



Technical Assistance Consultant's Report

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SRI LANKA: Small Towns & Rural Arid Areas Water Supply and Sanitation (Cofinanced by the Japan Special Fund and the Cooperation Fund for the Water Sector)

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For: National Water Supply and Drainage Board

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Asian Development Bank

Small Towns and Rural Arid Areas Water Supply and Sanitation Project

ADB TA 4853-SRI



Final Report

Main Report

March 2008



In association with

IDP Consult Inc



Small Towns and Rural Arid Areas Water Supply and Sanitation Project

MAIN REPORT

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Small Towns and Rural Arid Areas Water Supply and Sanitation Project

KNOWLEDGE SUMMARY

The purpose of this project is to facilitate sustainable development in disadvantaged urban and rural districts in Sri Lanka. Its outcome will be to improve water supply and provide sanitation infrastructure and services to the dry zone districts of Sri Lanka.

The existing water supplies in the four project towns — Chilaw, Puttalam, Mannar and Vavuniya — are severely stretched and inadequate. Water resources are limited, treated water supplies are scheduled across the day in 3 of the towns, water quality problems are evident in 3 of the towns, the assessed level of non-revenue water is very high in all four of the towns and the cost recovery rate is low due to low service quality. None of the towns have piped sewerage systems or sewage treatment facilities, current sanitation provision is inadequate and causes environmental pollution. The rural areas of the five Districts covered by the Project generally have inadequate water resources and a low level of “Safe Water”.

The proposed project will have the following five components:

- i. Improved and expanded piped water supply provision to the four towns, with improved and increased raw water resources and improved water treatment.
- ii. New or improved sanitation system provision to the four towns, a sewerage sanitation system including sewage treatment is proposed for Vavuniya, septage treatment and local non sewerage sanitation improvements for the other three towns.
- iii. Rural communities along the routes of the new water transmission mains will be permitted water supplies and will be supported in the provision of on-site sanitation
- iv. Selected villages in the 5 Districts may receive support in the provision of piped water supplies, point sources and support in the provision of on-site sanitation, if funds are identified.
- v. A Capacity Development and Project Implementation support component.

There will generally be four subprojects for each town: (i) water resources, water treatment and water distribution (ii) sewerage and sewage treatment or septage treatment (iii) rural on-site sanitation to communities along the transmission mains and (iv) non sewerage sanitation improvements.

There will generally be three subprojects for the rural communities (i) water resources and piped water supply, or (ii) a piped supply combined with point sources such as onsite wells (iii) on-site sanitation.

Planning for the Project has been based on the projected population growth and increase in demand for services over the period to 2030.

Priority will be given to the rehabilitation, replacement and extension of the existing water infrastructure of the four towns, rehabilitation of the water mains and system control and monitoring will be targeted at Non Revenue Water reduction.

The extent of the construction of new extensions and facilities will be governed by funding availability.

The total cost of the Project is estimated at US\$111.02 million equivalent. The financing plan will consist of a \$48.0 million loan and US\$15.0 million grant from ADB's Asian Development

Fund, US\$18.75 million loan from ADB Ordinary Capital Resources, \$28.25 million from the Sri Lanka Government and US\$1.02 million from community financing.

The Urban water supply subprojects are economically viable, with EIRRs ranging from 13% to 19.3%; the Urban sanitation subprojects chosen have EIRRs ranging from 13.2% to 45%.

The Executing Agency will be the NWSDB under the Ministry of Water Supply and Drainage MWSD, a Project Coordination Unit (PCU) at the central level will be set up for management of the Project, and for monitoring and reporting.

The PCU will hire international and national consultants to assist with overall management of (and provide technical support to) the Project.

The Implementing Agency will be the NWSDB, two local Project Implementation Units, responsible for day to day project management, will be set up in Vavuniya and Chilaw.

The implementation period will be over 5 years, the first commencements on site are planned for 2009 with completion in 2014.

Urban contract packages will consist of civil works, split between water and sanitation, Rural Community local level works (if funding is available), mechanical & electrical equipment and vehicles.

It is proposed that the NWSDB focus on the effective operation and maintenance of the urban water supply schemes and the Vavuniya sewerage system and sewage treatment plant; the Urban Councils will operate and maintain the non sewerage systems and the septage treatment plants; and that the rural neighbourhood, Community Based Organisations operate the rural water supply schemes.

The overall benefits and impacts of the Project will be: (i) increased and improved coverage of water supply, improved sanitation, including to the poor; (ii) improved service delivery; (iii) improved public health; (iv) strengthening of institutional capabilities in urban planning and management, and in overall governance; (v) strengthening of community participation and empowerment; (vi) economic opportunities, creation of employment, and poverty reduction; and (vii) reduction of environmental degradation by the introduction of improved sanitation.

GLOSSARY AND ACRONYMS

ADB	Asian Development Bank
AF	affected families
AP	affected people
CAD	computer-aided design
CAP	community action plan
COSTAB	ADB financial analysis program
CPFPFG	Compensation Policy Framework and Procedural Guidelines (ADB)
CSD	Consulting Services Division (ADB)
DED	detailed engineering design
DFID	Department for International Development (UK)
EA	executing agency
EIA	environmental impact analysis
EIRR	economic internal rate of return
EMP	environmental management plan (ADB)
FIRR	financial internal rate of return
GAP	gender action plan
GC	Greater Colombo
GDI	general development index
GIS	geographic information system
GND	Grama Niladari Division
GPS	global positioning system
GTZ	German Development Corporation
HDI	human development index
HH	Household
HPI	human poverty index
IA	implementing agency
IBRD	International Bank for Reconstruction and Development (or World Bank)
ICT	information communication technology
IDD	international direct dialling
IEC	information-education-communication
IEE	initial environmental evaluation
IPDP	indigenous peoples' development plan (ADB)
ISA	initial social assessment
IT	information technology
JBIC	Japan Bank for International Cooperation
KAP	knowledge, attitudes and practices
KfW	Kreditstalt für Wiederaufbau
LAR	land and resettlement
LCB	local competitive bidding
M	Million
M&E	monitoring and evaluation
MIS	management information system
MOF	Ministry of Finance
MOH	Ministry of Health
MoHA	Ministry of Home Affairs
MOU	memorandum of understanding
MPA	Methodology for Participatory Assessments
MRM	management review meeting issues paper (ADB)
NGO	non-government organization
NK	Nippon Koei
NRW	Non Revenue Water
NWSDB	National Water Supply and Drainage Board

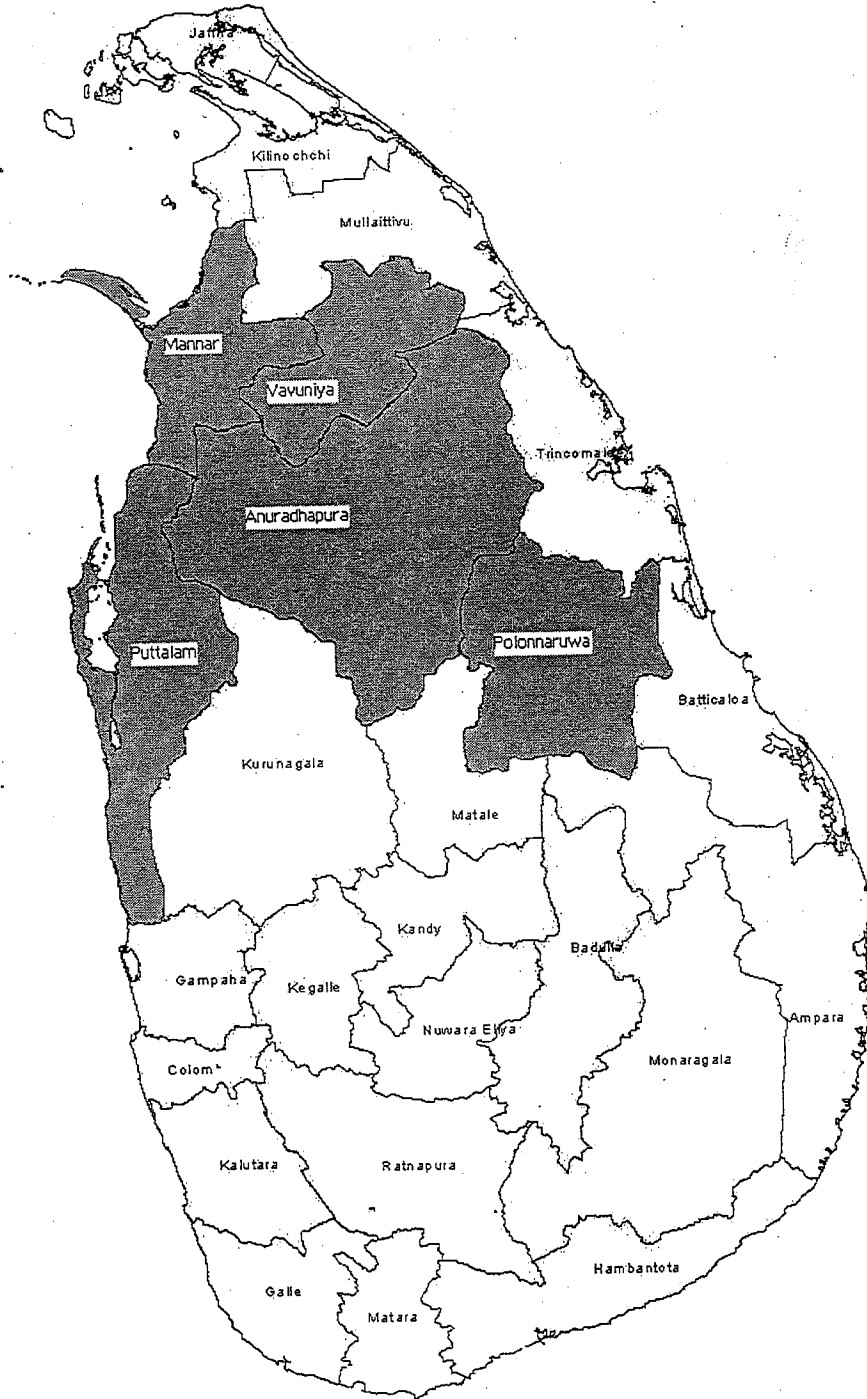
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O&M	operation and maintenance
PCR	project completion report (ADB)
PFL	Pour Flush Latrine Toilet
PHAST	Participatory Hygiene and Sanitation Transformation
PLF	project logical framework
PMO	project management office
PMR	project management report (World Bank)
PPAR	project performance audit report (ADB)
PPE	Property plant and equipment
PPMS	Project Performance Management System (ADB)
PPR	project performance report (ADB)
PPTA	Project Preparation Technical Assistance
QARQ	quantity, accessibility, reliability and quality (water indicators)
QCBS	Quality and Cost-Based Selection
RAP	resettlement action plan
RFP	Request for Proposal (ADB invitation document)
RO	NWSDB Regional Office
ROW	right of way
RP	Resettlement Plan
R&R	resettlement and rehabilitation
RRP	Report and Recommendation to the President (of ADB)
RSC	NWSDB Regional Support Centre
RWSS	rural water supply and sanitation
SA	special account
SEIA	Summary Environmental Impact Analysis
SOP	standard operating procedure
TA	technical assistance
TOR	terms of reference
ToT	training of trainers
UK	United Kingdom
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USA	United States of America
USD/\$	United States dollar
VIP	Village Improvement Program (WB)
WB	World Bank
WHO	World Health Organization
WSES	water supply and environmental sanitation
WSS	water supply and sanitation
WTP	willingness to pay

Small Towns and Rural Arid Areas Water Supply and Sanitation Project

Project Districts Location Map

- i) Assistance for rural areas in five districts and,
- ii) Urban schemes in Mannar, Vavuniya, Puttalam and Chilaw.



MAIN REPORT

1. Background

1.1 Introduction

1. The Technical Assistance Agreement for TA 4853-SRI: Small Towns and Rural Arid Areas Water Supply and Sanitation Project was executed between the Government of Sri Lanka and the ADB. The TA was approved in October 2006 by the ADB to prepare the Small Towns and Rural Arid Areas Water Supply and Sanitation Project. The TA became effective on the 5th April 2007 and commenced on 17th May 2007.

2. The TA consists of two components that:

- (i) Deliver a feasibility study suitable for ADB financing that emphasises poverty reduction and responds to locally expressed needs regarding priority water supply and sanitation infrastructure, and
- (ii) Capacity development assistance for institutionalising mechanisms for sustainable community-based infrastructure development.

3. The Revised Terms of Reference as included in the Contract were attached to the Inception Report and are included in the Final Report – Main Report, as Appendix 1.

4. The Executing Agency for the TA is the Ministry of Water Supply and Drainage (MWSD) and the Implementing Agency is the National Water Supply and Drainage Board (NWSDB) under the Ministry of Water Supply and Drainage. Overall guidance during the implementation of the TA is being provided by the National Steering Committee, headed by the Secretary of the MWS&D.

5. The team for implementation of the TA is comprised of officers of the NWSDB in the Head office in Ratmalana and in the District offices, as well as the consultant's TA Team. Since the commencement of the TA, close coordination, and support to the TA Team has been provided by Mr. W.B.G Fernando, Assistant General Manager (RWS). In the districts, assistance has been provided to the TA Team by the NWSDB staff in the regional and local offices.

6. The NWSDB has made available offices in Ratmalana and Anuradhapura during the project and provided venues for various workshops, such as the Training Centre in the Anuradhapura offices.

1.2 Study Outputs

Component 1 of the PPTA project, provides the following main outputs;

7. Outline feasibility studies for the recommended sub-projects in the water supply and sanitation sector for the towns of Vavuniya, Mannar, Puttalam and Chilaw. Including costs, implementation and procurement recommendations (see Annex 2 and 3)

8. Outline feasibility studies for the selected Rural sub-projects in the water supply and sanitation sector for the villages or small towns of Thodaveli, Cheddikulam and Pahala

Puliyankulama. Including costs, implementation plans and involvement of the community and recommendations. (see Annex 4, Parts B)

9. Summary investment levels for water supply and sanitation in the Rural Sector in the 5 Districts covered by the Project, to meet NWSDB corporate plan targets for “safe water”, including Rural Sector assessments. (see Annex 4 part C)

10. Proposals for project monitoring and evaluation. (see Appendix 4 of this report)

11. Financial and economic analyses are presented for the recommended sub-projects and for the Rural Sector, (See Annex 3, 4 and 6)

12. Proposals for institutional strengthening and capacity building of the NWSDB local offices, Municipalities and Community Based Organisations. (See Annex 3, 4 and 5)

13. Proposals for poverty, social safeguards and environmental protection measures, where found to be appropriate and necessary. (see Annex 7, 8 and 9)

Component 2 of the PPTA provides for developing institutional support for Community Based Organisations (CBOs), through awareness training of the By-laws, Credit Trust Funds and financial management and accounting training for the CBOs. (see Annex 10, 11 and 12)

1.3 Scope of the Draft Final Report

14. The following documents comprise the Draft Final Report for the project

Main Report

Annex 1 - Urban WS & S Technical Standards and Options

Annex 2 - Water Resources

Annex 3 - Urban WS & S Sub Projects

Annex 4 - Rural WS&S Sub Projects

Annex 5 - Institutional Analysis

Annex 6 - Overall Costs Economic and Financial Analysis

Annex 7 - Social Development Documentation

Annex 8 - Social Safeguards

Annex 9 - Environmental Assessment

Annex 10 - Bye laws for CBOs

Annex 11 - CBOs Credit Trust Fund

Annex 12 - Financial Management for CBOs

15. Documents, Annex 3 and 4 are standalone documents for each of the towns and villages, they incorporate the individual elements associated with planning for the subprojects and the social and resettlement implications.

1.4 Water Supply and Sanitation in Project Areas

16. In Puttalam and Chilaw, inhabitants are dissatisfied with the quality of existing water supplies and in Vavuniya the quantity available is strictly limited by shortage of reliable water resources. The situation in Mannar has not been studied in the normally required detail due to the security situation and difficulties of getting into the town, but supplies are limited and new connections to the water supply system are not allowed.

17. Only Vavuniya has a wastewater treatment plant, designed to intercept sullage in the storm drains and to treat it before discharge upstream of a local water supply source. This

was constructed under GTZ funding but has now fallen into disuse, primarily due to a lack of clear ownership and responsibility for maintenance and operation.

18. Improvements to both water supply and sanitation infrastructure are possible in the four project towns identified within this PPTA. These will lead to improvements in living conditions for a substantial number of beneficiaries.

19. Outline descriptions of the existing water supply and sanitation systems, for each of the sub-project areas is given in Section 7 of this report.

20. Outline proposals for water supply and sanitation proposals for each of the sub-project areas is given in Section 8 of this report.

1.5 External Assistance

21. A detailed analysis is found in Section 4.2 of this report. The water supply and sanitation sector in Sri Lanka has received significant assistance, including loans, grants and technical assistance, from foreign institutions and agencies. Among the institutions that have extended or are providing assistance to the sector are ADB, JBIC (Japan Bank for International Cooperation), World Bank, JICA, KfW of Germany, AUSAID, JICA, SIDA, EDCF and DEXIM of Korea, Austria, France, Norway, ANZ/FIC of Australia and New Zealand, and DANIDA. Table 4.4 Section 4.2 a list of loan- and grant-financed projects from the mid-nineties to 2006 with the names of the respective institutions/countries that provided the assistance.

22. ADB and JBIC are the two biggest contributors to the rehabilitation and expansion of water supply facilities managed by NWSDB. ADB's involvement has been predominantly in the water supply sub-sector in secondary towns and rural areas.

23. As of December 2006, the water supply, sanitation and waste management sector in Sri Lanka has received a total of about US\$ 324 million in total assistance from the ADB, including US\$ 315.3 million in loans to 7 public sector projects, and an estimated US\$ 9.0 million in technical assistance. The loans that were provided to this sector accounted for 8.4 percent of total ADB lending of \$3.763 billion as of December 2006.

24. Table 4.5 Section 4.2 is a list of loan and technical assistance projects financed by ADB since the Bank got involved in the sector in 1985. Two additional loan projects are on the pipeline for approval in 2007, viz: (i) the Jaffna Water Supply & Waste Water Management Project (est. loan: US\$50 million, grant: US\$15 million), and (ii) Greater Colombo Wastewater Management (est. US\$50 million).

2. Project Rationale

2.1 The PPTA Project

2.1.1 Purpose of Project

25. The impact of this project preparatory technical assistance (PPTA) is to facilitate sustainable development in disadvantaged districts in Sri Lanka. Its outcome is to improve basic water supply and sanitation infrastructure and services in dry zone districts of Sri Lanka. The PPTA outputs consist of (i) a feasibility study suitable for ADB financing that emphasizes poverty reduction and responds to locally expressed needs regarding priority

water supply and sanitation infrastructure, and (ii) capacity development assistance for institutionalizing mechanisms for sustainable community-based infrastructure development.

2.1.2 Project Methodology

26. The PPTA emphasises the importance of targeting those areas in the North-East and North West Provinces of Sri Lanka with the most acute shortages of drinking water and sanitation services and facilities. In addition, it also considers opportunities in rural areas in the North Central Province. While supporting inclusive social development and subsidiarity principles to strengthen local centers, the PPTA aims to increase transparency, complement activities undertaken locally or by other assisting agencies, and involve stakeholders from early stages of the planning and design process. The PPTA has assisted local government and community participation and should ensure that the design of the ensuing Project has an integrated approach, and also draws all participating organizations into the implementation of the development of the sub-projects in a way that validates and strengthens them.

27. The PPTA consist of two components.

28. **Component 1**, which focused on preparing a comprehensive feasibility study, was implemented in two phases. Phase I, consisted of a detailed evaluation of the water supply and sanitation sector, and (i) collection and review of basic planning data, capabilities, and resources for development in four urban centers, with an emphasis on more deprived areas; (ii) evaluation of sample ADB subprojects and determined “lessons learned”; (iii) initiated a socio-economic assessment in identified target areas; (iv) mapped and analyzed poverty data, the incidence of waterborne diseases, and the concentration of minority and disadvantaged groups; (v) undertook engineering field surveys and mapping to ascertain the condition of basic infrastructure and amenities, including collecting data on water and sanitation facilities; and (vi) identified priority urban and rural areas based on needs for improved coverage and determined population projections and demand for services. Results were analyzed and discussed at stakeholder consultations at the national and district levels. In Phase II, (i) selected and refined project-specific investment components in both urban and rural areas; (ii) developed technical options acceptable to all stakeholders; and (iii) conducted economic and financial feasibility studies, environmental and social studies, and other documentation as required by ADB guidelines. An institutional development and capacity-building program was also developed to support the prioritized infrastructure rehabilitation, augmentation, and development in selected towns and included a detailed non revenue water reduction program. In addition to infrastructure development, the PPTA considered and developed health and hygiene education programmes.

29. **Component 2** of the PPTA helped ensure project completion sustainability measures for the community-based schemes. For this purpose, the TA supported NWSDB in (i) conducting consultations with provincial councils and local authorities and developing an understanding on the proposed by-laws enabling CBOs to exist as legal entities and on the Development Fund for Water Supply and Sanitation, this will ensure CBOs’ access to credit facilities; and (ii) prepared and delivered a basic accounting, budgeting, and overall financial management training component for CBOs and CBOs’ district offices.

2.2 ADB Policy and Country Strategy

30. ADB's current Country Strategy and Program (CSP)¹ for Sri Lanka is focused on three strategic areas, namely: (i) promoting pro-poor economic growth; (ii) advancing social development; and (iii) supporting improved governance. The CSP is aimed at supporting the government's strategy of reducing poverty and achieving high economic growth with emphasis on economic reform, private sector development and reducing the current geographical disparities in access to the benefits of economic growth.

31. The core sectors of intervention for this current CSP include: agriculture and rural development, transport (roads and ports), energy (including rural electricity), financial sector, and small and medium enterprises (SME), education (especially skills and vocational training), and water and sanitation. The thematic areas are environment, private sector development, gender and governance.

32. For the Water Supply and Sanitation sector, ADB's strategic thrust is to improve the overall performance of the sector, to include:

- (i) Supporting policy and institutional reforms to achieve independent regulation, effective decentralization of service delivery to local government and communities, and the participation of the private sector and NGOs, and to increase customer responsiveness and social accountability;
- (ii) Promoting institutional reforms and sector strategies that ensure financial sustainability required to operate, maintain and rehabilitate existing infrastructure, and to allow for expansion of services to non-served populations, especially in rural areas;
- (iii) Integrating environmental and social impacts, including gender, in the planning and implementation of water supply and waste management plans and policies;
- (iv) Introducing water saving management strategies through, among others, awareness campaigns and scheme specific tariffs for non-basic consumption to maximize the effectiveness of investments and to minimize environmental impacts;
- (v) Supporting demand-driven community-based approaches in rural water supply and sanitation and the decentralization of project management and implementation to community-based organizations and local governments;
- (vi) Increasing investments in the sanitation and wastewater management following similar principles that apply to water supply; and
- (vii) Improving the access of the poor to these facilities, particularly in those areas where sector investments have been lacking in past decades.

33. ADB's interventions in this sector will: (i) finance physical infrastructure to provide safe water and sanitation to rural and urban population to improve their health and nutrition; (ii) support environmentally sustainable economic growth, especially in urban centers, and ameliorate living conditions of the rural and urban poor, particularly women; (iii) increase the capacity of the government to provide safe water by improving financial and institutional sustainability of the water sector; (iv) support tariff reform and the establishment of an independent regulatory body as well as encouraging participation of the private sector; and (v) support decentralization of service delivery to local governments and to continue using community participatory approaches in rural areas.

¹ A new CSP is being prepared and will soon be released and adopted for the next assistance cycle, 2008-2012.

34. Key concerns about the sector are the need to: (i) achieve cost recovery that fully covers operation and maintenance and debt service as well as making a significant contribution to capital investments; (ii) establish institutional autonomy of utilities; (iii) promote balanced and sustainable development based on comprehensive water resources management with clearly allocated water rights; (iv) improve access of low-income groups to infrastructure facilities; (v) improve the urban environment; (vi) strengthen the capacity of lower levels of government to assume greater responsibility for service delivery, development and improvement; and (vii) facilitate public-private dialogue. In the sanitation sector, ADB is advocating (i) the introduction of a sewerage tariff as a surcharge on water tariff to meet O&M costs of sewerage service; (ii) unification and rationalization of water supply and sewerage services in Greater Colombo; and (iii) promotion of better urban planning as a tool to improve storm water and road drainage.

35. In related area of Governance, ADB's focus is to improve the effectiveness and efficiency of public services and public policy management within the overall objective of achieving higher sustainable economic growth, reducing poverty and fiscal consolidation. ADB will help improve governance through a service delivery policy framework that ensures services are equitable, accessible, efficient and sustainable. The policy framework will be an integral part of programs directed at improving services, and governance will be mainstreamed in specific sector investments. ADB assistance will include the following:

- (i) introduction of a service delivery policy framework through pilot projects in priority services in certain areas (including the north and east), and their subsequent up-scaling, and
- (ii) ADB's proposed projects in road, energy and water supply and sanitation may mainstream this approach through developing and implementing service delivery policies for these sectors (in addition to sector management reform measures currently being applied under individual project loans).

36. In Health, Nutrition and Social Protection, a sector that is closely linked to the water supply and sanitation, ADB will continue to provide indirect interventions to improve the health of the population, mainly through assistance to water supply and sanitation and rural electrification. Access to health services in conflict-affected areas is a priority in the overall rehabilitation and reconstruction efforts.

37. In March 2002, the ADB and the Government of Sri Lanka signed a poverty reduction partnership agreement endorsing the Government's priorities for poverty reduction and ADB's country operational strategy (COS) which defines the Bank's plans to support poverty reduction. The agreement set out a long-term vision of: (i) sustained reduction in poverty disparity between the Western province and the rest of the country; (ii) progress toward full achievement of the MDG social development targets; (iii) good governance in terms of reduction in government's share in the commercial sectors of the economy, decline in the relative size of the civil service, adoption of best principles of public expenditure management and involvement of professional groups, private sector and community in decision making and provision of public services; and (iv) progress in reducing conflict-related poverty. It also set out a framework for monitoring and evaluating the progress made under the agreement.

3. Country Profile

38. Sri Lanka is an island nation in South Asia, located about 31 kilometers off the southeastern coast of India. It has an area of 65,610 sq. km., almost half the size of Nepal or Bangladesh and one-fiftieth the area of India. Its current population is estimated at around 20 million and density averages 304 persons per square kilometer. The country is mostly flat to rolling plains, with the northern portion of the island generally arid and the southern areas receiving ample rainfall.

39. At present, the country is subdivided into nine provinces alongside 25 administrative districts, see Appendix 2 for details. Provinces are governed by provincial councils and below this level of government are a total of 311 local authorities, consisting of 18 municipal councils (MC), 37 urban councils (UC) and 256 pradeshiya sabhas (PS).² Sri Jayawardenapura Kotte is the nation's political capital. Together with Colombo and Dehiwala-Mount Lavinia, it forms the Greater Colombo Area (GCA) which is the country's major urban center as well as its commercial, industrial, shipping, and transport hub. GCA is situated in the western region of the country.

40. It is estimated that less than a quarter of Sri Lanka's population live in urban centers, of which Colombo accounts for about 20 percent. The overall level of urbanization in the country is low relative to the average for the whole South Asia region (28 percent) or for other lower- to middle-income countries (49 percent).³ Projections indicate that urban population will reach about 6.5 million, or 30 percent of the total population in 2030.⁴

41. On average, the country's population has been growing at around 1.1 percent annually. Growth has been positive in all districts, except in Jaffna, which registered a negative 2 percent growth between 1981 and 2001 because of the civil conflict in the region. The district of Colombo, which in 2001 already had 12 percent of the country's total population, grew at a higher rate than the national average, at 1.3 percent per year.

42. Sri Lanka's economy has been growing moderately at 5-6 percent per year since 2002, much higher than the annual average of 4 percent of previous years (1993-2000) but below the average performance for the whole South Asia of 6.7 percent. In 2006, its Gross Domestic Product (GDP) increased by 7.2 percent. More than one-half (54 percent) of the GDP comes from the services sector while industry and agriculture (including forestry and fisheries) account for 26 percent and 19 percent, respectively. But although services is now the leading sector in the economy, agriculture still plays a major role since over one-third (34%) of the labor force (2004) is employed in this sector and that traditional plantation crops like tea, rubber and coconut constitute a significant proportion of the country's exports.

43. The policy reforms in the late seventies and eighties and the privatization/corporatization initiatives in the nineties led to the higher growth in the services and industrial sectors in the last two decades. Meanwhile, agricultural productivity growth remained sluggish, averaging just about 1-2 percent per year, constrained as it was by economic

² Municipal councils, urban councils and pradeshiya sabhas are created and governed by respective Acts. Municipal Councils are generally responsible for towns with populations of more than 30,000; Urban Councils for towns of 10,000 to 30,000; and Pradeshiya Sabhas for smaller towns with associated rural hinterlands.

³ World Bank, *Sri Lanka Development Policy Review*, December 2004.

⁴ Van Horen, Basil and Sisira Pinnawala, 'Sri Lanka', in Roberts, Brian & Trevor Kanaley, eds., *Urbanization and Sustainability in Asia: Case Studies and Good Practice*, 2006.

controls and weak infrastructure in the regions. This growth bias towards services and industry heavily favoured Colombo and neighbouring districts, leaving other regions whose economy were largely dependent on agriculture, to lag behind. By 2001, the contribution of the Western Province (which includes GCA) to GDP already constituted nearly one-half (47 percent), about five times the individual share of the second-tier regions that include the North West, Central and Southern provinces. Sabaragamuwa contributed 6 percent while Eastern, Uva and North Central provinces contributed between 4-5 percent. The Northern province, whose contribution was the least, accounted for only 2.5 percent. Over the years, the Western Province continued to dominate economic activities in the country and the trend towards economic concentration remained unabated and regional disparity widened.

44. Despite the 5-6 percent annual GDP growth during the past years, however, poverty level remained high. Poverty incidence in 2002 was estimated at 22.7 percent. Although the country's poverty level was much lower than in most countries in the region (e.g., India: 27.8 percent; Pakistan: 23.9 percent; Nepal: 30.9 percent; Bangladesh: 40 percent; Bhutan: 31.7 percent), the decline in poverty incidence from 26.1 percent in 1990/91 to just 22.7 percent over a decade later was too modest despite the sustained growth in per capita GDP of 3 percent per year. The poverty gap between the urban sector and the rest of the country also widened (Table 3.1). During the period 1990/91-2002, while urban poverty dramatically declined by almost half (from 16.3 percent to 7.9 percent), rural poverty headcount decreased by only 5 percentage points, from 29.4 percent to 24.7 percent. Poverty in the estate sector, on the other hand, got worse, increasing by about 50 percent from 20.5 percent to 30.4 percent. This trend in poverty decline, especially in the rural and estate sectors, can be attributed to the sluggish growth in agriculture on which majority of the population depends upon for income. It was also affected by the civil conflict which retarded overall economic performance and diverted public resources and attention away from economic priorities.

Table 3.1: Poverty Headcount Ratio (%)

Sector	1990/91	1995/96	2002
Sri Lanka	26.1	28.8	22.7
Urban	16.3	14.0	7.9
Rural	29.4	30.9	24.7
Estate	20.5	38.4	30.0

Source: HIES 1990/91, 1995/96 and 2002

45. Aside from the marked variations in poverty incidence among urban, rural and estate populations, differences also exist in the levels and trend in poverty across provinces and districts (Table 3.2).⁵ Colombo, in Western province, experienced a dramatic decline in poverty incidence and registered the lowest poverty level (6 percent) in 2002. It was followed by Gampaha, also in the same province, with 11 percent. Of the seven provinces with complete census in 2002, Badulla and Manaragala districts in Uva province had the highest poverty incidence (37 percent) followed by Ratnapula (34 percent) and Kegalle (32 percent) in Sabaragamuwa province. North Central had 20-24 percent of its population below the poverty line while North West had 25-31 percent. Central and Southern provinces had 23-30 percent and 26-32 percent of their population considered poor, respectively. It is also

⁵ For 2002, the censuses for Northern and Eastern provinces were not completed so there are no poverty data that exist for these two provinces.

interesting to note that while the general trend was towards a reduction in poverty level, some districts experienced the opposite trend. Poverty level in Puttalam (North West province) increased by 41 percent, from 22 percent to 31 percent. In Uva province, and more specifically in Badulla district, the increase was from 31 percent to 37 percent. For Manaragala, poverty level increased from 34 percent to 37 percent. Kegalle in Sabaragamuwa province had a slight increase in poverty incidence from 31 percent to 32 percent while in Ratnapura, the increase was from 31 percent to 34 percent. Matale in Central province similarly experienced a slight increase in poverty level, from 29 percent to 30 percent.

Table 3.2: Headcount Ratios by Province and District (%)

Province	District	1990-91	1995-96	2002
Western	Colombo	16	12	6
	Gampaha	15	14	11
	Kalutara	32	29	20
Central	Kandy	36	37	25
	Matale	29	42	30
	Nuwara Eliya	30	32	23
Southern	Galle	30	32	26
	Matara	29	35	27
	Hambantota	32	31	32
North-West	Kurunegala	27	26	25
	Puttalam	22	31	31
North-Central	Anuradhapura	24	27	20
	Polonnaruwa	24	20	24
Uva	Badulla	31	41	37
	Manaragala	34	56	37
Sabaragamuwa	Ratnapura	31	46	34
	Kegalle	31	36	32

Source: HIES 1990-91, 1995-96 and 2002

46. The decline in overall poverty incidence was not only quite insignificant but income inequality also deteriorated. The Gini coefficient for the whole country increased by 24 percent, from 0.34 to 0.42. In the urban sector, it went up by 19 percent (0.37 to 0.44) while in the rural areas, the increase was 30 percent (0.30 to 0.39). The exacerbation in income inequality in the estate sector was even more significant, with the Gini coefficient rising by 38 percent, from 0.24 to 0.33.

47. While poverty remains a major challenge for Sri Lanka, the country has fared far better than most countries in South Asia in terms of other social dimensions. Literacy rate (95.6%) among 15-24 years old is the highest in the region, although the quality of education is a concern. Net primary enrolment in 2004 was at 96 percent compared to 89.7 percent for India or 66.2 percent for Pakistan. Life expectancy for both sexes averaged 73.4 years. Infant mortality rate is the lowest in the region, at 12 per 1000 live births in 2005, down from 45 in the mid-1970s. Under-five mortality is also the lowest, falling from 32 per 1000 live births in 1990 to just 14 in 2004. Crude death rate stands at about 6.5 persons per thousand population. The maternal mortality rate of 23 per 100,000 live births in 2000 is at par with that in middle-income countries. One concern that remains, however, is the high prevalence of underweight children below 5 years old (2000: 29 percent) although this has declined from 38 percent in 1993.

48. Except perhaps for Millenium Development Goal (MDG) of halving poverty level by 2015, the country is well positioned to meet its other social development targets.

49. Sri Lanka currently ranks 93rd among 177 countries based on the Human Development Index (HDI)⁶ of the United Nations (UN), an improvement from its previous position of being 96th in 2002.

4. Water Supply and Sanitation Sector in Sri Lanka

4.1 Country Sector Strategy

50. The provision of safe drinking water and sanitation is one of the Government's most important economic and social objectives. It is frequently cited as "the single, highest social service priority by poor households".⁷ Addressing the needs, especially of the poor, for water supply and sanitation not only supports the Government's MDG commitment to halve the proportion of population without access to these services but also addresses, directly or indirectly, five other goals, namely: eradicating extreme poverty and hunger (Goal 1); reducing child mortality (Goal 4); improving maternal health (Goal 5); combating malaria and other diseases (Goal 6); and ensuring environmental sustainability (Goal 7).

51. According to National Water Supply and Drainage Board (NWSDB)⁸ statistics, 76.1 percent of the country's population currently has access to safe water supply, with 32 percent being served with piped water, 34 percent deriving water from protected dug wells, 8 percent from tube wells and hand pumps, and 2 percent using harvested rain water.⁹ In terms of urban and rural populations, access is estimated at 80 percent for urban, 65 percent for rural and 50 percent for those in the estate sector. As for sanitation, the estimated figures are 77.8 percent for urban population, 67.5 percent for rural and 43.2 percent for the estate sector.¹⁰

52. It is estimated that there exist about 500 water supply schemes all over the country. NWSDB operates and manages 291 schemes, with over a million service connections to date, consisting of 910,294 house connections, 90,437 non-domestic connections and 8,055 additional house connections served by public standposts. The remaining schemes are operated and managed by local authorities, although no data exist as to how many of these systems actually exist and which local authorities own them. But in some cases, NWSDB supplies local authorities with bulk water.

53. While water supply schemes are widely distributed throughout the country, wastewater collection and disposal systems are not widely available and only Colombo has sewerage facilities. The rest of the population relies on on-site sanitation which, although appropriate, has become a source of groundwater pollution because of poor construction,

⁶ HDI is a comparative measure of countries worldwide based on combined factors of life expectancy, literacy, education and standard of living.

⁷ Government of Sri Lanka, "Sri Lanka: Connecting to Growth: Sri Lanka's Poverty Reduction Strategy" in *Regaining Sri Lanka: Vision and Strategy for Accelerated Development*, May 2003.

⁸ NWSDB is the lead government agency in the water supply and sanitation sector in the country. The role and functions of the agency are described in Annex 5: Institutional Analysis.

⁹ NWSDB, *Corporate Plan 2007-2011*.

¹⁰ Based on the revised version of the chapter on "Water Supply and Sanitation", (Section 4.3) of *Mahinda Chintana: Vision for a New Sri Lanka, A 10-Year Horizon Development Framework* prepared by NWSDB.

inadequate maintenance and leakages especially in densely populated areas. The Greater Colombo sewerage system is old, dating back to early 1900's, and was designed for a population of 400,000 people. At present, it services a total of only about 50,000 connections. Because of its limited capacity, only a fraction of wastewater in GCA is treated. Sewers are often silted and the lack of maintenance and rehabilitation has made the system obsolete. The current population has greatly exceeded its design capacity.

54. Water resources in the country are scarce, especially in the north where annual rainfall can be as little as 750 mm. This situation creates heavy reliance on groundwater sources which, because of unregulated extraction, are getting depleted and are being polluted by improper sewage disposal and leakages from poorly constructed sanitation and other disposal facilities. Groundwater in some areas contains unacceptable levels of fluoride or iron, or are excessively saline, and require treatment before distribution for domestic consumption.

55. There are a number of key issues currently confronting the sector. These include, among others, (i) the deterioration in the quality of water resources because of pollution; (ii) water allocation; (iii) extending service coverage to unserved areas, including disaster-affected areas; (iv) inadequate attention and insufficient investment in sanitation; (v) institutional issues such as delays in institutional reforms and decentralization process, private sector involvement, lack of coordination among agencies, and lack of institutional mechanism for community-managed water supply systems; (vi) lack of awareness among low income communities about low-cost technological options; (vii) high levels of non-revenue water¹¹; and (viii) lack of proper pricing policy that could effect efficient water demand management and achieve financial sustainability.

56. Urgent attention is required to address the above issues. More specifically, actions are needed: (i) to enunciate a clear cost recovery tariff policy; (ii) establish a regulatory framework; (iii) promote institutional autonomy of utilities and public-private partnership for investment and maintenance of systems; (iv) formulate clear policies and procedures for allocating water rights; and (v) develop a groundwater development and management policy to address groundwater resource depletion and use.

57. During the past several years, the Government has initiated several policy reforms aimed at: (i) improving institutional efficiency and decentralizing planning and management of the sector; (ii) mobilizing additional resources from beneficiaries, including tariff adjustments to cover part of capital costs; and (iii) introducing comprehensive water resources management.

58. In developing the water supply and sanitation sector, the Government is being guided by the following principles proclaimed at the New Delhi Global Consultation in 1990: (i) the protection of the environment and safeguarding of health through integrated management of water resources and liquid and solid wastes; (ii) institutional reforms promoting an integrated approach including changes in behaviour and full participation of women at all levels in sector institutions; (iii) community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programs; and (iv) sound financial practices through better management of existing assets and widespread use of appropriate technologies.

¹¹ In 2006, the island-wide NRW was estimated at 34.4%. NRW for Colombo Municipal Council area was 51.8% and for other regions, about 30%.

59. The Government of Sri Lanka has set a target of achieving a coverage of 85 percent of the population with access to safe drinking water by 2015 and 100 percent by 2025. For sanitation, the targets are 87 percent by 2015 and 100 percent by 2025. These targets are part of the Government's commitment to the MDGs including the goal of reducing by half the proportion of the population without sustainable access to safe drinking water and sanitation by 2015.

60. To achieve this goal, the Government is adopting a two-pronged strategy involving large-scale system expansion for urban schemes and a vast number of small-scale community improvement initiatives to rural communities.

61. The Government's 5-year plan for water supply (2007-2011), as reflected in NWSDB's corporate plan, is to increase access to safe water from the current level of 76.1 percent to 82.7 percent of the population by the end of the plan period. The target is to have 41 percent of the population have access to piped water provided by NWSDB and local authorities by 2011, 30 percent deriving from protected dug wells, 8 percent from tube wells and hand pumps, and about 4 percent from harvested rain water. The annual targets are shown in Table 4.1.

Table 4.1. Access to Safe Water Supply (%)

Water Supply Scheme	2007	2008	2009	2010	2011
Pipe borne, NWSDB/municipalities	32	33.9	36.5	38.2	40.3
Pipe borne, other sector agencies	1	1	1	0.9	0.8
Protected dug wells	33	32	31	31	30
Tube wells/hand pumps	8	8	8	8	8
Rain water harvesting	2.4	2.7	3	3.3	3.6
Overall access	76.4	77.6	79.5	81.4	82.7

Source: NWSDB Corporate Plan 2007-2011

62. For sewerage, the plan is to increase service coverage from the current 2.4 percent to 3 percent of the population by 2011.

63. To achieve the above targets, NWSDB's plan calls for a total investment of Rs 164.2 billion (US\$1.49 billion at current exchange of Rs110:US\$1) in 2007-2011, 63.4 percent of which is estimated to be financed by foreign funds, 15.3 percent by local funds, and 21.3 percent by funds that are yet to be sourced. About 28.4 percent of the investments are for on-going projects, 11 percent are earmarked for projects that have already been approved by the Cabinet, and 60.5 percent for projects that are under negotiation or for which funding will still have to be identified, see table Table 4.2.

Table 4.2: Capital Investment Program – Water Supply (Rs million)

	2007	2008	2009	2010	2011
Projects under implementation	2,465	1,883	1,461		
Domestic-funded	21,386	12,614	6,581	355	
Foreign-funded					
New projects with Cabinet approval					
Domestic-funded	885	1,145	773	80	
Foreign-funded	2,785	4,975	4,510	2,865	
Projects under negotiation					
Domestic-funded	1,827	6,152	5,183	3,130	
Foreign-funded	3,524	11,240	16,820	15,155	1,415
Future projects				8,415	26,585
Total investments	32,872	38,009	35,329	30,000	28,000

Source: NWSDB Corporate Plan 2007-2011

64. For sewerage, NWSDB's investment plan requires around Rs 42.9 billion (US\$390 million), 23.1 percent of which is accounted for by on-going projects, 21.3 percent by projects with Cabinet approval, and 55.6 percent by projects under negotiation or yet to be negotiated. Foreign funding comprises 64 percent of total investment while the remaining 36 percent will be financed locally or by funds whose sources will still have to be determined. Table 4.3 provides an annual breakdown of the investments for this subsector.

Table 4.3: Capital Investment Program – Sewerage (Rs million)

	2007	2008	2009	2010	2011
Projects under implementation	45	100	316		
Domestic-funded	3,621	2,755	2,300	772	
Foreign-funded					
New projects with Cabinet approval					
Domestic-funded	50	50			
Foreign-funded	1,300	2,897	2,347	2,468	
Projects under negotiation					
Domestic-funded	23	190	191		
Foreign-funded	489	1,854	2,354	2,970	1,350
Future projects				3,790	10,650
Total investments	5,528	7,846	7,508	10,000	12,000

Source: NWSDB Corporate Plan 2007-2011

4.2 External Assistance to the Sector

65. The water supply and sanitation sector in Sri Lanka has received several assistance, including loans, grants and technical assistance, from foreign institutions and agencies. Among the institutions that have assisted the sector are ADB, JBIC (Japan Bank for International Cooperation), World Bank, JICA, KfW of Germany, AUSAID, JICA, SIDA, EDCF and DEXIM of Korea, Austria, France, Norway, ANZ/FIC of Australia and New Zealand, and DANIDA. Table 4.4 lists loan- and grant-financed projects from the mid-nineties to date, with sources of assistance.

66. ADB and JBIC are the two biggest contributors to the rehabilitation and expansion of water supply facilities managed by NWSDB. ADB's involvement has been predominantly in the water supply sub-sector in secondary towns and rural areas.

67. As of December 2006, the water supply, sanitation and waste management sector in Sri Lanka has received from ADB a total assistance US\$ 324 million, including US\$315.3 million in loans to 7 public sector projects, and an estimated US\$8.7 million in technical assistance. The loans that were provided to this sector accounted for 8.4 percent of total ADB lending of \$3.763 billion as of December 2006.

68. Table 4.5 provides a list of loan and technical assistance projects financed by ADB since the Bank got involved in the sector in 1985. Two additional loan projects are on the pipeline for approval in 2007, viz: (i) the Jaffna Water Supply & Waste Water Management Project (est. loan of US\$50 million and grant of US\$15 million), and (ii) Greater Colombo Wastewater Management (est. US\$50 million).

69. Of the seven loan projects financed by ADB, two involved improvement of water resources and sector management. The first loan project aimed at providing safe drinking water and sanitation services was the Water Supply Sector Project approved in 1986 for a loan of US\$30 million, followed by the Second Water Supply & Sanitation Project, approved in 1993 for US\$40 million, which targeted a total of 440,000 people in 16 towns in Central and Western provinces (districts of Kalutara, Kegalle and Monoragala). The latter project also provided assistance to NWSDB in improving its operational efficiency and financial viability; piloted a rural water supply and sanitation scheme; raised public awareness on hygiene, water conservation and water pollution issues; and reduced UFW in Greater Colombo.

70. The recently completed Third Water Supply & Sanitation (Sector) Project, was aimed at a larger coverage of 1.03 million population in rural and small towns in Kegalle, Kalutara, Monaragala, Puttalam, Anuradhapura and Hambantota in North and North West provinces. It involved the rehabilitation of selected large water supply schemes in larger towns, building simple piped schemes and latrines for communities of 2,000-6,000, and protected dug wells and latrines for smaller communities of 500-2,000. The project also provided capacity building assistance to NWSDB to support more management autonomy.

71. ADB is currently funding the Secondary Towns and Rural Community-Based Water Supply and Sanitation Project, for which a supplementary loan of \$60 million was recently approved in November 2006. The project is building water schemes that will provide water to some 969,000 people in Batticaloa and Muttur in North East province, Hambantota in Southern province and Polonnaruwa and Anuradhapura in North Central as well as in rural areas of Polonnaruwa, Anudhapura and Batticaloa districts. It also involves construction of sanitation facilities designed to benefit about 171,000 people.

72. As shown in Table 4.5, ADB has financed a total of sixteen TA projects, including three projects on water resources management, two on wastewater management, three on

institutional strengthening of NWSDB, two on improving the regulatory framework for the sector, and the remaining projects on water supply and sanitation investments. The Small Towns and Rural Arid Areas Water Supply & Sanitation Project (this project) is currently ongoing while the Strengthening the Regulatory Framework for Water Supply & Sanitation Project (TA 4049) has just recently been completed.

73. JBIC has also been actively involved in providing financial assistance to the sector for the past several years. Currently, it is financing the Small Scale Infrastructure Rehabilitation and Upgrading Project (SIRUP) which involves mostly rehabilitation and improvements of small water supply schemes in the country-side. JBIC is also funding large projects that include the Kalu Ganga Water Supply Project, NRW Reduction in Greater Colombo, Towns North of Colombo WSS (Stages 1 & II), the Greater Kandy Water Supply Project, Greater Colombo Water Rehabilitation, and the Sewage Disposal System for Kandy Municipal Area.

74. The World Bank is currently funding the Small Community Water Supply and Sanitation Project (SCWSSP) which is being implemented by the Water Supply and Sanitation Division of the Ministry of Urban Development and Sacred Area Development. Started in 2003, SCWSSP will run for 6 years and covers the Central, North Western and North Eastern provinces. The project constructs small water schemes and sanitation facilities for rural communities. As of December 2006, it has implemented a total of 448 sub-projects covering some 87,099 households.¹² The funds are given as grants to CBOs and the CBOs are authorized to collect water tariff for the annual maintenance of the systems. Total project cost is \$62 million of which \$40 million is funded by WB as grant.

75. Table 4.6 lists foreign-funded, large-scale water supply and sanitation schemes that are currently being implemented by NWSDB. The list does not include projects in tsunami-affected areas which are being funded by UNICEF, DANIDA, KfW, IFRC, JICA, FINNIDA, USAID, World Vision and Helvitas, among others.

Table 4.4: External Assistance to the Water and Sanitation Sector in Sri Lanka

Project Name	Year Approved	Source	Amount (million)
A. Loan-Financed Investment Projects			
Rehabilitation and Upgrading of Southern Catchment of the Greater Colombo Sewerage System	2007	Austria	Euro 10.70
Water Sector Development Project	2007	Japan	Y13,231.00
Central Wastewater Treatment Plants for Ratmalana, Moratuwa & Ja-Ela/Ekala Areas	2006	Sweden	\$ 70.00
Coastal Towns Areas affected by Tsunami	2006	IFRC	\$ 30.00
UNIHA Project	2005	Austria	\$ 12.74
Greater Colombo Sewerage Project	2005	Denmark	\$ 33.00
Matara Integrated Water Supply System	2004	Japan	\$ 135.6
Secondary Towns and Rural Community Based Water Supply and Sanitation Project	2003, 2006	ADB	\$120.60
Non-Revenue Water Reduction Project	2003	Japan	\$ 45.61
Kelani Conservation Barrage Project	2002	ADB	\$ 13.19
Greater Galle Augmentation Water Supply and Sanitation Project	2001	Germany	\$ 25.60
Nawalatipiya, Ampara and Koggala Projects	2001	Germany	\$ 27.00
Greater Kandy Water Supply and Sanitation Project	2001	Japan	\$ 115.2

¹² 13th Quarterly Progress Report, Second Community Water Supply & Sanitation Project, 4th Quarter, 2006.

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Community Water Supply and Sanitation Sector (Phase II)	2001	World Bank	\$ 20.00
Third Water Supply and Sanitation Project	1999	ADB	\$ 75.00
Anuradhapura Water Supply and Sanitation	1999	France	\$ 05.60
Kegala Water Supply Project	1999	Germany	\$ 05.82
Water Treatment Plant at Anuradhapura	1998	France	\$ 07.34
Water Supply Nawalapitiya	1998	Germany	\$ 06.16
Water Supply Ampara	1998	Germany	\$ 03.52
Towns North of Colombo– Stage 1	1998	Japan	\$ 43.19
Mahaweli Restructuring and Rehabilitation Project	1998	World Bank	\$ 56.22
Towns South of Colombo	1997	Japan	\$ 30.31
Mahaweli System C Upgrading	1997	Japan	\$ 32.06
Kalu Ganga Water Supply Project	1997	Japan	\$ 96.72
Towns North of Colombo Water Supply and Sanitation Project	1997	Japan	\$ 47.10
Kalmunai Water Supply Project	1997	Denmark	\$ 03.15
Ambatale Refurbishment	1996	France	FF29.50

Project Name	Year Approved	Source	Amount (million)
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B. Grant-Financed Investment Projects

Sewer Cleaning Equipment	2005	Japan	Y 146.00
Greater Colombo Wastewater Management	2004	ADB	\$ 00.85
Participatory Improvement of Underserved Population in Colombo	2003	Germany	Euro 05.00
Greater Colombo Waste Water Management Sector Review	2003	ADB	\$ 00.15
Hiccaduwa Coastal Zone Management	2000	U.S.	\$ 03.70
Water Augmentation of Nuwara Eliya Project	2002	Japan	\$ 01.00
TA 3434: Accounting Review of NWSDB	2001	ADB	\$ 00.09
Groundwater Investigation – Hambantota and Monaragala Districts	2000	Japan	\$ 17.00
Polonnaruwa District Rural WS & Sanitation Pre-Investment	2000	New Zealand	\$ 00.12
Rehabilitation Water Supply Mannar	1999	Germany	\$ 00.53
Pre-Investment Study and Pilot Project	1999	New Zealand	\$ 00.13
Third Rural Water Supply and Sanitation Sector	1998	Norway	\$ 07.42
TA 3030: Western River Basins Sector Project	1998	ADB	\$ 01.50
Rural Water Supply and Sanitation – Vavuniya	1997	Germany	\$ 24.68
Greater Colombo Sewerage Project	1997	U.K.	\$ 03.20
National Framework for Development of Rural Water Supply & Sanitation Framework	1997	UNDP	\$ 00.50
The Improvement of Drinking Water Supplies	1996	Japan	\$ 07.70
Walawe Left Bank Irrigation & Extension Project (II)	1996	Japan	\$ 83.32
TA 2609: Rural Water Supply and Sanitation Sector	1996	ADB	\$ 00.60

ADB = Asian Development Bank, IFRC = International Federation of the Red Cross, UNDP = United Nations Development Programme.

Source: Asian Development Bank estimates.

Table 4.5: ADB-Loan Financed & TA Projects in Water Supply & Sanitation, Sri Lanka

Project Title	Year Approved	Amount (\$ Mill)
A. Loan-financed Projects		
Secondary Towns & Rural Community-Based Water Supply & Sanitation (Supplementary Loan)	2006	60.3
Secondary Towns & Rural Community-Based Water Supply & Sanitation Project	2003	60.3
Water Resources Management Project	2000	19.7
Third Water Supply & Sanitation Sector Project	1997	75.0
Second Water Supply & Sanitation Project	1993	40.0
North Western Province Water Resources Development Project	1992	30.0
Water Supply Sector Project	1986	30.0
Total		315.3

Project Title	Year Approved	Amount (\$ Mill)
B. Technical Assistance Projects		
Strengthening of Regulatory Framework for Water Supply & Sanitation (Supplementary)	2006	0.04
Small Towns & Rural Arid Areas Water Supply & Sanitation (formerly Secondary Towns and Community-Based Water Supply & Sanitation)	2006	0.87
Greater Colombo Waste Water Management	2004	0.85
Greater Colombo Wastewater Sector Review	2003	0.15
Strengthening the Regulatory Framework for Water Supply & Sanitation	2002	0.285
Secondary Towns Water Supply & Sanitation	2000	1.00
Accounting Review of the NWSDB	2000	0.10
Water River Basins Sector Project (formerly Kelani Kaluganga River Basin)	1998	1.50
Rural Water Supply & Sanitation (formerly Third Water Supply & Sanitation)	1996	0.60
Institutional Strengthening for Comprehensive Water Resources Management	1995	1.57
Management Strengthening of the NWSDB	1993	0.552
Institutional Assessment for Comprehensive Water Resources Management	1993	0.188
Second Water Supply Sector Project	1991	0.25
Financial Accounting & Reporting Assistance to NWSDB	1991	0.10
Rural Water Supply & Sanitation Sector Dev't Planning	1989	0.60
Water Supply Rehabilitation	1986	0.075
Total		8.73

Source: Asian Development Bank

Table 4.6: Large-Scale Foreign-Funded Projects, NWSDB, 2007

	Project Name	Funding Source	Treas.Alloc (Rs M)
1	Augmentation of Nawalapitiya, Ampara and Koggala WS	KfW Germany	875.0
2	Eastern Coastal Towns of Ampara District (ECTAD) WS Phase II	Australia	130.0
3	Eastern Coastal Towns of Ampara District (ECTAD) WS Phase III	Australia Korea	1,950.0
4	Greater Galle Augmentation WS – Stage I	Australia	-
5	Hikkaduwa Coastal Zone Waste Management	JBIC	-
6	Towns North of Colombo WS – Stage I	JBIC	490.0
7	Towns North of Colombo WS – Stage II		60.0
8	Water Resources Management (Kelani Conservation Barrage)	ADB JBIC	
9	Greater Kandy WS Phase I Stage I	JBIC	1,003.0
10	Greater Kandy WS Phase I Stage II	JBIC	190.0
11	Sewage Disposal System Kandy Municipal Area	JBIC	60.0
12	Kalu Ganga WS	ADB	1,100.0
13	Third Water Supply & Sanitation	JBIC	430.0
14	NRW Reduction in Greater Colombo Area		3.0
15	Secondary Towns Rural Community-Based WS & Sanitation	ADB JICA	2,770
16	Improvements to WS in Matara District	DANIDA	150.0
17	Greater Colombo Sewerage Urgent Rehabilitation	ADB	850.0

	Project Name	Funding Source	Treas.Alloc (Rs M)
18	Greater Colombo Sewerage Rehabilitation		40.0
19	Waste Water Disposal System for Ratmalana/Moratuwa & Ja-Ela/Ekala	SIDA	1,002.0
20	Hambantota/Ambalantota/Weligama/Kataragama WS Implementation Project & Badulla, Bandarawela integrated FS (UNIHA)	Austria	
		India	195.0
21	Enterprise-wide IT Solution Project for NWSDB	DANIDA	68.0
22	Towns South of Kandy	DANIDA	1,510.0
23	Greater Kurunegala WS	Korea	465.0
24	Greater Galle Augmentation WS – Stage II	DANIDA	620.0
25	Nuwara Eliya District Group Town WS	DANIDA	820.0
26	Kelani Right Bank WTP	JICA	1,688.0
27	Sewer Cleaning Equipment	ADB	12.0
28	Jaffna Peninsula WS & Sanitation		205.0
29	Rehabilitation & Augmentation of Labugama-Kalatuwawa WTP	Hungary	
		Austria	370.0
30	Rehabilitation & Augmentation of Kirindioya WS	Netherlands	350.0
31	Augmentation of Negombo WS	JBIC	330.0
32	Greater Colombo Water Rehabilitation		117.0
		Spain	
33	Galagoda WSS in Galle District		250.0
34	Rehabilitation & Upgrading of Southern Catchments of GC Sewerage	Austria	650.0
	Total		18,753.0

4.3 Existing Methods of Water Supply in Sri Lanka

76. The following paragraphs summarises the existing methods of water supply that are in use in Sri Lanka. The summary is generally applicable to the entire island, but details of the actual facilities and conditions in each of the four Project Towns and 3 Villages will be included in Annex 3 and 4 respectively.

77. The provision of safe drinking water and sanitation is one of the Government's most important economic and social objectives. It is frequently cited as "the single, highest social service priority by poor households".¹³ Addressing the needs, especially of the poor, for water supply and sanitation not only supports the Government's MDG commitment to halve the proportion of population without access to them but also addresses, directly or indirectly, five other goals, namely: eradicating extreme poverty and hunger (Goal 1); reducing child mortality (Goal 4); improving maternal health (Goal 5); combating malaria and other diseases (Goal 6); and ensuring environmental sustainability (Goal 7).

78. According to National Water Supply and Drainage Board (NWSDB)¹⁴ statistics, 76.1 percent of the country's population currently has access to safe water supply, with 32 percent being served with piped water, 34 percent deriving water from protected dug wells, 8

¹³ Government of Sri Lanka, "Sri Lanka: Connecting to Growth: Sri Lanka's Poverty Reduction Strategy" in *Regaining Sri Lanka: Vision and Strategy for Accelerated Development*, May 2003.

¹⁴ NWSDB is the lead government agency in the water supply and sanitation sector in the country. The role and functions of the agency are described in Section I.D of this report.

percent from tube wells and hand pumps, and 2 percent using harvested rain water.¹⁵ In terms of urban and rural populations, access is estimated at 80 percent for urban, 65 percent for rural and 50 percent for those in the estate sector. As for sanitation, the estimated figures are 77.8 percent for urban population, 67.5 percent for rural and 43.2 percent for the estate sector.¹⁶

79. It is estimated that there exist about 500 water supply schemes all over the country. NWSDB operates and manages 291 schemes, with over a million service connections to date, consisting of 910,294 house connections, 90,437 non-domestic connections and 8,055 additional house connections served by public standposts. The remaining schemes are operated and managed by local authorities, although no data exist as to how many of these systems actually exist and which local authorities own them. But in some cases, NWSDB supplies local authorities with bulk water.

80. Water resources in the country are scarce, especially in the north where annual rainfall can be as little as 750 mm. This situation creates heavy reliance on groundwater sources which, because of unregulated extraction, are continuously getting depleted and are being polluted by improper sewage disposal and leakages from poorly constructed sanitation and other disposal facilities. Groundwater in some areas contains unacceptable levels of fluoride or iron, or is excessively saline, such that treatment is necessary before distributing the water for domestic consumption.

81. There are a number of key issues currently confronting the sector and these include, among others, (i) the deterioration in the quality of water resources because of pollution; (ii) water allocation; (iii) extending service coverage to unserved areas, including disaster-affected areas; (iv) inadequate attention and insufficient investments in sanitation; (v) institutional issues such as delays in institutional reforms and decentralization process, private sector involvement, lack of coordination among agencies, and lack of institutional mechanism for community-managed water supply systems; (vi) lack of awareness among low income communities about low-cost technological options; (vii) high levels of non-revenue water¹⁷; and (viii) lack of proper pricing policy that could effect efficient water demand management and achieve financial sustainability.

82. Urgent attention is required to address the above issues. More specifically, actions are needed: (i) to enunciate a clear cost recovery tariff policy; (ii) establish a regulatory framework; (iii) promote institutional autonomy of utilities and public-private partnership for investments and maintenance of systems; (iv) formulate clear policies and procedures for allocating water rights; and (v) develop a groundwater development and management policy to address groundwater resource depletion and use.

83. During the past several years, the Government has initiated several policy reforms aimed at: (i) improving institutional efficiency and decentralizing planning and management of the sector; (ii) mobilizing additional resources from beneficiaries, including tariff

¹⁵ NWSDB, *Corporate Plan 2007-2011*.

¹⁶ Based on the revised version of the chapter on "Water Supply and Sanitation", (Section 4.3) of *Mahinda Chintana: Vision for a New Sri Lanka, A 10-Year Horizon Development Framework* prepared by NWSDB.

¹⁷ In 2006, the island-wide NRW was estimated at 34.4%. NRW for Colombo Municipal Council area was 51.8% and for other regions, about 30%.

adjustments to cover part of capital costs; and (iii) introducing comprehensive water resources management.

84. In developing the water supply and sanitation sector, the Government is being guided by the following principles proclaimed at the New Delhi Global Consultation in 1990: (i) the protection of the environment and safeguarding of health through integrated management of water resources and liquid and solid wastes; (ii) institutional reforms promoting an integrated approach including changes in behaviour and full participation of women at all levels in sector institutions; (iii) community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programs; and (iv) sound financial practices through better management of existing assets and widespread use of appropriate technologies.

85. The Government of Sri Lanka has set a target of achieving coverage of 85 percent of the population with access to safe drinking water by 2015 and 100 percent by 2025. For sanitation, the targets are 87 percent by 2015 and 100 percent by 2025. These targets are the Government's commitment under the MDG whose goal is to reduce by half the proportion of the population without sustainable access to safe drinking water and sanitation by 2015.

86. To achieve this objective, the Government is adopting a two-pronged strategy involving large-scale system expansion for urban schemes and a vast number of small-scale community improvement initiatives to bring better water supply and sanitation services to communities.

87. The Government's 5-year plan for water supply (2007-2011), as reflected in NWSDB's corporate plan, is to increase access to safe water from the current level of 76.1 percent to 82.7 percent of the population by the end of the plan period. The target is that by 2011, about 41 percent shall have access to piped water provided by NWSDB and local authorities, 30 percent from protected dug wells, 8 percent from tube wells and hand pumps, and about 4 percent from harvested rain water. The annual targets are shown in the Table below.

Access to Safe Water Supply (%)

Water Supply Scheme	2007	2008	2009	2010	2011
Pipe borne, NWSDB/municipalities	32	33.9	36.5	38.2	40.3
Pipe borne, other sector agencies	1	1	1	0.9	0.8
Protected dug wells	33	32	31	31	30
Tube wells/hand pumps	8	8	8	8	8
Rain water harvesting	2.4	2.7	3	3.3	3.6
Overall access	76.4	77.6	79.5	81.4	82.7

Source: NWSDB Corporate Plan 2007-2011

88. For sewerage, the plan is to increase service coverage from the current 2.4 percent to 3 percent of the population by 2011.

89. To achieve the above targets, NWSDB's plan calls for total investments of Rs 164.2 billion (US\$1.49 billion at current exchange of Rs110:US\$1) in 2007-2011, 63.4 percent of which is estimated to be financed by foreign funds, 15.3 percent by local funds, and 21.3 percent by funds that are yet to be sourced. About 28.4 percent of the investments are for on-going projects, 11 percent are earmarked for projects that have already been approved by the Cabinet, and 60.5 percent are for projects under negotiation or for which funding will still have to be identified (see Table below).

Capital Investment Program–Water Supply (Rs million)

	2007	2008	2009	2010	2011
Projects under implementation					
Domestic-funded	2,465	1,883	1,461		
Foreign-funded	21,386	12,614	6,581	355	
New projects with Cabinet approval					
Domestic-funded	885	1,145	773	80	
Foreign-funded	2,785	4,975	4,510	2,865	
Projects under negotiation					
Domestic-funded	1,827	6,152	5,183	3,130	
Foreign-funded	3,524	11,240	16,820	15,155	1,415
Future projects				8,415	26,585
Total investments	32,872	38,009	35,329	30,000	28,000

Source: NWSDB Corporate Plan 2007-2011

4.4 Existing Methods of Sanitation in Sri Lanka

90. The following paragraphs summarise the existing methods of sanitation that are in use in Sri Lanka. The summary is generally applicable to the entire island, but details of the actual sanitation facilities and conditions in each of the four Project Towns and 3 villages will be included in Annex 3 and 4 respectively.

91. Conventional piped sewerage has been constructed in very few areas of Sri Lanka and only a very small percentage of the country's urban population is served in this way. An indication of the scarceness of sewers in the country can be obtained by comparing the number of water connections in the country with the number of sewer connections. According to the NWSDB Corporate Plan, 2007 – 2011, the official number of individual connections for piped water supplies in 2006 was 952,145 while the number of sewer connections was just 80,000, almost all of which are in Colombo.

92. It has been estimated by NWSDB that about only 2.5% of the total population is served by a piped sewerage system and the remainder is served by some form of individual on-site sanitation technology.

93. Conventional sewerage systems have been constructed in the capital city of Colombo, the first one dating from 1910. Since then, two extensions to the Colombo sewerage system in the areas of Kollonawa and Dehiwala were implemented by NWSDB in 1986. The Water Board operates and maintains the two extension schemes, but the original Colombo scheme is operated and maintained by Colombo Municipal Council. More recently, in 2004, the Hikkadua sewerage scheme was implemented by NWSDB and is now operated and maintained by them. Brief details of these sewerage schemes are given on the following table:

Existing Sewerage Schemes in Sri Lanka

Scheme Location	Year of Construction	Pipe Materials	Pipe Sizes (mm)	Method of Treatment
Colombo	1910	DI / VC / RCC	250 – 1100	Micro-screening & two Sea Outfalls
Dehiwala	1986	DI	250 – 350	
Kollonawa	1986	DI	300 – 300	
Hikkadua	2004	µPVC/VC	225	Facultative Ponds and sea disposal
Kataregama	Not available			

94. Some other minor sewerage schemes have been constructed to serve individual residential housing estates in recent years. These are mainly in the vicinity of the Colombo area, but they have also been provided in some towns such as Anuradhapura.

95. In places where there are no sewers, one of the first methods of sanitation to be employed was the bucket latrine system of excreta disposal. The system is very basic and comprises a toilet stall which is used for defecation. An opening in the base of the outer wall is provided to allow urine to drain away, usually into the roadside stormwater drain. The same opening is used by labourers, known as scavengers, to collect the excreta and cart it away for disposal. Often, it is disposed of into the nearest stormwater or on vacant ground. The scavengers are paid a small amount by the householders for their labours.

96. Bucket latrines are insanitary and they have very little to commend them. They cause odours and attract vermin and insects. Moreover, the scavengers are at risk daily in carrying out their obnoxious tasks. The whole concept is unhygienic to everyone concerned: the users, the neighbours, and the scavengers. It has been the policy of the Sri Lankan Government to replace this system. The policy has been successful and there are now almost no bucket latrines remaining in the country.

97. The most common method of non-sewered sanitation that is currently in use in Sri Lanka is the single-pit pour flush latrine (PFL). Due to cultural practices and religious beliefs, the most usual anal cleansing material is water, which is ideally suited to the PF latrine. In the past, the cultural preference was for these latrines to be located outside the dwelling, but within the plot area. In rural areas and on large sized urban plots, the latrines are still located outside dwellings, but pressure of land in most urban areas now dictates smaller plot sizes that require that latrines are built inside the dwelling. The pit is usually offset and connected to an external soakage pit, but, sometimes, the soakage pit is located within the confines of the building, e.g. beneath an internal courtyard.

98. PFL toilets with offset soakage pits are universally accepted in Sri Lanka and they are, by far, the most common sanitation technology in use in both the urban and the rural contexts. Their main disadvantage is that sullage from the house needs to be dealt with separately and this sometimes creates its own problems, particularly in urban areas where sullage is usually disposed of by discharging it into an adjacent stormwater street drain.

99. Septic tanks are used in some urban areas where houses have individual water connections and indoor flush toilet facilities but no access to a sewerage system. They are used to dispose of toilet wastes and sullage, the overflow from the tank being discharged into a soakage pit for percolation into the sub-soil. This system is generally used in low density, high income, urban housing plots, but it is also used for institutional buildings, such as schools, hospitals, and public office buildings. In Sri Lanka, even when septic tanks are installed, it is still common practice to discharge sullage to street drains.

100. Communal toilet facilities have been provided in most urban centres. Most of the successful facilities are provided at strategic locations for use by the general public adjacent to bus stands, railway stations, hospitals and local markets. Operation and maintenance of the communal facilities is usually managed by the local authority, but, in some places, this activity has been contracted out to the private sector.

101. The practice of defecation on open ground is offensive and can be a health hazard. This practice is not a common occurrence in most of Sri Lanka, as it has been estimated by NWSB that more than 90% of all dwellings have toilet facilities within the building or within the plot. Incidents of defecation on the beach or on open land are mainly confined to the urban slum areas on the fringes of towns and thinly populated rural areas. As the density of people living in the slum areas is usually high, the health and environmental risks can therefore be significant in the overall context of the situation. Communal toilet blocks, that sometimes also include bathing and laundry facilities, have been provided in some urban slum areas in an attempt to discourage indiscriminate defecation.

Environmental and Public Health Aspects of the Existing Facilities

102. Because they deal with the unsafe products of wastewater, almost all sanitation technologies have the potential to place risks on public health or to deliver negative environmental impacts. The implementation of conventional sewerage systems usually improves public health levels and provides positive environmental benefits. This is only true if the sewers functions efficiently, are properly maintained, and that suitable treatment is given to the collected wastewater.

103. When open defecation is practised in rural areas with a low population density, it does not constitute a serious health threat. However, if it takes place in densely populated urban slum areas, it promotes high levels of disease and poses a significant health risk. Apart from health concerns, it is aesthetically displeasing, personally degrading, and contributes to the poor quality of life in the slum settlements. Although this practice is not common, attempts should be made to eliminate it completely, as has been achieved with the abolition of bucket latrine systems.

104. Pour-flush latrines are a major improvement over bucket latrines or open defecation. The main disadvantage of PFL toilets, is that the soakage pits for the latrines are usually only designed to accept toilet wastes. Separate facilities are required for the disposal of sullage, but, instead, sullage is usually discharged directly into the street drains.

105. Septic tanks are an acceptable form of sanitation from both the public health point of view and from the aesthetic point of view. However, there is practically no difference between raw sewage and septic tank effluent as far as the potential hazard to public health is concerned. The effluent still contains many pathogenic bacteria and therefore needs to be disposed of in a proper, safe manner. If it is allowed to overflow into street drains, or if the sludge is not removed and disposed of properly, then this will deliver negative environmental impacts.

106. The principal public health and environmental concerns regarding the widespread use of pour-flush latrines and soakage pits or septic tanks are centred around three issues:

- (i) the pollution of groundwater,
- (ii) the emptying of the pits/tanks, and
- (iii) the disposal of sullage and wastewater to street drains.

107. These problems are currently causing concern, even although the water demand in all of the Project Towns is suppressed due to the inadequacy of the present water supply systems. Once the water supply is improved and there is more water available for public use, the sanitation situation will deteriorate further. The quantities of foul wastewater from toilets will not increase, unless pour flush latrines are replaced by cistern flushed toilets. The potential for groundwater pollution and the pit/tank emptying problems will, therefore, not increase. However, the quantities of sullage are likely to rise substantially as a result of an improved water supply and the problems associated with the disposal of sullage to street drains will grow.

108. The problems mentioned above are interlinked and they are discussed in the following sections:

(i) *Groundwater Pollution*

109. The adequacy of the water supply in many urban centres has deteriorated in recent years. The combination of an increasing demand from a growing population and a lack of investment in new facilities have combined to provide systems that are often inadequate to fully serve the needs of the urban residents.

110. Few towns receive a continuous water supply. As a result, new private boreholes have been sunk and old abandoned wells have been brought back into use to satisfy the demand requirements. There is also a large number of hand-dug shallow wells in the towns that are being used for domestic water supply. There is currently no control over the private building of such facilities.

111. The large number of latrine and septic tank soakage systems that are in use in the urban centres throughout the island is causing concern. In some towns, the aquifer that lies directly below the town is a source of drinking water. The fears are that the underground water aquifers are becoming increasingly contaminated by seepage from the pits and that this could constitute a public health hazard. The location of soakage pits and shallow wells on the same plot is also a health concern. As water is abstracted from wells and boreholes in increasing quantities, there is an escalating risk of deteriorating public health.

112. In reality, the risk of contamination of a piped water supply by pathogens is not high, particularly where the water is given proper treatment. Of more concern is the possibility of rising levels of nitrates in the groundwater that is associated with faecal contamination. Although, undoubtedly, pit latrines in urban areas can contribute to high nitrate levels in groundwater, it has been shown (Field Investigation Report in the Kalpitya Area, NWSDB/University of Peradeniya, 2006) that high nitrate levels in Sri Lanka can also be attributed to agricultural activities. The widespread practice of the tipping of urban solid waste and septage in uncontrolled dumps will also contribute to groundwater contamination in some places.

113. The main significance of the presence of nitrates in drinking water is their toxic effect on humans. Nitrates affect the ability of young babies and infants to utilise and absorb oxygen effectively with the result that they die of suffocation, an illness known as methaemoglobinaemia (infantile cyanosis/blue baby). The risk to infants is usually over by the age of six months and breast-fed infants are at much less risk than those fed by bottle. There is a culture of breast feeding babies in Sri Lanka and so the risk of methaemoglobinaemia should not be exaggerated.

(ii) *Pit/Tank Emptying*

114. Apart from being obnoxious, the manual emptying of pits and tanks containing human excreta is hazardous for the workers who are exposed to handling human wastes that have not been treated.

For the users, the main problem is the lack of a reliable and efficient gully bowser (vacuum tanker) service in most towns. The Urban Councils are responsible for providing an efficient pit/tank emptying service, but, usually because of financial constraints, the councils do not have a sufficient number of gully bowsers to meet the demand.

115. At present, there are few sewerage systems or wastewater treatment works in the country into which the wastes from pits or tanks, normally termed “nightsoil” or “septage”, can be emptied. A common place for disposing of the septage is on the municipal solid waste tip. Again, as there are no properly designed and constructed sanitary landfill facilities in the urban centres, the dumping of nightsoil only adds to the unhygienic condition of these tips and the consequent environmental hazard. Leaching of the nightsoil from the municipal tips can contribute to groundwater pollution.

116. Where a council has a tanker service, users, including government buildings, pay a fee for the service. If a householder cannot obtain a booking from the council, due to high demand, or if the householder cannot afford the fee, manual emptiers are often employed for the purpose. If there is sufficient space on the ground within the plot, a separate hole is dug and the contents of the pit are buried on site. Where there is insufficient space, the pit contents are carried to nearby open ground or, sometimes, to a stormwater drain. This task of manual pit emptying is highly obnoxious and is also hazardous to those who carry it out. In addition, if the contents of the pits are not disposed of in a proper manner, there is a risk to the general public.

(iii) *Sullage/Wastewater Disposal to Street Drains*

117. Sullage, often referred to as “grey water”, is water that has been primarily used for food preparation, washing dishes and utensils, laundering clothes, bathing and washing. Essentially, any water, other than rainwater and WC waste, arising from a household can be classified as sullage.

118. The risk to public health through contact with sullage is not as high as through contact with foul wastewater from toilets, also known as “black water”. However, sullage may contain grease, food particles, hair and other impurities, and research has shown that it can also contain high levels of pathogenic organisms. Possibly of more concern is the potential infection route that sullage provides for viral infections. Viruses comprise a serious health risk that is amplified by the relatively low dose that is required to cause infection compared with bacterial infections. The number of viruses found in greywater is dependent upon the health of the population generating the wastewater.

119. In Sri Lanka, it is a common practice for sullage to be disposed of directly to street drains in urban areas, even although it is against Urban Council Regulations. Very few houses have separate soakage pits for the disposal of sullage and there is a common misconception that the street drains have been provided specifically for the purpose of sullage disposal. In rural areas, the sullage water is usually disposed of to the surrounding ground, either indiscriminately or for the growing of vegetables.

120. The health risk of indiscriminate disposal of sullage is not serious in rural areas and in the less densely populated areas of towns, but it poses a potential threat in urban centres and high density housing areas. This is of particular concern in places where difficult soil

conditions prevent the seepage of wastewater from latrines into the surrounding soils and, instead, it also overflows into adjacent street drains.

121. The systems for the collection of solid waste in urban centres are usually not very efficient and the street drains are often filled with rubbish. This hinders the flow of the sullage in the drains and causes ponding of the wastewater, which provides breeding sites for mosquitoes and other insects. Sanitary conditions in the stormwater drains would improve considerably if solid waste collection and street cleaning in the towns were more effective.

122. An improved water supply to an urban centre will not increase the quantities of foul wastewater that have to be disposed of, unless there is a social change from pour flush latrines to cistern flushed toilets. It can be expected, however, that there will be an increase in the quantities of sullage and, under the current disposal practices, the sanitary conditions of the stormwater drains in streets will deteriorate further.

4.5 Lessons Learnt from Previous Projects

123. Important lessons learned from various water supply and sanitation (sector) projects in Sri-Lanka are given in Appendix 3. Some specific lessons learned from ADB assisted schemes are outlined below:

Third Water Supply and Sanitation (sector) Project (TWSSP) - Loan no.2575 SRI (SF)

- (i) The “demand driven approach” has been accepted everywhere, but different methods have to be used for measuring the real community demand in future.
- (ii) Though the women’s participation in sustaining the water supply scheme is highly appreciated, no special strategies have been developed for empowering women.
- (iii) Unqualified Partner Organisations (POs) have not fulfilled the purpose of mobilising communities. Therefore, appointing qualified POs with staff experienced in working with poor is vitally important in future projects.
- (iv) The implementation methodology (Sub Project Cycle) of the TWSSP has been very successful and may be used in future projects too, with appropriate modifications.
- (v) Improper forecasting of future demand and expansion of scheme beyond the projected usage due to socio-political influences badly affects the sustainability of the scheme in many ways. Higher attention is needed for this.
- (vi) Lack of a proper financial management system has lead to misuse use of funds in some water supply schemes. Proper financial management in CBOs needs special attention from the outset.
- (vii) The traditional means of making aware the people of sanitation and hygiene promotion activities have not produced good results. Innovative strategies and participatory methods are needed to attract the community.
- (viii) Environment has not been considered by many CBOs as a major component that contributes to sustainability and therefore protecting of water sources and catchments has been neglected. Special attention is needed for this.
- (ix) CBOs need to be fully involved from the outset of proposed schemes in order for them to be successful.
- (x) Monitoring has not been used properly as a project management tool, in providing feedback for future projects. This should be addressed in future.
- (xi) Lack of a preventive maintenance program within the CBO and/or a Technical Support Unit in the regional office of NWSDB can hinder the progress of water supply schemes. This has to be addressed in future projects.

- (xii) Construction of wells, tube wells etc. in lands not legally acquired can create much trouble later.
- (xiii) When operations staff, such as pump operators, are not paid or are underpaid, they are not likely to stay with the water supply schemes. A sustainable system of payment is required.
- (xiv) When there is a real need for water and no alternative solutions are available within the community, the success of the water supply scheme is more likely.

Second Water Supply and Sanitation Project - Loan no. 1235-SRI

- (i) The project should have been designed to cover fewer towns and to meet at least the 10-year demand, so that expansion and rehabilitation works could have been further integrated.
- (ii) To avoid conflicts with other water users and to secure water sources, the availability of water should have been carefully examined at design stage and its projected use coordinated with other users.
- (iii) Inaccuracies in cost estimates for rehabilitation works have led to cost overrun and insufficient contingency funds have been provided to overcome the shortfall.
- (iv) Non Revenue Water (NRW) and Unaccounted Water (UFW) could not be reduced on a sustainable basis only by repairing the infrastructure. Institutional, managerial and social measures were also required in parallel with the rehabilitation works to ensure sustainability.
- (v) Tariff increases were effective in decreasing the water demand of high-consumption households, but not enough to substantially reduce overall water demand. Public awareness measures on the correct use of water should also be undertaken to limit water demand.
- (vi) Before handing over the water supply distribution systems to local authorities, the Government and NWSDB should allocate enough funds and staff to support local authorities in training staff and building capacity.

Water Supply Sector Project - Loan no.817-SRI

- (i) Water supply development needs to be designed in the context of overall regional or national water resources management.
- (ii) To maintain momentum in project implementation, it is better to engage more than one consulting firm for construction supervision, O&M support and training.

5. Project Scope

124. The project consists of 2 Components, Component 1 is split into 2 Phases

5.1 Component 1: Preparing a Feasibility Study for Water Supply and Sanitation

5.1.1 Phase I: Sector Review and Data Collection

A. Shortfalls, Constraints, and Lessons

125. The team reviewed and analyzed existing studies, reports, urban data, and related information, including lessons from past water supply and sanitation and urban development projects in Sri Lanka. The team also reviewed the experience of projects assisted by the Asian Development Bank (ADB) and other agencies, non government organizations (NGOs), and community-based organizations (CBOs). To do this accurately, the team conducted a

preliminary evaluation study of around 15 to 20 small schemes (including both rural and urban centers) executed by ADB in selected or adjacent provinces. The team shared lessons with central and provincial governments and local authorities, as well as with representatives of citizen groups.

B. Data Collection on Infrastructure and Service Delivery

126. The team undertook the following tasks:
- (i) Assessed the total financial envelope available for the sector, including resources in central and provincial government and donor pipelines.
 - (ii) Collected and assess community data on general affordability and willingness to pay for water supply and sanitation.
 - (iii) Described, mapped and quantified the condition of basic amenities and services in the urban and rural areas, highlighting needs and deficiencies in the water supply, sanitation and drainage subsectors
 - (iv) Discussed managerial and administrative arrangements in existing urban and rural schemes.
 - (v) Examined the current environmental situation and the severity of potential health problems caused by a lack of access to basic infrastructure.
 - (vi) Developed an inventory of, and critically reviewed, all relevant initiatives for infrastructure development, studies, plans and programs, and public and private sector proposals.
 - (vii) Described existing relevant operation and maintenance (O&M), tariffs, and status of billing and collection for the selected subsectors. The consultant also conducted a capacity assessment of the local authorities in the proposed project area and identified areas of responsibility under the project preparatory TA (and potentially ensuing Project) for local authorities.

5.1.2 Phase II: Detailed Feasibility Study

A. Project Design

127. The consultant prepared preliminary engineering design for all four project towns and three sample subprojects in rural areas and undertook detailed subproject preparation activities, including an analysis of suitable technical options acceptable to communities. Bearing integrated water resource management principles in mind, the consultant undertook the following:

- (i) Screened all viable technical options and complete the technical design for selected least-cost water supply and sanitation, sewerage and wastewater treatment options, in consultation with stakeholders and local communities.
- (ii) Conducted a physical reconnaissance of underground and surface water supplies, including (a) assessment and basic modeling of water table replenishment to determine scheme sustainability, (b) assessed surface water resources suitable for water extraction, an analysis of existing upstream and downstream uses, and assessed maximum extractable water, and (c) analyzed water quality for proposed options in each town and the sample rural subprojects.
- (iii) Detailed the technical viability of the various proposed options for each project subcomponent and demonstrate that they were the least-cost option under a combined system approach.
- (iv) Developed recommendations for protecting surface water quality in consultation with representatives from provincial irrigation departments containing (a) proposed guidelines for implementing source protection measures; and (b) proposed a specific action plan for implementation in all

- towns under the Project, including community awareness.
- (v) Recommended a strategy for an integrated and comprehensive program for reducing non revenue water, taking into consideration capacity for local and national implementation.
- (vi) Assessed the impact of wastewater collection and treatment on the water quality of receiving watercourses before and after project construction.
- (vii) Assessed the adequacy of on-site and off-site wastewater treatment options to accommodate incremental amounts of wastewater.
- (viii) Reviewed current approaches and develop an outline strategy for proposed health and hygiene education and environmental protection awareness.
- (ix) Reviewed existing O&M options and prepared a strategy for community implementation of rural schemes, including technical procedures to ensure efficiency and sustainability and proper financial, accounting, and managerial arrangements for O&M.
- (x) Reviewed and defined design criteria and standards.
- (xi) Outlined designs; arrangements for construction staging, implementation, and tendering; major civil works schedules; PCU and PIU staffing requirements.
- (xii) Identified requirements for key advance actions to avoid implementation delays.
- (xiii) Developed a project monitoring framework for the execution
- (xiv) In consultation with stakeholders, developed proposals for adequate project implementation in relation to engineering, planning, project management, and other essential disciplines. Based on an evaluation of staff and available skills, recommend additional recruitment and/or upgrading of expertise.

B. Project Costs

128. The consultants undertook the following tasks:
- (i) Developed project costs and unit rates at market rates.
 - (ii) Summarised the project costs estimated for land, civil works, equipment, materials, resettlement, environmental monitoring and mitigation, consulting services, taxes and duties, project management and capacity building, and interest and other charges during construction.
 - (iii) Presented procurement contract packages, clearly indicating the packages to be financed in line with ADB's *Procurement Guidelines*.
 - (iv) Prepared detailed financing and disbursement plans.

C. Financial and Economic Analyses

129. The consultants conducted project economic and financial analyses in accordance with ADB's requirements. To this end, they undertook the following activities:
- (i) Described the macroeconomic and sector context.
 - (ii) Updated water demand and wastewater discharge data
 - (iii) Assessed project alternatives and confirmed least-cost solutions.
 - (iv) Reviewed cost-recovery policies and tariffs at and national level and current arrangements in each town.
 - (v) Proposed cost-recovery mechanisms (including necessary institutional arrangements) through user charges, taxes, and/or other techniques for O&M and recovery of initial investments, and a tariff structure for each subproject for medium and long-term recovery, taking affordability, willingness to pay, water conservancy, cross-subsidization, and full cost-recovery requirements into account.
 - (vi) Estimated the detailed economic project costs for selected options, applying

- appropriate disaggregations of costs, standard conversion factors, and shadow prices as required.
- (vii) Identified all quantifiable and unquantifiable project economic benefits, considering with and without Project scenarios, as well as incremental and non-incremental benefits.
 - (viii) Reviewed the financial performance of the urban Councils in the selected towns.
 - (ix) Prepared financial projections for operations 10 years after project completion.
 - (x) Computed relevant financial indicators for each Water Supply Scheme and Sanitation scheme to assess financial viability.
 - (xi) Assessed the Sub-Project's financial viability.
 - (xii) Estimated economic and financial internal rates of return and perform sensitivity analyses, including switching values and calculation of the real weighted average cost of capital (WACC).
 - (xiii) Calculated the poverty impact ratio and conduct a distribution analysis.
 - (xiv) Reviewed and update the existing financial management assessment for the National Water Supply and Drainage Board (NWSDB) and its local offices, including a review of tariff methodology and proposed performance improvement recommendations.
 - (xv) Reviewed the financial performance of urban and municipal councils to be included under the Project.
 - (xvi) Reviewed existing tariff projections for NWSDB nationwide and determine their suitability for this Project.
 - (xvii) Evaluated the adequacy of tariff methodology and tariff objectives and recommend improvements.

D. Organizational and Institutional Assessment

130. The consultant undertook the following actions:
- (i) Reviewed the status of approval and implementation of sector policies and regulations, particularly those regarding the Public Utilities Commission.
 - (ii) Reviewed the organizational composition of NWSDB, the level of responsibility and accountability of different units, existing funding mechanisms, and means for enhancing efficiency.
 - (iii) Reviewed the status of implementation of corporate and business plans, monitoring mechanisms, methods employed to achieve targets, and linkages to the performance improvement program.
 - (iv) Analyzed provincial and district structures (including district-level rural support units), staffing roles and capabilities, budgets, finance resource bases, cost-recovery mechanisms for urban infrastructure and services, revenue collection performance, accounting systems, internal control mechanisms, and procurement procedures.
 - (v) Assessed the strengths and weaknesses of the accounting system and, together with the Finance Division, developed recommendations and a time-bound action plan for improvement.
 - (vi) Reviewed the asset management structure and level of valuation and developed recommendations for an asset management plan for NWSDB.
 - (vii) Recommended operational performance measures, Key Performance Indicators (KPIs).
 - (viii) Assessed and evaluated the presence, capability, and potential role of NGOs in Project areas.

E. Institutional Strengthening and Capacity Development

131. To ensure the sustainability of the investments under the Project, the consultant carried out the following tasks:

- (i) Developed a carefully designed capacity-building program for NWSDB's local offices, local authorities, and CBOs, specially focus was made in relation to collecting, updating, organizing, and managing financial information for routine work.
- (ii) Recommended an institutional strengthening program for the Urban Councils who will operate the sanitation sub-projects, based on the local authority assessment conducted in Phase I.
- (iii) Reviewed the existing capacity-building program for communities to manage, operate, and maintain proposed facilities, including, where relevant, community introduction, collection and administration of user charges. Capacity-building activities will also address groundwater protection and conservation, environmental and hygiene education, and awareness programs and campaigns.

F. Poverty and Social Assessment

132. By means of a socioeconomic survey and other tools, and in accordance with ADB's *Guidelines for Incorporation of Social Dimensions in ADB Operations*, the consultant assessed the Project's social impact by undertaking the following tasks:

- (i) Reviewed existing poverty per capita data, access to basic services by the poor, and the acuteness of health problems in (a) the 4 selected urban centers, and (b) the 3 selected districts where rural interventions are to be supported.
- (ii) Reviewed the Government's national development strategy.
- (iii) Conducted a detailed poverty and social analysis for project areas, segregating data for urban and rural centers, guided by ADB's *Handbook on Poverty and Social Analysis*. Specific activities will include (a) conducting a full socioeconomic survey of project beneficiaries by gender and income group; (b) estimating the number of project beneficiaries with incomes below the official poverty line; (c) conducting an affordability analysis; (d) identifying vulnerable groups, including any minorities; (e) evaluating social and economic benefits; (f) identifying project impacts and recommending mitigation measures; (g) collecting and analyzing health data, including morbidity and mortality rates caused by waterborne diseases; (h) analyzing and evaluating social networks; and (i) preparing a poverty reduction and social development strategy.
- (iv) Based on ADB's *Policy on Gender and Development* and assisted by ADB's *Gender Checklist for Water Supply and Sanitation* and *Gender Checklist on Urban Development Projects*, the consultant conducted the following: (a) a gender analysis and identified the potential for participation by women in project design, implementation, O&M, and training; (b) assessed local gender-related constraints and opportunities for development; (c) formulated a gender action plan for the ensuing Project.

G. The consultants also undertook the following actions:

133. Details of which follow.

- (i) Developed a participatory framework for community participation in the identification, planning, and design of the Project in urban and rural areas.
- (ii) Prepared a strategy for community mobilization and/or community organization for implementation under the resulting Project.
- (iii) Assessed needs and distribution and capabilities of local NGOs in selected subsectors in towns and rural areas.

H. Social Safeguards

134. The consultants ascertained the number of minorities and vulnerable people and their socioeconomic status and assessed the specific anticipated impact that the Project will have on them using, among other documents, the checklist for categorization of indigenous people and will, if necessary, developed indigenous people development plans according to ADB's policy on indigenous people.

135. At an early stage of TA implementation, the consultant applied ADB's resettlement checklists to identify resettlement issues and ascertain the nature and extent of the Project's impacts on affected households. Based on the assessment, the consultants determined whether any of the water and sanitation infrastructure would have involuntary resettlement impacts and, if this is the case, in accordance with ADB's involuntary resettlement policy and *Operations Manual* on involuntary resettlement, a resettlement plan was prepared based on subproject design in each town, including:

- (i) Review and assessment of key national policies, laws, and guidelines regarding land acquisition and compensation;
- (ii) identified and enumerated people likely to be affected through a survey and/or census and preparing an asset inventory that identifies all types of losses;
- (iii) ascertained preferential relocation areas, compensation, and livelihood restoration through consultation with those who might be affected;
- (iv) established an entitlement cutoff date and estimating the requirements for financial resources, comparing these with available resources;
- (v) provided options for relocating housing and other structures, including transfer to established new sites, options for livelihood restoration, and mechanisms for addressing grievances;
- (vi) defined institutional responsibilities for approving, implementing, managing, financing, and monitoring the resettlement plan along with implementation schedules, capacity building, financial plans and budgets, and a plan for internal and external monitoring and evaluation of the resettlement plan.

136. The consultants used the ADB's *Handbook on Resettlement* as a guide for resettlement planning. For the rural component, which is envisaged as a sector-like component, the consultant prepared a resettlement framework that is consistent with the urban resettlement plan or plans.

I. Environmental Assessment

137. The consultants undertook the following tasks:

- (i) Prepared an initial environmental examination and summary or an environmental impact assessment and summary and an associated environmental monitoring plan covering each of the project towns and subcomponents, as well as simplified initial environmental examinations for three rural sample subprojects. This will be conducted in accordance with ADB's *Environment Policy* and ADB's *Environmental Guidelines*, as well as Sri Lanka's National Environmental Act and other environmental protection regulations.
- (ii) Assessed the positive and negative environmental impacts of proposed urban social infrastructure and services related to their location, design, construction, and O&M.
- (iii) Proposed mitigation measures and develop a full environmental monitoring plan.
- (iv) Conducted "Disclosure" consultations in line with ADB requirements.

- (v) Formulated environmental management plans for environmentally sensitive subcomponents.
- (vi) Prepared an environmental assessment and review procedure framework for the rural component of the Project.

J. Consultations and Consensus Building

138. To ensure community participation during the planning and design stages and to promote enhanced ownership, the consultants carried out public consultations in selected towns and rural areas. Stakeholder workshops at national, provincial, district and town level were conducted; (ii) early stages of design to identify needs, options and priorities; (ii) discussions with other water users and reaching of a common agreement, (iii) disclosure on final designs for environmental and social safeguards public consultation.

5.2 Component 2: Developing Institutional Support for Sustainable Water Supply Community-Based Management

139. NWSDB's Rural Water Supply Unit has initiated a program of activities that will allow CBOs to access (i) technical assistance, and (ii) credit sources for essential O&M and rehabilitation of rural schemes developed under this Project or other projects. The support provided under this component provided awareness workshops for the various elements of the program and recommendations for the continuance of the strategy.

5.2.1 Introducing By-Laws Relating to the Management of Rural Water Supply CBOs

140. The lack of recognition of CBOs within Sri Lanka's legal framework was identified as one of the problems for effective community management of water supply and sanitation facilities. Based on studies prepared with United Nations Development Programme assistance under the National Water Supply and Sanitation Sector Facilitation Programme, by-laws for *pradesiya sabhas* and local authorities were formulated to enable CBOs to operate as service providers. In conformity with the 2001 national policy for rural water supply and sanitation and pertinent manuals, NWSDB has prepared draft by-laws and resolutions relating to the management of rural water supply by CBOs. Such by-laws empower CBOs to create, carry out, maintain, and control small semi-urban and rural water supply schemes and widen their opportunities for access to funding capital for new facilities. Unfortunately, to date only one provincial council has adopted such by-laws. The consultant has undertaken the following tasks:

- (i) Reviewed By-laws of concern and associated legal documentation.
- (ii) Supported NWSDB in organizing and conducting workshop sessions with each of the remaining provincial councils.
- (iii) Facilitated dialogue with provincial councils and local authorities and address their concerns.
- (iv) Prepared educational materials and handbooks outlining major advantages and implications of by-laws.
- (v) Translated documents into Sinhalese and Tamil;
- (vi) Held awareness training and explanatory sessions with all provincial councils and selected local authorities and/or *pradesiya sabha* representatives, CBO districts, and CBOs.

5.2.2 Operationalizing the Water Supply Development Fund for CBOs

141. The long-term sustainability and successful introduction of water and sanitation schemes implies access to financing in case of emergency rehabilitation, expansion, and

development. While schemes have been handed over to CBOs for O&M and general management, and CBOs also engage in fee collection, the Government retains ownership of the assets. CBOs have restricted access to financing sources and their lack of collateral limits their access to banking facilities. NWSDB, in coordination with the Rural Water Supply and Sanitation Division of the Ministry of Urban Development and Water Supply, has completed the preliminary design of the Water Supply Development Fund for CBOs and piloted the creation of the Community-Based Organizations Credit Trust Board, a fund proposed to be managed by Sri Lanka's provincial councils, in the North Central Province. Given these circumstances, the consultant has provided support to NWSDB by

- (i) reviewed the status of implementation of the Water Development Fund for CBOs in the North Central Province and provide recommendations;
- (ii) prepared educational materials and handbooks on the subject and user-friendly manuals and instructions for CBOs;
- (iii) translated documents into Sinhalese and Tamil;
- (iv) conducted awareness training and explanatory sessions with all provincial councils and selected local authorities and/or *pradesiya sabha* representatives, CBO districts, and CBOs in those councils agreeing to adopt the funds.

5.2.3 Institutionalizing Financial Management and Accounting for Small Scheme Operators

142. Major findings resulting from ADB3, one of ADB's previous regional technical assistances, indicated that there were difficulties encountered by a significant number of CBOs in relation to financial management and accounting. To address this, the consultant engaged in the following activities:

- (i) Reviewed experience from ongoing projects and material developed under previous assistance.
- (ii) Developed simple and efficient budgeting methods for CBOs and associated training materials.
- (iii) Developed simple accounting and auditing methods and mechanisms for CBOs and associated training materials.
- (iv) Selected and trained "Trainers" that will carry out the Financial Management System training during the implementation of the project
- (v) Conducted training in the districts, focusing on training CBO representatives.

6. Component Selection Approach

6.1 Urban Projects

143. All four of the town schemes forming part of this project were selected by NWSDB and the ADB prior to commencement of the PPTA. During the selection, poverty and access to services data, particularly water and sanitation infrastructure were considered. Mannar and Vavuniya in the North-East Province with Chilaw and Puttalam in the North West Province were selected and the decision to proceed with these towns was confirmed at the first National Steering Committee meeting in July 2007.

6.2 Rural Sub-Projects

144. The selection of the rural sub-project areas was based on the following:

- (i) Inclusion of border villages which have been more exposed to hardship in recent times
- (ii) Villages located in Vavuniya, Mannar and Puttalam districts and possibly Anuradhapura and Polonnaruwa

(iii) Villages of mixed ethnic groups

145. The movement of project staff was restricted in the Mannar and Vavuniya areas and it was necessary to obtain the assistance of the NWSDB District Engineer and the respective District Secretaries in the selection of two sub projects, one in each District.

146. In Puttalam, Pahala Puliyankulama was selected, it is considered as a border village and was also one of the sub projects prioritized under the 3rd ADB project, for inclusion in the project. Implementation of the scheme could not be carried out under ADB 3 due to the objections raised by the Irrigation Department of the extraction of raw water for the village.

147. The table below gives details of the reasons for the selection of the villages for the study.

Details of Four Villages Selected as Rural Sub Projects

District	Name of the sub project	Remarks	Partner organisation
Mannar	Thodaveli (Rural)	Thodaveli is situated about 7 kms from the town center in the Mannar DS division on Mannar island and is within the “cleared” area. It is situated adjacent to the urban boundary. In Mannar District, the “cleared” area is very limited and the urban scheme also covers a large area within the island. Therefore, this village is selected as a rural scheme. The scheme was selected by Mrs. S. Malathi, District Engineer of NWSDB, considering the identified need for additional drinking water.	Rural Development Foundation
Vavuniya	Cheddikulam (Small Town)	The small town is situated about 15 kms west of Vavuniya on the Medawachchiya to Mannar road in the Cheddikulam DS division, where there is a big need for additional drinking water. Both Tamils and Muslims are living in the area and both face severe drinking water problems. This area very often experiences armed conflict. The scheme was selected by Mrs.S.Malathi, District Engineer of NWSDB.	Dehiowita Janatha Foundation
Puttalam	Pahala Puliyankulama (Rural)	Pahala Puliyanakulama, which is about 25 kms north-east of Puttalam, is situated in the Karuwalagaswewa DS division. It is a community that had been considered by the ADB3 TWSSP and dropped due to an issue over the planned water source. Though there is a good water source, at that time officials of the Irrigation Department had	Wayamba Social Welfare and Cultural Development Foundation

District	Name of the sub project	Remarks	Partner organisation
		objected to the extraction of water from the source. The village is bordering on the “conflict” area and was selected after consulting the District Engineer of NWSDB.	
Anuradhapura	Periyakulama (Rural)	The village is in a “disturbed” area, situated in the Medawachchiya DS Division where Sinhala and Tamil ethnic groups live together. This was on the list of the selected villages for the ADB3 TWSSP, but no scheme was implemented due to limited funds . There is a big need for drinking water and that is the reason for selection by the District Engineer of NWSDB.	Rajarata praja Kendraya

148. The village selected in Anuradhapura District, Periyakulama was selected as one of the border villages where all the three communities of Sinhalese, Tamil and Muslim peoples live. Following lack of progress in developing proposals during the PPTA, ADB agreed to omit the village from the project study

7. Water Supply and Sanitation in Project Areas

7.1 Water Supply

7.1.1 Water Supply in Chilaw Project Area

149. The town of Chilaw is located on the shores of the Indian Ocean on the west coast of Sri Lanka and its entire area lies at an elevation between 2 m and 8 m above sea level. The dominant topographical feature in the town is the long, narrow, ribbon lagoon known as Chilaw Lake, running parallel to the coastline, that separates the mainland area of the town from the narrow coastal strip on which Chilaw is located. Deduru oya main river joins the coast at Chilaw and it is the only available major surface water source in the sub-project area.

150. The selected sub-project area for augmentation covers about 40 GND's in and around Chilaw town limits and it also covers two small town areas of Bingiriya and Arachchikattuwa. This is in accordance with the newly demarcated urban development plan, from the Urban Development Authority (UDA).

151. With respect to existing water supply facilities, Chilaw water supply scheme was rehabilitated in 1992 under Chinese assistance. It is the main piped water supply facility available for the Town, other than one part of the town that gets water from two rural piped water systems.

152. The majority of the people in the area, especially in the outskirts of the town limits are dependent on shallow dug wells or locally made hand pumped tube wells placed taking

water from the sand band. Water quality problems are high in most of those wells, either due to high iron contents (3 to 10 mg/l) or high hardness and alkalinity, which exceed desirable levels for drinking. In addition seasonal saline intrusion is the other issue for groundwater on the coastal belt. Water level fluctuation of the wells is reported at the inland areas towards the east of the town. As a whole the available water sources for the entire area have some sort of problems with water quality. The following table summarizes the present status of the existing Chilaw water supply scheme maintained by the NWSDB.

Present status of Chilaw WSS

Chilaw WSS	Details	Present condition
Source	Ground water - 11 Borehole wells Situating mainly along the river bank and some wells affected with bank erosion.	2 wells abandoned due to clogging of the well structure. Other wells also gradually decreasing the yield.
Storage facilities	2 clear water tanks total capacity 1853m ³ 1 balancing Water Tower 953m ³	Storage structures are in good condition
Pumps	10 sets of borehole pumps 6 high lift pumps	12 years old. Frequent break downs High lift pumps directly couple to the distribution network and the tower act as balancing tank
Treatment facilities	Cascade aerators Reaction & sedimentation tanks Rapid sand filter Chlorinator	.Raw water quality absolutely bad One set of filters and aerators are mal-functioning and it was for last couple of years . Treatment system does not effective to satisfactorily remove high iron and alkalinity in BH water at the moment
Overall production	4034 m ³ per day	Far below the current need and not match even with the existing plant capacity of 7100 m ³ /d
NRW	33% (average)	Some Bulk water meters mal-functioning and the figure has doubt
Distribution & Coverage	8 GNDs fairly covered 10 GNDs partly covered Domestic connections 4995 Non domestic 895	Under size pipes are quite substantial at the distribution network and low pressure zones available specially at the coast line
O & M staff	4 per 100 connections	At satisfactory level. However elctro mechanical staff shortage and preventive maintenance not regular
Other WSS	Punchivilathawa village wss and Arachchikattuwa small town wss are located within the project area	Village scheme is operating well by CBO but water quality problems at one of the production wells reported recently. Small town scheme at commissioning stage but there also issues at water sources with hard quality. Partial treatment has been added to suit the rural context

Current critical issues at Chilaw WSS

153. The net production capacity of the shallow boreholes is decreasing and two wells have been completely abandoned. The current treated water production depends only upon one filter and half of the other elements of the water treatment plant, this causes over loading of the facility. The rusty and hard taste and the yellowish brown colour of the treated water are not acceptable features of the water for the majority of consumers. All expansions and new water supply connections were suspended a long time ago as a result of the serious problems at the production units.

154. The following critical issues have been reported with respect to the current status of production units and the level of service.

- The present possible net production is around 4000 m³/d including the production of recently added two deep tube wells to the system. It is far below the current demand even within the existing scheme boundary
- The present iron content of the shallow boreholes vary from 3.1 mg/l to 10.9 mg/l which sometimes create residual iron deposits at the level of 3 mg/l after treatment. The rusty and hard taste and the yellowish brown colour are not acceptable features of the water for the majority of consumers. This affects other domestic purposes as well, such as clothes washing.
- Efficiency of production at the treatment plant not up to the design capacity because of mal-functioning of 50% of the production units. One set of reaction chambers and the rapid sand filter units have not been in use for quite a long time and thereby treated water production is reduced.
- Despite of the tremendous demand for connection to the system in the neighboring areas, all expansions and new water supply connections are suspended, due to the serious problems at the treated water production units. The Urban Council of Chilaw is also facing serious complaint problems due to the unsatisfactory level of the water service in their operating limits.

7.1.2 Water Supply in Puttalam Project Area

155. Puttalam is located on the coast about 110 km north of Colombo (8° 2' North and 79° 49' East). The town is on the east of Sri Lanka's second largest sea lagoon, Puttalam Lagoon, the towns lies on the shores of the Lagoon, the topography of the town is generally flat, with slight undulations

156. The surface geology is represented by a range of Quaternary alluvium, beach rocks and clayey lagoonal deposits with limited permeability. Older terrace deposits, also of Quaternary age, extend inland. Older Miocene limestone, exploited for public water supplies, underlies the whole of the coastal area, but is only exposed at the surface in two small areas immediately east of the urban area. Because of the geology at the area the table shallow but not in favorable quality for drinking at many locations

157. The proposed project area covers 49 GND's in 5 DS divisions, in the Puttalam District. The Inland areas towards Anamaduwa town are at higher elevation to that of the coastal belt and the water table is fairly deep and the existing shallow wells are becoming dry during long dry spells. For both shallow and deep ground water, in many locations, the hardness is above the acceptable limits for drinking water

158. Under the sub-project proposal to the year 2022, only part of the project area (4 distribution zones out of 7) have been considered. Within which, the Puttalam town water supply is the only major piped water supply available in the area, other than several small CBO maintained rural pipe schemes towards north of the town. A new piped scheme is under construction at the moment under the UNICEF assistance with a capacity of 2000 m³/d mainly focusing on the resettlement areas at Manathiuv GND. The following table summarizes the current status of the Puttalam town main water supply scheme.

Present status of Puttalam WSS

Puttalam WSS	Details	Present condition
Source	Ground water 1. Shallow well field in Mee Oya river bed 2. Miocene aquifer well field (Old wells) 3. UNICEF new wells	04 lateral shallow wells at river bank connected to a central well. Very old well field. Water table fluctuates with river flows and raw water quality complex with high EC, Mn and Alkalinity. Total production 1500 m ³ /dT At the last rehabilitation in 1993 10 new deep BH's were added and now only 08 working. Decreasing yield reported with hard quality. In 2007 new 09 deep wells were done at the above same aquifer. Quality hard and treatment needed. The estimated safe yield is 5500 m ³ /d and the wells still not commissioned
Storage facilities	1 Ground sump- 2000 m ³ 2 Water Tower- 300 m ³	Ground sump has two identical units, located in TP site to collect treated water and in good condition. Conical shape tower located in TP site and mainly serve Army for its dedicated supply.
Pumps	6 sets of 30Kw, 41m head centrifugal pumps	This is for direct pumping to the distribution system and out of which two pumps allocated to pump to the tower. 14 years old pumps Frequent break downs. UNICEF has assisted to replace them at the end of last year.
Treatment facilities	Cascade aerators 2 units Semi automated RSF 2 units Chlorinator	The design capacity of the plant is 7000 m ³ /d Structures are in a reasonably good condition .but one of the filters had serious problem with filter media and now only 50% of the elements at the plant in operation
Overall production	6536m ³ per day	This is far below the current needs Population influx as a result of IDP's from Mannar district has aggravated the problem.
NRW	Estimated 26%	Based on estimated figures since most of the flow meters are not working. Doubts at estimation and the value might be more.
Distribution & Coverage	19 GNDs fully or partly covered Domestic connections 8145 Non domestic 499 Yard Posts 44	Supply period 6hrs per day. More than 2000 in the registered waiting list. Distribution pipe system in good condition but now many pipes are under sized to cater the expansions and infill.
O & M staff	3.5 per 1000 connections	Satisfactory but shortage in some disciplines and affected to the services.

Puttalam WSS	Details	Present condition
Other WSS	10 other WSS managed by CBO.	Most of the schemes were done under the 3 rd ADB assisted project. These include village rural pipe schemes and the CBO's are doing the management satisfactorily. However reaching design horizon by 2010 or 2012. Some schemes reported water quality problems similar to the Puttalam scheme and awaiting for rehabilitation.

Current critical issues at Puttalam WSS

159. Due to the limitations at the water production units, the hours of water supply have been curtailed zonal wise and in general most of the distribution zones receive less than 6 hours of water supply. The level of service is going down day by day and the current level of supply does not match the recent growth in and around Puttalam town. Frequent power failures occur in the area aggravated the issue further.

160. Other than the Mee-oya well field, all other borehole sources have been subjected to diminishing yield, which has curtailed the recommended safe yield by about 30% to 40%, depending upon the condition of the aquifers. However once the recently constructed 09 Nos new wells under the UNICEF funds are in operation, the water scarcity will be reasonably reduced.

161. Water quality problems include the presence of calcite deposits in the pipe lines and the brownish or blackish colour is a regular problem with the treated water, this is due to iron and/or manganese.

162. The pumps installed under the recent rehabilitation of the ground water sources only lasted 5 years and the O&M authority was compelled to replace all of them to maintain the required level of production. The high-lift pumps were also in bad condition but they have been replaced recently under the UNICEF funds.

163. More than 2000 households are on the waiting list to obtain water connections and the IDP camps (where located around the township) are eagerly waiting a better water supply from the piped scheme, since there is no any other feasible options of supply available for them.

164. Two Industrial zones have also been planned to be established on an area of about 350 ha of land in Thammannagama and Nelimwewa GND,s (construction is ongoing in one at the moment and the other will start in near future). Their treated water requirement would be around 3000 m³/d but the facility cannot be provided from the present scheme due to the prevailing constraints in production .

7.1.3 Water Supply in Vavuniya Project Area

165. Vavuniya is one of the major town centers for the Northern Province of Sri Lanka, lying approximately 60km north of Anuradhapura and 100km south of Jaffna. It is situated at the southern end of North Central Province. Its location makes Vavuniya strategically important, as all transport to and from the North passes through the town. Many displaced persons from the Wannu region have settled in the town in recent years and it is now considered to be the main administrative and commercial centre of the region. The project area concerned covers 17 GND's in Vavuniya DS division.

166. The area comprises hard metamorphic rocks everywhere, which have a thin weathered zone and thin alluvial cover along the larger watercourses. These rocks are part of the Highland group of Sri Lanka and the underlying geology comprises high grade metamorphic rocks, such as hornblende biotite gneisses, granite gneisses, and charnockites. These rocks are nonpermeable, thereby the hydro-geology of the area does not favor extraction of large quantities of groundwater from the thin fracture zones in the hard rocks.

167. Because of the nature of ground, people in the project area (17 GND's in and around Vavuniya town) have always attempted to build large diameter shallow dug wells as their preliminary water source. The water level fluctuation is very high and most of the wells become completely dry during the dry spells. Minor irrigation tanks also have the same nature and people in the area suffer greatly during the dry periods of the year with their domestic water supply needs.

168. Vavuniya town water supply scheme is the only available piped water system within the area, other than small scale piped water schemes serving some Institutions.

Present status of Vavuniya WSS

Vavuniya WSS	Details	Present condition
Sources	Ground water 2 No Shallow wells 10 No deep borehole wells	One borehole well is clogged and not in operation. Pumps are not installed in 2 wells and the wells are not in operation. Water quality hard and user perception poor. Even with several interventions time to time situation of the water sources remain same Yield of the wells varying wet to dry. Maximum recorded yield of a well is 200 m ³ /d
Storage facilities	1 Water Tower capacity 650m ³	This is the only available storage facility
Pumps	8 borehole pumps	Pumps very old and low efficiencies
Treatment facilities	Disinfection with bleaching powder	
Overall production	736.5m ³ per day	Far below the present water needs
NRW	Estimated 4.7% - 34.2%	Huge variation and not accurate. Some months based on low estimations
Distribution & Coverage	Confined to city limits. Domestic connections 731 Non domestic 345 Yard Posts 03	Supply period 3hrs per day. Such a densely populated area, only 1076 connections were given. Connections curtailed due to limitations at production Distribution system only limited to town area and expansions not possible in some areas due to under size pipes
O & M Staff	16/1000 connection	Staffing ratio high because of several operating points even with low productivity

Current critical issues at Vavuniya WSS

169. New water supply connections have been curtailed for a long time, despite the large number waiting for piped water facility. The people are facing tremendous hardships at present with respect to safe drinking water.

170. The possible extraction rate has gone far below that expected. The situation becomes worse during the dry spells of the year due to low recharge of the aquifers. Hours of water supply has gone down to 3 hrs during the dry season and frequent breakdown of the borehole pumps make the situation worse.

171. Water quality in most of the ground water sources has a low acceptance by the users, mainly due to high concentration of iron and manganese, in some areas hardness leads to calcite deposits blocking the pipes.

172. Despite much effort made during the past by donor agencies and the NWSDB the O&M authority, the current situation is still bad, the following deficiencies are observed with respect to the status of supply.

- (i) Though Vavuniya is one of the major city centers in Northern Province only 1076 piped water connections were able to be given due to the poor supply. New connections have been curtailed for a long time despite there being a long waiting list for a connection
- (ii) Attempts made to increase extraction of the required quantity from ground water has failed due to the ground formation in shallow and deep aquifers. The probable extraction rate has gone further down, than expectation. The situation is far worst in the dry spells of the year due to low recharge of the aquifers
- (iii) Water quality of most of the ground water sources is low
- (iv) Hours of water supply has further gone down to 3 hrs during the dry period and frequent breakdowns of the pumps make the situation further worst.
- (v) O&M facilities and the spares resources at the Vavuniya maintenance division is poor, especially as preventive maintenance of pumps and equipment is not being done in a regular manner due to lack of resources. This has further aggravated the situation.

7.1.4 Mannar Project Area

173. The urban centre of Mannar Town is located on Mannar Island, just off the north-west coast of Sri Lanka. The area of the island is approximately 128 km². The land is almost entirely flat, without no distinct drainage patterns. The highest elevation of the island is only 4.2 m above mean sea level

174. Mannar is situated in an area of calcareous sedimentary rocks which contain some significant limestone, aquifers. The sedimentary zone extends northwards and has several sub-basins, one of which is the Murunkan basin. All the sediments thicken seawards and thin out inland as they reach the hard rocks of the mainland. In the Mannar-Murunkan area the limestones, which appears to be partly karstified, are covered largely by Quaternary sands and clays, and on Mannar Island, many meters thickness of aeolian dune sands.

175. Hydro-geology of the Mannar island is thereby based on clear water collection, in the sand dunes.

176. People mostly depend on shallow dug wells or locally made hand pump wells installed in the sand aquifers. Saline intrusion is reported, especially during the dry periods and some aquifers have totally been polluted with saline water by over extraction.

177. The only available piped water scheme within the project area (25 GND's in Mannar DS division) is Mannar “Integrated WSS” which combines Vankalai, Thirukathikeshwaram and Mannar town pipe water supply schemes. The following table indicates the summary details of the Mannar Integrated WSS system.

Summary details of Mannar Integrated WSS

Issues Mannar	Details	Present condition
The urban centre of Mannar is located on Mannar Island off the north-west coast of Sri Lanka. The area of the island is approximately 128 km ² . The land area of the island is almost entirely flat, without no distinct drainage patterns. The highest elevation of the island is 4.2 m above mean sea level		Mannar is situated in an area of calcareous sedimentary rocks which contain some significant limestone, aquifers. The sedimentary zone extends northwards and several sub-basins, one of which is the Murunkan basin and all sediments thicken seawards and thin out inland against the hard rocks of the mainland. In the Mannar-Murunkan area the limestones, which appear to be partly karstified, are covered largely by Quaternary sands and clays, and on Mannar Island many meters thickness of aeolian dune sands.
Hydro-geology of the Mannar island is thereby based on the clear water collection at the sand dunes.	People mostly depend on the shallow dug wells or locally made hand pump wells installed at the sand aquifers. Saline intrusion is reported especially dry periods and some aquifers have totally been polluted with saline water by over extractions	
Only available pipe scheme within the project area (25 GND's in Mannar DS division) is Mannar integrated water supply system which integrates Vankalai, Thirukathikeshwaram and Mannar town pipe water supply schemes.		Table Summary details of Mannar Integrated WSS

Current critical issues at Mannar WSS:

178. The serious issue is the gravity transmission from Murunkan to Mannar where 23 Km long. The main feeds both Vankalai and Thirukathikeshwaram water system in between Murunkan and Mannar. There are two main problems with the gravity main. One issue is unsuitable design with type 400 pipe, causing frequent pipe bursts, bursts are reported in the main due to its unsuitability to stand even in marshy terrains. The second issue is with bottlenecks in the pipe line due to small diameter ductile iron pipes being used for causeway and bridge crossings. This reduction of diameters has resulted in the reduction of flows in the gravity main. Hence the Murunkan pumps have to be curtailed on average to 6 hrs per

day due to backing up of flows due to the transmission system not being able to transfer the pumped flows.

179. Replacement of the gravity main is a priority need to be able to access the existing and improved production at Murunkan.

7.1.5 Rural

A. Water Supply in Pahala Puliankulama

180. Pahala Puliyankulama GND is situated in Karuwalagasweva DS division of Puttalam district. It was a settlement under the “ Neelabemma” irrigation settlement project and the farmer families were settled in year 1995 onwards.

181. There are undulations in the ground profile of the settlement area and the ground slopes towards Yoda Ela irrigation canal. Thereby the water table varies from 2m to 8m depending upon the ground profile and the overburden soil type. The water table fluctuation is very rapid with the monsoonal pattern of the higher land, but the wells in the low area along the canal has a correlation with the water levels of the canal

182. There are several surface water sources in close proximity to the area namely, Kala Oya, Yoda Ela, Kadawatha Wewa, Ottupallama Wewa, Gammirigaswewa, Mal Wewa, Palugaha Wewa and Pahala Puliyankulama Mahawewa and Dambu wewa. Most People use the river for bathing and washing purposes. The tank water is being mainly used for irrigation purposes.

183. There are 03 tube wells and 06 public wells (4 protected and 2 unprotected) scattered in the entire GND. Due to bad the odour and the offensive taste of the water only 2 wells are being used for drinking purposes at present. In addition 7 protected private wells and 4 unprotected private wells are also in use.

184. The Protected public well near Pahala Puliyankulama tank and private unprotected well near Neelabemma are the two wells that are mostly used for domestic water. There is a mini piped scheme constructed by the School Development Society to supply drinking water to 150 students in Pahala Puliyankulama school, using as the source the protected shallow well near Phala Puliyankulama village center. This well also runs dry during the dry season. In addition to the school children nearly 158 families use this well as the domestic water source during the wet period, but during the dry spell their water fetching distance is nearly 2 Km.

185. The other well is situated close to Sirithunga’s land near Neela Bemma, it provides water for quite a large number of families (around 100), although the quality of the water is not satisfactory it does not go dry.

186. The people carry water to their houses either on foot or by Bicycle or use other modes of transport. As a whole, the majority of the settlers face serous problems in their domestic water supplies though the GND is surrounded by ample surface water sources.

B. Water Supply in Cheddikulam Area

187. Cheddikulam small town is situated along the Medawchchiya – Mannar road and within the DS division of Cheddikulam in Vavuniya district. The 4 GND’s within the project area are fairly flat in topography, with a mild slope towards the east.

188. Geologically the study area belongs to the Wannu Complex group of Precambrian metamorphic rocks. The topography is exhibited as generally flat terrain with faintly developed ridge and valley landforms. North – South directed major and minor strike lineaments and East- West directed minor fracture systems were observed in the Cheddikulam and surrounding areas. The main rock types in the project area are identified as granitic gneiss, layered biotitic gneiss and quartzite. The topsoil consists of fine sand and clay. The overburden can be identified as major three groups. The first layer is mainly composed of fine sand formations with silt and clay and the second layer is gravel and sand mix clay, the third layer is weathered rock. The thickness of the overburden varies from place to place, generally it lies between 12.0 m - 25.0 m.

189. The ground water level of the area is about 3.0 m – 6.0 m below the ground surface. Ground water aquifers are recharged from the rainfall and surface water sources of the area. The storage and recharge capacities of the deep ground water aquifers of the project area are satisfactory for use.

(1) Existing Ground Water Sources

190. Hand-pump tube wells and dug wells are the main drinking water sources of the area. According to the information gathered during the study period it has been noted that there are about 350 water sources within the sub-project area (04 GND's), used as the available water sources for them, regardless of the quantity and quality problems within them. Out of 350, 270 are protected water sources and only 84 are unprotected. Protected wells and hand-pumped tube wells are considered as protected water sources. The following table indicates the summary of those water sources.

Available GW sources in the project area

Drinking water sources	Cheddikulam GND	Muhanthankulam GND	Madurankulam GND	Kangankulam GND	Total
Protected dug well	11	82	117	27	237
Unprotected dug well	18	18	32	12	80
HPTW	11	7	13	2	33
	40	107	162	41	350

191. The water is sufficient at those sources only from October to January during the North East Monsoonal period. Reduction of yield of the water sources starts then and the situation becomes worse in July, August and September. During this period the people in the area have very little water available for domestic use. Most breakdowns are reported on the hand-pumped tube wells in June, July and August, due to overuse. Colour, taste and odour changes in these months and many people can be found around the wells during these three months.

(2) Surface Water sources

192. There are large and small tanks in the area, noted in table below.

Number of Surface Water Sources at the Project Area

Water sources	Cheddikulam	Muhanthankulam	Madurankulam	Kangankulam	Total
Tank	1	1	1	1	4

193. All most all the tanks completely run dry during the dry spell of the year in July to September and then start filling with the monsoonal rains by October onwards.

194. The following are the reported water quality problems in relation to the available water sources at present.

- Dental fluorosis is very common in the area.
- Renal failures have been identified in the areas near Cheddikulam namely Punewa,.
- Hardness of water is a very common quality problem in each and every well.
- In the rainy season a muddy taste occurs in the dug wells.

195. Similarly the quantities available for extraction are limited especially in the dry spells and in the shared water sources. Water sources mostly run dry in the dry season every year and this situation prevails for at least six months of the year.

C. Water Supply in Thodaveli Area

196. Thodaveli GND is situated in the Mannar Ds division in Mannar district and about 12 Km away from Mannar town towards Thalai-Mannar. The topographically of the project area is flat with very mild undulations.

197. Miocene limestones form the bedrock of Mannar Island, it is the basic geology but here it is overlain by a succession of Pleistocene and Recent deposits. These include aeolian and alluvial sands, some cemented to form beach rock, with some with finer grained lagoonal deposits and gravels. The maximum thickness of these strata is about 20m, but the average encountered according to the drilling logs examined was about 10m

198. There are no natural rivers, irrigation tanks or ponds in close proximity to Thodaveli GND other than a lagoon about 4 km distance

199. Before 2000 the entire community of Thodaveli GND contained 82 families and 50% of the families had their own shallow dug wells or shared with others. In year 2000, about 300 displaced families from Manthal DS division were resettled in Joseph vas Nagar (premises belonging to the church) in Thodaveli and another 11 common dug wells were constructed. This was to meet the immediate need of water supply to those displaced families. Over time nearly 80% of that 300 resettled families have constructed their own shallow tube wells (230 in number) in the sandy formation for drinking purposes. Since the resettlement was on temporary basis at the beginning, the plots of land allocated was small, around 5 to 6 perches and temporary houses were built, of a compact nature, the situation has not changed. Besides some of them have constructed pit latrines on the same small plots of lands and thereby problems have started with extraction of uncontrolled quantities of water from a limited aquifer belt, made of a shallow ground water lens, abstraction has been continuous for the last 7 years.

200. Some of the problems with domestic water as at present and the difficulties with user communities are follows.

- The 41 individual shallow dug wells used by the original dwellers of the village have gradually fallen out of use due to dis-colouration and the offensive odour of water. Only 11 wells are satisfactory for use by the communities at present and the people express fear of contamination of the remaining wells in the near future.
- Out of the 11 common shallow dug wells constructed in Joseph Vas Nagar, after year 2000, during the resettlement, only 05 are being used at present and only

used for bathing purposes. Other wells were abandoned due to the same water quality reasons as in the village of Thodaveli.

- Water extracted from some tube wells is also contaminated with underground sediment, and thereby suffering discolouration and offensive odour, the water is not suitable for drinking.
- The wells that are being used at present also run dry during the dry season, due to over abstraction.

7.2 Sanitation

7.2.1 Chilaw

201. There are no public sewers or wastewater treatment facilities in the town, but the District General Hospital collects its foul wastewater in two underground chambers within the hospital grounds and pumps the wastewater a distance of around 750 m to a small pond system located between the railway line and the shore of the lagoon. The effluent from these ponds flows directly into the lagoon adjacent to the outfall from the main storm water drainage channel (the Malaria Drain) at a point south of the central commercial area of town.

202. The Hospital Ponds comprise one large pond that has been partitioned into two ponds separated by a stone-built wall. Each pond measures approximately 25 m by 45 m, but their depths are not known. The ponds operate in series, the wastewater being pumped directly into the primary pond and then flowing through a gateway in the partition wall into the secondary pond. The effluent from the secondary pond discharges by gravity to the shore of the lagoon.

203. The hospital operates and maintains the wastewater pumping station, but the ponds show no signs of being maintained or monitored. There is little evidence left of the original fence around the ponds and they are readily accessible to the public. The earth embankments of the ponds are not in good condition, with abundant weed and shrub growth and with signs of animal burrows. There are also indications that the effluent from the secondary pond is seeping through the external embankment slope. There are no records of wastewater flows or of wastewater influent or effluent quality.

204. The most common on-site technology in the town is pour flush latrines connected to either a soakage pit or a septic tank. It is reported that some pit latrines still exist in the town, but none of these was found during field inspections. The Urban Council will not issue a Building Permit unless there is provision for adequate sanitation in the building plans. Thus, any dwellings in the town that don't have a toilet are considered by the UC to be illegal.

205. There are two main problems associated with the sanitation situation in the town. The first is due to the soil conditions. It is reported that during the dry season, most soakage pits function satisfactorily in the predominantly sandy soils. However, during the wet season, the water table rises and the soakage pits cease to function properly. The same difficulty also affects the drainage of effluent from septic tanks. The second problem concerns the emptying of pits and tanks. Because the Urban Council does not own a gully bowser and there are no private tankers in the town, emptying and disposal of the contents of pits and tanks has to be done manually. This is carried out either by the Council scavengers or by private labourers. When larger, institutional septic tanks need to be emptied, it is reported that a gully bowser is hired from Puttalam Urban Council.

206. As elsewhere in Sri Lanka, disposal of sullage from premises, including both domestic and institutional buildings, follows the commonly accepted practice of discharging directly to the street drains. The non-functioning of soakage pits and the difficulties in

emptying pits and tanks also sometimes result in the overflowing of foul water into the storm water road drains, particularly during the rainy season.

207. Four communal toilet blocks were constructed under the ADB-financed Urban Development Low Income Housing Project (UDLIHP) around the year 2002. These facilities are under the ownership of the Urban Council, but their operation and maintenance has been outsourced to the private sector. Annual tenders are prepared by the UC for each block and bidders submit a price for the opportunity to operate and maintain the block and to collect a charge, usually 5 Rs per visit, from users. The UC receives annual income from the outsourcing, whilst placing the responsibility for the maintenance of the blocks with the private sector. In practice, the system results in a poor standard of facilities being offered to the public.

208. Very little maintenance of the toilet blocks is undertaken by the private operators and few checks are carried out by the UC. The design of the blocks could have been improved and better site selection might have improved their sustainability. A brief description of each of the public toilet blocks is given below.

A. Central Transport Board (CTB) Bus Stand

209. This toilet block is located close to the centre of the town in a corner of the government bus stand to provide a facility for travellers.

210. The facilities comprise individual sections for males and females, separated by an office for the attendant. In the female section there are three toilet cubicles and a wash basin and in the male section there are three toilets, three urinals and a wash basin. There is an overhead water storage tank to provide continuity of supply and the wastewater is discharged to a septic tank and soakage pit. There is no electricity supply and, hence, no lighting.

211. The facilities are in very poor condition with no signs of any maintenance having been carried out. The conditions are very unhygienic and in the male section only one of the toilet cubicles is currently in use. Urine from the urinals in the male section is discharged directly into a street drain.

B. Private Bus Stand

212. This facility is located adjacent to the bus stand that is used for privately operated buses. It is situated very close to the CTB bus stand, on the opposite side of the Kurunegala Road.

213. The design of the block is similar to the block that has been provided at the CTB Bus Stand. Although it is not ideal, the facility has been maintained in much better condition. Electric lighting has been installed and it is open from 5 am until 7 pm.

214. This block is reported to be the most frequently used in town and it probably attracts customers away from the CTB facility. It is reported that the average daily income to the operator is around 2,000 LKR.

C. Corea Road

215. The design of this block is unlike the others in the town. It has only two female and two male toilet cubicles and a male urinal stall. Outside, there are four deep bathing basins. There is no electricity supply. The condition of the facilities is poor and there appears to have been no maintenance carried out for a long time.

216. The block is in a location in which there appears to be no demand for a public toilet. Consequently, it is rarely used. Because there is little income to be derived from it, the Council has let it to a private individual on a long term basis rather than on an annual basis. It would probably be better for the Council to close this facility, as it does not appear to be providing any service to the public.

D. Wadiya Road

217. Wadiya Road is the name of the road that runs northwards along the coastal strip from the Rest House at Chilaw Stage past the fishing communities to the fishermen's cemetery at the northern end of the strip. There is a disused public toilet at the northern end of the fishermen's dwellings that used to be made use of by the fishing community, but its condition has deteriorated to such an extent that it is no longer in use.

218. A new toilet block was constructed under the ADB project to serve the low income fishing community. It was not built in a location that is central for those residents, but in a position that is some distance from them, closer to the Rest House end of Wadiya Road. The consequence is that it is not often used by its intended target group.

219. The condition of the facilities in the toilet block is not good. During one of the field visits, preparations were underway for a week-long religious festival that was about to take place, with an associated amusement park on the shorefront. In anticipation of additional income, the operator had improved the facilities and had installed temporary shower arrangements on the outside of the block.

7.2.2 Puttalam

220. There are no piped sewers or wastewater treatment facilities in the town,

221. It is reported that a few residential dwellings on the fringes of the town have VIP latrines and that there are also some pit latrines in the IDP camps that are located in the areas surrounding the town. Within the town, in common with most other urban centres in Sri Lanka, the almost universal on-site sanitation technology is the pour flush latrine. In individual dwellings, disposal of toilet wastewater is by means of a soakage pit, while larger office buildings and institutional buildings, such as schools, use septic tanks and soakage pits.

222. Because there is no piped sewerage system in the town, all grey water is discharged into surface water drains, either into the stone built drains in the central areas of town or into the shallow earth road drains in the outer residential areas. On some of the plots in the outer areas, sullage is disposed of within the plot.

223. Foul wastewater from the Base Hospital is disposed of in septic tanks and soakage pits, whilst the grey water is discharged directly to surface water drains.

224. The soil conditions in Puttalam are silty sands that have limited permeability. In addition, in the wet season in particular, the water table is high and soakage pits cannot dispose of the wastewater effectively. This sometimes results in the overflow of wastewater to street drains.

225. Chilaw Urban Council owns one gully bowser for the emptying of septic tanks and soakage pits. It has a capacity of four cubic metres and was purchased in 2001. For plots within the town limits, the UC makes a charge of Rs 1,725 per load. Outside the town limits, for example if it travels to Chilaw, there is an additional mileage charge per kilometre.

Religious organisations are not charged and “poor people” pay a reduced fee. The septage that is collected from the pits and tanks is disposed of by discharging directly on the ground surface on private coconut plantations.

226. There are three public toilet blocks in the town that were constructed around 2000 under an ADB funded project. They are located at the bus stand, the Fish Market and the main supermarket. The designs are similar, with separate facilities for male and female users and an attendant’s office and store. Water is supplied from an overhead water storage tank and the wastewater is discharged into a septic tank and soakage pit. There is no electrical lighting and there are no bathing facilities.

227. In the block adjacent to the bus stand there is a problem with the disposal of wastewater and the effluent from the soakage pit is flowing directly into an open street drain. This block is quite a large facility, with ten toilet cubicles in both the male and female sections.

228. The block at the Fish Market has been well designed and is maintained in good condition. There are five toilet cubicles in both the male and female sections with wash basins for hand washing. The walls are tiled and the facility is clean and hygienic. There are no odour problems and there do not appear to be problems with the disposal of wastewater. The outstanding problem is that there is currently no water supply to the wash hand basins. The reason for this could not be ascertained.

229. Maintenance and operation of the toilet blocks has been outsourced by the UC to the private sector on the basis of annual tenders. The successful tenderer pays a monthly fee to the UC and, in return for carrying out the maintenance, retains the user charge of Rs 5 per visit. Maintenance of the toilet blocks is generally poor and it has been reported by the Chairman to the UC that the Council is considering discontinuing the private leasing arrangement.

7.2.3 Vavuniya

230. There are no public sewers or wastewater treatment facilities in the town.

231. There are a number of septic tanks and soakage pits serving various buildings within the General Hospital grounds. Not all of these are working properly and some sullage is discharged to Vavuniya Tank via a storm water drain. Because of the ineffectiveness of the septic tank and soakage pit systems, a VUC gulley bowser has to visit the hospital at least twice every week for the emptying of pits/tanks. The bowser discharges the septage adjacent to the municipal solid waste disposal tip along Mannar Road. Once the water supply system to the hospital is improved, the problems of wastewater disposal in the hospital will become considerably worse.

232. In 2005, a proposal was submitted to UNICEF for the funding of a number of items to improve the environment of the hospital. The request was rejected. Recently, a revised proposal for the construction of a wastewater treatment facility was submitted to UNICEF for their consideration. It is reported that the funding has now been approved.

233. Few details of the UNICEF-funded scheme are available, but the information collected so far indicates that the project will include modification of the hospital’s wastewater collection system to by-pass the existing septic tanks and to provide treatment in a system of constructed wetlands within the hospital grounds. Effluent from the wetlands will discharge into the paddy field area downstream of the Vavuniya Tank that lies behind the hospital. No other details are currently available as the design has not yet been completed.

Discussions with UNICEF indicated that the scheme might be implemented during 2008, but that this is not certain.

234. Because there is no piped sewerage system in the town, all buildings, including commercial premises, government buildings and institutions, and residential dwellings, use some method of on-site sanitation for the disposal of foul wastewater.

235. The town storm-water drainage was designed to discharge directly into the Vavuniya Tank. Because of the increasing population and the quantity and nature of the sullage, this raised environmental concerns regarding the negative impact on the quality of the water in the Tank. As part of a USAID project in 1998, a set of waste stabilisation ponds was built between the Bazaar area and the edge of the Tank to provide a degree of treatment to the sullage before it entered the tank reservoir. The inlet to the ponds is designed so that the dry weather flow in the Main Drain is channelled into the ponds, but that during wet weather when the flow in the drain is large and there is high dilution of the sullage, it is diverted directly to the Tank.

236. It is reported that a few residential dwellings on the outskirts of the town have VIP latrines, but the most common sanitation technology is the pour flush toilet connected to either a septic tank or directly to a soakage pit. Almost all of the residential dwellings have pour flush latrines connected directly to an individual soakage pit, but in most of the larger buildings, such as schools, government offices and institutions, and the hospital, the foul wastewater is collected in septic tanks and discharged to soakage pits.

237. The soils in the area are generally silty/sandy soils overlying weathered rock. Generally, the soils appear to be sufficiently permeable to accept the small volumes of pour flush water from individual dwellings, except in the rainy season when the water table rises and some soakage pits are reported to overflow. The main concern with soakage pits in individual dwellings is the possibility of contamination of the water in the individual shallow wells that have been dug on most residential plots. The use of individual shallow wells should decrease once the town's water supply is improved.

238. VUC owns two gully bowsers for the emptying of septic tanks and soakage pits. One was purchased by the Council in 2003 and the second one was donated to the Council by ADB in 2007. VUC charges Rs 2,645 per load and the septage is taken to the solid waste dumping ground 13 km outside town on the Mannar Road for disposal in a large open pit. The area is forested and the dumping of the septage does not cause nuisance, although there is potential for pollution of the groundwater aquifers. There are no private gully bowsers operating in the town, but the disposal ground also serves the IDP Camps that are located outside the town.

239. Two public toilet blocks have been provided by VUC: one located at the central bus stand and one in the Bazaar area. Their condition is not good and they are in need of rehabilitation. of into the earth street drains or is disposed of within the plot.

7.2.4 Mannar

240. There are no public sewers or wastewater treatment facilities in the town. On site sanitation system is the available infrastructure. In UC limits about 329¹⁸ HH are without

¹⁸ Socio Economic Survey

satisfactory sanitation facility.

241. Because there is no piped sewerage system in the town, all grey water is discharged into surface water drains and all buildings, including commercial premises, government buildings and institutions, and residential dwellings, use some method of on-site sanitation for the disposal of foul wastewater.

242. It is reported that a few residential dwellings on the outskirts of the town have VIP latrines, but the most common sanitation technology is the pour flush toilet connected to either a septic tank or directly to a soakage pit. Most of the larger buildings, such as schools, government offices and institutions have septic tanks, but almost all dwellings have individual soakage pits.

7.2.5 Rural

A. Sanitation in Cheddikulam

General

243. Cheddikulam [GND-211A] is located in the western part of Vavuniya district and the population is 2037. It is a proposed small town RWSS scheme. The existing sanitation facilities are in the form of, on site latrines, constructed at a distance of 20-30 m away from permanent or temporary dwellings. The condition of the latrines and quality of the superstructure varies according to the status of households and also the availability of water for washing and flushing. Poor hygienic conditions of the latrines has been attributed to the shortage of water supply. The majority of existing latrines are constructed out of burnt clay bricks plastered with lime mortar. Common defects of the existing latrines, include damaged soakage pits and poor hygienic conditions.

244. Houses either have no water sealed latrines or have badly damaged latrine pits, they are generally classified as unsatisfactory sanitation facilities. The unsatisfactory sanitation in Cheddikulam is about 20% according to survey data. These unsatisfactory sanitation facilities should be improved to satisfactory conditions in accordance with the national policy, and national programmes of NWSDB.

Available facilities

245. The majority of available latrines are constructed according to the requirements of the households. The Vavuniya district has previously not been selected for inclusion in community based rural water supply and sanitation [RWSS] projects under the ADB assistance. The assessment of current service level is based purely on the socio-economic survey data and the summary is given below in the table below.

Available Sanitation Facilities & Indicators.

Type of facility	Number of HH	Percentage
Direct Pit latrine/ Temporary latrine	45	9.3%
Water Sealed and- Commode	378	78%
Bucket	0	0
Communal	5	1.1%
Open defecation	43	8.9%

246. The number of households without water sealed latrine facilities is ~ 20%, of which 8.9% are without latrines. In view of the above data ~20% of households in Cheddikulam have unsatisfactory sanitation facilities. About 64% of interviewees have responded

positively for better sanitation facility. The constraint confronted with the community in construction of latrines is the shortage of funds for investments.

B. Sanitation in Pahala Puliyankulama

General

247. Pahala Puliyankulama village is located in the southern part of the Puttalam district and the population is 768. It is a proposed village RWSS scheme. The existing sanitation facilities are in the form of, on plot latrines constructed at a distance of 20-30 m away from permanent or temporary dwellings. The condition of the latrine and the quality of superstructure varies according to the status of households and also the availability of water for washing and flushing. The majority of existing latrines are made out of mud or burnt clay bricks plastered with lime mortar. The temporary and semi-permanent houses in the GND amounts to 70 in number, about 28% of the total number of houses. Poor hygienic conditions are a common problem with the latrines belonging to the temporary houses. About 94% of existing water sealed latrines are in good condition.

248. Houses either have no water sealed latrines or have badly damaged latrine pits and are generally considered as unsatisfactory sanitation facilities. In Pahala Puliyankulama 43% of households fall into the category of unsatisfactory sanitation condition. These unsatisfactory sanitary facilities should be improved in accordance with the national policy and national programmes of NWSDB.

Available facilities

249. The majority of available latrines are constructed by the households according to preferred specifications. The Puttalam district has previously been selected for community based rural water supply and sanitation RWSS project under ADB assistance.

250. The service level assessment is based on the socio-economic survey data and the summary is given below.

Summary of Available Sanitation Facilities & Indicators.

Type of facility	Number of HH	Percentage
Direct Pit latrine	0	0
Water Sealed and/or Commode	148	57%
Bucket latrines	0	0
Communal	0	0
Open defecation	110	43%

251. The number of HH without latrine facilities is 43% and none have direct pit latrines. In view of the above data 43% of households in Pahala Puliyankulama have unsatisfactory sanitation facilities. About 96.4% of interviewees have responded positively for better sanitation facility. The constraint confronted with latrine construction is the shortage of funds with the community for investments, about 85% of households said that shortage of funds is the main constraint. See the table below of responses to the questionnaire.

	Description	Number of HH
1	Survey conducted	104
2	Willing to construct Toilet	96%
3	Unsatisfactory sanitation	43%

C. Sanitation in ThodaveliGeneral

252. Thodaveli GND is located on Mannar Island in the Mannar district and the population is 1862. It is a planned 'village' RWSS scheme and the majority of families were resettled in year 2002. The number of families in Thodaveli is 382. The existing sanitation facilities are in the form of, on plot latrines constructed at a distance of 20-30 m away from permanent or temporary dwellings. More than 50% of houses in the GND are temporary / semi permanent. The existing latrines are made out of burnt clay bricks plastered with lime mortar. The condition of the latrine and the quality of superstructure are unsatisfactory. There are 16 communal latrines and these are damaged badly. The latrine pits are damaged and septage is leaking. Proposals are in the pipeline to replace all communal latrines by individual latrines. Poor hygienic conditions are a common problem with the communal latrines and latrines belonging to temporary houses. In Thodaveli very few existing water sealed latrines are in good condition.

253. Houses either have no water sealed latrines or have badly damaged latrine pits and are generally considered as unsatisfactory sanitation facilities. In Thodaveli 47% has unsatisfactory sanitation. These unsatisfactory sanitary facilities shall be improved in accordance with the national policy and national programmes of NWSDB.

254. There are plans to construct 120 new pour flush latrines in Thodaveli to improve unsatisfactory sanitation. The NGO "Sarwodaya" plans to provide financial assistance for this scheme. However, this programme to improve on-site sanitation is not considered in our estimate because it may not go ahead.

255. Ground water contamination due to leaking septage and high permeable soil characteristics of soil are the main issues to be addressed in the proposed sanitation projects in Mannar island.

Available facilities

256. Most of available latrines were constructed with the assistance of NGOs. The Mannar district had previously not been selected for community based rural water supply and sanitation project under ADB assistance.

257. Assessment of the service level, is based on the socio-economic survey data and the summary is given in table below.

Summary of Available Sanitation Facilities & Indicators

Type of facility	Number of HH	Percentage
Direct Pit latrine or no latrines	180	47%
Water Sealed and/or Commode	108	28%
Bucket latrines	0	0
Communal	94	24%
Open defecation	n/a	n/a

258. About 47% of households in Thodaveli have unsatisfactory sanitation facilities. Most of the interviewees have responded positively for better sanitation facility. The constraint confronted with latrine construction is the shortage of funds available with the community.

8. Project Descriptions for recommended projects

8.1 Water Supply

8.1.1 Urban Water Supply

A. Chilaw

259. For Chilaw sub-project, two suitable options were considered, the difference being the location of proposed new treatment plant.

260. The supplementary surface water source of Deduruoya (river) has been selected, though several possible water sources in the project area were considered, with a possible optimal extraction rate of 20,000 m³/d. This is in addition to the development of the existing groundwater sources to take the capacity of the existing treatment works up to 6500 m³/d.

261. Considering the growth of population up to 92,730 in the designated five distribution zones (41 GND's) by year 2030, the design consumption has been computed as 15,859 m³/d.

262. In order to use the facilities effectively over time and avoiding unnecessary advance investment, phased proposals have been formulated. Basically the water treatment and associated pumps have been phased to suit the expansions with identical units after year 2022, but other elements were planned for the 2030 design requirements, with consideration being made for land constraints for duplications and expansions.

263. The Phase1 implementations are planned for the utilization of available ground-water sources up to possible extraction of 6500 m³/d and the incorporation of Deduru oya water source up to the treatment capacity of 9000m³/d, timed to suit the phased requirement.

264. Based on the least cost analysis, the sub-project for locating the new treatment plant along the Chilaw – Kurunegala main road, about 2 km away from the Punchivillatewa junction has been selected as the least cost option (Option 2).

265. The outline of the phased sub project is tabulated below. Preliminary designs are based on available topographic and demographic data. Quantities listed are subject to minor changes according to outcomes of further investigations and detailed land survey of the sub project areas. However the main components remain valid, but need further expansion and rectification during detailed analysis and design of the sub project.

Summary of Water Supply Sub Project (Including Water Resources)

Sub project	Components	Capacity / Quantity	Remarks
A. Chilaw Urban water supply sub-Project	1. Water resources development at Deduru oya	Intake capacity suit to optimum abstraction rate up to 20000 m ³ /d	Work includes construction of low level weir , R. C collecting intake gallery, channels for flow diversion, river bank protection & sediment removal system tank and construction of intake well
	2. Improvements to existing ground water sources	Construction of 07 replacement wells and replace BH pumps	Detailed investigations will follow to find the suitable adjoining locations to the existing wells
	3. Rehabilitation of existing treatment works at Chilaw (Munneshwaram)	Modifications to the existing aerators with reacting chambers as aerators cum up flow roughing filters,	This is to improve the effective removal of precipitated iron at the aeration

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Sub project	Components	Capacity / Quantity	Remarks
		replacement of filter sand at rapid filters and improvements to sludge removal	
	4. New treatment works (at proposed location under option 2)	Semi conventional treatment plant with phased production capacity of 9000 m3/d	To suit high turbidity variation. Consists of aerators, tube settlers with clarifiers, rapid filters and chlorinators
	5. Transmission mains, (raw water & treated water)	- HDPE- 16925 m (diameter 280 to 400 mm) DI - 13160m (diameter 300 to 400 mm)	Pumping main from intake to new TP and gravity main from new Bingiriya tower to existing TP and pumping to Bangadeniya new tower
	6. Storage Reservoirs	Ground reservoir- 500m3 Bingiriya tower- 900 m3 Bangadeniya Tower– 750m3	Ground reservoir at new TP site and other two towers at Bingiriya & Bangadeniya
	7. Distribution system (05 principle zones) <ul style="list-style-type: none"> • Distribution mains • Trunk mains • Replacement • Expansions • Rider mains 	- HDPE- 7350m (diameter 280 to 400 mm) DI – 7100 m (diameter 300 to 400 mm) uPVC– 11300 m (diameter 90 to 225 mm) uPVC– 23300 m (diameter 90 to 225 mm) uPVC– 61500 m (diameter 63 to 110 mm) uPVC– 23500 m (diameter 90 to 110 mm)	Main delivery pipes from head works Connecting to the local distribution zones Replace existing under size pipes Provisional quantities for local distribution expansions Mainly along the main roads
	8. Pumps for new head works	55 Kw, submersible - 02 29 Kw end suction - 02 15 Kw, end suction - 04 20 Kw VSD - 02	Intake pumps High lift, TP to Bingiriya High lift from existing TP to UC tower & Bangadeniya new tower Replacement of pumps to town zone

B. Puttalam

266. For Puttalam sub-project, only one suitable option was available, due to constraints in available water sources. For the phasing of the water resource options it was necessary to consider when the selected supplementary surface water sources (Inginimitiya irrigation tank) might be ready to provide additional water for abstraction. It is assumed to be available from year 2020 onwards, this is with the concurrence of the Department of Irrigation. Hence the proposed supply area is also phased accordingly, to supply a total of 04 zones (24 GND's) from 07 Zones (49 GND's) to suit the phased production.

267. The Phase1 implementations are planned with the utilization of available groundwater resources up to possible extraction of 8500 m3/d and the incorporation of Kala

Oya water source up to the treatment facility of 9000m³/d, timed to suit the phased consumption requirement.

268. The outline of the phased sub project is tabulated below. Preliminary conceptual designs are based on available topographic and demographic data. Quantities listed are subject to minor changes according to the outcome of further investigations and detailed land survey of the sub project areas. However the main components remain valid but need further expansion and rectification during future analysis and design of the sub project.

Summary of Water Supply Sub Project (Including Water Resources)

Sub project	Components	Capacity / Quantity	Remarks
B. Puttalam Urban water supply sub-Project	1. Water resources development at Kala Oya including rehabilitation/ restoration of two minor tanks to facilitate buffer storage at drought	Intake capacity suit to optimum abstraction rate of 15000 m ³ /d	Work includes restoration of Achchamolai tank and diversion Kala Oya river flow, rehabilitation and improve storage of Eluwankulama tank and construction of intake well
	2. Rehabilitation of existing treatment works at Puttalam	Rehabilitation of filter units to treat 6500 m ³ /d capacity GW from UNICEF new wells and old deep wells (dilution will also be done at the plant with mixing hard GW with treated surface water)	In addition to this 2000 m ³ /d capacity treatment facility available at Manthivu for UNICEF new wells
	3. New treatment works at Eluwankulama,	Semi conventional treatment plant with phased production capacity of 9000 m ³ /d	Consists of aerators, tube settlers with clarifiers, rapid filters and chlorinators
	4. Transmission mains, (raw water & treated water)	-HDPE- 22060 m (diameter 355 to 450 mm) DI - 19615m (diameter 300 to 400 mm)	Pumping main from new TP to existing TP and to new tower
	5. Storage Reservoirs	Ground reservoir-2000 m ³ Elevated tower- 1500 m ³	At new TP site and Kaladiya
	6. Distribution system (04 principle zones)	-	
	<ul style="list-style-type: none"> • Distribution mains 	HDPE- 8200m (diameter 280 to 400 mm) DI – 11750 m (diameter 200 to 400 mm)	Main delivery pipes from head works
	<ul style="list-style-type: none"> • Trunk mains 	HDPE- 4600m (diameter 280 to 355 mm) uPVC – 11750 m (diameter 110 to 225 mm)	Connecting to the local distribution zones
	<ul style="list-style-type: none"> • Replacement 	uPVC – 7750 m (diameter 90 to 110 mm)	Replace existing under size pipes
	<ul style="list-style-type: none"> • Expansions 	uPVC – 27500 m (diameter 63 to 110 mm)	Provisional quantities for local distribution expansions
	<ul style="list-style-type: none"> • Rider mains 	uPVC – 29000 m (diameter 90 to 110 mm)	Mainly along the main roads

Sub project	Components	Capacity / Quantity	Remarks
	7. Pumps for new head works	High lift New TP -160 KW High lift to new tower-65KW	Submersible Split casing

C. Vavuniya

269. For the Vavuniya sub-project, two options have been considered for the water resources for Vavuniya, the Per Aru impounding water source option has been selected as the least cost option for augmenting the Vavuniya water supply scheme. As the impounding reservoir has the optimum utilisation capacity of 12000 m³/d extraction (excluding losses) the proposed project is the Phase 1 development, allowing future expansions downstream of the river after 2022 to cater up to the 2030 design demand of approximately 20000 m³/d. However certain project components such as transmissions, storage, distribution mains etc should have the capacity to cater for the design demand under the proposed phased project investments.

270. The outline of the phased sub project is tabulated below. Preliminary conceptual designs are based on available topographic and demographic data. Quantities listed are subject to minor changes according to the outcome of further investigations and detailed land survey of the sub project areas. However the main components remain valid but need further expansion and rectification during future analysis and design of the sub project.

Proposed Project Components

Components	Capacity / Quantity	Remarks
1. Water resources development at Pera-arua impounding reservoir	Intake capacity suit to optimum abstraction rate up to 12000 m ³ /d. and the impounding reservoir has effective storage capacity of 3.78 MCM.	Work includes construction of earth dam, concrete spillway, outlet sluice, access roads and construction of R.C intake well with 5m diameter to suit 4m water depth.
2. Improvements to existing ground water sources	Construction of 06 new wells at a well field with BH pumps and replace existing BH pumps. The overall expected production around 3000 m ³ /d.	Detailed investigations will follow to find the suitable new wells and the new pumping mains will be laid to pump water to existing tower and the new tower at Moontrumoorippu GND.
3. New treatment works (at the adjoining land to the proposed impounding reservoir)	Conventional treatment plant with phased production capacity of 12000 m ³ /d. Treatment process have the elements of aerator, up flow clarifiers, rapid sand filters, activated carbon gallery and disinfection facility.	To suit high turbidity variation. At the river and provision for algae removal.
4. Transmission mains, (raw water & treated water)	DI - 18,450m (diameter 300 to 450 mm)	Pumping main from intake to new TP and pumping mains to Nelukulam ground sump and from there to 03 towers.
5. Storage Reservoirs	Ground reservoir- 500m ³ TP tower- 300 m ³ Nelukulam Tower- 1000m ³ Sump Nelukulam-2500 m ³ Moontrumoorippu tower-1500 m ³	These storages are in addition to the existing tower at town. The tower at new TP site to cater the local demands at the Shasthrikulam area where the impounding reservoir is planned to construct.
6. Distribution system (05 principle zones) Distribution mains	- U PVC- 9200m (diameter 110 to 225 mm)	Main delivery pipes from head works

Components	Capacity / Quantity	Remarks
Trunk mains	DI – 11450 m (diameter 200 to 400 mm)	Connecting to the local distribution zones Replace existing under size pipes Provisional quantities for local distribution expansions Mainly along the main roads
Replacement	uPVC– 16010 m (diameter 160 to 225 mm)	
Expansions	DI – 4800 m (diameter 200 to 300 mm)	
Rider mains	uPVC– 20600 m (diameter 90 to 160 mm)	
7. Pumps for new head works and replacement of existing BH pumps (all pumps operational and standby)	22 Kw, submersible -02 7 Kw, submersible -02 15 Kw, submersible -02 16 Kw, submersible -02 3.5 Kw end suction -02 20 Kw, end suction –02 64 Kw Split casing-02 27 Kw VSD - 02	Intake pumps BH pumps replacement BH pumps replacement BH pumps new wells High lift, TP to TP tower High lift for Nelukulam tower TP to Nelukulam sump Nelukulam sump to Moontrumoorippu tower

D. Mannar

271. For Mannar sub-project, there was only one option recommended for increased water resources, as there were no other acceptable sources available in the area the extension of the Murunkan wellfield is recommended.

272. The Mannar “Integrated” water supply system serves Mannar town scheme, Vankalai WSS and the Thiruketheeshwaram temple WSS. The 5 principle distribution zones would cater for the water demands in the 25 GND’s. The design demand is around 8000 m3/d at the year 2030 and the supply balance of about 5000 m3/d is proposed to be obtained through further development of Murunkan well field as the reliable option.

273. The following table summarises the proposed project components.

Proposed Project Components

Components	Capacity / Quantity	Remarks
1. Water resources development at Murunkan	Flushing and developing existing 04 BH's Construction of new 04 BH's (03 operational,01 standby)	This is to improve further additional extraction capacity of 5000 m3/d. Test drilling shall follow the safe yield analysis and quality testing to confirm
2. Transmission mains, (Gravity & pumping)	DI - 5750m (diameter 200 to 50 mm) HDPE – 27100m (diameter 280 to 450mm)	Covers gravity main from Murunkan to Mannar existing sump and new sump at Pallimunai and capacity improvements of branch main Vankalai. Also new pumping mains to Pallimunai and Eluthoor towers
3. Storage Reservoirs	Ground reservoir Pallimunai- 500m3 New tower Eluthoor - 900 m3	These storages are in addition to the existing tower at town, Murunkan,

Components	Capacity / Quantity	Remarks
4. Distribution system (05 principle zones) Distribution mains	- U PVC- 1800m (diameter 160 to 225 mm) HDPE – 8200 m (diameter 280 to 355 mm)	Thiruketheeshwaram and Vankalai. Main delivery pipes from head works
Trunk mains	uPVC– 12400 m (diameter 110 to 225 mm) HDPE – 3000 m (diameter 280)	Connecting to the local distribution zones
Expansions	uPVC– 58000 m (diameter 63 to 160 mm)	Provisional quantities for local distribution expansions
Rider mains	uPVC– 17000 m (diameter 90 to 110 mm)	Mainly along the main roads
5. Pumps for new head works and replacement of existing BH pumps (all pumps operational and standby)	4.5 Kw, submersible -03 4 Kw, submersible -04 1.5 Kw end suction -02 4.5 Kw, end suction –02 7.5 Kw, end suction –02 3.0 Kw, end suction –02	BH pumps replacement BH pumps new wells Vankalai tower Mannar tower Palamunai new sump to tower Mannar sump to Eluthoor tower

8.1.2 Rural Water Supplies

274. The following tables give the summary details of the proposed Rural sub-projects, these project items are not included within the overall project costs shown in Section 10.

A. Summary of Proposal for Pahala Puliyankulama Rural Water Supply

Technical Choice – Piped water supply	
Design Horizon	Year 2025
Per capita Consumption	105 l/day
Design Demand	191 m ³ /day
Water resources Requirement	201 m ³ /day
Water source	Neela Bemma Yoda Ela (Surface water canal)
Intake Details	Location: bank of the canal Type : Reinforced Concrete Direct Intake structure trapezoidal in shape with entry mouth & gate control. uPVC 160mm diameter Type 600 pipeline from Intake structure to the existing 4m diameter dug well located at the canal reservation. The existing well structure is solid but certain minor repairs and cleaning is needed.
Treatment works	Daily design output: 200 m ³ . Operation Time : 16 hrs (to suit village operations) Components Roughing Filter : 8m diameter 2m high filter bed The base of reinforced concrete and the circular walls with 50mm thick Ferro-cement Slow sand Filter : <ul style="list-style-type: none"> ➤ Filtration Rate: 0.15 to 0.2 m³/m²/ day ➤ Required Area of Filters: 83 m² ➤ Effective size of sand(ES): 0.35mm

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	Chlorination: Bleaching powder solution feed through a constant head feeder to the clear water sump Clear Water Sump ; Capacity :20 m ³ Type :Ferro-cement circular ground tank
Storage Reservoir	Capacity :60m ³ , Effective tower height : 10m Location : The State Land adjoining to the existing community hall
Raw Water pumping main	PVC Type 1000 pipes of 90mm diameter ; Length : about 1000m
Raw water pumps	The Pumping rate : 9 m ³ /hr. (2.5. l/sec) Effective pump head: of 25m. Details : Two identical pumps of 1.5 KW, single stage vertical delivery back pullout centrifugal type end suction pumps
Raw water Pump House	3m X 3m Brick structure Location : premises of the existing intake well site
Treated Water Pumping Main	Length : 2550m, Diameter : 90mm, Type : 1000 uPVC
Treated Water Pumps	Required head : 49.4 m , Rate of pumping : 8.5 m ³ /hr (2.36 l/s) Pump Details: 2 KW, horizontally mounted complete with drive motor on a common base plate, single stage vertical delivery back pullout centrifugal end suction pumps.
Treated Water pump house	15 m ² Reinforced base and the walls with brick structure
Distribution Network	uPVC type 600 ; Total length of pipes : 13270 m, Diameter range; 50 - 160mm

B. Summary of Proposal for Cheddikulam Rural Water Supply

Technical Choices – Piped water supply scheme and Point sources			
Design Horizon	Year 2025		
Mixed Option	Pipe scheme & individual dug wells (New & Rehabilitation)		
a) Proposed Pipe Scheme			
Per capita Consumption	90 lpd		
Design Demand	200.5 m ³ /day		
Water resources Requirement	235.9 m ³ /day		
Water source	3 Tube wells (Deep Ground water, one standby)		
Intake Details	Depth of wells : 70m (wells 1&2) Diameter of well: 180 -195mm (wells 1 & 2) Expecting Yield: 75-200 l/min (well 1), 100 – 250 l/min (well 2) Dynamic water level: 40-50 m b.g.l (well -1), 25 – 40 m b.g.l (2)		
Treatment works	Will be decided later in par with water quality		
Storage Reservoir	Capacity : 80m ³ , Height: 13m (Location : Gam Udava Premises)		
Borehole pumps & pumping main		Pump 1	Pump 2
	Length of pumping main m.	760	110
	Pumping rate l/sec	3.33	3.33
	Pumping Head m.	67.5	72.5
	Power KW	4	5
Distribution System	uPVC type 600 ; Total length 13160m.: Diameter : 50 – 160mm		
b) Proposed Point Sources			
New Shallow dug wells (depth about 9m & diameter 2.4 m)	142		
New Shallow dug wells (depth about 8m & diameter 2.4 m)	47		

C. Summary of Proposal for Thodaveli Rural Water Supply Scheme

Technical Choice – Piped water supply	
Design Horizon	Year 2025
Per capita Consumption	100 lpcd
Design Demand	360m ³ /day
Water Sources	Clear water lense at sand band (Shallow aquifer)
Intake Details	Renovate the abandoned well in Konnyankudiyiruppu and construct 02 nos of supporting wells (3m diameter and 6m deep each and connecting with 150 mm diameter uPVC lateral pipes.
Treatment works	constant head type chlorinator to feed chlorine solution into the intake well.
Storage Reservoir	Capacity : 80m ³ Effective height : 13.5m Circular Ferro-cement tanks
Raw Water pumping main	Diameter : 110mm, Type: UPVC type 1000 Total Length : 2800 km
Raw water pumps	High Lift Pumps, Power : 3KW Total Head: 37.5m, Pumping Rate: 15m ³ /hr
Distribution System	Pipe Type : UPVC type 6000 Diameter : 50mm -160mm (range) Total Length: 4780m

8.2 Sanitation**8.2.1 Urban Sanitation**

275. The outlines of the recommended sanitation sub projects are tabulated below. Preliminary designs of sub projects are based on available topographic and demographic data. Items and quantities listed are subjected to minor changes according to the outcome of further investigations and land survey of the sub projects areas. However the main components remain good but need further expansion and rectification during future analysis and detailed design of the sub project.

276. For three urban areas Mannar, Puttalam and Chilaw, a septage treatment facility and associated non sewerred sanitation assistance is the recommended sub project solution, due to the traditional sewerage option not being financially economic. Whereas for Vavuniya a conventional sewerage system and wastewater treatment plant, was assessed as financially economic and accordingly is the recommended sub project option.

A. Summary of Sanitation Sub Projects Chilaw - [Septage Treatment Facility]

Sub project	Components	Capacity / Quantity	Remarks
Chilaw Urban Non Sewered Sanitation	1. Septage disposal facilities –Sludge thickener, anaerobic ponds, sludge drying beds, wetland and site development.	- Capacity ~39m ³ /day - Size of septage - drying bed 2400 m ²	Earth structure with concrete lining and walls.
	2. Vacuum tankers 2 Nrs- [initially only one tanker shall be provided]	- Capacity =3000 lt - Capacity =1500 lt	Locally assembled

	3. Sanitation to GNDs benefiting from water supply from the water transmission mains but located outside UC limits	- Approximately 500 HH	Concrete squatting pan and soakage pit
	4. Rehabilitation of public latrines.	- 4 nrs	

B. Summary of Sanitation Sub Projects Puttalam - [Septage Treatment Facility]

Sub project	Components	Capacity / Quantity	Remarks
Puttalam Urban Non Sewered Sanitation	1. Septage -thickener, anaerobic ponds, sludge drying beds, wetland, outfall structure, and site development.	- Ultimate capacity DWF = 45 m3/d	RCC & Earth structure with concrete lining,
	2. Vacuum tanker	- Capacity = 3000 lt	Locally assembled
	3. Rehabilitation of public latrines.	- 3 nrs	
	4. Sanitation to GNDs benefiting from water supply from the water transmission mains but located outside UC limits	- Approximately 500 HH	Concrete squatting pan and soakage pit

C. Summary of Sanitation Sub Projects – Vavuniya [Sewered Sanitation and Treatment]

Sub project	Components	Capacity / Quantity	Remarks
Vavuniya Urban Sewered Sanitation	1. Stabilization ponds, outfall structure, and site development.	- Ultimate capacity DWF= 765 m3/d - Design retention period 24 days -	Earth structure with concrete lining,
Excluding-Kurumankadu	2. Submersible pumping stations, site development and electro mechanical equipment.	- One PS of Wet well diameter = 5m & liquid depth = 4m - Pump capacity 60 l/sc.	RCC structure
	3. Main sewers and manholes of average diameter 1300mm	- Length = 5.4km, Diameter vary from 350 mm to 150mm	VC
	4. Rider mains and secondary sewers	- Length = 6.51km diameter 225mm to 150mm	VC
	5. Pumping main	- Length = 3.00km Bore 250mm	HDPE
	6. Vacuum tanker	- Capacity =3000 lt	Locally assembled
	7. Rehabilitation of existing storm water stabilization ponds	- 3 ponds approximate sizes, 30m x15m x 1.5m	Earth structure and inlet works
	8. Rehabilitation of public latrines	- 2 Nrs	
	9. Sanitation to GNDs benefiting from water supply from the water transmission mains but located outside UC limits	- Approximately 500 HH	Concrete squatting pan and soakage pit

D. Summary of Sanitation Sub Projects Mannar - [Septage Treatment Facility]

Sub project	Components	Capacity / Quantity	Remarks
Mannar Urban Non Sewered Sanitation	1. Septage -thickener, anaerobic ponds, sludge drying beds, wetland, outfall structure, and site development.	- Ultimate capacity DWF = 28 m3/d	RCC & Earth structure with concrete lining,
	2. Vacuum tanker 1 No	- Capacity = 3000 lt	Locally assembled
	3. Rehabilitation of public latrines.	- 4 nrs	
	4. Sanitation to GNDs benefiting from water supply from the water transmission mains but located outside UC limits	- Approximately 329 HH	Concrete squatting pan and soakage pit

8.2.2 Rural Sanitation

277. Pollution of the environment¹⁹ and health hazards are the main issues connected with unsatisfactory sanitation systems, both in Urban and in rural areas. The improvement of rural sanitation system is required, not only to overcome the sanitation issues but also to achieve the targets of the national programmes and the NWSDB Corporate Plan targets.

278. The proposed rural sanitation package, consists of contribution to the provision of latrines to all the qualifying households in the villages. The funding criteria adopted are, the availability of adequate water supply, demand for improved sanitation system and willingness to construct own latrine.

279. Recommended sanitation technology for the rural sanitation schemes is the construction of Pour Flush Latrines (PFL) toilets.

A. Cheddikulam

280. Proposed rural sanitation package consist of –

1. PFLs to 98 households in the community in Cheddikulam. It is approximately 20% of the families in the GND.
2. Training of relevant staff of Vavuniya ULAs on safe disposal methods of sewage/ septage.

B. Pahala Puliyankulama

¹⁹ Project proposal for Sanitation and Hygiene Education Vavuniya– by PO –Peoples Development Foundation[PDF]

281. Proposed rural sanitation package consist of –

1. PFLs to 110 households in the community in Pahala Puliyankulama. It is approximately 43% of the families in the GND.
2. Training of relevant staff of Puttalam & Chilaw ULAs on safe disposal methods of sewage / septage.

C. Thodaveli

282. Proposed rural sanitation package consist of –

1. PFLs for 180 households of the community in Thodaveli. It is approximately 47% of the families in the GND.
2. Training of relevant staff of Mannar ULAs on safe disposal methods of sewage/ septage.

9. Outline Implementation and Procurement Principles and Arrangements

9.1 Overall Project Implementation Arrangements

283. The National Water Supply and Drainage Board under the Ministry of Water Supply and Drainage shall be the Executing Agency (EA) of the Project. With two project implementation units (PIUs) at the local level in Chilaw and Vavuniya. A Project Coordinating Unit (PCU) will be established to provide support to the EA at the head office level. Project Support Implementing Units (PSIUs) will also be established for the rural schemes if they obtain funding and proceed. Guidance and policy direction will be provided by the National Steering Committee, which shall be chaired by the Secretary of the MWSD. Complimentary coordinating committees will be established at the provincial, district, and village levels.

284. The two PIUs in the Districts shall be established in lieu of a Project Management Unit in the Head Office, to be closer to the project sites for better coordination and expediency in implementation. The set up, will also enable the effective transfer of technology and capacity building of field staff, who will later on be tasked to operate and maintain the completed systems. It is proposed that a PIU shall be established in Chilaw to cover Puttalam and Chilaw and in Vavuniya for both Vavuniya and Mannar. The PIU shall be headed by a Project Implementing Unit Head who will work closely with the small PCU at the Head Office and shall report directly to the Assistant General Manager for Development . The PIUs shall be supported by Project Management consultants who will be engaged to assist the PMU during the initial years of project implementation.

285. It is envisaged that functions, that are currently heavily centralized with the top management level of the NWSDB and in the ministries, such as the Ministry of Finance, will be delegated to the PIUs to lessen the unnecessary layers of approval and thus facilitate project implementation. These functions include the recruitment and hiring of all positions other than the Project Director, Assistant Project Director and PIU heads, these are proposed to be handled by PCU. All procurement and related activities shall be undertaken by the PIUs. The payment processing, which starts with the voucher preparation shall continue to be carried out at the head office by the PCU. It has been the experience in other similar ADB projects that delays in project implementation are often caused by the lack of authority of the PIU to recruit staff and the rather centralized procurement procedures used by the head office.

286. The PCU at the Head Office should be a lean unit with only 2 or 3 staff, at the most, to liaise and coordinate with ADB, particularly on issues relating to project financial management. The PCU shall be staffed by an Accountant, a Project Engineer and a support staff member.

287. Project Support Implementing Units (PSIUs) - PSIUs shall be established at the pradeshiya sabha to provide coordination and technical support in the implementation of rural water supply schemes. At the start of project design, the CBOs will be established and representatives of the CBOs should be involved in project implementation and will be seconded to the PSIUs. At least 2 representatives from the CBO of each village shall to be trained on technical aspects and on financial and general management of a rural water supply scheme. They will need to be committed as counterpart staff to the project, to work on a part-time basis, at least 50% of the time. The objective is to provide them with an understanding of the project and to train them “on the job” for the eventual operation and maintenance of the system. They will be assigned specific tasks on the task needed, so that they can also contribute to project implementation and learn by training on the job.

9.2 Implementation

9.2.1 Rural Water supply

288. In principle, rural water supply should meet with the National Rural water supply policy of Sri Lanka, according to which, the beneficiary community has to play a vital role during the project planning, implementation and O&M stages. The beneficiary community groups shall be organized as a legalized body called the ‘Community Based Organization’ (CBO).

289. The whole project planning and implementation process is demand responsive and the beneficiary contribution could be either in cash, labour or both, depending upon the necessity. The community share varies according to the technology choice and the CBO can decide the contributory scenarios to suit the beneficiary preferences and the affordability.

290. However, the project should make additional contribution to the project if the water sources are at a long distance from the village and involve long transmission mains. Without additional allocation the community share would be unaffordable. On the other hand, if the water sources have serious quality problems with their natural ground morphology and would involve additional water treatment, with associated high costs, then the project should bear the whole of the additional cost if the source option is feasible and no other alternatives are available.

291. The following sections indicate the basic principles to be followed and the proposed mechanism for implementation with sharing of responsibilities.

A. CBO as a Main Implementing Body

292. This rural sub-project has been planned to be implemented through the participation of the community by forming a community based organization (CBO) in their locality. These CBOs would represent all the communities and be registered under the Divisional Secretary, so that it would have legal validity.

293. Working through a CBO is more effective than working directly with individuals or specific interest groups, since by forming a CBO their efforts and thoughts are concentrated towards a common goal of the effective implementation of the project.

294. This CBO will be the responsible body for implementing overall project activities, financial management etc and finally responsible for O&M of the system. The CBO is integral to the success of the rural sub-project due to the following:

- It is important to build a powerful and vibrant organization through a well developed constitution, transparent financial management in the CBO needs to be developed by using a proper financial reporting system.
- For the implementation of this project, it is a necessity to have capacity building programmes for the communities, which will provide necessary attitude improvements, knowledge, training and skills to the community, to facilitate them for better construction management.
- In addition, on going evaluation and specialized guidance are to be provided, for smooth implementation of the project. In this respect it shall be done through a panel of consultants who are highly educated in socio economic, technical and financial fields.
- A Partner Organization (PO) would guide, give technical advice and liaise between the community and the Institutions and would push the CBO towards achieving the targets. The PO for the project is likely to be handling several other sub-projects, but should keep in close liaison with the CBO during the construction phase for helping to solve their day to day technical and other related management problems. Qualified technical officers in field of water supply field should be attached to the PO's. Despite the shortage of personnel in the Districts at present, he or she must be totally responsible for the quality of the construction and the end product.

B. Responsibility Matrix

295. The following table indicates the suggested division of responsibilities among the implementation parties to make the sub-project a success. Further negotiations and development of proposals are needed to be carried out during the project pre-implementation phase to improve and finalize the matrix for the final implementation of the sub-projects.

Activity/ components	Implementation Mode	Direct Responsibility	Assistance/ Facilitation
Planning & Designs <ul style="list-style-type: none"> • Final Community action Plan • Further detailed investigation • Final approvals of water resources • Detailed Designs & drawings • Finalizing estimation & budget 	CBO/PO Contractors/CBO/PO CBO/PO PO/ Consultants PO/ Consultants	CBO PIU CBO PIU CBO/PIU	Consultants/ resource personnel - do- PIU PMU
Construction <ul style="list-style-type: none"> ○ possession of lands ○ Resettlement & compensation issues ○ Liaison with line agencies for approvals ○ Construction training ○ Water resources improvements & intake structure ○ Treatment Plant ○ Pipe supply 	CBO CBO/PO CBO/PO/PIU PO/ Consultants CBO/Farmer Org: CBO/Contractors CBO/PIU	CBO CBO/PIU PO PIU/CBO CBO/PO CBO/PO/ PIU CBO/PIU	PO Consultants PMU Ext. training Inst Consultants/ID : Consultants -do-

<ul style="list-style-type: none"> ○ Pipe laying & testing ○ Other civil Constructions ○ Supply & installation of M&E equipment ○ Final commissioning 	<p>CBO/PO CBO/Contractors</p> <p>Suppliers/CBO</p> <p>CBO/PO</p>	<p>CBO CBO/PO/PIU</p> <p>PIU/CBO</p> <p>CBO/PIU</p>	<p>-do- -do-</p> <p>PO, consultants</p> <p>Consultants</p>
<p>Allied works</p> <ul style="list-style-type: none"> ● Community contribution ● Supply materials for house connections ● Giving connections ● Reinstatement of roads 	<p>CBO/PO</p> <p>CBO</p> <p>CBO CBO/PIU</p>	<p>CBO</p> <p>CBO</p> <p>CBO CBO/PIU</p>	<p>Consultants</p> <p>PO</p> <p>PO PO</p>
<p>Monitoring & Quality control</p> <ul style="list-style-type: none"> ➤ Regular supervision & testing ➤ Progress review ➤ As built drawings ➤ Preparation O&M manual ➤ Training on O&M 	<p>CBO/PO</p> <p>PO/PIU CBO/Contractors PO/Contractors</p> <p>PO/Consultants/Contractor</p>	<p>CBO/PO</p> <p>CBO/PIU PO/PIU PIU</p> <p>PIU/CBO</p>	<p>PIU/consultants</p> <p>Consultants Consultants</p>
<p>Affiliate with other sub-project programs</p>	<p>CBO/PO</p>	<p>CBO/PO</p>	<p>PIU/consultants</p>

Note: CBO – Community Based Organization
PO - Partner Organization
PIU - Project Implementation unit

9.2.2 Urban Water Supply

A. General Principles on Sub-Project Implementation

296. The urban water supply systems are comparatively large in respect to the area coverage and water serving population. The socio- economic behaviors in the urban areas are quite complex and the beneficiaries are difficult to gather together on common interests or welfare activities, even though they are applicable to the entire area. However unlike the rural areas, the Urban areas always prefer to obtain services on a commercial basis and pay for services at a competitive price. Hence the approach on urban water supplies shall be quite different to the rural context. Thereby the following key factors need to be considered at the formulation of implementation arrangements for the general population.

- (i) Participatory planning has limitations, but a quick random sample base information collection exercise needs to be arranged to ascertain the user perception at different localities of the project areas.
- (ii) Water supply development functions should not be a burden to their day to day life and they do not tolerate hardships as a result of development activities (eg damage to the property entrances)
- (iii) In the implementation process their contributions are difficult to obtain but they are wanting and expecting a better quality water and a better level of uninterrupted water service, at a reasonable cost.
- (iv) Expertise and capacities available within the urban communities need to be obtained by payment, even though the water supply development has direct benefits to them. However participatory models can be tried out at the outskirts of the towns, especially for the functions of pipe laying, water

resources development etc. If this is done it will create a sense of ownership, but due recognition needs to be given to them in all respects of the process

297. Considering all above facts, it is recommended that the implementation of the urban water supply projects is in the following manner

- Project Implementation Units shall be at district level, comprised of project management staff from NWSDB including a local Senior consulting engineer recruited to the unit as the advisor on planning design & implementation. However if the manpower resources are not available in a particular district (eg; Mannar) then out sourcing is recommended, giving priority to in-district recruitment.
- Where applicable, use of the local construction consortiums (design and construction) shall be considered in order to develop partnerships at the local level.
- In order to ensure a quality end product, it is suggested that a “quality assurance committees’ is appointed, both at the District level and the NWSDB, RSC levels. The Committee should undertake detailed periodical quality reviews. The district level committees should represent the authorized members from the beneficiaries covering all principle distribution zones
- At the RSC level, it is recommended that a Chief technical advisor, is appointed, to assist the district level consultancy staff and undertake an advisory role on overall contract management and quality control. There should be a office within the RSC for the Technical advisor and the staff and he/she should directly advise and guide the Project Director on overall contract management of the project both for the Urban and Rural water supplies.

298. The proposed implementation programme for the urban water supply schemes of the four towns are as follows

B. Sub-Project Implementation

1. Implementation Schedule- Chilaw WSS

Item Description	Year - 1	Year - 2	Year - 3	Year - 4	Activity Duration Months
1.0 Design & Tendering Phase					18
2.0 Transmission System Supply & laying of pipes & specials					24
3.0 Civil Works					45
Water source development (GW & surface water, Deduru oya)					
New & Rehabilitation ,TW & storage tanks					




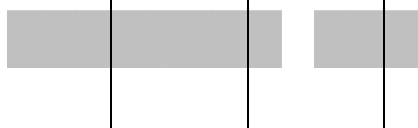


4.0 Distribution Systems Supply & laying of pipes & specials (New & rehabilitation)						33
4.0 M&E Works (including commissioning) Supply & Installation of M&E equipment (with automation)						30

2. Implementation Schedule- Puttalam WSS






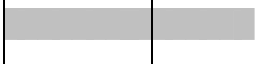




Item Description	Year - 1	Year - 2	Year - 3	Year - 4	Activity Duration Months
1.0 Design & Tendering Phase					18
2.0 Transmission System Supply & Laying of pipes & specials					24
3.0 Civil Works					45
3.1 Water source development (GW & surface water)					
3.3 Rehabilitation existing WTP & New TP					
3.5 Storage Tanks					
4.0 Distribution Systems Supply & Laying of pipes & specials (Rehabilitation & expansion)					33
5.0 M&E Works Supply & installation of M&E works including automation					15

3. Implementation Schedule- Vavuniya WSS

Item Description	Year – 1	Year - 2	Year - 3	Year - 4	Year - 5	Activity Duration Months
1.0 Design & Tendering Phase						21
2.0 Transmission System Supply laying of pipes &						24

specials		
3.0 Civil Works		42
3.1 GW development		
3.2 Surface water development (Puthkulam-Pera aru)		
3.3 Rehabilitation of existing facilities New treatment, storage & commissioning		
4.0 Distribution System		30
Supply & Laying of Distribution pipes		
5.0 M&E works		21
Supply & Installation of M&E equipment including commissioning		

4. Implementation Schedule- Mannar WSS

Item Description	Year - 1	Year - 2	Year - 3	Year - 4	Activity Duration months
1.0 Design & Tendering Phase					15
2.0 Transmission System Supply and Laying of pipes & specials					18
3.0 Civil Works					27
3.1 Development of Murunkan GW					
3.2 Storage Tanks & other other rehabilitations					
4.0 Distribution Systems Supply and Laying of pipes & specials Distribution mains					18
5.0 M&E Works Supply & Install pumps & final commissioning					15

9.2.3 Rural Sanitation

299. The proposals for rural sanitation are focused on the requirements specified in the draft National sanitation policy and the National program of the NWSDB. Recommended sanitation facilities for rural communities are confined to the construction of individual pour flush water sealed latrines. The sanitation facilities are to be provided only to the GNDs benefiting from the Rural water supply schemes and those communities receiving water supplies from the water transmission mains being constructed under the 4 Urban water sub-projects.

300. The CBO that is formed for rural water supply sub project shall be responsible for the implementation of rural sanitation facilities too. In general the principle of rural sanitation improvement is an integral approach and it is closely related to the water supply sub project and the arrangement is similar. Hence Section 9.2.1 is common to both water and sanitation.

301. The activities in the Responsibility Matrix, Section 9.2.1, differ slightly in rural sanitation but the implementation mode remains the same for both water and sanitation. [e.g -resettlement catchment protection, road reinstatement etc are not applicable]

9.2.4 Urban Sanitation

302. the urban sanitation systems proposed are conventional sewers and wastewater treatment plants for Vavuniya and septage treatment plants for Chilaw Puttalam and Mannar. The conventional sewerage system in Vavuniya serves only the densely populated core urban area of the town. The participatory approach is not suitable for major construction works and therefore the sanitation projects shall be constructed under contracts both ICB and NCB.

303. The recommended project implementation management recommendations for urban water supply are given in section 9.2.2 above. The same implementation management procedure and principals are proposed for the urban sanitation sub projects, urban sanitation sub-project issues are essentially the same as for the urban water supply sub projects.

304. The proposed implementation programme for the urban sewerage and sanitation schemes of the four towns are as follows

1. Implementation Schedule – Chilaw Sanitation [Septage Treatment Plant / Vacuum tanker service]

Item Description	Year - 1	Year - 2	Year - 3	Year - 4	Activity Duration Months
1 Design Stage	■				12
2 Tender invitation Evaluation & award		■			9
3 Civil Construction		■	■		21
4. Equipment , Testing & Commissioning			■	■	12

2. Implementation Schedule – Puttalam Sanitation [Septage Treatment Plant / Vacuum tanker service]

Item Description	Year - 1	Year - 2	Year - 3	Year - 4	Activity Duration Months
1 Design Stage	■				12
2 Tender invitation Evaluation & award		■			9
3 Civil Construction		■	■		21
4. Equipment , Testing & Commissioning			■	■	12

3. Implementation Schedule – Vavuniya Sanitation [Wastewater treatment plant and Sewerage Reticulation system]

Item Description	Year 1	Year 2	Year 3	Year 4	Activity Duration Month
1 Design Stage					
1.1 Investigation, surveying etc.					4
1.2 Civil and structural design					4
1.3 Tender documents / ERQ					1
2 Tender invitation & Evaluation/ award					4
3 Construction Stage					
3.1 Gravity Sewers/ MH & JC					22
3.2 Pumping Stations & Force mains- FS					10
3.3 Stabilisation ponds/ Treatment works					18
4 House connections [1150 nos.]					

Note: After completion of construction works, provision of house connections will be started and shall be finished within 24 months..

4. Implementation Schedule – Mannar Sanitation [Septage Treatment Plant / Vacuum tanker service]

Item Description	Year - 1	Year - 2	Year - 3	Year - 4	Activity Duration Months
1 Design Stage					12
2 Tender invitation Evaluation & award					9
3 Civil Construction					21
4. Equipment , Testing & Commissioning					12

9.3 Procurement

9.3.1 Urban Water supply

General Principles

305. While developing the Procurement plan for implementation of the proposed urban water supply projects, the following factors were given due consideration. These are based on the past experience of projects of a similar nature, regarding procurement work and the guidelines of ADB for procurement.

A. Supply & Laying of Pipes

- Bulk materials supplies are promoted, considering the cost advantages of bulk procurements with attractive discounts for the supply of pipes. Based on that, Chilaw and Puttalam has been taken as one set and similarly Vavuniya and Mannar together as another. Those combinations were made considering their geographical locations and the nature of working environment.
- Considering packaging similar types of pipes together, will facilitate direct supplies from the respective manufactures, with their quality assurance instead of purchasing through third parties. Thereby pipe types of HDPE, DI, PVC etc are batched as separate contract packages together with their specific application in transmission systems or distribution systems..
- Considering packaging of supply and laying, together for a particular pipe type would always have advantages. Packaging in such a manner for a single contract will make sure of the responsibilities to a single party and avoid unnecessary procedural and functional delays in procurement. Joint ventures are promoted to share the equal responsibilities in the disciplines of supply and laying of a particular pipe material. This will assist and facilitate the technical experts working together in both fields and ensure the quality of the end product..

B. Civil Works

306. Similar to the pipe works, the amalgamation of Chilaw and Puttalam together and Vavuniya and Mannar together are considered for the following activities wherever possible.

- Water resources development under the proposed sub-projects, are improvements to the ground water sources and the surface water sources. Since they are in different disciplines and involve specific technologies, it would be proper to separate them out under two contracts. Local expertise is prominent in water resources development, it is proposed to have design and built NCB contracts for them.
- Rather than packaging small contracts, it is advisable to have quite a reasonable size of civil contracts and to invite capable parties to undertake the job and to end up with quality end product. Also it is imperative to invite technical “know how” during the design and to allow them to take the responsibility for the construction. Since the proposed water treatment units are mostly of the conventional type and local expertise can do this work, thereby it is recommended to open opportunities for competitive bidding to local consortiums as well. This will provide attractive competition during the bidding process, however the responsibility of proper design, review and the quality management shall be entrusted to project implementation units and their advisers.

- Combining similar types of civil structures together where appropriate, will give advantages both to the project and the contractors. Hence combining similar types of structures is proposed for the water treatment plants and the water storage structures, the contractors can expedite the design process with minimum resources and time by handling the structures simultaneously. Resources for construction can also be optimised with advance planning and will effect a saving. By using this approach an attractive bidding price can be expected

C. M&E Works

307. Based on passed experience, it has been revealed that the supply and installation of equipment and their proper commissioning had often failed due to the limited experience of the local industry. Especially the expertise in system automation is still lagging behind. Hence it is important to call for joint ventures from foreign and local companies for supply and installation of M&E equipment. The contract principles should be targeted at the overall quality of the end product rather than the benefit of their local agents.

308. More avenues need to be opened for the suppliers to give alternative proposals, especially for system automation of their pumps and equipment, rather than just asking them to be confined to a standard pre-design. Hence opportunity shall be introduced to the supply contracts for alternative bidding

309. Availability of spares, after sales services and capacity building of the O&M operators needs to be given priority during the selection of suppliers and to be included when considering the contract packaging, an adequate level of spares under the contract is essential.

310. Based on the above facts the following procurement plans have been prepared.

A. Procurement Plan - PP [Water Supply Component – [General Contexts]

Project Information	
Country	Sri Lanka
Project name	Small Towns and rural Arid areas Water Supply and Sanitation Project
Loan or TA Reference	PPTA4853-SRI
Date of Effectiveness	
Amount : US\$	Loan amount =
Executing Agency	National Water Supply And Drainage Board
Approval date Of OPP [original procurement plan]	-
Approval of recent PP	-
Publication of local Advertisements	1.8.2009
Period covered by this plan	Approximately 3 yrs

Procurement Thresholds

Procurement Method	To be Used(Value\$)
ICB Works	>2000000
ICB Goods	>500,000
NCB-Works	<2,500,000
NCB-Goods	<500,000
Exceptional methods Community Procurement	Rural component below Rs 50 million[\$50,000]

Procurement thresholds, consultants' services

Procurement Methods	To be used (value \$)
Quality Cost based Selection (QCBS)	Package A&B-(under) - \$5.7Million
Consultants Qualifications Selection(CQS)	N/A
Least Cost Selection	N/A
Alternative Methods Single Source Selection (SSS)	Augmentation of Package B- \$ 1 Million

B. List of Contract Packages in Excess of \$100,000 - Goods, Works and Consulting Services
 [Water Supply Component]

Project Town / Location	Contract No. ²⁰	Description of work	Type of contract	Mode of Procurement	Estimated value (\$mill) ²¹	Approximate Date of Adv.	Prior review Y/N
Chilaw & Puttalam	WS/CIV/PH1/ CHL & PUT/ICB or NCB WS/TR&DB/ PH1/CHL& PUT/ICB or NCB WS/M&E/PH I/CHL& PUT/ ICB	<p>Chilaw</p> <ul style="list-style-type: none"> • Supply and laying of DI pipes, special & valves for transmission mains, distribution systems. [100-400mm dia. 20.7km] • Supply and laying of HDPE pipes & special for transmission mains, distribution systems.[180-400mm dia. 22.6km] • Supply and laying of PVC pipes & specials for transmission & distribution systems. [63-225mm dia. 119.6km] • Water resource development –Ground water/ Surface water • Rehabilitation of existing TP and New TP civil work [Capacity 6500m3/day]. • New storage structures and other civil works [2 nos. Towers , 900m3, 750m3] • Supply and installation of Pumps and automation system including supply and installation of necessary M&E equipment for TP. <p>Puttalam</p> <ul style="list-style-type: none"> • Supply and laying of DI pipes, special & valves for transmission mains, distribution systems. [200-450mm dia. 31.4km] • Supply and laying of HDPE pipes & special for transmission mains, distribution systems.[280-450mm dia. 33.0km] • Supply and laying of PVC pipes & specials for 	Design & built/ Add measurement/	ICB/NCB	27.59	1.8.09	Y

²⁰ Contract numbers subjected to revisions.

²¹ Cost of recommended option , Excluded land & consulting services / Implementation overheads.

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Project Town / Location	Contract No. ²⁰	Description of work	Type of contract	Mode of Procurement	Estimated value (\$mill) ²¹	Approximate Date of Adv.	Prior review Y/N
Vavuniya & Mannar	WS/CIV/PH1/ VAU & MAN/ICB or NCB	<p>transmission & distribution systems. [63-225mm dia. 68.1km]</p> <ul style="list-style-type: none"> Water resource development –Ground water/ Surface water Rehabilitation of existing TP and New TP civil work [Capacity 9000m3/day] New storage structures and other civil works [1 no. Tower , 1500m3] Supply and installation of Pumps and automation system including supply and installation of necessary M&E equipment for TP. 	Design & built/ Add measurement/	ICB/NCB	25.81	1.8.09	Y
	WS/TR&DB/ PH1/VAU & MAN/ICB or NCB	<p>Vavuniya</p> <ul style="list-style-type: none"> Supply and laying of DI pipes, special & valves for transmission mains, distribution systems. [200-450mm dia. 34.7km] Supply and laying of PVC pipes & specials for transmission & distribution systems. [63-225mm dia. 120.2km] Water resource development –Ground water/ Surface water Rehabilitation of existing TP and New TP civil work [Capacity expansion from 12,000-18,000m3/day] New storage structures and other civil works [1 no. Ground reservoir -2500m3, 3nos. Towers 300, 1000, 1500m3] Supply and installation of Pumps and automation system including supply and installation of necessary M&E equipment for TP 					
	WS/M&E/PHI/VAU & MAN/ICB	<p>Mannar.</p> <ul style="list-style-type: none"> Supply and laying of DI pipes, special & valves for transmission mains, distribution systems. [200-400mm dia. 5.75km] Supply and laying of HDPE pipes, special & valves for transmission mains, distribution systems. [180-450mm dia. 38.6km] Supply and laying of PVC pipes & specials for 					

TA No. 4853 – SRI: FINAL REPORT

Project Town / Location	Contract No. ²⁰	Description of work	Type of contract	Mode of Procurement	Estimated ²¹ value (\$mill)	Approximate Date of Adv.	Prior review Y/N
		transmission & distribution systems. [63-225mm dia. 88.9km] • Water resource development –Ground water. • Rehabilitation of existing civil works • New storage structures and other civil works [1 no. Ground reservoir -500m3, 1no. Tower 900m3] Supply and installation of Pumps and automation system including supply and installation of necessary M&E equipment for TP.					

Notes:

UWS = urban water supply, ICB =International Competitive Bidding, NCB= National competitive Bidding. The cost estimates are based market values in 2007.

Contract numbers subjected to revisions.

¹ Cost of recommended options, Excluded land & consulting services.

C. Indicative Procurement Packages [Urban Water Supply - Chilaw & Puttalam]

No.	Contract Description	Location	Estimated Contract Value - Million US\$ ²²	Procurement Mode	Responsible agency
Chilaw & Puttalam					
1	Supply and laying of DI pipes, special & valves for transmission mains, distribution systems. [Combined Package]	Chilaw/ Puttalam	8.05	ICB Equipment – S Admeasurements	ADB/GOSL
2.	Supply and laying of HDPE pipes & special for transmission mains, distribution systems. [Combined Package]	Chilaw/ Puttalam	7.82	ICB Equipment – S Admeasurements	ADB/GOSL
3	Supply and laying of PVC pipes & specials for transmission & distribution systems	Chilaw	2.5	NCB Equipment – S & I Admeasurements	GOSL
4	Supply and laying of PVC pipes & specials for transmission & distribution systems	Puttalam	1.51	NCB Equipment – S & I Admeasurements	GOSL
5	Water resource development –Ground water	Chilaw	0.22	NCB Design and built	GOSL
6	Water resource development –Surface water [Combined Package]	Chilaw/ Puttalam	2.21	NCB Design and built	GOSL
7	Rehabilitation of existing TP and New TP work civil works only [Combined Package]	Chilaw/ Puttalam	2.71	NCB/ICB Design and built	ADB/GOSL
8	New storage structures and other civil works [Combined Package]	Chilaw/ Puttalam	1.11	NCB Design and built-	GOSL
9	Supply and installation of Pumps and automation system, including supply and installation of necessary M&E equipment for TP. [Combined Package]	Chilaw/ Puttalam/	1.46	ICB Equipment – S & I Admeasurements	ADB/GOSL

²² Estimated basic cost excluding duty, contingencies and VAT.

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C. Indicative Procurement Packages [Urban Water Supply - Vauniya & Mannar]

No.	Contract Description	Location	Estimated Contract ²³ Value - Million US\$	Procurement Mode	Responsible agency
Vavuniya & Mannar					
1	Supply and laying of DI pipes, special & valves for transmission mains, distribution systems. [Combined Package]	Vavuniya/ Mannar	6.54	ICB Equipment – S Admeasurements	ADB/GOSL
2	Supply and laying of PVC pipes & specials for transmission & distribution systems.	Vavuniya	2.88	NCB Equipment – S& I Admeasurements	ADB/GOSL
3	Supply and laying of HDPE pipes & special for transmission mains, distribution systems.	Mannar	3.90	ICB Equipment – S Admeasurements	ADB/GOSL
4	Supply and laying of PVC pipes & specials for transmission & distribution systems.	Mannar	2.09	NCB Equipment – S& I Admeasurements	GOSL
5	Water resource development –Ground water [Combined Package]	Vavuniya/ Mannar	0.14	NCB Design and built	GOSL
6	Water resource development –Surface water	Vavuniya	4.63	ICB/NCB Design and built	ADB/GOSL
7	New Treatment work, civil works only [Combined Package]	Vavuniya	2.22	NCB Design and built	GOSL
8	New storage structures and other civil works [Combined Package]	Vavuniya/ Mannar	2.27	NCB Design and built-	GOSL
9	Supply and installation of Pumps and automation system, including supply and installation of necessary M&E equipment for TP. [Combined Package]	Vavuniya/ Mannar	1.15	ICB Equipment – S& I Admeasurements	ADB/GOSL

²³ Estimated basic cost excluding duty, contingencies and VAT.

9.3.2 Urban Sanitation

311. The construction and installation experience, of urban sewers, under ground pumping stations, major wastewater or septage treatment plants, in Sri Lanka is limited and we have not identified any local companies in the construction industry, with this experience.

312. Taking into consideration the weakness of the local supply chain for materials and services, the procurement of services and material for sanitation projects is considered under a single contract for each town allowing the contractor to have access to the International supply chain.

313. The draft procurement plans for sanitation are given below.

A. Procurement Plan - PP [Urban Sanitation] General Context

Project Information	
Country	Sri Lanka
Project name	Small Towns and rural Arid areas Water Supply and Sanitation Project
Loan or TA Reference	PPTA4853-SRI
Date of Effectiveness	
Amount : US\$	Loan amount =
Executing Agency	National Water Supply And Drainage Board
Approval date Of OPP [original procurement plan]	-
Approval of recent PP	-
Publication of local Advertisements	1.8.2009
Period covered by this plan	-

Procurement Thresholds

Procurement Method	To be Used(Value\$)
ICB Works	>2000000
ICB Goods	>500,000
NCB-Works	<2,500,000
NCB-Goods	<500,000
Exceptional methods Community Procurement	Rural component below Rs 50 million[\$50,000]

Procurement thresholds, consultants' services

Procurement Methods	To be used (value \$)
Quality Cost based Selection (QCBS)	Package A&B-(under) - \$5.7Million
Consultants Qualifications Selection(CQS)	N/A
Least Cost Selection	N/A
Alternative Methods Single Source Selection (SSS)	Augmentation of Package B- \$ 1 Million

B. List of Contract Packages in Excess of \$100,000 - Goods, Works and Consulting Services
 [Sanitation Component]

Project Town / Location	Contract No. ²⁴	Description of work	Type of contract	Mode of Procurement	Estimated ²⁵ value (\$mill)	Approximate Date of Adv.	Prior review Y/N
Chilaw	SE/UWS/PH1/CHL/I CB (Alternative system to preferred option)	Septage treatment facility and associated constructions and E&M equipments,	Turnkey	NCB	0.89	1.8.09	N
Puttalam	SE/UWS/PH1/PUT/N CB (Alternative system to preferred option)	Septage treatment facility and associated constructions and E&M equipments,	Turnkey	NCB	0.99	1.8.09	N
Vavuniya	SE/UWS/PH1/VAV/I CB	Sewage Treatment works and associated constructions, forced sewers, Gravity sewers and associated E&M equipment structures, pumping stations, outfall structure,	Turnkey	ICB	4.29	1.1.10	Y
Mannar	SE/UWS/PH1/MAN/N CB	Septage treatment facility and associated constructions and E&M equipments,	Itemized BOQ	NCB	0.75	1.1.10	N
Puttalam Vavuniya Mannar Districts	Community Base infrastructure.	Low cost sanitation to communities in three districts	Itemized BOQ	NCB Community based Procurement	-	1.1.10	N

Assumed Consulting services fee is ~4.75% of contract value.

SE = Sewerage, UWS = urban water supply, ICB =International Competitive Bidding, NCB= National competitive Bidding. The cost estimates are based market values in 2007.

²⁴ Contract numbers subjected to revisions.

²⁵Cost of recommended option exclude land & consulting services cost, duty, contingencies and VAT

C. Indicative Procurement Packages [Urban Sanitation]

Excluding land cost.

No.	Contract Description	Location	Estimated Contract ²⁶ Value - Million US\$	Procurement Mode	Responsible agency
1	Septage treatment facility and associated constructions and E&M equipments,	Chilaw	0.81	NCB Design and built [Turnkey]	NWSDB
2	Low-cost sanitation Program- connected with urban water supply.	Chilaw	0.09	NCB-Community base procurement	NWSDB
3	Septage treatment facility and associated constructions and E&M equipments,	Puttalam	0.90	NCB Design and built [Turnkey]	NWSDB
4	Low-cost sanitation Program- connected with urban water supply.	Puttalam	0.09	NCB-Community base procurement	NWSDB
5	Supply and laying of main sewers and rider mains including Manholes, pumping stations, and pumping mains, etc	Vavuniya	2.62	ICB Design and built[Turnkey]	ADB
6	Wastewater treatment works, outfall, and site development.	Vavuniya	1.46	ICB Design and built	ADB
7	Supply and installation of Pumps, equipments for testing, vehicles, etc	Vavuniya	0.12	ICB Equipment-S&I	ADB
8	Low-cost sanitation Program- connected with urban water supply.	Vavuniya	0.09	NCB-Community base procurement	ADB

Parity assumed is 1 US\$=110 SLR

²⁶ Estimated cost exclude land & consulting services cost, duty, contingencies and VAT

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No.	Contract Description	Location	Estimated Contract ²⁷ Value - Million US\$	Procurement Mode	Responsible agency
9	Septage treatment facility and associated constructions and E&M equipments,	Mannar	0.66	NCB Civil works	NWSDB
10	Low-cost sanitation Program- connected with urban water supply.	Mannar	0.09	NCB-Community base procurement	NWSDB
	Consulting services				
11	Design and construction supervision of urban sanitation sub projects, Package –B			QCBS	ADB
18	Design and construction supervision of RS .Package-A			QCBS	NWSDB

Parity assumed is 1 US\$=110 SLR

²⁷ Estimated cost exclude land & consulting services cost, duty, contingencies and VAT

10. Summary Cost Estimates and Financing Plan

10.1 Project Cost Estimates

314. The total cost of the Project, including all contingencies and financing charges but excluding the cost of the rural water supply and sanitation (Component 2),²⁸ amounts to approximately SLR12,028.4 million, or US\$111.02 million.

315. Foreign currency cost is estimated at SLR4,869.8 million (US\$44.95 million) and comprises about 40% of total Project cost. Local currency cost amounts to about SLR7,158.0 million (US\$66.1 million), or 60% of total costs.

316. The overall Project cost estimates and the cost of each Project component are shown in Table 10.1.

10.2 Financing Plan

317. Financing for the Project was assumed to come from the Asian Development Bank, the Government of Sri Lanka and from participating communities and Project beneficiaries.

318. Financing from ADB is a mix of loan and grant from the Bank's Special Fund Resources called the Asian Development Fund (ADF) and a loan from its Ordinary Capital Resources (OCR).

319. ADF loan terms include (i) 32-year maturity with an 8-year grace period, (ii) 1% interest charge during the grace period and 1.5% during the amortization period, and (iii) equal amortization payment. Interest during construction was assumed to form part of the loan.

320. OCR lending rate was based on the 5-year LIBOR swap rate which is currently at 3.6% per annum plus a spread of 0.20%. Based on a recent Bank policy that became effective on 1 October 2007, LIBOR-based project loans include a commitment charge of 0.15% - a reduction from the previous rate of 0.35%. The new policy likewise eliminated the front-end fee.

321. Community contribution comes from households and non-domestic users who will bear the full cost of house connections.

322. The proposed financing plan is shown in Table 10.2

²⁸ The cost of Component 2 was initially excluded from the total Project costs and the ensuing financing plan since the scope and the magnitude of the investment for this sector still has to be agreed between the Government of Sri Lanka (GoSL) and the Asian Development Bank (ADB).

Table 10.1 Project Cost Estimates**Table 1.1 Project Cost Estimates**
(Million)

Category	Total Cost SLR	Total Cost US\$	Foreign Exchange (\$)	Local Currency (\$)
A. Base Costs				
1. Component 1: Urban WSS				
a. Vavuniya Urban WSS	2,495.07	23.03	8.26	14.77
Water Supply	1,992.68	18.39	7.24	11.15
Sanitation	502.39	4.64	1.02	3.62
b. Mannar Urban WSS	942.36	8.70	5.07	3.62
Water Supply	856.31	7.90	4.88	3.03
Sanitation	86.05	0.79	0.20	0.60
c. Puttalam Urban WSS	1,872.09	17.28	9.86	7.42
Water Supply	1,759.72	16.24	9.59	6.65
Sanitation	112.37	1.04	0.27	0.76
d. Chilaw Urban WSS	1,399.44	12.92	6.31	6.60
Water Supply	1,297.30	11.97	6.06	5.91
Sanitation	102.14	0.94	0.25	0.69
Component 1 Subtotal	6,708.96	61.93	29.51	32.41
2. Component 2: Rural WSS				
a. Vavuniya RWSS	-	-	-	-
b. Mannar RWSS	-	-	-	-
c. Puttalam RWSS	-	-	-	-
d. Anuradhapura RWSS	-	-	-	-
e. Polonnaruwa RWSS	-	-	-	-
f. Hygiene Education, Gender, Vulnerable People's Plan, Environmental Education	-	-	-	-
Component 2 Subtotal	-	-	-	-
3. Component 3: Institution and Capacity Building				
a. Strengthening local NWSDB offices (North West & North Central Provinces)	161.21	1.49	1.09	0.40
b. Developing CBO Capacity for WS Operation & Management	76.81	0.71	0.19	0.52
c. Strengthening NWSDB Capacity in Project Management & Implementation	40.92	0.38	0.21	0.16
d. Urban Hygiene Education, Gender Training and Vulnerable People's Plan	37.04	0.34	-	0.34
Component 3 Subtotal	315.98	2.92	1.50	1.42
4. Component 4: Project Management				
a. Consultancy Services	153.71	1.42	0.76	0.66
b. Detailed Design and Construction Supervision	186.70	1.72	1.03	0.69
c. PCU/PIU Office Support	123.62	1.14	0.21	0.93
d. Environmental Management and Monitoring	36.50	0.34	-	0.34
e. Audit Services	5.00	0.05	-	0.05
Component 4 Subtotal	505.53	4.67	2.00	2.67
Subtotal Base Cost	7,530.47	69.51	33.01	36.50
B. Contingencies				
1 Physical Contingencies	670.91	6.19	2.53	3.67
2 Price Contingencies	1,369.29	12.64	3.56	9.08
3 Risk Allowance	290.24	2.68	1.08	1.60
Subtotal Contingencies	2,330.45	21.51	7.16	14.35
C. Financing Charges	517.94	4.78	4.78	-
D. Taxes and Duties	1,649.49	15.23	-	15.23
Total	12,028.35	111.02	44.95	66.07

Note: Project cost estimates do not include the cost of Component 2 (Rural Water Supply and Sanitation) since the scope and magnitude of the investment has yet to be agreed upon between the Government of Sri Lanka and the Asian Development Bank (ADB).

a Exchange rate of SLR108.34 = \$1.

b Base costs are as of December 2007.

c Physical contingencies are estimated at 10% for civil work and 5% for equipment and other costs for WS; 10% for all sanitation costs.

d Price contingencies are estimated using local inflation of 9% in 2008, 7% in 2009 until 2013 for local costs; 0.8% from 2008 onwards for foreign costs.

e Risk allowance applies only to Mannar and Vavuniya and is estimated at 4% of total civil works and equipment.

f Financing charges are estimated, assuming 3.6% interest rate plus 0.2% spread on OCR loan and 1% interest rate on ADF loan.

g VAT at 15% on all goods; tax and duties for imported goods

Source: Consultant estimates.

Table 10.2. Financing Plan

(US\$ million)

Source	Foreign Currency	Local Currency	Total Cost	%
Asian Development Bank	42.75	39.0	81.74	74
ADF loan	23.02	24.99	48.00	
ADF grant	7.19	7.81	15.00	
OCR loan	12.54	6.20	18.75	
Government	2.20	25.05	28.25	25
Community/Beneficiaries	-	1.02	1.02	1
Total	44.95	66.07	111.02	100

323. ADB will finance approximately 74% of total Project cost to consist of:

- US\$48.0 million loan and \$15.0 million grant from ADF, for a total ADF financing of US\$63.0 million.
- US\$18.8 million loan from OCR.

324. Total ADB loan from both ADF and OCR amounts to about US\$81.7 million.

325. Government equity to the Project is around US\$28.2 million (25%) which will cover US\$2.2 million foreign currency costs and US\$25.1 million local currency costs.

326. Community financing is estimated at US\$1.02, or 1% of total Project cost.

327. Table 10.3 below gives an indicative disbursement schedule for the ADB loan/grant financing.

Table 10. 3. ADB Disbursement (US\$ million)

Source	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
ADF Loan	3.48	21.29	13.37	7.03	0.68	0.08	45.93
ADF Grant	1.14	6.95	4.37	2.29	0.22	0.03	15.00
OCR Loan	0.44	6.93	4.71	3.57	-	-	15.64
Total	5.11	35.29	22.42	12.86	0.85	0.04	76.57
Percent	7%	46%	29%	17%	-	-	100%

Appendix 1 - Revised TOR for the Project

I. BACKGROUND

1. **Meeting the Millennium Development Goals.** Sri Lanka's continued efforts to improve its development indicators have placed the country ahead of most other South Asian countries.¹ Nevertheless, 22.7% of all Sri Lankans live below the national poverty line. Much of the country's economic activity and wealth is disproportionately concentrated in the western part of the country, and Sabaragamuwa and the North-East Provinces remain among the most disadvantaged in terms of access to economic opportunities, education, and general infrastructure. While recent reports² indicate that the country is expected to meet Millennium Development Goal target 10 by 2015 if adequate progress continues, major challenges include regional disparities and urban-rural differences, for example, between 1990 and 2002, access to improved water sources increased from 91% to 99% in urban areas and from 62% to 72% in rural areas. Similarly, 75% of the urban population is served by piped water, but only 14% of the rural population benefits from such a service. The proportion of the urban population that had access to improved sanitation increased from 89% to 98% during the same period, while rural coverage rose from 64% to 89%. Differences among provinces are even more prominent,³ but cannot always be quantified. The provision of safe drinking water through the construction of new schemes and the augmentation of existing ones represents a major milestone in the Government's New Development Strategy. Consequently, in line with the 2001 national policy for rural water supply and sanitation, the Ministry of Urban Development and Water Supply (MUDWS) set a goal of providing access to safe drinking water and basic sanitation to all citizens by 2010, whereas the National Water Supply and Drainage Board (NWSDB)⁴ aims to provide piped drinking water to 45% of the population by 2015. Supporting such goals and targets by means of a comprehensive policy and a regulatory framework is essential.

2. **Policy and Regulatory Framework.** Both the draft water supply and sanitation policy, first formulated in 2002, and the recently prepared draft national policy on sanitation and draft policy on rural sanitation, are expected to be submitted to the Cabinet before the end of 2006. These policies provide the necessary framework needed for the sustainable operation and management of sector-related assets. Even though commissioners were appointed soon after the creation of the Public Utilities Commission in 2002, its functions in relation to regulating the water sector have not been fully effected, partly because of delays in formulating and approving laws pertaining to the water industry. In this regard, the Government has recently proposed revising the existing legal framework to enable Public Utilities Commission to regulate service standards, tariffs, and customer satisfaction.

3. **Water Quantity and Quality.** Water resources are scarce, particularly in dry zone, low-lying areas of the country, where annual rainfall can be as little as 750 millimeters, creating high dependence on groundwater and on reservoir storage. Groundwater sources in such areas often contain unacceptable levels of fluoride or iron or are excessively saline and require treatment prior to distribution. Water quality in irrigation tanks and canals can be poor from a microbiological and/or a physico-chemical perspective, with pollution often resulting from

¹ In 2005, Sri Lanka ranked 93rd out of 177 countries on the United Nations Development Programme's human development index. According to the index, Sri Lanka's urban population has remained approximately constant at 21 to 22% of the total population for the past 10 years.

² ADB. 2006. *Asia Water Watch 2015*. Manila; National Council for Economic Development. 2005. *Millennium Development Goals Country Report 2005: Sri Lanka*. Colombo.

³ According to National Water Supply and Drainage Board statistics, in districts such as Mannar, Puttalam, and Vavuniya, as few as 11.4%, 2.5%, and 6.7% of households, respectively, have piped water.

⁴ NWSDB currently provides around 29% of the population with piped water, while about 10% of the population has access to hand pumped tube wells.

upstream activities and from man-induced and livestock activities in the catchment area. Despite ongoing efforts, the scope for improving water quality remains significant. In coordination with provincial irrigation departments, this should include improving source protection and catchment management and enhancing monitoring at treatment sites and throughout transmission and delivery points.

4. **Sewerage and Sanitation.** Throughout the country, pour-flush systems are rapidly replacing dry toilets. While septic tanks and on-site sanitation systems are gradually being adopted, surface and groundwater resources, particularly around urban centers, are at risk of bacterial contamination from effluent leakages from poorly constructed and maintained pit latrines and discharges from septic tanks and other disposal facilities. Except in a few areas in Colombo,⁵ in Hikaduwa, and in the near future, possibly in Jaffna, Kandy and Nuwara Eliya, Sri Lanka has no areas covered by sewerage systems, and of those areas with such systems, Colombo has only basic facilities for primary treatment of sewage. In Colombo, sewers are often silted and in need of maintenance. In towns, storm water drainage facilities are generally in poor condition, as they are rarely cleaned and rehabilitated, but the situation is even worse in poor and informal areas, because of the lack of overall planning, inadequate maintenance, and encroachment on drainage channels. Poor maintenance and rehabilitation are often associated with insufficient allocation of financial resources.

5. **Operational Performance and Financial Management.** NWSDB, through its corporate plan,⁶ aims to improve its operational and financial performance.⁷ Continuous efforts have yielded such improvements as (i) annual increases in service connections that have averaged 11% for the last 10 years, (ii) reductions in the number of staff per connection from a relatively high 27.60 staff per 1,000 connections in the 1980s to 8.92 in 2005, and (iii) introduction of a computerized and decentralized billing and collection system with an average collection efficiency of 97.6% over the past 10 years. However, the scope for further improvements remains significant. The main problems in relation to the delivery of water and sanitation include low self-financing ratios, insufficient tariff recovery, and high production costs. Even for those with access to piped water, delivery standards are often inadequate. Despite the consistent use of bulk and household meters, nonrevenue water levels remain high (currently exceeding 33%); water pressure is, in many cases, low; and supply is intermittent, which in itself increases nonrevenue water. Systems are almost invariably extended beyond their design capacities which further exacerbates operation and maintenance problems.⁸

6. **Community Participation.** In addition to NWSDB, local authorities, nongovernment organizations (NGOs), and community-based organizations (CBOs) are responsible for

⁵ NWSDB is responsible for the operation and maintenance of sewerage systems in Dehiwala and Kolonnawa, in seven housing schemes in Greater Colombo and two outside Colombo, and in three industrial promotion zones, or for some 50,000 connections.

⁶ NWSDB is in the process of preparing a revised corporate plan for the next 5 years.

⁷ Despite satisfactory performance up to 2002, NWSDB's financial performance has declined over the past 3 years. NWSDB's nationwide water tariff was last revised in March 2005. Continued tariff increases are necessary to accommodate, among other things, substantial levels of inflation. NWSDB aims to recover at least operation and maintenance costs, debt-service costs, and depreciation. It derives about two thirds of its revenues in Greater Colombo, with an effective cross-subsidy of 5:1 from nondomestic to domestic water supplies. In addition, the introduction of a sewerage tariff in 2006 remains critical, as sewerage activities contribute to total losses.

⁸ This is the case in several towns in the North-East and North West Provinces. In Mannar, where water supply is limited to 10 divisions, the population receives less than 3 hours of water a day and the system experiences frequent breakdowns. In Vavuniya, the current system is too small to meet demand, water supply is distributed for less than 4 hours per day, and less than 60% of the population is covered.

operating a number of smaller schemes.⁹ Community involvement in planning, design, implementation, and operation and maintenance, often facilitated by NGOs, has increased schemes' sustainability. However, if long-term sustainability is to be secured, critical activities to be institutionalized include (i) introducing a suitable legal and regulatory framework, (ii) providing communities with access to credit and resources for maintenance and repairs, and (iii) organizing replicable financial and accounting capacity development programs for CBOs.

7. **Lessons.** Previous projects have highlighted the need to (i) incorporate greater consultation, participatory processes, and local government involvement; (ii) avoid conflicts among water users and secure adequate rights; (iii) conduct adequate costing, minimizing inaccuracies in cost estimates that may lead to significant cost overruns; (iv) increase water and sewerage tariffs on an annual basis, taking inflation and tariff objectives into consideration; (v) promote sustainable water resource development and establish frameworks for water resource management; and (vi) develop capacity targeting all levels of influence.

II. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

8. The impact of this project preparatory TA will be to facilitate sustainable development in disadvantaged districts in Sri Lanka. Its outcome will be to improve basic water supply and sanitation infrastructure and services in dry zone districts of Sri Lanka. Project preparatory TA outputs will consist of (i) a feasibility study suitable for ADB financing that emphasizes poverty reduction and responds to locally expressed needs regarding priority water supply and sanitation infrastructure, and (ii) capacity development assistance for institutionalizing mechanisms for sustainable community-based infrastructure development.

B. Methodology and Key Activities

9. While keeping in line with integrated assistance to urban and rural areas, the TA will emphasize the importance of targeting those areas in the North-East and North West Provinces of Sri Lanka with the most acute shortages of drinking water and sanitation services and facilities. In addition, it will also consider opportunities in rural areas in the North Central Province. While supporting inclusive social development and subsidiarity principles to strengthen local centers, the TA will aim to increase transparency, complement activities undertaken locally or by other assisting agencies, and involve stakeholders from early stages of the planning and design process. The TA will seek local government and community participation and ensure that the design of the ensuing Project has an integrated approach, and also draws all actors into the upgrading process in a way that validates and strengthens them.

10. The TA will consist of two components. Component 1, which will focus on preparing a comprehensive feasibility study, will be implemented in two phases. Phase I will consist of a detailed evaluation of the water supply and sanitation sector, and will (i) collect and review basic planning data, capabilities, and resources for development in four urban centers,¹⁰ with an

⁹ In rural areas, both MUDWS and NWSDB, with support from the World Bank and ADB, have extensively promoted community participation in water and sanitation for more than a decade. Other donors working in this sector include the Danish government (engaged in small towns in the Central Province and Colombo), the Japanese Government (supports programs through NWSDB and local authorities in Kandy), and the French and German governments.

¹⁰ Districts are selected considering poverty and access to services data, mostly water and sanitation infrastructure. It is proposed that urban schemes in Mannar and Vavuniya in the North-East Province, and Chilaw and Puttalam in the North West Province may be examined under the feasibility study. Districts where support for rural assistance

emphasis on more deprived areas; (ii) evaluate sample ADB subprojects and determine lessons learned; (iii) initiate a socioeconomic assessment in identified target areas; (iv) map and analyze poverty data, the incidence of waterborne diseases, and the concentration of minority and disadvantaged groups; (v) undertake engineering field surveys and mapping to ascertain the condition of basic infrastructure and amenities, including collecting data on water and sanitation facilities; and (vi) identify priority urban and rural areas based on needs for improved coverage and determine population projections and demand for services. Results will be analyzed and discussed at stakeholder consultations at the national and district levels. In phase II will (i) select and refine project-specific investment components in both urban and rural areas; (ii) develop technical options acceptable to all stakeholders; and (iii) conduct economic and financial feasibility studies, environmental and social studies, and other documentation as required by ADB guidelines. An institutional development and capacity-building program will support the prioritized infrastructure rehabilitation, augmentation, and development in selected towns and will include a detailed nonrevenue water reduction program. In addition to infrastructure development, the TA will consider health and hygiene education.

11. Component 2 of the TA will help NWSDB institutionalize postproject completion sustainability measures in community-based schemes. For this purpose, the TA will support NWSDB in (i) conducting consultations with provincial councils and local authorities and developing understanding on the proposed by-laws enabling CBOs to exist as legal entities and on the Development Fund for Water Supply and Sanitation, which will ensure CBOs' access to credit facilities; and (ii) preparing and delivering a basic accounting, budgeting, and overall financial management training component for CBOs and CBOs' district offices.

C. Implementation Arrangements

12. NWSDB, under MUDWS, will be the executing agency and will (i) appoint a TA unit coordinator, who will have a supportive, coordinating, and facilitating role; and (ii) provide office space, furniture, equipment, and technical and support counterpart staff to the TA as necessary. Overall guidance for TA implementation will be provided by the TA Steering Committee, which will be headed by the secretary of MUDWS and will include senior officials from other government agencies, including the Ministry of Finance and Planning; NWSDB; the Ministry of Local Government; the Central Environmental Agency; and representatives of provincial governments, local authorities, aid agencies, and NGOs. The Steering Committee will first meet no later than 2 weeks after the start of the TA to confirm the coverage area and within 8 weeks of TA commencement to review the outcome of phase I of component 1. After that, the Steering Committee will meet on a bimonthly basis or as frequently as required to review TA progress and provide direction, particularly on policy issues.

13. The TA will be implemented over 8 months from March 2007 to November 2007. A team of international and national consultants will be selected and recruited through a firm using the quality- and cost-based selection method to provide a total of 74.5 person-months of consulting services, 20.5 person-months of international consultants and 54 person-months of national consultants, of which 33 person-months will be allocated to component 1 and 21 person-months will support component 2. The international consultants will include experts in water supply and sanitation, economics, hydrology, sanitation and sewage treatment, organizational development and financial management, and environment. The national consultants will include experts in water supply engineering, sanitation and sewerage, drainage, social development and gender

is to be evaluated include Mannar, Puttalam and Vavuniya, and possibly Anuradhapura and Polonnaruwa. The study will consider similar beneficiary gains in rural and urban areas. Remote villages will be prioritized.

issues, resettlement, financial analysis, and environment for component 1 and rural water supply, financial management and accounting, and community development for component 2. The consultants will be selected and engaged by ADB in accordance with the *Guidelines on the Use of Consultants*. ADB's full technical proposal will be used in selecting consultants. Extensive workshops and consultations will be conducted under both components of the TA. Office equipment financed by the TA will be procured in accordance with ADB's *Procurement Guidelines*.

III. TERMS OF REFERENCE FOR CONSULTANTS

14. The components will complement and inform each other. Component 1 will be divided into 2 phases. Indicative assignments for different competencies are presented in table 1. Consultants may be based in Anuradhapura or other location to be jointly agreed.

A. Component 1: Preparing a Feasibility Study for Water Supply and Sanitation

1. Phase I: Sector Review and Data Collection (1–2 months)

15. **Shortfalls, Constraints, and Lessons.** The team will review and analyze existing studies, reports, urban data, and related information, including lessons from past water supply and sanitation and urban development projects in Sri Lanka. The team will also review the experience of projects assisted by the Asian Development Bank (ADB) and other agencies, nongovernment organizations (NGOs), and community-based organizations (CBOs). To do this accurately, the team will conduct a preliminary evaluation study of around 15 to 20 small schemes (including both rural and urban centers) executed by ADB in selected or adjacent provinces. The team will share lessons with central and provincial governments and local authorities, as well as with representatives of citizen groups.

16. **Data Collection on Infrastructure and Service Delivery.** The team will undertake the following tasks:

- (i) Assess the total financial envelope available for the sector, including resources in central and provincial government and donor pipelines.
- (ii) Collect and assess community data on general affordability and willingness to pay for water supply and sanitation.
- (iii) Describe, map, and quantify the condition of basic amenities and services in urban and rural areas, highlighting needs and deficiencies in the water supply, sanitation, sewerage and sewage treatment, and drainage subsectors.¹¹
- (iv) Discuss managerial and administrative arrangements in existing urban and rural schemes.
- (v) Examine the current environmental situation and the severity of potential health problems caused by a lack of access to basic infrastructure.
- (vi) Conduct an inventory of, and critically review, all relevant initiatives for infrastructure development, studies, plans and programs, and public and private sector proposals.
- (vii) Describe existing relevant operation and maintenance (O&M) procedures, tariffs, and status of billing and collection for the selected subsectors. The consultant will also conduct a capacity assessment for local authorities in the proposed project area and seek ways to identify areas of responsibility under the project

¹¹ Specific reference will be made to problems affecting existing distribution systems, leaks, water pressure, water frequency, materials used, and system adequacy and efficiency.

preparatory TA (and potentially ensuing Project) for provincial councils and local authorities.

2. Phase II: Detailed Feasibility Study (5–6 months)

17. **Project Design.** The consultant will prepare a preliminary engineering design for all four project towns and three sample subprojects in rural areas¹² and will undertake detailed subproject preparation activities, including an analysis of suitable technical options acceptable to communities.¹³ Bearing integrated water resource management principles in mind, the consultant will undertake the following:

- (i) Screen all viable technical options and complete the technical design for selected least-cost water supply and sanitation, sewerage, wastewater treatment, and drainage options in consultation with stakeholders and local communities.¹⁴
- (ii) Conduct a physical reconnaissance of underground and surface water supplies, including (a) testing and basic modeling of water table replenishment to determine scheme sustainability, (b) assessing surface water resources suitable for water extraction (this should include a historical evaluation of the source and of flow fluctuations throughout the year, an analysis of any existing upstream and downstream uses, and a hydrological model to determine maximum extractable water), and (c) analyzing water quality for proposed options in each town and sample rural subprojects.¹⁵
- (iii) Discuss the technical viability of the various proposed options for each project subcomponent and demonstrate that they are the least-cost option under a combined system approach.
- (iv) Develop a catchment program for improved water quality in consultation with representatives from provincial irrigation departments containing (a) guidelines for implementing source protection measures; and (b) a specific action plan for implementation in all towns under the Project, including community awareness.
- (v) Prepare an integrated and comprehensive program for reducing nonrevenue¹⁶ water, taking into consideration capacity for local and national implementation.
- (vi) Assess the impact of wastewater collection and treatment on the water quality of receiving watercourses before and after project construction.
- (vii) Assess the adequacy of on-site and off-site wastewater treatment options to accommodate incremental amounts of wastewater.
- (viii) Review current approaches and develop an outline strategy for proposed hygiene education and water and environmental monitoring systems.
- (ix) Review existing O&M options and, if necessary, prepare a revised strategy for community implementation of rural schemes, including technical procedures to

¹² This component will take full coverage and equitable distribution into account.

¹³ The modality of the ensuing investment is expected to be a Project with a rural sector-like component.

¹⁴ The selected least-cost options should also be environmentally and socially acceptable.

¹⁵ Tests will include assessing levels of fluoride, iron, and manganese and the extent of salinity, bacteriological contamination, blue-green algae, and so on, as deemed necessary. The results will be compared with national quality standards and World Health Organization standards for drinking water and appropriate treatment to comply with the standards will be recommended. In particular, the origin of contamination will differentiate between source and distribution, as this might result from intermittent supply.

¹⁶ Overall, factors that have contributed to the practice of discontinuous supply include (i) rapid growth in population and water demand (and in some areas, particularly in the dry zone, shortage of water); (ii) inadequate water charges (and in some instances collection mechanisms) leading to insufficient revenues to repair, maintain and replace infrastructure; (iii) intermittent and poor quality electricity supply; (iv) inadequate human resource development, including training in modern utility operations; and (v) inadequate and/or slow demand responsiveness and customer-orientation. Some of these factors being specifically suffered by local-authority and smaller schemes.

ensure efficiency and sustainability and proper financial, accounting, and managerial arrangements for O&M.

- (x) Review and/or define design criteria and standards.
- (xi) Outline designs; arrangements for construction staging, implementation, and tendering; major civil works schedules; staffing requirements; and methods for selecting appropriate equipment, including maintenance and inspection of subcomponents.
- (xii) Identify requirements for key advance actions to avoid implementation delays.
- (xiii) Develop project monitoring and evaluation arrangements for the executing and implementing agencies in accordance with ADB's requirements for project performance management systems, ensuring that the beneficiaries also undertake monitoring and evaluation is also undertaken by the beneficiaries.
- (xiv) In consultation with stakeholders, develop a design and monitoring framework. Estimate requirements for adequate project implementation in relation to engineering, planning, project management, and other essential disciplines. Based on an evaluation of staff and available skills, recommend additional recruitment and/or upgrading of expertise.

18. **Project Costs.** The consultants will undertake the following tasks:

- (i) Estimate project costs at market rates.
- (ii) Summarize the project costs estimated for land, civil works, equipment, materials, resettlement (if any), environmental monitoring and mitigation, consulting services, taxes and duties, project management and capacity building, and interest and other charges during construction.
- (iii) Present procurement contract packages, clearly indicating the packages to be financed in line with ADB's *Procurement Guidelines*.
- (iv) Prepare detailed financing and disbursement plans.

19. **Financial and Economic Analyses.** The consultants will conduct project economic and financial analyses in accordance with ADB's requirements.¹⁷ To this end, they will undertake the following activities:

- (i) Describe the macroeconomic and sector context.
- (ii) Update water demand and wastewater discharge data and calculate projections for various end user groups, e.g., groups using treated effluent for irrigation.
- (iii) Assess project alternatives and confirm least-cost solutions.
- (iv) Review cost-recovery policies and tariffs at and national level and current arrangements in each town.
- (v) Propose cost-recovery mechanisms (including necessary institutional arrangements) through user charges, taxes, and/or other techniques for O&M and recovery of initial investments,¹⁸ and a tariff structure for each subproject for medium and long-term recovery, taking affordability, willingness to pay, water

¹⁷ ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila; ADB. 1998. *Guidelines for Economic Analysis of Water Supply Projects*. Manila; ADB. 2002. *Economic Analysis in 2002: A Retrospective*. Manila; ADB. 2004. *Economic Analysis Retrospective 2003 Update*. Manila; ADB. 2002. *Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank*. Manila. The consultants will be informed by ADB. 2003. *ERD Technical Note Series No. 9. Setting User Charges for Public Services: Policies and Practices at the Asian Development Bank*. Manila; ADB. ADB. 2004. *ERD Technical Note Series No. 10. Beyond Cost Recovery: Setting User Charges for Financial, Economic and Social Goals*. Manila; ADB.

ADB's Economics Research Department *Technical Notes* 9, 10 and 17.

¹⁸ The various financial scenarios to be presented should include different combinations of (i) O&M (at the very least), (ii) debt service, (iii) depreciation, (iv) replacement of essential parts, (v) initial investment, etc.

- conservancy, cross-subsidization, and full cost-recovery requirements into account.
- (vi) Estimate the detailed economic project costs for selected options, applying appropriate disaggregations of costs, standard conversion factors, and shadow prices as required.
 - (vii) Identify all quantifiable and unquantifiable project economic benefits, considering with and without Project scenarios, as well as incremental and nonincremental benefits.
 - (viii) Review the financial performance of selected towns.
 - (ix) Prepare financial projections for operations 10 years after project completion.
 - (x) Compute relevant financial indicators for each town to assess financial viability.
 - (xi) Assess the Project's financial viability.
 - (xii) Estimate economic and financial internal rates of return and perform sensitivity analyses,¹⁹ including switching values and calculation of the real weighted average cost of capital.
 - (xiii) Calculate the poverty impact ratio and conduct a distribution analysis.
 - (xiv) Review and update the existing financial management assessment for the National Water Supply and Drainage Board (NWSDB) and its local project offices, including a review of tariff methodology and proposed performance improvement recommendations.
 - (xv) Review the financial management performance of urban and municipal councils to be included under the Project.
 - (xvi) Review existing tariff projections for NWSDB nationwide and determine their suitability for this Project.
 - (xvii) Evaluate the adequacy of tariff methodology and tariff objectives and recommend improvements.

20. **Organizational and Institutional Assessment.** The consultant will undertake the following actions:

- (i) Review the status of approval and implementation of sector policies and regulations, particularly those regarding the Public Utilities Commission.
- (ii) Review the organizational composition of NWSDB, the level of responsibility and accountability of different units, existing funding mechanisms, and means for enhancing efficiency.
- (iii) Review the status of implementation of corporate and business plans, monitoring mechanisms, methods employed to achieve targets, and linkages to the performance improvement program.
- (iv) Analyze provincial and district structures (including district-level rural support units), staffing roles and capabilities, budgets, finance resource bases, cost-recovery mechanisms for urban infrastructure and services, revenue collection performance, accounting systems, internal control mechanisms, and procurement procedures.
- (v) Assess the strengths and weaknesses of the accounting system and, together with the Finance Division, develop recommendations and a time-bound action plan for improvement.
- (vi) Review the asset management structure and level of valuation and develop an asset management plan for NWSDB.²⁰

¹⁹ Risks, such as project delays, will be considered in the sensitivity analysis.

²⁰ Aspects to be considered include a review of methodology and implementation of asset registration and valuation, asset transfer, asset maintenance, etc.

- (vii) Recommend any other operational performance measures deemed necessary.
- (viii) Assess and evaluate the presence, capability, and potential role of NGOs in Project areas.

21. **Institutional Strengthening and Capacity Development.** To ensure the sustainability of the investments under the Project, the consultant will carry out the following tasks:

- (i) Develop a carefully designed capacity-building program for NWSDB's local offices, local authorities, and CBOs, especially in relation to collecting, updating, organizing, and managing financial information for routine work.
- (ii) Develop an institutional strengthening program for urban entities to operate the schemes based on the local authority assessment conducted in phase I.
- (iii) Review existing manuals and guidelines and revise, where necessary, the existing capacity-building program for communities to manage, operate, and maintain proposed facilities, including, where relevant, community introduction, collection and administration of user charges. Capacity-building activities will also address groundwater protection and conservation, environmental and hygiene education, and awareness programs and campaigns.

22. **Poverty and Social Assessment.** By means of a socioeconomic survey and other tools, and in accordance with ADB's *Guidelines for Incorporation of Social Dimensions in ADB Operations*,²¹ the consultant will assess the Project's social impact by undertaking the following tasks:

- (i) Review existing poverty per capita data, access to basic services by the poor, and the acuteness of health problems in (a) selected urban centers, and (b) selected districts where rural interventions are to be supported.²²
- (ii) Review the Government's national development strategy.
- (iii) Conduct a detailed poverty and social analysis for project areas, segregating data for urban and rural centers, guided by ADB's *Handbook on Poverty and Social Analysis*.²³ Specific activities will include (a) conducting a full socioeconomic survey²⁴ of project beneficiaries by gender and income group; (b) estimating the number of project beneficiaries with incomes below the official poverty line; (c) conducting an affordability analysis; (d) identifying vulnerable groups, including any minorities; (e) evaluating social and economic benefits; (f) identifying project impacts and recommending mitigation measures; (g) collecting and analyzing health data, including morbidity and mortality rates caused by waterborne diseases; (h) analyzing and evaluating social networks; and (i) preparing a poverty reduction and social development strategy.
- (iv) Based on ADB's *Policy on Gender and Development*²⁵ and assisted by ADB's *Gender Checklist for Water Supply and Sanitation* and *Gender Checklist on Urban Development Projects*, the consultant will do the following: (a) conduct a gender analysis and identify the potential for participation by women in project design, implementation, O&M, and training; (b) assess local gender-related constraints and

²¹ ADB. 2003. *Guidelines for Incorporation of Social Dimensions in Bank Operations*. Manila

²² The preliminary list of urban centers to be covered under this TA include Mannar and Vavuniya in the North-East Province and Chilaw and Puttalam in the North West Province. Districts where support for rural assistance is to be evaluated and designed include Mannar, Puthalam, and Vavuniya. In Anuradhapura and Polonnaruwa, remote villages will be prioritized. Coverage will be confirmed at inception.

²³ ADB. 2001. *Handbook on Poverty and Social Analysis*. Manila

²⁴ The use of qualified NGOs to assist with and conduct surveying and poverty mapping may be considered.

²⁵ ADB. 2003. *Policy on Gender and Development*. Manila; ADB.

opportunities for development; (c) formulate a gender action plan for the ensuing Project.

23. The consultants will also undertake the following actions:
- (i) Develop a participatory framework for community participation in the identification, planning, and design of the Project in urban and rural areas.
 - (ii) Review NWSDB's guidelines and manuals dealing with (a) selection of partner organizations, (b) social mobilization and community participatory planning processes, (c) socioeconomic surveys, (d) environmental conservation plans and hygiene and sanitation, (e) participatory rural appraisals, and (f) cost sharing and update as necessary;
 - (iii) Prepare a strategy for community mobilization and/or community organization for implementation under the resulting Project. Review previous approaches to community organization for urban and rural participation in Sri Lanka and detail project activities to organize communities for O&M of water utilities and sanitation facilities.
 - (v) Assess needs and distribution and capabilities of local NGOs in selected subsectors in towns and rural areas.

24. **Social Safeguards.** The consultants will ascertain the number of minorities and vulnerable people and their socioeconomic status and assess the specific anticipated impact that the Project will have on them using, among other documents, the checklist for categorization of indigenous people and will, if necessary, develop indigenous people development plans according to ADB's policy on indigenous people.

25. At an early stage of TA implementation, the consultant will apply ADB's resettlement checklists to identify resettlement issues and ascertain the nature and extent of the Project's impacts on affected households. Based on the assessment, the consultants will determine whether any of the water and sanitation infrastructure will have involuntary resettlement impacts and, if this is the case, in accordance with ADB's involuntary resettlement policy and *Operations Manual* on involuntary resettlement, prepare a resettlement plan based on subproject design in each town, including

- (i) reviewing and assessing key national policies, laws, and guidelines regarding land acquisition and compensation;
- (ii) identifying and enumerating people likely to be affected through a survey and/or census and preparing an asset inventory that identifies all types of losses;
- (iii) ascertaining preferential relocation areas, compensation, and livelihood restoration through consultation with those who might be affected;
- (iv) establishing an entitlement cutoff date and estimating the requirements for financial resources, comparing these with available resources;
- (v) providing options for relocating housing and other structures, including transfer to established new sites, options for livelihood restoration, and mechanisms for addressing grievances;
- (vi) defining institutional responsibilities for approving, implementing, managing, financing, and monitoring the resettlement plan along with implementation schedules, capacity building, financial plans and budgets, and a plan for internal and external monitoring and evaluation of the resettlement plan.

26. The consultants will use ADB's *Handbook on Resettlement*²⁶ as a guide in resettlement planning. For the rural component, which is envisaged may be a sector-like component, the consultant will prepare a resettlement framework that shall be consistent with the urban resettlement plan or plans.

27. **Environmental Assessment.** The consultants will undertake the following tasks:

- (i) Prepare an initial environmental examination and summary or an environmental impact assessment and summary²⁷ and an associated environmental monitoring plan covering each of the project towns and subcomponents, as well as simplified initial environmental examinations for three rural sample subprojects. This will be conducted in accordance with ADB's *Environment Policy* and ADB's *Environmental Guidelines*,²⁸ as well as Sri Lanka's National Environmental Act and other environmental protection regulations.
- (ii) Assess the positive and negative environmental impacts of proposed urban social infrastructure and services related to their location, design, construction, and O&M.
- (iii) Propose mitigation measures and develop a full environmental monitoring plan.
- (iv) Conduct consultations in line with ADB requirements.
- (v) Formulate environmental management plans for environmentally sensitive subcomponents.
- (vi) Prepare an environmental assessment and review procedure framework for the rural component of the Project.

28. **Consultations and Consensus Building.** To ensure community participation from planning and design stages and enhanced ownership, the consultants will carry out public consultations in selected towns and rural areas. Stakeholder workshops at national, provincial, district and town level will be conducted throughout the Project, including (i) initial data collection phase and evaluation study; (ii) early stages of design to identify needs, options and priorities; (iii) discussions with other water users and reaching of a common agreement, (iv) disclosure and agreement on final designs and (v) environmental and social safeguards public consultation.²⁹

²⁶ 1998. ADB. *Handbook on Resettlement: A Guide to Good Practice*. Manila

²⁷ The need for an environmental impact assessment will be particularly relevant if water is to be sourced from an environmentally protected or sensitive area, as may be the case in Mannar if water is to be extracted from the Giant's Tank.

²⁸ ADB. 2002. *Environment Policy*. Manila; ADB. 2003. *Environmental Assessment Guidelines*. Manila.

²⁹ The process will typically include the following: (i) identify individuals to represent the various stakeholder groups from towns and communities, allowing the stakeholders to nominate their own representatives, and ensure that all major stakeholder groups are represented; (ii) develop an issues assessment in consultation, explore issues that affect both the formulation of a project investment, and summarize views in an issues matrix; (iii) define the detailed methodology for the consensus building efforts and, if necessary, make a translation of the final version available to all participants; (iv) coordinate a consensus group that includes all the stakeholders, including high-level staff or community representatives, capable of making commitments on behalf of their organization, and gender-balance representation; (v) document the proceedings. Equal opportunity and encouragement will be given for all stakeholders to participate. All attempts will be made to reach consensus on every important issue. The issues to be discussed and resolved through the consensus meetings will include (a) realistic basic urban services subcomponents; (b) the institutional mechanisms most suitable for delivery schemes, clearly defining roles of each stakeholder; (c) a strategy for effectively mobilizing communities, with specific focus on involving women; (d) optimal strategy for O&M, addressing institutional and financial sustainability issues, as well as the need for major repairs; and (f) sustainable mechanisms for monitoring and evaluation.

B. Component 2: Developing Institutional Support for Sustainable Water Supply Community-Based Management

29. NWSDB's Rural Water Supply Unit has initiated a program of activities that will allow CBOs to access (i) technical assistance, and (ii) credit sources for essential O&M and rehabilitation of rural schemes developed under this Project or other projects. The support provided under this component will allow piloting of the program and replication under the Project potentially ensuing from this project preparatory TA.

30. Introducing By-Laws Relating to the Management of Rural Water Supply CBOs.

The lack of recognition of CBOs within Sri Lanka's legal framework was identified as one of the problems for effective community management of water supply and sanitation facilities. Based on studies prepared with United Nations Development Programme assistance under the National Water Supply and Sanitation Sector Facilitation Programme, by-laws for *pradesiya sabhas* and local authorities³⁰ were formulated to enable CBOs to operate as service providers. In conformity with the 2001 national policy for rural water supply and sanitation and pertinent manuals, NWSDB has prepared draft by-laws and resolutions relating to the management of rural water supply by CBOs. Such by-laws empower CBOs to create, carry out, maintain, and control small semi-urban and rural water supply schemes and widen their opportunities for access to funding capital for new facilities. Unfortunately, to date only one provincial council has adopted such by-laws.³¹ The consultant will undertake the following tasks:

- (i) Review by-laws of concern and associated legal documentation.
- (ii) Support NWSDB in organizing and conducting workshop sessions with each of the remaining provincial councils.
- (iii) Facilitate dialogue with provincial councils and local authorities and address their concerns.
- (iv) Prepare educational materials outlining major advantages and implications of by-laws and ensure their distribution.

31. **Operationalizing the Water Supply Development Fund for CBOs.** The long-term sustainability and successful introduction of water and sanitation schemes implies access to financing in case of emergency rehabilitation, expansion, and development. While schemes have been handed over to CBOs for O&M and general management, and CBOs also engage in fee collection, the Government retains ownership of the assets. CBOs have restricted access to financing sources and their lack of collateral limits their access to banking facilities. NWSDB, in coordination with the Rural Water Supply and Sanitation Division of the Ministry of Urban Development and Water Supply, has completed the preliminary design of the Water Supply Development Fund for CBOs and piloted the creation of the Community-Based Organizations Credit Trust Board, a fund proposed to be managed by Sri Lanka's provincial councils, in the North Central Province. Given these circumstances, the consultant will provide support to NWSDB by

- (i) reviewing the status of implementation of the Water Development Fund for CBOs in the North Central Province and provide recommendations;
- (ii) preparing educational materials on the subject and user-friendly manuals and instructions for CBOs;
- (iii) translating documents into Sinhalese and Tamil;

³⁰ It is proposed for this to be framed in terms of provisions made in the Local Authorities (Standard By-Laws) Act No. 6 of 1987 and Pradesiya Sabha Act No. 15 of 1987.

³¹ As part of the legal requirements necessary to effect the By-laws, approval from the Provincial Minister in charge of Local Government must be obtained and published in *The Gazette*, as should be associated a Pradesiya Sabha resolution.

- (iv) conducting training and explanatory sessions with all provincial councils and selected local authorities and/or *pradesiya sabha* representatives, CBO districts, and CBOs in those councils agreeing to adopt the funds.

32. Institutionalizing Financial Management and Accounting for Small Scheme Operators. Major findings resulting from one of ADB's regional technical assistances³² indicate difficulties encountered by a significant number of CBOs in relation to financial management and accounting. To address this, the consultant will engage in the following activities:





































- (i) Review experience from ongoing projects and material developed under previous assistance.
- (ii) Develop simple and efficient budgeting methods for CBOs and associated training materials.
- (iii) Develop simple accounting and auditing methods and mechanisms for CBOs and associated training materials.
- (iv) Conduct training in at least 10 districts, with a focus on training district-level support units and (in the presence of district-level officers) *pradesiya sabha* and CBO representatives.

C. Reporting Requirements

33. The consultants will submit four major reports: (i) an inception report no later than 4 weeks after commencement of services; (ii) an interim report within 3.5 months; (iii) a draft report at the end of the seventh month and (iv) a final report within four weeks of receiving comments from the Government and ADB on the draft report. Both draft final and final reports will contain separate sections for (a) the feasibility study and (b) community-development support. The consultants will also submit short monthly progress notes summarizing project activities, issues, constraints and proposed solutions. Tripartite meetings will be held among ADB, the Government and the consultants to review the inception, midterm and draft final reports and verify output-to-purpose accomplishments. Key deliverables from this TA will be translated by consultants to facilitate their review by Government and other stakeholders.

³² ADB. 2004. Technical Assistance for *Pilot Testing Participatory Assessment Methodologies for Sustainable and Equitable Water Supply and Sanitation Services*. Manila (RETA 6224).

Table 1: Indicative Staffing Schedule for Consultants

Position	Project Month								Person-Months		
	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	IC	NC	
A. International Consultants (IC), 											
1. Water Supply and Sanitation Specialist (TL)									7.5		
Component 1											
2. Economist									2.5		
3. Environmental Specialist									2.0		
4. Hydrologist									3.0		
5. Organizational Dev't and Financial Mng't Specialist									2.5		
6. Sanitation and Sewage Treatment Specialist									3.0		
B. National Consultants (NC), 											
1. Drainage Specialist										3.0	
2. Environment Specialist										3.0	
3. Financial Analyst										3.0	
4. Resettlement Specialist										4.0	
5. Sanitation and Sewage Treatment Specialist											6.0
7. Social Development and Gender Specialist											7.0
8. Water Supply Engineer (DTL)											7.0
Component 2											
1. Rural Water Specialist											6.0
2. Financial Management Specialist											7.0
3. Community Development Specialist											8.0
Total									20.5	54.0	
Reports and Deliverables	Inception Report										
	Midterm Report										
	Draft Final Report										
	Final Report										
Tripartite Meetings											

International Experts will be appraised based on the following additional criteria

- **Team Leadership**

The assignment requires advanced leadership, managerial, diplomatic, and negotiating skills and a history of managing for results, in adherence to the working regulations of employers.

- **Water Supply and Sanitation Specialist**

The expert should preferentially have a minimum of 15 years of experience. The expert will have advanced skills in overall urban development as well as water supply and sanitation. Practical experience should cover planning and feasibility design of projects, detailed engineering design, policies, and participatory consultative processes. The expert should be familiar with multiple treatment processes (which should preferably, but not exclusively, also include desalination). Country and regional experience and knowledge of ADB processes would be beneficial. Familiarity with familiarity with ADB processes and procedures would be an advantage.

- **Economist**

The expert will have advanced skills in reviewing and analyzing macroeconomic and sector issues, preparing socio-economic surveys and conducting demand analysis, familiarity with cost recovery policies and cost recovery mechanisms, tariff and user charges, and reviewing social and financial objectives. Practical experience should cover international best-practice knowledge, billing and financial management, detailed economic project costing, economic efficiency, quantifiable and unquantifiable project economic benefits, and financial sustainability principles. Familiarity with rights-based approaches would be beneficial. Country or regional experience and knowledge of ADB processes would also be beneficial.

- **Environmental Specialist**

The assignment requires preferentially a minimum of 10 years of experience. The expert will have experience in environmental impact assessment, integrated water resource management, environmental legislation, institutions and processes. Country or regional experience would also be beneficial.

- **Hydrologist**

The expert will have experience in assessing groundwater yields and forecasting extraction. The expert will master computer-based modeling programs and other related tools. The Hydrologist will have proven experience in working in arid areas. Country or regional experience would also be beneficial.

- **Organizational Development and Financial Management Specialist**

The expert will have practical experience in urban governance, policy and institutional reform and its entry points, processes, institutional appraisal, financial management analysis, business and market analysis, and stakeholder analysis. Familiarity with rights-based approaches would be beneficial. Country or regional experience would also be beneficial.

- **Sanitation and Sewage Treatment Specialist**

The expert, with a background in engineering, will have a proven track record in designing sewage reticulation systems and sewage treatment plants. Operational experience will be beneficial. Country or regional experience would also be beneficial.

Appendix 2 - Political/Administrative Subdivisions and Distribution of Local Authorities, Sri Lanka, 2003

Political/Administrative Subdivisions and Distribution of Local Authorities,
Sri Lanka, 2003

Province	District	Number of Local Authorities			
		MC	UC	PS	Total
Western	Colombo	4	3	5	45
	Gampaha	2	5	12	
	Kalutara		4	10	
Central	Kandy	1	4	17	42
	Matale	1		11	
	Nuwara Eliya	1	2	5	
Southern	Galle	1	2	15	43
	Matara	1	1	12	
	Hambantota		2	9	
North Western	Kurunegala	1	1	18	32
	Puttalam		2	10	
North Central	Anuradhapura	1		18	25
	Polonnaruwa			6	
Uva	Badulla	1	2	14	27
	Monoragala			10	
Sabaragamuva	Ratnapura	1	1	13	26
	Kegalle		1	10	
North Eastern	Jaffna	1	3	12	71
	Mannar			4	
	Vavuniya		1	4	
	Mullativu			4	
	Kilinochchi			3	
	Batticaloa	1	1	10	
	Ampara	1	1	14	
	Trincomalee		1	10	
Total		18	37	256	311

Source: Sri Lanka Institute of Local Governance

**Appendix 3 - Report on the methodology used and the results of the Lessons Learnt
Survey Lessons Learnt**

Appendix 3

Report on the Methodology Used and the Results of the Lessons Learnt Survey

1. Introduction

1. Lessons are important for the project planners to correct mistakes and formulate projects rationally. In the field of water supply and sanitation in Sri Lanka, many agencies have been struggling with finding sustainable solutions for safe drinking water and sanitation issues in rural communities. The Rural Water Section (RWS) of the National Water Supply & Drainage Board (NWSDB), The Rural Water Division (RWD) of the Ministry of Urban Development and Development of Sacred Cities, The Ministry of Nation Building, Provincial Councils, International Non-Governmental Organizations such as Plan International and World Vision, are the major institutions among them. Various organizations such as the Central Government, Asian Development Bank (ADB), World Bank, etc. have been assisting those agencies since the mid 90s to implement rural water supply and sanitation schemes in various scales. The majority of those schemes, more or less have applied demand driven as well as participatory approaches and believed that the Community Based Organizations (CBOs) should manage the rural water supply schemes. Therefore, high community involvement in each aspect i.e. designing, implementation and operational & maintenance (O&M), has been emphasized in such schemes. Thus, lessons that can be gained from the experience of these schemes, especially from the ADB assisted Third Water Supply and Sanitation (TWSSP) project, are enormous.

1.1. Methodology

2. Accordingly, seventeen rural water supply schemes were selected for evaluation under this PPTA to learn lessons. Nine village schemes and two small town schemes, completed under the ADB assisted Third Water Supply and Sanitation (sector) Project, one village scheme and one small town scheme of the ADB assisted Secondary Town and Rural Community Based Water Supply and Sanitation Project, one village scheme completed by the World Bank assisted Community Water Supply and Sanitation Project (CWSSP) and implemented by the Rural Water Division of the Ministry of Urban Development and Development of Sacred Cities, two village schemes completed by the Plan International and World Vision (International NGOs), one village scheme implemented by the RWS division of NWSDB with its own funds and

assistance from the Fisher Fund of Switzerland (see Annex 1) were among the selected schemes.

3. When selecting the sample, the stratified sampling method was first used to ensure that water supply schemes implemented in the proposed project location as well as the different technologies and schemes are included into the sample and then seventeen schemes were selected using the random sampling method. Thus, the sample included three small town schemes and fourteen village schemes. Technology wise, it consisted of three categories of technologies, namely piped schemes, point sources and a combination of piped and point sources

1.2. Measuring of performance of parameters

4. A check list (see Annex 2) was utilized with a set of indicators to generate information to measure the performance of the schemes using fifteen parameters developed to cover the most important aspects such as planning, implementation and Operation and Maintenance of the schemes. Each parameter was measured with four indicators under three categories i.e. poor, satisfactory and very satisfactory. The indicators in the poor category were not eligible for marks, but the indicators under the satisfactory category got 15 marks for each, while an indicator in the very satisfactory category was eligible for 25 marks. To see the overall status of a parameter, the total marks obtained by the respective parameter was considered. To see the overall performance of a scheme, the average total of marks of all the parameters was considered. Thus, a scheme which received less than 40 marks was categorized as poor and the schemes that obtained 40-60 marks were considered as schemes with satisfactory performance. Accordingly, the schemes that obtained 60-100 marks were placed in the category of very satisfactory performance. However, it should be noted that the purpose of the exercise was not to grade the schemes, but to learn lessons from them. Therefore, in the analysis the emphasis was given to lessons to be learnt.

1.3 Justification for selecting the schemes for assessment

5. The locations of the proposed water supply schemes to be covered by the TA No. 4853-SRI, are quite different from those of the previous ADB assisted water supply and sanitation projects. Two of the districts to be covered are Mannar and Vavuniya, which come under the Northern Province, where there is a severe scarcity of water sources and the population often experience conflicts between the government's armed forces and Tamil militants, which heavily disturbs the

day-to-day life of the civilians. The rest of the project location is also bordering to the conflict area. Therefore, when selecting the schemes for the lessons learned study, one of the major criteria's was selecting a few schemes from the area that are considered as 'Threatened Villages' (the villages adjacent to conflict areas) to learn what constraints that the communities and the project implementers face in implementing water supply and sanitation schemes in those areas. Likewise, some schemes implemented using different technology and methods, both by the NWSDB and other agencies, were included in the selected schemes. The selection was confined only to the schemes that had been implemented close to or in the proposed project locations. Considering the above factors, the schemes were selected randomly from lists of schemes provided by the relevant agencies.

1.4. Evaluation process

6. All the local specialists of the consultant's team were engaged in collection and compilation of information to ensure a quality output from the exercise. Three multi-disciplinary groups of the specialists, comprised of three members in each, assessed the schemes. As the first step of the assessment process, the consultants organized a one-day workshop on the 9th August 2007 for District Managers, Sociologists/Community Development Officers and a few representatives of the Partner Organizations who were directly involved in implementing the TWSSP. This was considered as a workshop for service providers from which to learn lessons. The outcome of the workshop is presented in this report. Assistance of the officials of the NWSDB as well as other relevant agencies was sought for organizing the CBO meetings for scheme evaluation. A field test on the checklist was conducted by the consultants prior to the assessment to ensure the quality of the exercise.

7. What's more, the appropriate lessons, which will be applied in the proposed project, were also found in some of the study reports on the TWSSP. The draft Project Completion Report (PCR), the Benefit Monitoring & Evaluation study (BM&E), Qualitative Information Assessment (QIA), and in addition, three dissertations of Masters Degrees related to the TWSSP, completed recently by NWSDB staff, who were directly involved in implementing the project, were included in the documents studied. The lessons and recommendations found in these documents are also included in this report.

1.5. Limitations

8. Due to the limited time frame and resources, the number of parameters selected to assess the schemes was confined to only fifteen. Since this exercise was for learning lessons, a deeper analysis of data on each parameter was not considered necessary. Similarly, the differences in the implementation methodologies between the different agencies were also not considered in depth, but major characteristics of their approaches were considered for any lessons to be learnt. It was found difficult to give marks for the schemes that are not functioning at present. Udappuwa, the rural water scheme, which has been implemented with NWSDB's own funds, is one such scheme. It was only possible to record NA (Not Applicable) for all the parameters, but the schemes was still further assessed since there lessons to be learnt as to how the present situation there had arisen.

1.6. Time frame

9. The evaluation was commenced in the field in the first week of August and completed within three weeks from the commencement (see Annex 3). Meeting the respective communities was a difficult task since many of the village schemes are situated far away from town centers and it was difficult to communicate with them prior to visiting them.

2. Findings

10. The evaluation was conducted in sixteen schemes (except Udappuwa) to assess the fifteen parameters and generated a lot of very valid data and information from which many lessons can be learnt for the proposed project. Therefore, a simple analysis (Annex 4) was done with the data generated for lessons.

11. The following is a summary of the analysis:

The analysis shows that some of the parameters had been performed well in some schemes but in others things did not been happen as required or expected. The important parameters such as selection of sub projects, technology utilized, levels of community participation, quality of construction, reliability of water supply service, O&M mechanisms, women's participation and good governance were shown to have been successfully achieved in the majority of the selected schemes. However, in many of the schemes, it was witnessed that the performances of sanitation and hygiene promotion activities, consolidation activities, environmental activities, financial management, monitoring mechanisms, involvement of stakeholders and the

implementation mechanisms did not reach a satisfactory level. In only a few schemes it was shown that they did not reach a satisfactory level.

12. The poor performance in reaching the above parameters directly affects the sustainability of the schemes and therefore, the factors that contributed to this situation have to be identified and corrected for application in other projects. The discussions held with the CBO leaders, VCC members, community members, service providers, etc., revealed that many factors conducive to the successes and the failures of the schemes and some proposals to correct them were suggested. Accordingly, in the following chapters (a) the common lessons and proposals (b) the specific lessons learnt and proposals suggested during the evaluation of schemes (c) the specific lessons and proposals from the workshop held with the service providers and (d) lessons extracted from the studies such as PCR -2007 of TWSSP, BM&E, QIA and the three dissertations of MA degrees are presented respectively.

2.1 Common lessons and proposals

13. The following can be highlighted as the common lessons that almost all the parties identified. Likewise, the recommendations suggested, based on the lessons, are more or less the same. Hence, the following can be considered as the major lessons and recommendations that are important for consideration in formulation of the proposed project:

- The demand driven approach is highly accepted everywhere, but the indicator (a list of names of the community members) used for measuring the degree of willingness to pay does not give a realistic picture on the situation. Accordingly, if new schemes implemented are based on such a list may encounter problems and unnecessary delays. A new strategy is needed.
- Women as CBO's officials, group leaders and members of the CBOs have played a significant role in every stage of the project cycle of the scheme. Their active participation has been identified as one of the major factors for the success and the sustainability of the scheme. However, no special strategies have been developed for empowering women and therefore this factor has to be considered seriously.
- Governance of the CBOs has been very satisfactory in most of the schemes. More good governance practices would contribute to establishing transparent functioning and sustainability of the schemes.

- When implementing projects with community participation, high level of mobilization of people is of paramount importance. Partner organizations (PO) are fully responsible for mobilizing the community towards the fullest participation and therefore the role of the PO is very vital. Appointing unqualified POs for this purpose completely damages the purpose and makes communities distance themselves from the scheme. Therefore, appointing qualified POs is very important.
- The active CBOs, Divisional Level Coordinating Committee (DLLCs), Village Coordinating Committees (VCC) and Group Leaders who are committed and work in partnership with each other and the service providers, concerning the expected outcome of the scheme, really make the success of the scheme. In a situation where this context did not exist, the schemes failed. Therefore, this situation has to be taken into serious consideration.
- For many schemes, the future water demand was not properly forecasted, yet it has been witnessed that CBOs are compelled to go beyond the projected usage due to socio, political situations, which has affected the sustainability of the scheme in many ways.
- Financial management aspect needs more attention. Lack of annual budgeting, low tariffs, no proper record keeping or financial monitoring system, not maintaining a capital fund for replacement etc. have slowed down the efficiency of many schemes. This situation, in some schemes has even has led to misuse of funds.
- The traditional ways and means of making aware the people on sanitation and hygiene promotion activities and lack of a planned system to utilize the local as well as the national level health authorities effectively in the scheme have shown poor results. Innovative strategies and more participatory methods would attract especially the poor segment of the community and school children in this subject.
- Environmental issues have not been considered by many CBOs as a major component that contributes to sustainability of the schemes and therefore it is not in the agenda of the CBOs. Accordingly, the protection of water sources and catchment areas have been neglected. Special attention is needed to this.
- The Consolidation program, which covers the preparations for the management, operation and maintenance for efficient sustainability of the schemes, has not worked properly. Special attention from the outset of the project has to be paid in this regard and

a proper plan that could be implemented without much trouble has to be developed with the assistance of the CBOs, CBO fora and the DLCC.

- Monitoring as a whole is not satisfactory in most of the schemes. Monitoring of progress, water quality, quality of constructions, financial situations, etc., in many of the schemes has not had proper attention paid to this. Documentation of lessons that can be applied in other projects or sharing experiences with other CBOs and outside agencies, developing and updating data bases have been very limited. Proper attention to this aspect has to be paid in the proposed project.
- Lack of a preventive maintenance mechanism within the CBO and unavailability of a Technical Support Unit in the regional office of NWSDB are other factors that hinder the progress and the sustainability of the schemes.

2.3. Specific findings of the evaluation of schemes

- Almost all the CBOs responsible for schemes under the ADB assisted 3rd Water Supply and Sanitation Project mentioned that the Sub Project Cycle implemented in their schemes was effective. The CWSSP, ADB 4th project and Plan International have applied more or less the same implementation methodology though with some differences.
- Poor segment of the community pay their cash contribution earlier than the well off people if they are properly mobilized.
- Appointing group leaders is a necessary and wise action for the success of water supply schemes.
- Divisional Level Coordinating Committee (DLCC) is a very effective system for water supply schemes.
- Tri-partite agreement has not shown expected results.
- The election of government officials to the executive committee of CBOs, overwhelms the voice of community leaders.
- Insufficient community mobilization produce low results.
- A low tariff system does not cover the replacement cost and make at least a marginal profit level.

- It is difficult to retain workers such as caretakers, meter readers, etc., when there is no payment for their services.
- Inadequate water demand forecasting gives much trouble when expanding the schemes.
- The Sanitary Revolving Loan Fund has not been utilized for the intended purpose.
- The amount of financial assistance (Rs. 4,000) given for the construction of latrines was insufficient and delayed the completion of construction.
- Caretakers who have not been given training on control panels and basic electrical work cannot run the schemes efficiently.
- Starting of construction work before collecting the required community (cash) contribution delays the construction process.
- The progress of the sanitation and hygiene promotion program depends highly on the Public Health Inspector (PHI) and the local health authority.
- Wells constructed during the wet period often dry up during the dry period.
- When there is a real need and no alternative solutions are available, then the schemes achieve success.
- Inactive CBOs create tremendous problems.
- Neglecting local knowledge in the selection of water sources has created many issues.
- High community participation gives good results.
- Obtaining just a list of names indicating that a 75% of the community accepts the demand driven approach is not effective.
- Starting construction work without considering the participatory time availability of the community delays the progress of the schemes.
- Political involvement in CBO activities really disturbs the progress of the schemes.
- Village Coordinating Committee (VCC) is a very important mechanism to work in the community at the pre-project phase.
- Improper awareness of rainwater harvesting does not encourage people to use rainwater for drinking purposes.
- Technology of point sources has not given expected results in many places.

- If the NWSDB and Partner Organization (PO) do not give proper attention in selection of proper water sources especially the boreholes, the schemes face severe problems.
- Installation of low quality water meters has given trouble in many places.
- Conflicts between villagers and among officials of the CBOs always badly affect the progress of the water supply schemes.
- Lack of a preventive mechanism leads to sudden break downs of the schemes.
- Lack of an annual budgeting system for the CBO creates financial issues.
- Participation of women in water supply schemes is very effective.

Note:

14. Neglecting communities situated between a selected scheme and the water source or the distribution tower creates much trouble. The neglected communities tend to damage the main or use water by making illegal connections so disturbing the effective functioning of the system and creating conflicts among the communities. The scheme in Udappuwa has such an experience and at present the scheme is totally failed and the two communities do not maintain a good relationship too.

2.4. Lessons and proposals that emerged from the workshop with service providers

15. The participants of the workshop were the District Managers, Consolidation Engineers, Sociologists, Community Development Officers and a few representatives of the Partner Organizations. The participants, except for the PO representatives, were based at the Project Implementation Unit (PIU) in the districts, were the ones who directly implemented the schemes through the Divisional Implementation Unit (DIU), POs and CBOs. They were responsible for liaising with relevant government officials and organizing the DLCC. Therefore, their rich and first hand experience, lessons learnt and proposals were very important in this exercise. The participants, as the service providers, were formed into small groups and asked to use their experience in assessing the performance of the schemes. As a result they presented the outcome categorized into nine parameters that were subsequently used in evaluating the village schemes. Accordingly, the outcome of the workshop is given below:

2.4.1 Appropriateness of selection of sub projects

- Receiving just a list of names of community members expressing their willingness to pay (requirement of 75% of the community) has not given expected results in many places.
- Payment of 50% of the cash contribution before the commencement of scheme delays, if not the group leaders and VCC work actively.

2.4.2. Effectiveness of stakeholder involvement

- In schemes where committed and active group /community leaders were available, good results have been achieved. Therefore, selection of group leaders is very important. The method use by the 4th ADB project for this purpose seems effective.
- Active participation of the community/group leaders should be encouraged, but not by paying allowances.
- The Divisional Secretary and Community Development Officer of the Divisional Secretariat can play an important role in the preparation and formulation of the scheme and therefore they should be involved from the beginning.
- Changing of the ruling party in the Pradeshiya Sabha (PS) has always created barriers to the progress of the water supply schemes and therefore the project implementers should deal with both the ruling and opposition parties equally for the sake of the scheme.

2.4.3 Appropriateness of implementation methodology

- It was difficult to achieve the set targets qualitatively within the given time frame in the sub project cycle applied in the TWSSP and therefore the time frame for the preparation and implementation of the scheme need to be reconsidered since it has to be done with community participation.
- Support services from the project have to be given in time.
- Appointing of contractors should be done carefully because unqualified contractors have caused much trouble and incidents and in some cases some of them abandoned the work due to their inability to complete the tasks in time.

- In evaluating tenders, the lowest price should not be the only criteria for selection and there should be a mechanism to evaluate the contractor's previous performance in the relevant field of construction.
- When selecting Partner Organizations, consideration of technical and financial proposals should be the base. Appointing of unqualified POs has created many issues in the community.
- The method of allocating a set fund to sub projects without considering the geographical as well as especial characteristics of the schemes is not effective.
- Preparing common expenditure estimates sometimes creates obstacles for the schemes. Therefore, when preparing expenditure estimates, the districts prices have to be considered (eg. Mannar and Vavuniya).

2.4.4 Appropriateness of utilization of technology in water supply

- Low cost water treatment (piripahadu) methods have failed in some schemes.
- Recommending inappropriate water supply technologies results in much trouble for the benefiting communities.
- Wells constructed during the wet season have often been found to dry up in the dry season.
- Water quality of tube wells has been found to change after a certain period of usage.
- The schemes where water demand forecasting has not been done properly, currently face difficulties in expansion.
- Unavailability of a Technical Support Unit is a big problem for the CBOs particularly with regard to O&M.

2.4.5. Quality of construction

- Mechanism should be developed to certify the quality of the materials.
- The construction work undertaken by CBOs in many schemes was not of good quality where there was none of the required construction skills available and proper monitoring.

- If a PS is selected as an implementation unit (PSIU as in ADB 4th project), an engineer should be provided for the PSIU through the NWSDB.
- CBOs should be given a thorough training in construction activities.
- Adequate level Surveys should be done in the preparation of pumping schemes.
- Expansion of the service/scheme in some places without considering the water demand forecasting data has endangered the sustainability of the schemes.

2.4.6. Degree of Community Participation

- The methods applied in both the 3rd and 4th ADB projects are recommended for the proposed project too, but measuring the level of participation should be based on qualitative indicators rather than quantitative.
- Quality of the community participation should be assessed at the end of each of the stages of the project implementation process.
- Strategies should be developed to maintain the enthusiasm of the community even after the completion of water supply and sanitation facilities.
- Emphasis has not been given properly on sustainability of the CBO.
- Resource mobilization within the project period should be done in time.
- Providing group loans increases the group strength and therefore the project should facilitate the development of a seed fund in the CBOs.
- Delays in deciding the water source discourages the community in being involved in the scheme enthusiastically.

2.4.7. Effectiveness of sanitation and hygiene promotions

- The financial assistance given for the poorest category for latrines is not adequate to complete the latrines without delays and difficulties.
- Community Facilitators should be given special training in hygiene education.
- Strategies should be developed to get the officials of the Health Authority involved effectively in the sanitation and hygiene promotion activities.

- The purpose of the Sanitation Revolving Loan Fund has not been achieved and therefore innovative strategies are needed to activate the fund.

2.4.8. Financial management

- Obtaining both program and financial progresses of schemes through one data base system would give good results and avoid delays.
- A simple guideline on financial management needs to be provided to the CBO at the outset.
- Annual auditing is essential and the members should be educated in general meetings on annual audit. Appointing an auditing committee for the CBO is useful.
- Auditing has to be done by an external party (though it is mentioned in the constitution, it is not followed in some places).
- Inappropriate tariff systems (low tariffs) in many schemes have created O&M issues.
- It is witnessed that the CBOs can manage rural water supply schemes efficiently and effectively, if they are trained well and apply good governance practices.
- A rehabilitation fund should be developed within the CBO.

2.4.9 Effectiveness of the existing monitoring mechanism

- In general there has not been a practice of recording of lessons learnt.
- Practicing of a strong monitoring mechanism to measure the progress and to make corrections always gives better results and therefore the CBO from the outset need to emphasize this.
- A special monitoring system for O&M is highly essential.
- Maintenance of common dug wells and hand pump tube wells are not as successful as the individual facilities. New strategies are needed.
- Monitoring of water quality should be encouraged.

2.5. Lessons excerpted from the Draft Project Completion Report of TWSSP –

16. The TWSSP is almost completed and therefore the draft Project Completion Report (PCR) is being prepared for presentation at a workshop planned to be held at the end of December. The report highlights many lessons and makes proposals for the improvement and to be applied

to other projects. The following chapter describes the lessons and recommendations of the PCR. The section of “other learning’s” of this chapter contains the experience especially collected through the project staff of the PIUs. This first hand experience derived from the field would be very valuable for the future project.

- Inaccuracies in cost estimates for rehabilitation works contributed to the cost increase. Higher contingency funds should have been provided for such works.
- UFW could not be reduced on a sustainable basis only by repairing infrastructure. Institutional, managerial, and social measures were required in tandem with the rehabilitation works.
- Before handing over the water supply distribution systems to local authorities, the Government and NWSDB should allocate enough funds and staff to support local authorities in training staff and building capacity.
- To extend services for the urban poor, the connection fee on concessionary terms and low lifeline tariff should be considered.

2.5.1. Other lessons

- Construction of rural water supply schemes in lands without acquiring them legally for the CBO, PS or the Divisional Secretary creates much trouble to the schemes.
- Caretakers and other staff whose services are needed for fulltime to run the schemes should be compensated for their services because they will not commit to their role if they are not paid.
- It is very important to make politicians thoroughly aware on project procedures and concepts; otherwise they might badly interfere in project activities, which in turn disturbs the smooth implementation of the project.
- Appointing of staff that are not familiar with community work and not committed in working with people makes severe harm to the schemes.
- Friendly dialogues among communities with the assistance of respectful leaders can solve conflicts and overcome barriers to schemes effectively.
- Electing community members associated with party politics as main office bearers for the CBOs creates many troubles in implementing the schemes.

- Delaying of depositing monthly collections in the account and keeping a large amount of money as cash in hand encourages financial misuses.
- Keeping financial records properly and regular monitoring of them by other main office bearers leads to reduce the misuses.
- Behavioral changes of people regarding the use of latrines can be achieved through continuous and effective ways of improving awareness.
- When preparing a Community Action Plan for a water scheme, the first item should be to develop and build the water source and then lay pipes from there to the site where the storage tank is built. If any resistance comes for using lands, etc., in the middle of pipe laying, then the remedial actions could be taken without having much damage to the project.
- Utilising a CBO managed water supply scheme by NWSDB without consulting or having approval of them to supply water for non-members eventually damages the sustainability of the scheme and the CBO as well.

2.6. Lessons excerpted from the BM&E study.

Experience of working with a Pradeshiya Sabha

17. Nochchiyagama rural water supply scheme has been implemented as a pilot project by the TWSSP to gain experience and lessons to work in partnership with PSs and the experience is that it is very important for the NWSDB to develop strategies to work with PSs. It has been witnessed by the staff of the NWSDB that the PS Chairman as a political character was concerned more on welfare type of activities and some times tried to by-pass the rules and regulations of the PS to help the supporters of the political party he was attached to. Moreover, the Chairman has made a lot of promises to the people, which cannot be fulfilled by the project, in order to sustain in party politics.

18. The Chairman has also encouraged a community to go for a piped scheme in a village where there is no electricity supply to operate the pump. The work has been commenced on the promise that electricity would be obtained with the support of the political authority, but it did not happen so and wasted a large amount of funds.

19. Being a politician, the Chairman preferred to take quick decisions despite the project guidelines in order to satisfy the community and such incidences have created difficult situations for the NWSDB staff.

20. The most difficult incidence that the NWSDB's staff has faced was an attempt of the Chairman of the PS to purchase millions of rupees worth of construction materials without going through the proper tendering process. The PMU has taken proper and timely actions with the PIU to solve this issue amicably.

21. It is also found that lack of a proper monitoring system and insufficient awareness of the PS Chairman about certain guidelines, especially the tendering procedures of the project, have been some of the main reasons for this situation.

22. Nonetheless, lack of monitoring, lack of negotiations, lack of mutual understanding, lack of flexibilities, lack of awareness about organization cultures and organization politics, confining only to the rules and regulations etc. by both the parties viz. the NWSDB and the PS have contributed more or less equally to create the above and other issues and delays the successful completion of the scheme.

23. Hence, Nochchiyagama pilot project is a valuable experience for the NWSDB staff as well as to the staff of PS on how to work collectively to achieve one goal with an organization where basically the mission, culture, procedures and the practices are different from each other. Therefore, new and innovative strategies need to be developed based on the above experience and lessons to work with PSs effectively, which has the full responsibility for looking after the water supply and sanitation facilities of the inhabitants of the PS area.

2.7. Recommendations excerpted from the study of Qualitative Information Assessment (QIA) - 2006

24. The Qualitative Information Assessment of Participatory Assessment Methodology was conducted with the assistance of RETA project of ADB in 2006. The purpose of the study was to assist the government, project implementing agencies and user communities to achieve sustainable and equitable services. This study has revealed many important lessons. A summary of them and some recommendations are presented below.

- Common dug wells, hand pumps and tube wells are not as successful as the individual facilities. Therefore, another strategy for the construction of common facilities is needed.
- Sometimes the better-off community members become leaders of the CBO's, which constrains ideas expressed in the CBO by the poor and women in particular.
- Batch-wise operation was a wise decision taken at the inception of the project.

- To avoid conflicts with other water users and to secure the water source, the availability of water should have been carefully examined, and its projected use should have been coordinated with other users at the design stage.
- Tariff increases were effective in decreasing the water demand of high consumption households, but not enough to substantially reduce overall water demand.
- Low attention is paid by the CBO's for appropriate tariff revisions in time. This is a serious issue for sustainability of the system.
- The involvement of beneficiaries in all aspects of development, implementation and O&M can create a sense of ownership and improve the sustainability of the project.
- Integrated approach on project implementation with sector partners and their intersection/departments was a good move. However, the available capacities and the limitations of the sector bodies need to be examined in depth prior to delegating the responsibilities to them.
- The existing procedures on compensation for damages (properties, inundations, compulsory acquisition, etc.) had created serious bottlenecks. In some instances, even court orders for compensation have not been carried out by the administrators and thereby the project and the third parties suffered.
- Alternative financing mechanisms, more suitable to the ability of the poorest to pay for water and sanitation services, can help to reach greater numbers of poor in a more sustainable manner.
- Water supply program must strive to include health and hygiene education and awareness raising efforts- without exception- if improvements in the well being of the rural communities are to be achieved.
- Ensuing projects should include stronger support for national and in particular local-level implementing agencies on planning and budgeting for O&M to increase the sustainability of systems. This may require capacity development and backstopping for O&M staff as well as users in community managed systems.
- Replacement trainings for O&M teams and committee members are largely not planned for-this is particularly a problem with the community managed schemes and requires forethought in the design of the project and planning for handover of systems.

- Attention in WASH sector program to source protection is weak. Water source protection from contamination and pollution are crucial if benefits of increased water supply are to be fully realized.
- On-site sanitation improvements are crucial.
- Support to communities and supporting local government institutions for planning and budgeting for O&M is urgent if the systems that have been implemented are to remain functional over a sustained period of time.

2.8. Lessons and recommendations excerpted from dissertations

25. Many studies have been conducted on the TWSSP since it is a very successful rural water and sanitation project as a whole implemented with the assistance of the ADB. The project implemented through the community development as well as demand driven approaches, giving benefits approximately to one million people in six districts producing many results and lessons for the water sector. The dissertations of MA degrees completed by three staff members who worked as the Chief Consolidation Engineer, a District Manager and a Senior Sociologist in TWSSP are three of such documents and have highlighted very important lessons on village as well as small town schemes and have also suggested valuable recommendations. Selected lessons and recommendations are stated in integrated manner in the following chapter.

- The present backup support system is not satisfactory due to non-functioning of tripartite agreement signed between CBOs, local authorities and NWSDB regional offices for hand pump tube wells.
- Steps of selection criteria of small towns, selection of NGOs as partner organizations and recruiting of experienced staff for selected NGOs should be reviewed and streamlined with local authorities and other relevant parties.
- Implementing the tripartite agreement, adherence to a preventive maintenance plan, regular meetings in CBOs, water quality monitoring program and re-evaluation of handing over process of water supply schemes to CBOs should be given proper attention.
- Low cost appropriate treatment methods should be introduced during the selection of water treatment facilities, where required and appropriate.

- A consolidation plan should be prepared before starting the project by considering each and every step of project and it should be closely monitored by experienced personnel during the implementation process.
- The present institutional set up should be upgraded to the level of a more legally recognized organization.
- Local authorities and NWSDB regional offices should appoint responsible officers for effective implementation of the tripartite agreement.
- NWSDB regional offices should arrange water quality monitoring program for CBO managed water supply schemes with a cost-covering basis.
- Preventive maintenance plan should be prepared and monitored by CBOs with the help of NWSDB for longer operational lives of pumps and other accessories.
- Regular meetings should be arranged within CBOs at least once in a month and with consumers in every six months to fill the communication gap among all parties.
- Monthly accounts should be published at CBO offices and an annual audit report be made available to all consumers.
- The project should arrange a maintenance fund for CBOs with the help of local authorities, provincial council and the government.
- Donors and implementers should pay attention to provide treated water rather than raw water for drinking.
- Metering of connections ensures equitable distribution, reduction of NRW, mitigating illegal connections and enhances the confidence within the community.
- Have a quality assurance system using an independent body prior to handing over schemes to CBOs.
- Involvement of the community from the planning stage will enhance the sense of ownership.
- Provide training, guidelines on financial transactions during implementation is recommended as it works well during O&M phase.
- Involvement of the poorest category in construction works has to be done without affecting or damaging their day-to-day breadwinning.

- Make aware the community on replacement cost and its relationship with the sustainability.
- Implement more hygiene education program during project implementation and O&M phases.
- Introduction of water quality monitoring systems in rural areas should be developed.
- Continuous refreshment training has to be provided to the CBOs.
- The major task of the CBO's forum will be to monitor CBO maintained water supply schemes.
- CBO should be developed as a pressure group then it will have influence on the sustainability of the water supply schemes even if the maintenance authority is not a CBO.
- Capacity of PS in funding and staffing should be seriously considered when planning the sustainability of the scheme.
- Lack of training in maintenance and poor monitoring have led to deterioration of the conditions of many hand pump tube wells.
- Lack of awareness regarding water quality causes increases in water born diseases.
- Rainwater harvesting programs should be encouraged by the government and other relevant authorities, since they are a good alternative to scarcity of water.
- There is a tendency that young leadership in the community is getting away from CBO activities due to the influence of party politics. Strategies should be developed to overcome this situation.
- Each and every segment in the community such as the schools, CBO's, Farmer Organizations, religious institutions, etc., should be got involved in protection of sources, the catchment area and in water resource management.
- User perceptions on rainwater harvesting for drinking have not yet been satisfactorily changed. The socio cultural phobia on this matter needs to be identified through a separate study.
- Attitudinal changing program with the community groups have to be planned in a careful and logical manner to popularize rainwater harvesting among people.

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Annex 1

Water supply schemes selected for primary evaluation.

No	Name of Sub-project	District	Pradeshiya Sabha	Implementing/Funding agency	Technology	No. of Households served	Remarks
01	Pemaduwa small town	Anuradhapura	Nuwara Gampalatha (Central)	NWSDB/ ADB(3)	Pipe wss	325	Small Town scheme
02	Kelanikawewa	-do-	Kahatagasdigiliya	NWSDB/ ADB(3)	Point sources	67	Village scheme
03	Kandalama West	-do-	Kekirawa	NWSDB/ ADB(3)	Pipe wss	254	Village scheme
04	Helambagaswewa	-do-	Medawachchiya	NWSDB/ ADB(3)	Pipe wss	226	Village scheme
05	Dunumandala wa	-do-	Wilachchiya	NWSDB/ ADB(3)	Pipe wss+ Point sources	215	Village scheme situated adjacent to conflict areas
06	Othtappuwa	-do-	Nochchiyagama	PS//NWSDB/ADB (3)	Pipe wss	375	Pilot Scheme
07	Galkiriyagama	-do-	Palagala	NWSDB/ ADB(4)	Pipe wss	250	Small Town scheme
08	Parawahagama	-do-	Palagala	Plan Sri Lanka	Pipe wss	237	Village scheme
09	Pahalawewa	Anuradhapura	Nachchaduwa	CWSSP/WB	Pipe wss	235	Village scheme
10	Punchi Vilathtewa	Puttalam	Chilaw	NWSDB/ ADB(3)	Pipe wss	200	Village scheme
11	Kurignampitiya	-do-	Kalpitiya	NWSDB/ ADB(3)	Pipe wss	270	Village scheme
12	Saliyawewa	-do-	Karuwalagaswewa	NWSDB/ ADB(3)	Pipe wss	600	Small Town
13	Ilakkattuwa	-do-	Arachchikattuwa	NWSDB/ ADB(3)	Pipe + point sources	530	Serious water quality problem at the source
14	Kaladiya/Nelumwewa	-do-	Puttalam	NWSDB/ ADB(3)	Pipe + Point sources	975	Village scheme
15	Mangalapura	-do-	Wnathawilluwa	World vision	Pipe	120	Village scheme
16	Udappuwa	-do-	Arachchikattuwa	NWSDB/ Swiss funds	Pipe wss	150	A rural scheme implemented with NWSDB's own funds
17	Mutugala	Polonnaruwa	Dimbulagala	NWSDB/ ADB(4)	Pipe wss	169	A Tamil community situated adjacent to the conflict areas

Annex 2

Evaluation of rural water schemes implemented by various agencies and managed by CBOs to learn shortfalls, constraints and lessons

General Information:

Name of the scheme:

GN Division:

DS Division:

Total no. of Households (HHs) at present:

No. of Samurdhi receiving HHs:

No. of HHs that has obtained CBO's membership:

Implementing Agency:

Service coverage

Type of service	Planned to accomplish by the project	Actual accomplishment by the project	Percentage of coverage by the project	Remarks
Water 1. Water Supply (piped water coverage) 2. Common dug wells 3. Individual dug wells 4. Hand pumps 5. Rain Water Harvesting				
Sanitation 1. Direct pit latrines 2. Water seal pit latrines 3. Other types				

Key:

Ratings for an individual indicator:

Poor: No marks

Satisfactory: each indicator = 15

Very satisfactory: each indicator = 25

Rating for a parameter:

Poor = No marks

Satisfactory = 40-60

Very satisfactory 60-100

Indicators under categories for measuring the performance parameters

Index	Performance parameters	Indicators with categories			Lessons
		Poor (0)	Satisfactory (60)	Very satisfactory (100)	
Planning and designing phase					
01	<p>Appropriateness of selection of sub projects</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> Required percentage of HHs (75%) did not agree to the demand driven approach Poor category did not pay the 50% of the community contribution Fifty percent of the community did not pay their contribution before the scheme started Poor category did not participate in formulating sub projects 	<ul style="list-style-type: none"> Required percentage of HHs (75%) agreed to the demand driven approach Poor category has paid the 50% of the community contribution Fifty percent of the community paid their contribution before the scheme started Poor category adequately participated in formulating sub projects 	<ul style="list-style-type: none"> More than required percentage of HHs (75%) agreed to the demand driven approach More than 50% of the poor category contributed the community contribution Fifty percent of the community paid their contribution before the scheme started Participation of the poor category in formulating sub projects was very satisfactory 	
02	<p>Effectiveness of stakeholder involvement</p>	<ul style="list-style-type: none"> Local political authority did not support DLCC was not active 	<ul style="list-style-type: none"> Local political authority did not disturb DLCC 	<ul style="list-style-type: none"> Local political authority supported Divisional Level Coordinating Committee 	

	<p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • VCC was inactive • PIU and PO did not play and active role 	<p>adequately support</p> <ul style="list-style-type: none"> • Village Coordinating Committee (VCC) was helpful to the CBO • Both PIU and PO played their roles adequately 	<p>(DLCC) involved in the scheme very effectively</p> <ul style="list-style-type: none"> • VCC acted as a consultative body to the CBO • The PIU and PO played effectively 	
03	<p>Appropriateness of implementation methodology</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • DIU/PO did not play an active role in implementation • Public Health Inspector (PHI) did not play an active role • DLCC did not play an active role • CBO/CBO forum did not play an active role 	<ul style="list-style-type: none"> • DIU's/PO's role in implementation was adequate • Public Health Inspector's (PHI) role was adequate • DLCC cleared many obstacles • CBO/CBO forum played an adequate role 	<ul style="list-style-type: none"> • DIU's/Po's role was very active • PHI's role was remarkable • CBO fully satisfied with the role of DLCC. • CBO/CBO forum was very active and helpful 	
04	<p>Appropriateness of technology utilized in water supply</p>	<ul style="list-style-type: none"> • Demand forecast does not match the current requirement • Water source is not adequate and reliable through out the year • User perception is 	<ul style="list-style-type: none"> • Design demand marginally satisfy the current requirements • Water source is adequate at wet period and 	<ul style="list-style-type: none"> • Demand assessment is proper to cater the design life of the system • Water source is reliable through out the year and have spare capacity • Users highly satisfy with the 	

	<p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<p>very poor on water quality</p> <ul style="list-style-type: none"> • Level of service is very poor and expansion is not possible 	<p>marginally fulfill in dry period</p> <ul style="list-style-type: none"> • User happy with the water quality • Level of service marginally satisfy and expansion not possible 	<p>water quality</p> <ul style="list-style-type: none"> • Level of service satisfactory and expansion possible 	
05	<p>Degree of community participation</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • Low participation in Shramadana activities (free labour) • Community paid their contribution, but after several reminders and requests by the DIU • Group leaders and animators did not play their role properly • CBO wasn't active and didn't collaborate with PO & DIU 	<ul style="list-style-type: none"> • Community participation in Shramadana activities was adequate • Community paid their contribution without long delays • The roles of group leaders and animators were adequate • CBO was good and active but, did not collaborate with PO and DIU 	<ul style="list-style-type: none"> • Community participation in Shramadana was highly satisfactory • Community paid their contribution in time and looked after the same of the poor • Group leaders/animators played their roles effectively • CBO was very active and collaborated with other stakeholders 	
06	<p>Quality of constructions</p>	<p>Pumping scheme</p> <ul style="list-style-type: none"> • CBO complaints on 	<ul style="list-style-type: none"> • CBO happy 	<ul style="list-style-type: none"> • CBO appreciate the work of 	

	<p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<p>intake</p> <ul style="list-style-type: none"> • CBO complaints on structure of the tower • CBO complaints on pipe laying • CBO complaints often on efficiency of motors <p>Point Sources</p> <ul style="list-style-type: none"> • CBO complaints on point sources <p>Latrines</p> <ul style="list-style-type: none"> • CBO complaints on design and construction of latrines 	<p>with the intake</p> <ul style="list-style-type: none"> • CBO happy with the tower structure, but has complaints • CBO happy with pipe laying, but not with the quality of pipes • CBO occasionally complains on efficiency of motors • CBO occasionally complains on point sources • CBO has no especial complaints on latrines 	<p>intake</p> <ul style="list-style-type: none"> • CBO appreciate the work of the tower • CBO appreciate the work of pipe laying • CBO satisfies with the efficiency of motors • CBO satisfies with point sources • CBO satisfies with the construction of latrines 	
07	Effectiveness of sanitation and hygiene promotion	<ul style="list-style-type: none"> • Less involvement of community people in hygiene promotion activities • Hygiene promotion clubs in schools/other innovative activities have not been implemented 	<ul style="list-style-type: none"> • Community members (both men and women participated in hygiene promotion activities adequately • Hygiene promotion clubs in school and 	<ul style="list-style-type: none"> • Significant community participation in sanitation and hygiene promotion activities • Hygiene promotion clubs in schools and other innovative activities are actively functioning even at present • Activities are being implemented by CBO on hygiene promotion 	

	<p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • CBO has not undertaken the responsibility of implementing the sanitation Programme • Sanitation Revolving Fund has not been used for the intended purpose 	<p>other innovative activities were active during the project period</p> <ul style="list-style-type: none"> • CBO was actively responsible in implementing the hygiene promotion programmes during the project period • Revolving fund existed, but stagnating 	<p>even after the scheme is handed over to them</p> <ul style="list-style-type: none"> • Revolving fund is actively implemented for the purpose 	
Operation and Maintenance					
08	<p>Effectiveness of existing monitoring system</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • No proper progress monitoring system within the CBO • No water quality monitoring mechanism available • No proper financial monitoring system • CBO forum/PS/NWSDB/Health does not involve in monitoring 	<ul style="list-style-type: none"> • CBO maintain an adequate monitoring system • Water quality is monitored occasionally • An adequate financial monitoring system is existed <ul style="list-style-type: none"> • CBO forum and NWSDB involve in monitoring occasionally 	<ul style="list-style-type: none"> • CBO maintain a very systematic monitoring system • Existing of a regular water quality monitoring system • Simple and appropriate financial monitoring system is in operation • CBO forum and NWSDB involve in monitoring regularly, but PS and Health do it occasionally 	
Part B - Sustainability and the present situation					

09	<p>Reliability of the water supply service</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • Operating hours are limited (below 6 hours) • Pressure is below standards • Water quality do not meet standards set by the government • A lot of customer complaints on service of water utility 	<ul style="list-style-type: none"> • Operating hours more than 6 to 18 hours • Minimum acceptable pressure • Water quality barely meets standards • Minimum complaints from customers; but performance still does not exceed expectations 	<ul style="list-style-type: none"> • Operating hours more than 18-24 hours • Good pressure • Water quality meets standards • Customers happy with performance of water quality 	
10	<p>Effectiveness of CBO,s O&M mechanism</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • CBO does not have a office, equipment and O&M set up • No full time caretaker and no system for refresher raining • CBO depends on NWSDB or other agencies in O&M • No preventive maintenance mechanism available and not yet thought of 	<ul style="list-style-type: none"> • CBO does have a office and equipment, but not a O&M set up • Part time caretaker and occasional refresher training • CBO sometimes depends on NWSDB in O&M • Preventive maintenance mechanism is available 	<ul style="list-style-type: none"> • CBO does have a adequately furnished office and a O&M set up • Full time caretaker and regular raining • CBO independently attend in O&M • A planned preventive mechanism is available and has thought of rehabilitation/replacement 	

		rehabilitation/replacement			
11	<p>Financial management</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • Does not able to meet current and future obligations and O&M from tariff charged • Simple receipts and disbursements system in place; reports are not updated • Understaffed and existing staff not qualified • Annual budgeting is not practiced 	<ul style="list-style-type: none"> • Only recover full O&M from tariff charged • Full financial reporting and accounting system available; acceptable internal control • Adequate staff, meets standards • Annual budget is not followed 	<ul style="list-style-type: none"> • Recover full cost of O&M and others • Full financial reporting system; good internal controls and financial reports are regularly prepared and updated • Adequate staff, highly experience and dedicated • Annual budgeting is in practice and followed 	
12	<p>Environmental concerns</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • The water source and the catchment are not protected • Soil protection methods are not applied • Environmental sanitation has not been accepted • Environment is not in the CBO's agenda 	<ul style="list-style-type: none"> • The water source is protected, but the catchment is unprotected • Some people apply soil protection methods, but not organic farming methods • Environmental sanitation is being practiced by some households • Environment is in the CBO's agenda, but 	<ul style="list-style-type: none"> • A well protected water sources and a catchment are existed , they are free of animal or human contamination • Majority apply soil protection as well as organic farming methods • Environmental sanitation is practiced by majority of the households • CBO highly concerns on environment 	

			not practiced		
13	<p>Effectiveness of Consolidation</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • CBO's idea on consolidation was not clear • No consolidation plan with DIU • No time allocation for consolidation activities • No staff for consolidation activities 	<ul style="list-style-type: none"> • CBO was sufficiently clear on consolidation activities • DIU had a plan for consolidation • Consolidation activities done, but time allocation was not sufficient • Staff were allocated, but not trained 	<ul style="list-style-type: none"> • CBO was fully aware with the consolidation activities • CBO implemented a consolidation plan with DIU • Consolidation activities done timely • Trained staff were available for consolidation activities 	
14	<p>Degree of women participation and empowerment</p> <p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • The number of women office bearers represented in the Exco. of CBO is negligible • No women organization is existed in the community • Women do not chair CBO meetings • Women do not involve in O&M activities or deciding tariff 	<ul style="list-style-type: none"> • At least one third of the Exco. members are women ,but voiceless • Women organization is existed, but depends on the CBO • Women chair the CBO meetings , but men dominate • Women do involve in O&M activities, but in deciding tariff 	<ul style="list-style-type: none"> • At least one third of the officials of the executive committee is women and powerful • Independent women's organization is existed and actively work with the CBO • Women chair meetings of the CBO effectively • Women actively involve in O&M activities and deciding tariff 	
15	<p>Good governance</p>	<ul style="list-style-type: none"> • CBO's elections are kept postponing 	<ul style="list-style-type: none"> • CBO's elections are held, but not 	<ul style="list-style-type: none"> • CBO's elections are held in time and leaders are 	

	<p>Level of satisfaction on the parameter</p> <p>Marks:</p>	<ul style="list-style-type: none"> • Decision making process is dominated by a few group • CBO's documents are not available to members or others • CBO does not treat members equally 	<p>regular</p> <ul style="list-style-type: none"> • Decision making process is open, but limited • CBO's documents are available only for officials • CBO theoretically treats members equally 	<p>changed to give opportunity for others</p> <ul style="list-style-type: none"> • Decision making process of CBO is democratic • CBO's documents are available for all the stakeholders • CBO treat all members equally 	
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Annex 3

Time Frame

Activity	Responsibility	August 2007			
		1	2	3	4
1. Organizing CBO meetings	CDS and NWSDB staff	x			
2. Field testing the checklist in a scheme in Polonnaruwa district.	Whole assessment team	x			
3. Conducting a workshop with service providers and compiling of data.	DTL, CDS and RWSE		x		
4. Literature review on lessons learnt.	CDS	x	x		
5. Assessing 16 schemes in Anuradhapura and Puttalam Districts.	Three groups of local consultants	x	x		
6. Analyzing data and prepare the final report	CDS		x	x	

Annex 4

Table 1: Results (marks received) of the evaluation done for seventeen CBO managed water supply schemes

Schemes Parameters & Marks	Pemaduwa	Kelanikawewa	Kandalama- West	Dunumadalawa	Oththappuwa	Galkiriyagama	Parawahagama	Pahalawewa	Helambagaswewa	Kuringampitiya	Saliyawewa	Ilakkattuwa	Kaladiya	Mangalapura	Udappuwa	Punchi	Muthugala
Selection of Sub projects	100	30	100	60	100	55	100	60	45	30	30	60	100	NA	NA	45	30
Stakeholder involvement	90	30	30	40	60	45	30	40	30	45	55	45	55	NA	NA	45	NA
Implementation Methodology	80	15	30	45	45	60	40	40	55	30	55	45	70	NA	NA	80	NA
Technology utilised	80	0	90	45	80	68	90	80	90	75	55	45	90	0	NA	45	25
Community Participation	60	45	100	45	60	55	100	55	45	15	65	60	65	30	NA	70	55
Quality of Constructions	68	12	100	56	68	55	100	84	92	75	76	47	100	15	NA	65	NA
Sanita/Hygiene Promotion	55	0	80	15	55	15	65	0	15	0	30	60	45	0	NA	70	15
Monitoring mechanism	60	15	45	45	0	45	45	45	45	60	30	30	45	0	NA	45	30
Reliability of water supply service	90	15	100	60	80	NA	100	100	80	80	60	15	100	30	NA	90	NA
O&M mechanism	80	0	65	30	80	15	40	50	90	45	65	30	75	15	NA	65	NA
Financial Management	30	0	55	15	30	15	55	30	55	45	40	60	55	0	NA	30	55
Environmental concerns	40	0	30	15	40	15	30	25	25	45	65	30	15	NA	NA	45	15
Consolidation activities	45	0	15	0	30	0	15	15	45	60	30	30	15	0	NA	45	0
Women participation	55	0	65	40	30	50	50	25	75	90	55	55	75	30	NA	65	65

Good governance	80	15	100	70	30	90	100	80	90	90	65	70	100	45	NA	90	90
Average Total	67	12	67	40	52	39	64	49	58	51	52	45	67	18	NA	60	38

Analysis

1. The parameter of selection of sub projects has been very satisfactory in eight schemes. It was satisfactory in three schemes while others were poor in the rest of the schemes. Stakeholders' involvement in two schemes was very satisfactory and they were satisfactory in seven schemes. This was poor in six while one reported that it was not applicable, because this scheme was implemented by the World Vision using their own officers and contractors directly. The parameter of scheme implementing methodology was reported as very satisfactory in four schemes. It was satisfactory in seven schemes and poor in three while NA in two. The two schemes, which have reported NA, except in Udappuwa, are the schemes that were implemented by World Vision and the ADB 4th project. The scheme of ADB 4th has had many difficulties in the initial stage since the area was disturbed by the conflicts between the Tamil militants and the government armed forces. Therefore, this parameter did not perform as expected in that scheme.

2. The technology utilized for water supply has been very satisfactory in nine schemes. It was satisfactory in four schemes and poor in three. The scheme of World Vision, which comes under the poor category, was implemented directly under the supervision of a technical officer of that agency. The scheme, which reported poor, is a scheme of the 3rd ADB project where implementation methodology was not successful due to the selection of the point source technology, which the community had not accepted. The other scheme, which reported poor is again the scheme of the 4th ADB where no proper technology has been used. In eight schemes, the parameter of community participation was very satisfactory. Six schemes have reported that it was satisfactory and two reported poor.

3. The significant fact that the quality of construction has received marks for very satisfactory in ten schemes while satisfactory in three. The rest reported poor. Only in four schemes, the sanitation and hygiene promotion parameter showed very satisfactory. It was satisfactory in another three schemes, while in all other schemes the status was poor. Similarly, only in two schemes, the monitoring mechanism has been very satisfactory. While it was just above the base mark (40) of satisfactory, in eight schemes, it was poor in the other six schemes. Except in four, the reliability of water supply service showed very satisfactory in the rest of the schemes. Two schemes have reported NA since service has not been commenced yet. One scheme where the technology utilized is point sources and another of which the operating hours are very limited due to a problem of the source have mentioned that the service is poor.

4. O&M mechanism of seven schemes was very satisfactory. Three schemes have reported that it was satisfactory while five schemes showed that it was poor. Another scheme reported that this parameter was not relevant since the operation of the scheme has not been commenced yet. In only one scheme, the financial management was very satisfactory. But eight schemes reported that it was satisfactory. However, the situation in the rest of the schemes i.e. seven was poor. The status of the parameter of environmental concerns was also more or less similar to that of the financial management. Only in one scheme, it has been reported that the situation

was very satisfactory. In three it was satisfactory and in all other schemes the result has been poor.

5. Again in one scheme the consolidation activities have been reported as very satisfactory, but only in three it was satisfactory while in the rest of the schemes, the situation has been poor. Regarding the women's participation in the schemes, six has mentioned that it was very satisfactory while another six have reported it was satisfactory. It was found that in four schemes, including one in which fifty percent of the population is Muslim, where women do not participate in community activities involving mingling with men in other ethnic groups. The significant fact is that in thirteen schemes, the good governance practices have been applied in CBOs. While it was satisfactory in one and the rest reported poor.

Appendix 4 – Monitoring Framework

MONITORING FRAMEWORK

Monitoring Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
Impact			
Improved health status and quality of life of the population in line with Millennium Development Goal (MDG) targets on safe water supply	By 2015 to meet the NWSDB Corporate Plan targets for safe water supplies in the 5 project Districts.	Reports and statistics from government agencies, development partners, and non-government organizations (NGOs)	Inadequate funding identified to be able to include all the proposed elements to meet the planned targets
Outcome			
Sustained access to improved drinking water and improved sanitation in the towns of Chilaw, Puttalam, Vavuniya and Mannar and XXXX Rural GNDs in the 5 project Districts of Puttalam, Mannar, Vavuniya Anuradhapura and Polonnaruwa.	<p>By 2015, in the project towns:</p> <p>At least xxxx % of regular households (HH) in the towns have access to improved drinking water supply</p> <p>At least xxxx % of regular HHs in the towns have improved sanitation facilities</p> <p>By 2015, in the project Rural GNDs:</p> <p>At least vvvv % of regular HHs in the selected GNDs have access to improved drinking water supply</p> <p>At least vvvv % of the of regular HHs in the selected GNDs have access to improved sanitation.</p>	<p>Local Government Department (LGD) reports</p> <p>Quarterly project reports</p> <p>Project surveys (baseline survey, end-of-project health impact evaluation survey)</p> <p>Biannual Asian Development Bank (ADB) reviews</p> <p>Mid-term and end-of-project evaluations</p>	<p>Town communities willingness to connect to the extended town water supply and the new town sanitation systems</p> <p>Rural communities are committed to the formation of Community Base Organisations (CBOs) to ensure the operation and sustainability of the rural sub-projects</p> <p>Project has created enough guidance documentation households' use of improved/new facilities</p> <p>Community expertise/ community committees/ CBOs can be retained and sustained after project completion.</p> <p>Rural community inability to fund their contribution levels to the rural sub-projects</p>
Outputs			
<p>1. Town Infrastructure</p> <p>Development of the main service lines and facilities for the project towns</p> <ul style="list-style-type: none"> • land acquisition for water resource improvements, water treatment plants, wastewater or septage treatment plants, treated water storage, pumping stations and extensions to existing 	<p>Completion and operation in 4 Towns of improved and extended water resource facilities.</p> <p>Completion and operation in 4 Towns of upgraded and extended water distribution networks, including to areas not presently served and to meet 2030 demands (additional HHs to be served by 2015</p>	<p>Confirmed land acquisition arrangements.</p> <p>Project quarterly progress reports</p> <p>NWSDB asset and performance records</p> <p>Field visits and interviews</p> <p>Regular and detailed quality control assessments of facilities constructed</p>	<p>Suitable and sufficient land has been acquired for additions to water works, and for wastewater treatment plants</p> <p>Design engineers and contractors are competent, and responsible for ensuring best work practices and standards are carried out</p> <p>NWSDB are able to</p>

Monitoring Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
<ul style="list-style-type: none"> water works; • topographic surveys; • Geotechnical surveys • New underground water supply boreholes and rehabilitation of existing water supply wellfields • construction of surface water collection tanks (Per Aru/ Puthukulam); • construction of new raw water intake works (Eluwankulama, Achchamolai); • Reinstatement of existing surface water collection tank (Achchamolai) • Construction of new water treatment works and extensions to existing water works; • rehabilitation and extension of existing elevated treated water storage tanks, pumping stations and water distribution pipelines and transmission mains; • construction of new elevated tanks, pumping stations and water distribution networks; • procurement of chlorination or chemical dosing equipment, pumps, generators, laboratory rooms and water quality testing equipment and tools; • construction of multicell anaerobic and aerobic waste stabilisation ponds in Vavuniya. • Construction of septage treatment plants in Chilaw Mannar and Puttalam Towns • construction of new sewers to high 	<p>estimated to be tttt,000).</p> <p>Establishment in 4 Towns of water quality testing facilities.</p> <p>Completion and operation in Vavuniya Town of a sewage collection system consisting of sewers (bbbb m), pumping stations (nnnn No), and waste stabilization treatment ponds (vvvv ha). HHs to be served by 2015 (estimated to be tttt,000).</p> <p>Completion and operation in 3 Towns, Chilaw, Puttalam and Mannar Towns of Septage treatment plants (bbbb ha) and the provision of (bbbb) Septic tank desludging vehicles</p> <p>Rehabilitation of Public Toilets in 4 Towns</p>		<p>provide reliable operational and maintenance service</p>

Monitoring Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
<p>density areas of Vavuniya town, including construction of pumping stations, and rising mains; procurement of septic tank desludging vehicles and equipment;</p>			
<p>2. Rural Sector Infrastructure Development of GND facilities with the active participation and contribution of community stakeholders, to support the sustainability of O&M at lane level, ensuring women’s participation throughout the process</p> <ul style="list-style-type: none"> • community construction of new neighborhood water supply networks; • construction of individual shallow dug wells • installation of water meters; • community construction of simple sanitation, “pour flush latrines” • NWSDB construction of water abstraction points, community boreholes or wells, treatment plants, treated water storage and pumping stations. 	<p>At least nnnn CBOs in 5 Districts established and functioning.</p> <p>Completion and operation in vvv GNDs of improved/enhanced water supplies and water distribution networks in at least bbbb GNDs.</p> <p>House water connections, with water meters, completed in at least bbbb GNDs, covering bbbb HH</p> <p>Completion of pour flush latrines in at least bbbb GNDs, covering bbbbbb HH.</p>	<p>NWSDB Annual Reports</p> <p>Project quarterly reports</p>	<p>GNs are supportive of the formation of CBOs.</p> <p>Community facilitators are adequately trained and motivated to provide high quality support to communities</p> <p>Community are willing to pay for the water supply services</p> <p>Community groups are willing to construct and manage water supply facilities</p> <p>Community is willing to construct sanitation facilities</p> <p>Collected service charges and tariffs will cover O&M costs</p>
<p>3. Capacity Development and Project Implementation Support</p> <p>Effective project management and coordination, to ensure that project aims are achieved to acceptable standards</p> <p>Improved NWSDB capacity for delivering quality water services in</p>	<p>Capacity building and technical training of NWSDB PIU staff completed.</p> <p>Improved accounting, financial management and budgeting systems implemented in NWSDB.</p> <p>CBOS set up and provided with technical and financial training completed in 5 Districts, covering</p>	<p>Project Quarterly Reports</p> <p>Minutes of meetings</p> <p>Survey reports</p> <p>Evaluation study reports</p> <p>Reports by project monitoring consultants</p>	<p>Continuity of NWSDB counterpart staff throughout the Project (no high turnover rates, necessitating extensive retraining)</p> <p>NWSDB remain in charge of delivering and facilitating urban water services</p> <p>Decisions are made on the operation of the Urban sanitation services</p> <p>CBO Byelaws are</p>

Monitoring Summary	Performance Targets/Indicators	Data Sources/ Reporting Mechanisms	Assumptions and Risks
<p>the 4 towns.</p> <p>Improved NWSDB capacity for delivering a quality sewerage sanitation service in Vavuniya Town.</p> <p>Improved Local Government capacity for delivering quality services in improved non sewerage Sanitation for the 3 towns, Mannar Chilaw and Puttalam.</p> <p>Technical and managerial training for NWSDB, PIU staff covering the 4 towns.</p> <p>Capacity development for NWSDB in the implementation of the prepared resettlement plans, and staff training for resettlement.</p> <p>Capacity development for NWSDB in the implementation of the prepared IEE plans and the resultant EMPs prepared by the implementation contractors for the 4 towns and villages and staff training for EI monitoring.</p> <p>Capacity development for Improvement of billing and cost recovery procedures by NWSDB including computerization.</p>	<p>xxxxx CBOs.</p> <p>Public awareness/ Environmental and Hygiene training completed in the 4 Towns and the vvv GNDs.</p>		<p>confirmed by the Provincial Councils and GNs for the effective operation of the CBO in the management and operation of the rural water supply facilities</p> <p>Strengthened internal controls within the Executing Agency to mitigate the risk of fraud and corruption in the Project</p>

Activities with Milestones		Start	Completion
Activity			
1.	Establishment of Project Coordination Unit within NWSDB	Pre-project	Pre-project
2.	Establishment of Project Implementation Units within NWSDB	Pre-project	Pre-project
3.	Prioritization and selection of the GNDs to be included under the Rural Sector subproject for the 5 project Districts	Month 3	Month 6
4.	Land acquisition	Pre-project	Year 3
5.	Resettlement surveys and assessment, compensation	Month 5	Year 3
6.	Recruitment of consultant teams and community facilitators	Pre-project	Month 6
7.	Additional Urban drainage assessments	Pre-Project	Pre-Project
8.	Additional Hydrological Surveys	Pre-Project	Year 1
9.	Additional Topographic surveys	Month 8	Year 3
10.	Additional Geo-technical investigations	Month 8	Year 2
11.	Detailed design for rehabilitation/replacement/extension of existing water supply infrastructure	Month 9	Year 2

12.	Preparation of tender documents, bid evaluation and contract awards for rehabilitation/replacement/extension of existing water supply	Month 10	Year 2
13.	EMP monitoring of the subproject construction phase	Year 2	Year 5
14.	Civil works for rehabilitation/replacement/extension of existing water resources and supply infrastructure	Year 2	Year 5
15.	Specification and procurement of septic tank desludging equipment	Year 4	Year 5
16.	Detailed design for new sanitation infrastructure, including sewage treatment and septage treatment plants	Year 2	Year 3
17.	Preparation of tender documents, bid evaluation and contract awards for new sanitation infrastructure, including sewage treatment and septage treatment plants	Year 2	Year 3
18.	Civil works for new sanitation infrastructure, including sewage treatment and septage treatment plants	Year 2	Year 5
19.	CBO mobilization/ formation	Month 7	Year 4
20.	Preparation of CBO Training Action Plans	Year 2	Year 5
21.	Detailed design for rural community water supply and sanitation infrastructure	Year 2	Year 5
22.	Preparation of tender documents, bid evaluation and contract awards for rural community level water supply and sanitation infrastructure	Year 2	Year 5
23.	Civil works for rural community water supply and sanitation infrastructure	Year 3	Year 5
24.	Community construction of water supply distribution systems	Year 3	Year 5
25.	Technical training of CBO staff in O&M, financial management	Year 2	Year 5
26.	Gender training	Year 2	Year 3
27.	Vulnerable Peoples Plan	Year 2	Year 5
28.	Awareness campaign - Health and Hygiene	Year 3	Year 5
29.	Awareness campaign - Environmental Awareness	Year 3	Year 5
30.	End of Project Survey	Year 5	Year 5
Inputs		US\$ million	
ADB			
Government of Sri Lanka			

Source: PPTA