIP will be the DDP as amended by all interested parties. The main factors to be agreed are overall coverage targets for the seven years of the PIP, service levels, project selection criteria and the institutional framework with its associated strategies and methods. These will be discussed and finalised with senior GOSL and implementing agency personnel at a workshop to be held on 11 and 12 July.

A second phase of field surveys will start on 24 June, lasting about two months. The objectives of this exercise are threefold:

1. To prepare accurate cost estimates for water supply facilities of a variety of types so as better to estimate the total cost of the proposed programme.

2. To have the resulting PEDs already available at the start of the investment programme, so as to be able to start implementation as soon as possible.

3. To assess some of the social factors involved with setting up the proposed participatory approach to providing the services.

This differs from the data collection exercise carried out in the first phase of the project, which was aimed at building up a picture of the existing water supply and sanitation situation in the area as a whole, rather than focussing on possible interventions.

The work will be carried out in 50 villages in each of the three districts. In 40 of these, a single visit will be made to cover points (1) and (2) above, whilst in a further 10, all three points will be covered. This will necessitate three visits to each of these 10 villages, where the communities themselves will undertake the PED in partnership with the project team (see Annex 1).

The selection of villages for this work was made in three stages. Firstly, five AGA divisions in each district were identified as priority areas for improvements in water supply, based on a combination of the coverage data collected in the first field survey and general judgements from Sarvodaya and NWSDB personnel working in the rural areas concerned. Secondly, discussions were held in the selected AGA divisions with the AGAs, PHIs, NWSDB and NGO personnel, to select 10 villages in each division where water supply is known to be poor. Finally, the same group selected 10 villages from the 50 in the district, such that three should represent villages where the communities are already well mobilised, as evidenced by substantial CBO and NGO activity, three very poorly mobilised (and generally economically

poor) villages where community participation in projects may be harder to establish, and four intermediate communities.

Modular costings will be prepared for different elements of water supply and sanitation facilities and applied to the layouts and site-specific data from the surveyed villages in order to prepare accurate costings for use in estimating overall programme hardware costs. This will enable the disaggregation of costs into foreign, local and tax/duty elements. Options for procurement will also be examined to find the most cost-effective system.

Recommendations will be made on social marketing and health education programmes, including proposed activities and budgets. Draft procedures will also be worked out for CBO and implementing agency activities such as operating the sanitation revolving funds, cash cost recovery and O&M.

Within the context of the proposed institutional framework, detailed plans will be drawn up for human resources and institutional development. This will include identification of recipients and providers of training, materials and sources for communication support, and a programme for development of the national and district institutional structures. Requirements for technical assistance will also be defined and worked into a proposed programme.

The different elements above will be combined together to form the proposed PIP, and a cost-benefit analysis carried out for project justification. Environmental impact will also be assessed according to criteria to be supplied by the World Bank

Annex 1

Field Surveys for Preliminary Engineering Design

ANNEX 1 Field Surveys for Preliminary Engineering Design

The AGA divisions selected for the survey are as follows:

Matara	*Ratnapura*	*Badulla*
Bengamuwa	Balangoda	Haldumulla
Dikwella	Embilipitiya	Haliela
Kotapola	Imbulpe	Mahiyangana
Mulatiyana	Kalawana	Migahakiyula
Pitabeddara	Kolonna	Soranathota

8 villages in each division have been selected to represent the different types of water supply systems to be used, and PED will be carried out based on a single visit ("single contact"). The remaining 10 villages per district have been selected to represent a cross-section of the different "social" types to be encountered. This has been done by selecting 3 organised and motivated villages where substantial community development has already occurred, as reflected in high levels of CBO activity; 3 villages where there is virtually none of this type of activity; and 4 villages at an intermediate level of community development. In these villages, PED will be carried out using participatory methods, over a series of three visits by the project teams to the communities concerned.

Participatory and "Single Contact" Methods for PED

1. Participatory Method

Ten villages per district (30 villages in total) have been selected for participatory planning with the following objectives:

- preparation of PED for these villages making full use of community inputs
- sensibilisation of these villages and their preparation for future collaboration
- the testing and assessment of the community planning methods spelled out in the DDP
- an assessment of the community response to these methods and general community interest in undertaking water projects within the models proposed

The objective of the exercise is not to assess potential implementing agencies.

The planning procedure consists of a series of meetings between a project team consisting of two community field workers and two engineers, and the community and its leaders to:

- determine how the information required could best be gathered
- assess interest in carrying out a water project in the village
- compile information required for pre-engineering design
- identify possible implementing agency for future project
- assess willingness of community to organise in order to collaborate with agency
- estimate community contribution required and possible
- estimate future project inputs and costs

The community field workers will gather information on the following:

- community characteristics and demand
- source and level of service preferences
- willingness and ability to pay
- preferred mechanism and timing of paying
- hygiene education levels
- existence of community groups and level of activity
- other community projects undertaken
- nature and cohesiveness of community
- potential problems and possible methods for their solution

The engineers and the community will gather information on the following:

- physical resources
- available water resources and their potential
- village layout determined through village mapping, measuring of distances etc.
- population estimates and projections
- number of latrines and their condition

This process will provide the information necessary to carry out pre-engineering design for these communities.

The information will be gathered using the participatory approaches outlined in the DDP. The community will be provided with information on what is expected in terms of community contribution, participation and long term management of a future project, and made aware of the requirements of potential implementing agencies in terms of formation of societies, contribution of funds, identification of volunteers etc.

The planning exercise will be carried out by Cowater, ECL, NWSDB and Sarvodaya personnel, with one planning team per district. The teams have been oriented through a workshop focusing on participatory and planning techniques, and are aware of the nature of the potential implementing agencies and cost recovery techniques proposed. It is estimated that the cycle of three meetings in the villages will take approximately 8 weeks to complete.

It is understood that the consultants' responsibility includes planning but does not extend to community mobilisation or implementation.

A mechanism has been developed to gather information on the experiences of the team in the field in the form of a standard protocol. A comparison will be made with the experiences in the villages in which PED was done with the "single contact" approach.

The end products of this planning procedure will be:

For each village:

1. an assessment of community interest and capability in taking on a water project

2. identification of the particular implementing agency most likely to be suitable for the community, and the initiation of a dialogue with this agency

3. community sensitization to the requirements of their participation and the initiation of the process of community organisation

4. awareness of possible sources of funding for future projects (Janasaviya Trust Fund Community Projects etc.), and the scale and form of community contributions

5. information on village characteristics, water resources, sanitation needs etc.

6. pre-engineering design of the potential system identified through this process (including water resource assessment, number and location of wells, standpipes and house connections, approximate pipe alignment, number and volume of tanks, pipe lengths, assistance required for latrine building etc.)

7. based on the above, an estimate of the costs of a project in the village (both hardware and software costs)

For the project:

1. analysis of the effectiveness of the participatory methods

2. assessment of general community response and interest in water projects in the three districts

3. data for use in costing and financial analysis for the PIP

Meeting Series:

First Meeting - with community leaders and planning team

Determine:

- who is working in the community
- what is nature of need for water supply and sanitation
- any experience of development project, especially for water, in the past
- any interest in collaboration
- ideas regarding possible implementing agency based on previous involvement, relationships, inclination etc.
- interest in arranging community meeting and beginning process of information gathering
- initiation of community mapping/self assessment

Second Meeting - full day visit to community - with community (arranged by leaders from first meeting), planning team

- use of participatory techniques to encourage contribution from all members (including women)
- explanation of objectives, constraints etc.
- discussion of health and labour saving objectives, brief introduction to hygiene education ideas and messages
- discussion and, if necessary, completion of community mapping activity
- identification of possible water sources
- assessment of latrines
- visits to households
- assessment of willingness and ability to pay
- assessment of interest in finding volunteers for training in community health education, operations and maintenance
- identification of suitable possible implementing agency for future projects
- request to find representatives to liaise with implementing agency staff
- formulation of basic design for water supply facilities

Third Meeting - leaders, community representatives and planning team

- presentation of results of engineers' investigation (finalised map, assessment of water sources, PED of proposed system and costs for various levels of service)
- discussion of requirements of particular implementing agency identified with regard to forming society, user group etc.
- planning for the future - how to continue momentum, identify sources of funding and pursue them (i.e. decide whether to wait for downstream funds via World Bank loan or apply for Janasaviya community works funds immediately)
- coordination of water source monitoring to cover all dry seasons

2. "Single Contact" PED

Forty villages have been selected in each district (120 in total) for pre-engineering design using a single contact approach. The PED will follow the format presented below. The approach taken in these villages will be one of information gathering, concentrating on both physical and community data. The PED team will include a member with social communication skills (recruited from Sarvodaya) in order to assess social selection criteria, and an ECL engineer. Although the team will initiate preliminary planning with the community, they will make only one visit to the community, and therefore not be in a position assess community interest and commitment in depth, or share the results of PED with the community.

3. Technical Format for PED

1. Village location data

2. Population and projections

3. Present water supply and sanitation arrangements/coverage

4. Water resources suitable for exploitation

5. Village rating according to selection criteria (need, social potential for sustainability)

6. Proposed project inputs and costs:

   (i) Shallow wells:
   No., depths, linings, pumps (if any)

   (ii) Tube wells:
   As (i), plus expected strata to be encountered

   (iii) Gravity:
   Estimated source yield, no. and volume of tanks, pipe lengths and diameters, estimated no. of standpipes/house connections

   (iv) Pumped:
   As (iii), plus head and treatment if required

   (v) Assistance required for latrine building

7. Layout diagrams at 1:10,000 showing main areas of housing, roads and vegetation and, according to water supply type, source location and approximate pipe alignment and areas suitable for public taps or wells.

   Final layout can only be made with substantial community input, during the early stages of the implementation programme.