

JAPAN INTERNATIONAL COOPERATION AGENCY

DEPARTMENT OF THE INTERIOR AND LOCAL GOVERNMENT
THE REPUBLIC OF THE PHILIPPINES

STUDY ON THE
PROVINCIAL WATER SUPPLY, SEWERAGE AND
SANITATION SECTOR PLAN
IN
THE REPUBLIC OF THE PHILIPPINES

VOLUME I

SUMMARY REPORT

PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION
SECTOR PLAN FOR THE PROVINCES

OF

ZAMBALES

RIZAL

ORIENTAL MINDORO

OCCIDENTAL MINDORO

ABRA

ILOCOS NORTE

ILOCOS SUR

BATANES

NUEVA VIZCAYA

FEBRUARY 1996

NIPPON JOGESUIDO SEKKEI CO., LTD.

EXCHANGE RATE (As of 1 August 1995)

US \$ 1.0 = Peso 25.7 = Yen 88.3

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PREFACE

In response to a request from the Government of the Republic of the Philippines, the Government of Japan decided to conduct master plan study on Provincial Water Supply, Sewerage and Sanitation Sector Plans for 9 Provinces and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Philippines a study team headed by Mr. Masatoshi Momose, Nippon Jogesuido Sekkei Co., Ltd., 3 times between August, 1994 and December, 1995.

The team held discussions with the officials concerned of the Government of the Philippines, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Philippines for their close cooperation extended to the team.

February, 1996



President
Japan International Cooperation Agency

February 1996

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Japan

Dear Mr. Fujita,

Letter of Transmittal

We are pleased to submit herewith the Final Report of the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan in the Republic of the Philippines.

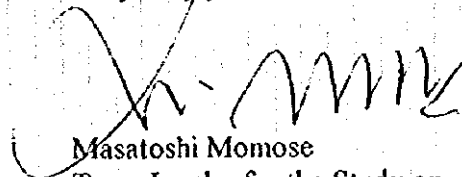
The Study was completed through the discussions with the officials of the Government of the Philippines and the field investigation during three visits from August 1994 to December 1995.

The Final Report consists of three volumes consolidating the three progress reports and the draft final report; Volume I - Summary Report which succinctly describes the study and recommendations; Volume II - Main Report which covers not only the long-term and medium-term development plans on water supply, sewerage and sanitation sector, but also institutional, operation and financial strengthening plan for the local governments; and Volume III - Supporting and Data Report including detailed analysis, relevant information and collected data.

In view of the urgency of water supply and sanitation improvement as well as the need for socio-economic development in the study provinces, we hope that the said plans will be realized in early stage.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs. We also would like to show our appreciation to the officials of the Department of the Interior and Local Government, the JICA Philippine Office, and the Embassy of Japan in the Republic of the Philippines for their kind cooperation and assistance throughout our field survey.

Very truly yours,



Masatoshi Momose
Team Leader for the Study on
Provincial Water Supply, Sewerage
and Sanitation Sector Plan in
the Republic of the Philippines



EXECUTIVE SUMMARY

Provincial Water Supply, Sewerage and Sanitation Sector Plans (PW4SPs) for nine (9) provinces in the Luzon area were prepared by respective Provincial Sector Planning Teams with the technical assistance of Japan International Cooperation Agency. The PW4SP will be the basis for the execution of the sector development in the province.

The PW4SP covers Long-Term Development Plan (2001-2010) and the Medium-Term Investment Program (1996-2000) to achieve the provincial targets of water supply, sewerage and sanitation sector. The plan includes the arrangements and logistics for the implementation and identification of needs for institutional strengthening.

The primary bases of the PW4SP are national sector policies and strategies. Current sector policies and strategies are:

- Self-reliance and local community management of services;
- An integrated approach to water, sanitation and hygiene education;
- Cost recovery of capital and O & M cost; and
- An integrated water resources strategy.

Study Area: The Provinces are Zambales, Rizal, Oriental Mindoro, Occidental Mindoro, Abra, Ilocos Norte, Ilocos Sur, Batanes and Nueva Vizcaya. Agriculture is the major economic activity common to these provinces. In the relevant sector, the high incidence of water-related diseases is prevalent indicating health problems. A lower sector service coverage in the rural area compared with urban area is a general finding.

Sector Services and Arrangements: The current service coverage of each sub-sector is estimated as percentages of served population/households/utilities against the total number. Problem areas by different service level are identified covering water supply and sanitation sector to come up with future arrangements. Based on the current analyses and the provincial targets established by sub-sector, phased requirements for the sector are developed. Further, financial arrangements availing Internal Revenue Allotment are discussed showing financial shortfall and alternative counter-measures to address this shortfall are defined. These study results are summarized in the attached tables. Improvements required for the institutional and monitoring activities are also major parts of the plan.

Frame Values and Future Requirements of PW4SP (Batch No.1 Group)

Province	Zambales			Rizal			Oriental Mindoro			Occidental Mindoro				
	1 city and 13 municipalities			14 municipalities			15 municipalities			11 municipalities				
	No. of Cities/Municipalities	102	137	148	38	47	377	49	113					
Frame Values & Sector Targets	No. of Barangays: Urban/Rural	191,127	213,836	551,309	708,933	88,489	1,341,524	90,145	714,218	144,941	282,557	427,408		
	Population 1994, 2000, 2010	216,670	242,411	278,053	182,775	254,110	518,072	574,184	655,308	220,302	243,641	357,859		
Sub-Sector	Area/Type	407,797	456,247	523,327	891,728	1,239,761	677,038	789,842	310,447	357,859	427,408			
	Water Supply	90%	90%	93%	82%	93%	93%	93%	70%	77%	93%			
	Sanitation	40%	65%	95%	59%	85%	85%	63%	44%	71%	95%			
	Sewerage	79%	93%	95%	71%	95%	77%	94%	69%	77%	94%			
	Solid Waste	43%	50%	70%	37%	70%	50%	70%	20%	30%	50%			
Future Requirements	Sub-Sector	100%	100%	100%	92%	100%	100%	100%	25%	50%	100%			
	Area/Type	62%	80%	N.A.	73%	85%	85%	N.A.	33%	50%	50%			
	Unit	20,940	157,900	508,000	126,600	508,000	15,100	75,200	24,700	74,000	95,000			
	Persons	74,800	103,600	86,000	72,700	86,000	156,000	134,500	76,800	95,000	47,800			
	Persons	24,800	47,400	153,200	47,200	13,600	34,100	61,200	10,300	24,000	24,000			
Cost Requirements	HH Toilet	15,500	27,800	11	10	11	18	6	14	12				
	School Toilet	N.A.	113,800	N.A.	39,600	489,300	N.A.	38,500	N.A.	51,400				
	Public Toilet	11,300	N.A.	N.A.	39,600	489,300	5,100	6,300	N.A.	N.A.				
	Persons	11,300	N.A.	N.A.	39,600	489,300	5,100	6,300	N.A.	N.A.				
	Persons	11,300	N.A.	N.A.	39,600	489,300	5,100	6,300	N.A.	N.A.				
Cost Requirements	Item	Investment Cost Required by Phase												
	Construction/ Rehabilitation	Water Supply	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II	Phase I	Phase II
		Urban Area	176,939	646,629	1,880,031	656,169	1,473,171	341,073	475,273	192,074	400,980	192,074	400,980	231,750
	Rural Area	79,533	466,753	1,473,171	377,903	1,473,171	58,773	240,999	88,979	231,750	88,979	231,750	169,230	
	Sanitation	28,509	886,608	408,860	278,266	408,860	282,300	234,274	103,095	427,683	23,190	427,683	19,398	
	HH Toilet	8,447	15,149	28,372	23,113	28,372	16,445	51,919	5,519	19,398	5,519	19,398	28,976	
	School Toilet	16,340	33,165	158,758	52,949	158,758	38,899	72,071	11,405	28,976	11,405	28,976	3,803	
	Public Toilet	2,736	7,607	3,291	2,991	3,291	6,573	1,878	4,438	1,828	4,438	1,828	9	
	Well Disinfectin	986	5	101	115	101	1,921	7	1,828	9	1,828	9		
	Urban Sewerage	205,448	830,682	3,571,642	735,337	3,571,642	404,911	882,300	215,264	375,497	215,264	375,497	828,663	
Sector Management	Engineering Studies	25,786	191,312	713,449	92,917	713,449	50,882	100,604	27,186	99,815	27,186	99,815		
Community Development & Training	17,377	141,906	543,259	54,215	543,259	43,069	83,662	17,604	78,268	17,604	78,268			
Sub-Total	43,163	338,218	1,256,708	147,132	1,256,708	93,951	184,236	44,790	178,083	44,790	178,083			
Total Direct Cost	288,611	1,866,655	6,898,903	882,469	6,898,903	498,862	1,066,566	260,054	1,066,566	260,054	1,066,566			
Contingencies	180,583	279,968	1,034,835	644,447	1,034,835	358,731	159,985	189,170	159,985	189,170	159,985			
Total Investment Cost	429,194	2,146,623	7,933,738	1,526,916	7,933,738	857,593	1,226,551	449,224	1,226,551	449,224	1,226,551			

Note: N.A. - Not Applicable, HH - Household
 City/municipalities excluded from the study area: Zambales - Olongapo City (Chartered City), Rizal - municipalities of Angono, Binangonan (areas other than Talim Island), Cainta and Taytay

Frame Values and Future Requirements of PW4SP (Batch No.2 Group)

Province	Abuja		Iloocos Norte		Iloocos Sur		Batanes		Nueva Vizcaya	
	22 municipalities		1 city and 22 municipalities		34 municipalities		6 municipalities		15 municipalities	
	No. of Municipalities	263	131	426	135	632	23	245	30	245
Frame Values & Sector Targets	No. of Municipalities		131		426		23		245	
	No. of Municipalities		131		426		23		245	
Population 1995, 2000, 2010	Urban Area		151,942		151,942		6,597		7,462	
	Rural Area		381,199		381,199		11,819		13,369	
Sub-Sector	Urban Area		151,942		151,942		6,597		7,462	
	Rural Area		381,199		381,199		11,819		13,369	
Water Supply	Urban Area		151,942		151,942		6,597		7,462	
	Rural Area		381,199		381,199		11,819		13,369	
Sanitation	Urban Area		151,942		151,942		6,597		7,462	
	Rural Area		381,199		381,199		11,819		13,369	
Sewerage	Urban Area		151,942		151,942		6,597		7,462	
	Rural Area		381,199		381,199		11,819		13,369	
Solid Waste	Urban Area		151,942		151,942		6,597		7,462	
	Rural Area		381,199		381,199		11,819		13,369	
Future Requirements	Urban Area		151,942		151,942		6,597		7,462	
	Rural Area		381,199		381,199		11,819		13,369	
Cost Requirements	Urban Area		151,942		151,942		6,597		7,462	
	Rural Area		381,199		381,199		11,819		13,369	

Note: N.A. - Not Applicable, HII - Household



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INTRODUCTION

1. Background of the Study

The Government of the Philippines (GOP) has, over the last decade, with the assistance from external donors, made considerable progress in developing the water supply and sanitation sector throughout the country. Nevertheless, infrastructure service delivery in this sector during the period of 1987 to 1995 has been insufficient to keep pace with the demand.

As of 1992, in urban areas outside Metro Manila, about 50% of the populace had access to safe water supply services, while in rural areas, less than 80% was adequately served. Private sanitary toilets were available to about 87% of households in urban areas nationwide; only 67% of households in rural areas. For sewerage, only portions of the cities of Metro Manila, Cebu and Baguio have sewerage systems. About 81% of the households practiced individual refuse disposal, while the remaining 19% relied on municipal refuse collection and disposal services, particularly in urban areas.

The activities in the sector are currently guided by the Water Supply, Sewerage and Sanitation Master Plan of the Philippines (NSMP: 1988-2000) and the Medium-Term Philippine Development Plan (MTPDP: 1993-1998). The sector development/project activities have been previously directed by central government agencies to a high degree. However, these activities are gradually being devolved to local government units (LGUs) in line with the Local Government Code of 1991.

With reference to the implementation of World Bank-financed First Water Supply, Sewerage and Sanitation Sector Project (FW4SP), the provinces in Luzon area were entrusted with preparation of "Provincial Water Supply, Sewerage and Sanitation Sector Plan (PW4SP)". Among them, nine (9) provinces were technically assisted by the Japan International Cooperation Agency (JICA). The PW4SP will be the basis for execution of sector development with financial assistance from foreign donors and in use of LGU's budget.

2. Objectives of the Study

The main objectives of the PW4SP are to establish the Long-Term Development Plan (2001-2010; Phase II) and the Medium-Term Investment Program (1996-2000; Phase I) to achieve the provincial coverage targets of water supply and sanitation sector. The plan includes the

arrangements and logistics for the implementation and identification of needs for institutional strengthening. The study is also designed to strengthen the LGUs capability in the preparation of sector plan through a series of workshop.

3. Study Areas

The study areas for the preparation of PW4SP cover nine provinces in Luzon area as shown in Figure 3.1. The provinces by the scheduled batch are as follows:

Batch No. 1

1. Zambales
2. Rizal
3. Oriental Mindoro
4. Occidental Mindoro

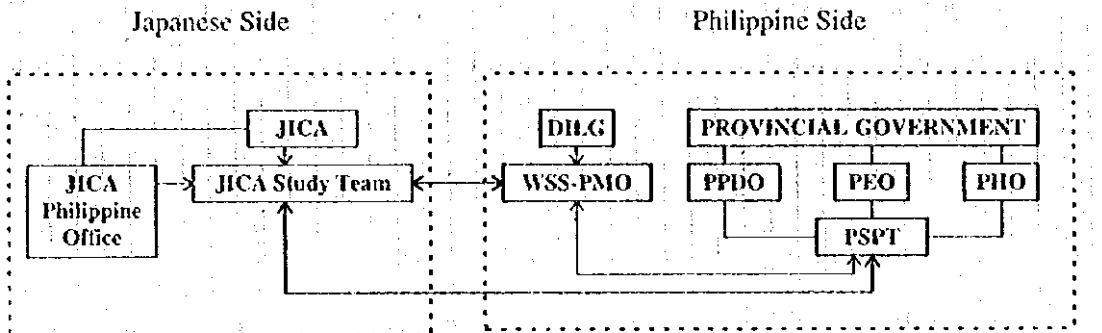
Batch No. 2

5. Abra
6. Ilocos Norte
7. Ilocos Sur
8. Batanes
9. Nueva Vizcaya

4. Study Organization

(1) General Organization

The general organization for the study is shown below.



- Note:
- | | |
|---------|---|
| JICA | : Japan International Cooperation Agency |
| DILG | : Department of Interior and Local Government |
| WSS-PMO | : Water Supply and Sanitation-Program Management Office |
| PPDO | : Provincial Planning and Development Office |
| PEO | : Provincial Engineering Office |
| PHO | : Provincial Health Office |
| PSPT | : Provincial Sector Planning Team |

(2) Japanese Organization

The Japanese Organization is represented by the Study Team under JICA headquarters and the supervisor in the JICA Philippine Office.

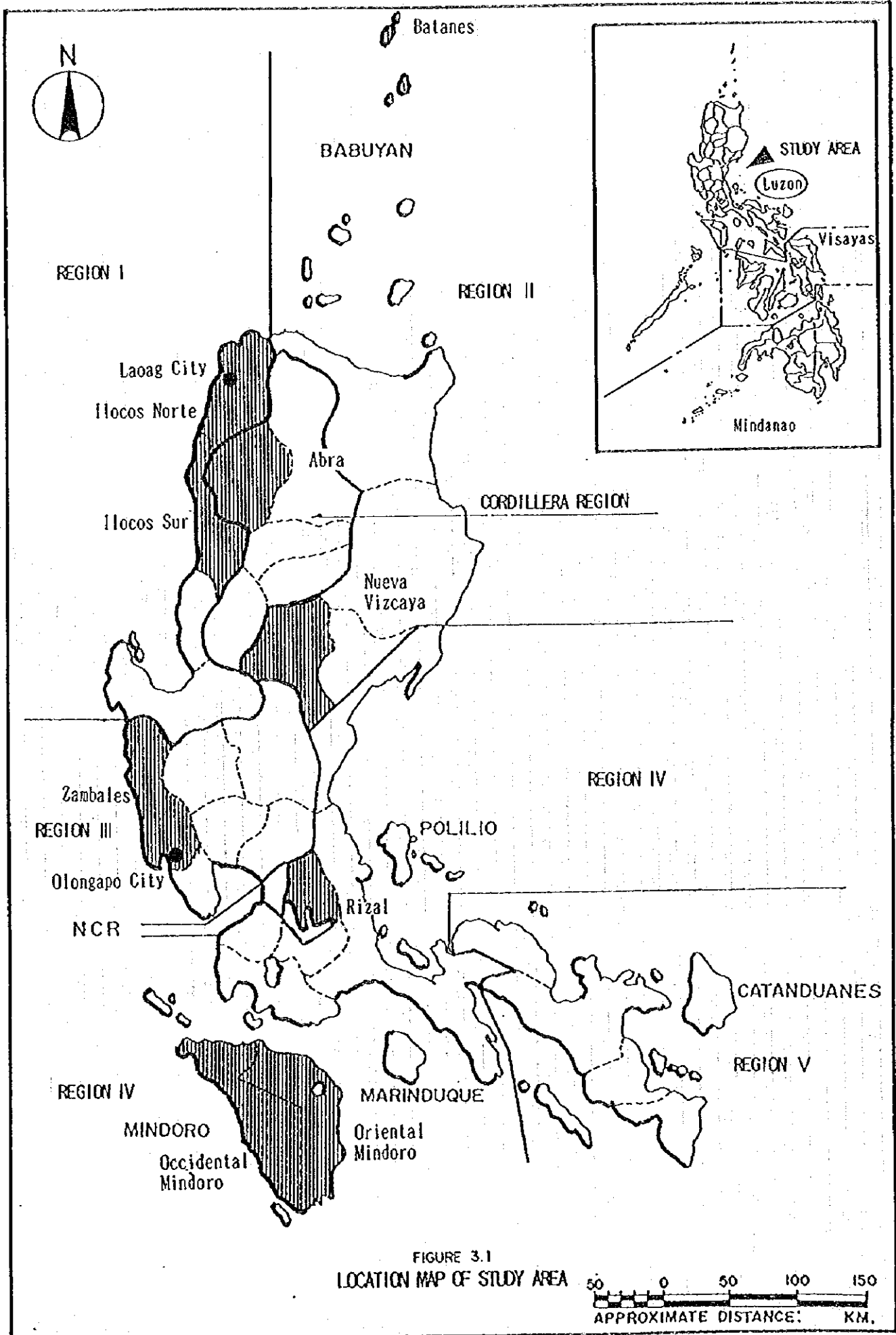


FIGURE 3.1
LOCATION MAP OF STUDY AREA



The staff members of the study team are as follows:

<u>Name</u>	<u>Field in Charge</u>
Mr. Masatoshi Momose	Project Management/Environmental Sanitation
Mr. Masuomi Hiroyama	Water Supply Planning
Mr. Kensuke Ichikawa	Hydrogeology
Ms. Yolanda M. Mingoa	Sanitation Planning
Mr. Manabu Fujikawa	Economic/Financial Analysis
Mr. Wilfred C. Barreiro	Institutional, Training & Community Development
Mr. Allen M. Lowe	System Engineering
Mr. Kenji Kasamatsu	Coordination

(3) Philippine Organization

The PW4SP for each of the province was prepared by a Provincial Sector Planning Team (PSPT) organized by the provincial government consisting of the Provincial Planning and Development Coordinator (PPDC), planning and development officers from PPDO, and staff members from Provincial Engineer's Office (PEO) and Provincial Health Office (PHO). The WSS-PMO, DILG is also the counterpart organization in the central government level.

The PSPT members of the nine provinces are as follows:

Province of Zambales

<u>Province of Zambales</u>	<u>Position</u>
1. Mr. Lawag Bada	PDO III, PPDO
2. Ms. Sandra Morillo	Training Specialist, PPDO
3. Mr. Edgar Fernandez	Water Resource Engineer, PPDO
4. Mr. Carlos Picos	Sanitary Engineer, PHO
5. Mr. Edgardo Fernandez	Clerk II, PPDO
6. Mr. Rodrigo Jallorina	Engineering Assistant, PEO

Province of Rizal

<u>Province of Rizal</u>	<u>Position</u>
1. Mr. Crispin P. Pablo	Provincial Planning & Dev't Coordinator, PPDO
2. Mr. Mario Cayetano	Water Supply Engineer, PPDO
3. Ms. Thelma Matatquin	Training Specialist, PPDO
4. Ms. Audrie Reyes	Computer Encoder, PPDO
5. Mr. Jose Mari Tamayo	Water Resource Engineer, PEO
6. Mr. Ricardo de Arroz	Sanitary Engineer, PHO

Province of Oriental Mindoro

<u>Province of Oriental Mindoro</u>	<u>Position</u>
1. Mr. Jaime G. Nuevas, Jr.	Provincial Planning & Dev't Coordinator, PPDO
2. Ms. Mely M. Manalo	Planning Officer III, PPDO
3. Ms. Marina B. Dela Cruz	Engineer II, PEO

4. Mr. Roberto O. Mendoza	Project Development Officer III, PPDO
5. Mr. Eduardo Badillo	Sanitary Engineer, PHO
6. Mr. Pedrito E. Abogado, Jr.	Sr. Sanitary Inspector, PHO
7. Ms. Juanita M. Javier	Planning Officer I, PPDO
8. Mr. Edmin L. Distajo	Project Development Officer I, PPDO
9. Ms. Lennie C. Bautista	Statistician I, PPDO
10. Mr. Norman M. Tolentino	CAA I, PPDO

Province of Occidental Mindoro

Position

1. Ms. Gladys Barile	Prov'l. Planning & Dev't. Coordinator, PPDO
2. Ms. Lorna Española	Project Evaluation Officer, PPDO
3. Mr. Jerry Lopez	Sanitary Engineer, PHO
4. Mr. Ruben Guinto	Engineer I, Governor's Office
5. Mr. Jonathan Trajeco	Engineer I, PEO
6. Ms. Malou Edquialane	Computer Operator, PPDO

Province of Abra

Position

1. Mr. Philip M. Tingonong	Provincial Planning & Dev't Coordinator, PPDO
2. Mr. Carlo Plurad	Project Development Officer IV, PPDO
3. Mr. Alfred Pajara	Project Development Officer III, PPDO
4. Mr. Rudy Mendoza	Civil Engineer IV, PEO
5. Ms. May Fe Trinidad	Statistical Aide/Computer Encoder, PPDO
6. Ms. Marjorie Lazarte	Training Specialist, PPDO
7. Ms. Jacqueline Plurad	Project Evaluation Officer III, PPDO
8. Mr. Crecensio Calina	Asst. Provincial Director, DILG
9. Mr. Carlito Benedicto	Sanitary Engineer, PHO

Province of Ilocos Norte

Position

1. Mr. Francisco Pilar	Provincial Planning & Dev't Coordinator, PPDO
2. Mr. Pedro Bueno	Prov'l Local Gov't Operation Officer, DILG
3. Mr. Peter Agcaoili	Training Specialist, PPDO
4. Ms. Eva Ibarra	Computer Programmer/Encoder, PPDO
5. Ms. Veronica Fabian	Sanitary Engineer, PHO
6. Mr. Winston Guerero	Water Resource Engineer, INWAD
7. Mr. Bonifacio Pailma	Water Supply Engineer, PEO
8. Mr. Charito Julian	Provincial Engineer, PEO
9. Ms. Leslie Leño	Training Specialist, DILG

Province of Ilocos Sur

Position

1. Mr. Sulpicio A. Mendoza	Provincial Planning & Dev't Coordinator, PPDO
2. Mr. Felipe Villaba	Prov'l Local Gov't Operation Officer, DILG
3. Mr. Jose Paet	Sanitary Engineer, PHO
4. Mr. Hernani Arquelada	Water Resource Engineer, PPDO
5. Mr. Randolph Quilban	Training Specialist, PPDO
6. Mr. Cresente Polanco	Water Supply Engineer, PEO
7. Mr. Wilfred Foz	Computer Programmer/Encoder, PPDO

Province of Batanes

1. Mr. Rolando Ventolero
2. Mr. Carlos Falces
3. Ms. Marissa Antonio
4. Mr. Jomas Fernandez
5. Mr. Godofredo Fabi
6. Mr. Felipe Cablay
7. Mr. Ireneo Geronimo

Position

Provincial Planning & Dev't Coordinator, PPDO
Asst. Provincial Engineer, PEO
PDO I, PPDO
Statistician I, PPDO
Prov'l Local Gov't Operation Officer, DILG
Provincial Health Officer, PHO
Computer Encoder, PPDO

Province of Nueva Vizcaya

1. Mr. Frederico Andaya
2. Mr. Edgardo Sabado
3. Mr. Franz Joseph Yoshiy
4. Ms. Evelyn Sagun
5. Ms. Carol Guntalilib
6. Ms. Imelda Acojido
7. Ms. Analiza Anabelle Ellamil

Position

Provincial Planning & Dev't Coordinator, PPDO
Water Resource Engineer, PPDO
Waterworks Engineer, PEO
Sanitary Engineer, PHO
Training Specialist, PPDO
Water Supply Engineer/Coordinator, DILG
Computer Encoder, PPDO

The members of WSS-PMO, DILG are as follows:

<u>Name</u>	<u>Position</u>
1. Mr. Orville M. Roque	Program Manager, WSS-PMO
2. Ms. Ellen I. Pascua	Asst. Program Manager
3. Mr. Rogelio B. Ocampo	Chief, Planning Division
4. Mr. Mario V. De Dios	Development Management Officer V
5. Ms. Fe Crisilla M. Banluta	PW4SP Project Officer, Coordinator, Ilocos Norte
6. Ms. Vivian B. Biala	Coordinator, Zambales and Ilocos Sur
7. Ms. Ma. Contessa C. Navarro	Coordinator, Rizal and Nueva Vizcaya
8. Ms. Josephine G. Ramos	Coordinator, Oriental Mindoro and Abra
9. Ms. Lina L. Griego	Coordinator, Occidental Mindoro and Batanes

5. Planning Approach for Future Sector Development

The primary bases of the PW4SP are national sector policies and strategies, as well as major legislation and regulations relevant to the sector. The guidelines for setting the provincial sector targets are the two national level plans, with priority given to MTPDP for medium-term targets. Current sector policies and strategies are summarized as follows:

- Self-reliance and local community management of services;
- An integrated approach to water, sanitation and hygiene education;
- Cost recovery of capital and O&M cost;
- Private sector participation; and
- An integrated water resources strategy.

The PW4SP will help ensure that the sector investments are optimized under the constraints of funds and water source availability as well as planning capacity. It is envisaged that the PW4SP will be progressively updated as its implementation proceeds. Furthermore, future detailed studies and plans for project implementation shall be conducted in the context of the PW4SP.

The data management system was established as a tool to come up with the outputs commensurate to the objectives of the provincial plan and at the same time reflect the planning approach. It will provide a map of relative needs in the province allowing for adjustment and updating when further information becomes available. Different scenarios may be worked out by planners using the program by changing key parameters based on planning assumptions and conditions.

6. Reports

The study reports prepared are as follows:

- (1) Summary Report (Volume I) covering the PW4SPs for nine (9) provinces
- (2) Main Report (Volume II) for respective provinces
- (3) Supporting and Data Report (Volume III) for respective provinces

The Summary Report is designed to combine nine PW4SPs. Chapters 1 and 2 are arranged in "INTRODUCTION" common to all concerned PW4SPs, while succeeding chapters are separately prepared by province for the convenience of respective provinces.

The Main Report presents the results of the whole study consisting of twelve (12) chapters. Chapter 1 describes the background and rationale for the sector planning of the provinces. Chapter 2 depicts the planning approach for the sector development. Chapter 3 provides the provincial profile that includes natural conditions and geographical features, socio-economic conditions, demographic trends, health status and environmental conditions. The existing sector conditions in physical, managerial and financial aspects are described in Chapters 4, 5 and 6. The possibility of water source development for water supply component is analyzed in Chapter 7. Chapters 8, 9 and 10 develop the Long-Term Development Plan and Medium-Term Investment Plan both for physical and sector management requirements. Chapter 11 presents the financial arrangements based on identified sources of fund. The recommendations on monitoring of implemented projects covering procedures and responsibilities in different administrative levels are provided in Chapter 12.

Supporting materials including alternative studies and detailed calculations, and data/information constitute Supporting and Data Report by province.

I. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF ZAMBALES

I.1 Provincial Profile

Zambales province is located at the western coast of Central Luzon. It is composed of 13 municipalities and the chartered City of Olongapo with Iba as the provincial capital. There are 239 barangays, of which 102 are urban and 137 rural. The province had a total population of 562,992 in 1990 with annual growth rate of 2.4% between 1980 to 1990, slightly lower than that of the region at 2.6%. Mt. Pinatubo eruption in 1991 resulted in only intra-municipal/provincial migration and therefore no significant effect was caused to the total provincial population.

Climate in the province is characterized by pronounced wet (from May to October) and dry (rest of the year) seasons. The terrain consists of rugged mountains rising moderately to steeply sloping in the eastern part and relatively flat along the coast. There are four (4) major natural drainage systems in the province. Almost half (49%) of the total land area still remains as forestland. Only 19% is devoted for agricultural use and built-up areas.

Agriculture is the major economic activity. The average annual household income in 1991 was P71,469 (excluding Olongapo City), higher than the national average of P65,000. However, about 52% of the total number of families lived within and below the established poverty threshold income of P52,377 in Region III. The unemployment rate in 1990 was as high as 12.5%.

All municipalities have electricity with 88% household coverage. Telecommunication services are also available to 88% of the municipalities/city. Likewise, a large number of banking institutions as well as industrial and commercial establishments exists, which reflects a relatively high level of urbanization. In terms of social services, there are 321 schools, 19 hospitals/clinics, and 118 rural health units/barangay health centers. The ratio to population of these health facilities is well above the national figures.

An indicator of health problems related to water supply and sanitation is the high incidence of water-related diseases. The reported water-related diseases in the province were viral hepatitis, diarrhea, dysentery, intestinal parasitism, sore eyes, skin diseases and malaria. Diarrhea, intestinal parasitism and skin diseases were among the ten leading causes of morbidity.

Environmental problems related to wastewater discharge and unsanitary solid waste disposal attributed to rapid population growth and increasing economic and industrial activities are occurring in some parts of the province. Major water pollution sources in urban areas are domestic wastewater and dumped refuse. Excluding Olongapo City, only 30% of the total households in the province relies on the municipal refuse collection services.

1.2 Existing Facilities and Service Coverage

The service coverage of each sub-sector is estimated as percentages of served population/households/utilities against the total number. In water supply, safe and unsafe classification of Level I facilities is introduced. Aside from household toilets, school and public toilets are included in the sanitation components in view of public hygiene improvement. Preliminary discussions on solid waste management are also considered.

In water supply sector, there are 9 Level III systems. Except for Subic Bay Metropolitan Authority (SBMA), which is limited to industrial and institutional uses, all others are Water Districts (WDs) located in Candelaria, Iba, Masinloc, San Antonio, San Felipe, Santa Cruz, Subic and Olongapo. A total of 8 Level II systems is being operated in rural barangays of Botolan, Cabangan, Palauig and San Narciso. Of the total 19,004 Level I facilities, 12,399 sources are classified as safe sources. Among the unsafe sources, approximately 5,000 sources are open dug wells.

In the study area, which excludes Olongapo City, approximately 58% or 237,700 persons of the present population (407,800 persons) are considered as adequately served (of which 68% in urban area and 32% in rural area). Under area classification, 84% of urban population and 36% of rural population have access to safe water sources/facilities. Of the served population, approximately 18% or 42,500 persons are served by Level III systems, while 80% or about 189,900 persons depend on Level I facilities. Level II coverage is only about 5,300 persons.

Three (3) types of sanitary toilets are available to 59,800 households covering 75% of the total households compared with the national coverage of 77%. The facilities consist of 7% flush type, 85% pour-flush and 8% VIP. In urban area, service coverage is 90%, while in rural area only 60% of the households has sanitary toilets.

The province has a total of 930 toilet units found in 311 schools. Only 35% of the students is adequately served by sanitary toilets in the study area. The present average ratio of 158

students per sanitary toilet is quite low to meet the service level standard of 50 students per facility. Likewise, there are 31 public toilets located at public markets and bus terminals in the study area. All the public utilities have at least one sanitary toilet. The manner of usage however, is inappropriate that renders these facilities unsanitary. There are no existing sewerage facilities in the province apart from Olongapo City (secured area of SBMA).

1.3 Existing Sector Arrangements and Institutional Capacity

The Local Government Code has re-defined the role, relationship and linkages of central, provincial, municipal and barangay institutions in the provision of basic services, including water and sanitation. The responsibility for water supply and sanitation functions was lodged with various national agencies. The new direction mandates the LGUs to play a larger role in planning and implementing water supply and sanitation projects. This raises serious institutional capacity and resource reallocation issues. New Implementing Rules and Regulations (IRR) reflecting the new sector role of the LGU and national agencies are being prepared.

At the central level, there are three (3) line departments (DILG, DPWH and DOH) and two (2) government owned and controlled corporations (LWUA and MWSS) responsible for planning and implementation. Other departments are concerned with macro-planning, national resource allocation decisions, as well as exercise of regulatory powers for tariff setting, environmental protection and management issues.

At the provincial and municipal levels, there are central agency field offices (of DPWH and DILG) and LGU offices working on the sector. Water districts, RWSAs and BWSAs have been organized to deal with the actual delivery of services. Some LGUs implement and operate municipal or provincial water and sanitation systems. Project management offices (PMOs, at the central level), ad hoc inter-agency committees and task forces have been organized to address coordination issues.

The current major institutional issues are those of management of the transition process and of re-establishing the leadership for the sector. Major resource realignments and capacity building initiatives are needed. At the local level, LGU capacity for sector project is insufficient and will require substantial input and support.

There is wide dissatisfaction among implementors themselves over the existing monitoring system. This leads to the problem of reliability of information coming from the field. There

is a need to establish a system which is perceived as having a direct link to performance, similar to project-based monitoring.

1.4 Past Financial Performance in Water Supply and Sanitation

In 1990-1994, the investment to the province for the sector amounted at P16 million. DPWH covered 173 wells and 17 rehabilitation works. LWUA extended assistance to 7 Water Districts. DILG financed for a Level III system under Barangay Water Program. DOIH targeted 19 school toilets in 1994 under the FW4SP program. The provincial government likewise financed for some water supply projects in 1994.

The IRA to the province between 1990 and 1993 accounted for about 1.0% of the national total IRA for all provinces. On the other hand, the IRA to municipalities of the province was arranged with 0.9% to the national total IRA for all municipalities. In 1993, the IRA to the province amounted at P198 million, of which 42% was allocated to the provincial government and 58% to the municipalities. Of the provincial government IRA, about 3.0% was used for the sector.

The capital cost for the Level I system is free to the community, while operation and maintenance are the responsibility of the associations. As for Level II systems, water charges for the repayment of capital expenses and the cost of operation and maintenance are collected by each association from the beneficiaries. For Level III system, WDs or RWSAs bear all capital cost borrowed from LWUA. Regarding sanitation sector, toilet bowls have been distributed to households without charges, although construction of the superstructure and the depository of private toilets is through self-help.

At present, water rates in the province are within affordable range based on the experiences. On the other hand, construction cost of private toilet seems to be expensive comparing with the family income.

Among the 8 water districts, only 3 have sound financial status. The financial performance of the RWSAs and BWSAs tend to face difficulties partly because the beneficiaries do not recognize the cost requirements.

1.5 Water Source Development

The study on water source development covers all the municipalities of the province. It gives an emphasis on groundwater sources rather than surface water considering its economic advantages.

The geologic rock units observed in the province are classified into three (3) main groups based on the ages of the rock formations: Pliocene and Older Rocks, Pleistocene to Pliocene Rocks and Recent Deposits. The Pliocene and Older rock units cover about 60% of the total provincial area and are largely distributed in the Zambales Mountains. Rocks classified as Pliocene to Pleistocene, which underlie about 20% of the total land area of Zambales, are extensive in the gently sloping to hilly areas from Iba to Santa Cruz and near Mount Pinatubo. The Recent deposits make up about 20% of the province and are widespread in the western coastal and alluvial plains from San Antonio to Santa Cruz.

For planning purposes in the development of groundwater sources, the provincial area is divided into shallow well, deep well and difficult areas. Shallow well area is limited (5% of the provincial area) to Palauig, Iba, Botolan and Santa Cruz, while deep well area covers about 35% of the province. Difficult area accounts for the remaining 60% of the provincial domain. The groundwater in the province is generally potable except for saline water reported along the western coastal plain. High iron concentration is likewise noted in Iba, San Antonio and San Marcelino.

Considering the existing wells in the province, the potential source of groundwater occurs between 2 to 180 mbgl in the Recent alluvium, the Plio-Pleistocene rocks and Miocene limestone formations. The development of deep wells is more advantageous than shallow wells considering the safe quality and invariable yield of deeper aquifers.

1.6 Future Requirements in Water Supply and Sanitation Improvement

Phased requirements for the sector development in the study area are assessed to meet the provincial targets established as percentages of beneficiaries or utilities to be served by sub-sector. Development priority in water supply sector is given to uplift service coverage in rural area, while the urban area is considered to maintain the present service level as shown in Table 1.6.1. Sanitation sector target is applied equally to urban and rural area in the same manner as the NSMP. Sewerage target is set for only part of urban centers in the long-term development, while solid waste management considered the medium-term household requirements.

Frame values are projected by municipality for respective sub-sectors; future population by urban and rural area, the number of students in public schools and the number of public utilities.

Table 1.6.1 Present Service Coverage and Sector Targets

Sub-Sector	Area/Type	Base Year Service Coverage	Provincial Sector Targets	
			Phase I	Phase II
Water Supply	Urban Area	90%	90%	93%
	Rural Area	40%	65%	95%
Sanitation	Household Toilet	79%	93%	95%
	School Toilet	43%	50%	70%
	Public Toilet	100%	100%	100%
Sewerage	Urban Area	-	Not Applicable	50%
Solid Waste	Urban Area	62%	80%	Not Applicable

Types of required facilities and their implementation criteria are determined according to service level standards currently adopted by the sector agencies. Urban populace is planned to be served by Level III systems, however, existing Level I and II facilities are to be used during Phase I period. For rural water supply, Level I facilities are to be adopted with limited application of Level II systems where houses are clustered and suitable untapped springs are confirmed. However, it does not exclude Level I and II facilities from being implemented in urban area as individual cases in the future as well as Level III systems in rural area. Rehabilitation work is planned only for new deep wells (Level I) to be constructed under PW4SP, considering the difficulty of rehabilitation for existing wells constructed by means of conventional methods.

In sanitation sector, pour flush and/or flush type household toilets are planned, while VIP type household toilet is considered in rural area as an intermediate measure. Sewerage program is planned in Phase II for limited urban areas. The study on solid waste considered only the number of required trucks for the year 2000. Additional service coverage of the sub-sector by phase is shown in Table 1.6.2.

Table 1.6.2 Additional Service Coverage by Phase

Sub-Sector	Area/Type	Unit	Additional Service Coverage	
			Phase I	Phase II
Water Supply	Urban Area	Persons	20,900	157,900
	Rural Area	Persons	74,800	103,600
Sanitation	Household Toilet	No. of Households	24,800	47,400
	School Toilet	No. of Students	15,500	27,800
	Public Toilet	No. of Utilities	9	25
Sewerage	Urban Area	Persons	Not Applicable	113,800
Solid Waste	Urban Area	No. of Households	11,300	Not Applicable

The required water supply facilities for Phase I include 13 deep wells for 4,131 house connections in urban area, while 956 deep and shallow wells are necessary for rural area.

Phase II requirements will cover 21 deep wells for 39,471 house connections and 1,732 deep and shallow wells for urban and rural water supplies, respectively. Rehabilitation requirements are estimated as 10% of the total number of deep wells to be constructed under PW4SP. Moreover, for Phase I, urban sanitation will require 8,095 household toilets, 28 school toilets and 9 public toilets, while rural areas need a total of 16,731 household toilets and 34 public school toilets. Solid waste management requires 9 refuse collection trucks for the year 2000. For Phase II, urban area will require 19,892 household toilets, 47 public school toilets and 25 public toilets. In the rural area, a total of 27,475 household toilets and 65 public school toilets are necessary.

1.7 Sector Management Plan

To effectively manage the water and sanitation sector, the provincial and municipal governments will have to make some adjustments in their current policies and structures. One glaring basic institutional need at the local level is a common vision and mission statement for the sector. A critical mass of people and resources who share in the vision must be identified and harnessed for sector management. Local planners need to focus on the long-term requirements.

The following policy and strategy statements will be adopted by the Provincial Government:

- (1) Sustainability shall be promoted through increased community responsibility for management of facilities.
- (2) Selection and prioritization of projects shall be based on demonstrated commitment of the beneficiaries to participate in the project, willingness to pay, the current water and sanitation and overall health conditions, potential for growth and costs.
- (3) Technology shall be appropriate to local conditions and resources. Economical facilities shall be pursued not necessarily insisting on low-cost construction.
- (4) An integrated approach to the provision of potable water supply, sanitation and hygiene education shall be promoted.
- (5) The LGU shall seek to provide water and sanitation in an equitable manner between rural and urban areas; between wealthy and depressed areas.
- (6) Cost Recovery and Cost Sharing (Subsidy): The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation.
- (7) Private Sector Participation: The LGU will gradually transfer its technical assistance functions to the private sector and provide incentives, as needed, and establish the regulatory framework for their participation.
- (8) The LGU shall actively seek out and negotiate with other potential sources of local and external funds (loans and grants) to finance the capital requirements of the sector.

- (9) Sector development shall be consistent with broader concerns for the environmental protection and management.
- (10) Disaster Response and Emergency Coordination: The LGU shall formulate, as part of its contingency plans, a program to provide water supply and sanitation services under emergency conditions.

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework considering, among others, the following: water allocation and water rights policies (conflict resolution); water rate review; association registration; water quality, etc.

In the medium-term, the primary source of funds is envisaged to be local taxes and allocations from the IRA 20% Development Fund. It is assumed that, in the medium-term, national and external funds will, although diminishing, continue to be channeled through local offices of central agencies. In the long-term, the Provincial Sector Trust Fund approach is an additional mechanism for financing project-related activities. The Trust Fund raises the LGU responsibility for effective and efficient utilization of these funds.

In the medium-term, a full-time Provincial Sector Team (PST) shall be set up for coordination and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This Team may be supplemented by staff detailed full-time from national and local agencies, as needed. In the long-term, the core group from the Team for a new Provincial Water Supply and Sanitation Office (PWSO) could be approved to continue to promote, assist and monitor all water supply and sanitation services in cooperation with the municipalities. The DILG-PMO shall continue to provide technical and managerial assistance in the formative years of the PST/PWSO.

Regarding the models formulated for the community development in three different service levels, deep wells will be feasible for Level I and III, while spring for Level II. The women's groups may be deputized/organized as BWSA for Level I, RWSA by the barangay councils for Level II and water cooperative for Level III. The community, especially the women sector, shall be involved in all phases of project management (planning, construction and O&M) and in undertaking health and hygiene education program. To provide the members with the necessary skills, training programs are to be implemented by concerned national agencies and by the provincial and municipal governments. The water district shall extend assistance to the community organizations.

1.8 Cost Estimates for Future Sector Development

The investment cost includes direct cost for construction/rehabilitation of required facilities and sector management, and physical and price contingencies. The recurrent cost is incurred for operation and maintenance of facilities. Unit construction cost per person/household/facility was first prepared under contract-out basis in 1995 price level. In this regard, the cost for procurement and distribution of toilet bowl for pour flush toilets is only counted for household toilets. Investment cost required by phase for the province is summarized in Table 1.8.1.

Table 1.8.1 Investment Cost Required by Phase

Unit: 1,000 Pesos

Item	Component	Phase I	Phase II
Construction/ Rehabilitation	Water Supply	176,939	646,629
	Urban Area	79,533	466,753
	Rural Area	97,406	179,876
	Sanitation	28,509	886,608
	Household Toilet	8,447	15,149
	School Toilet	16,340	33,165
	Public Toilet	2,736	7,607
	Disinfection of Well	986	5
	Urban Sewerage	-	830,682
		Sub-Total	205,448
Sector Management	Engineering Studies	25,786	191,312
	Community Development and Training	17,377	141,906
	Sub-Total	43,163	333,218
Total Direct Cost		248,611	1,866,455
Contingencies		180,583	279,968
Total Investment Cost		429,194	2,146,423

Note: Price contingency is not included in Phase II.

The investment cost for Phase I is estimated at about P429 million. A total of P205 million is required as the construction/rehabilitation cost in Phase I, of which 48% is for rural water supply, while only 14%, for sanitation sector.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 15 sets of well drilling equipment, 1 set of well rehabilitation equipment, 11 units of service truck with crane and 5 units of support vehicle; and 9 units of refuse collection truck. The total procurement cost is estimated at approximately P181 million. Likewise, annual recurrent cost in 1995 price level is estimated at P12 to P17 million/year during Phase I period.

1.9 Financial Arrangements

Projected IRA as potential funds for Phase I sector development revealed considerable needs of additional funds. The IRA in a total of the province accounts for only 21.9% (P94 million) of the provincial cost requirements (P429 million). In terms of municipal achievement by the IRA, percentages of Candelaria and Cabangan are relatively higher than the provincial average. Others are in the range between 13% and 36% to the requirements.

For implementation arrangements, three reference scenarios in assumption of different funding levels are referred to in view of (1) acquisition of external funds, (2) augmentation of sector finance under current arrangements (IRA), (3) introduction of private sector to mitigate public investment needs and (4) effective and economical investments. Among the scenarios, a 25% investment is envisioned as a possible achievement level enlarging the composition of IRA.

The PW4SP advocates the imposition of tariffs for the recovery of capital and O&M cost. The water rates for all service levels were confirmed to be affordable. With regard to household toilets, the construction cost is beyond the affordability under the current income level, especially in rural areas. To expedite sanitation improvements, introduction of specific loans with a revolving character may be an effective solution. For urban sanitation, the linkage with existing housing loan shall be established to cover construction of sanitary toilets.

1.10 Monitoring

The sector monitoring system must support a well-defined and accepted sector development process-model. It includes information collection, tracing the flow of raw data from the field to the central level information analysis and data feedback. With the sector monitoring, planners should be able to take a fresh objective view of the way it implements current strategies. A sector monitoring system should reinforce the linkage between water, sanitation and health; be reliable and involve the beneficiaries; be accepted by all sectors; be practical; and be followed through with effective feedback. The best monitors are the community members themselves since accurate monitoring reports are in their best interest. A consensus on common and practical definition of terms for monitoring purpose is needed.

A three-phased monitoring system is proposed with each phase progressively increasing the number and complexity of indicators to be used. It is envisaged that this will be linked up with the national sector monitoring system being developed.

There are existing Project Monitoring Committees (PMCs) at the provincial and municipal levels tasked with the monitoring of local government projects funded from national and local governments. At the provincial level, monitoring will include projects implemented and managed at this level with funds directly released to the province as provided under MO 175. The PMC shall be established in the province consisting of NGOs and representatives from the administration.

This PW4SP should be updated at least every five years. Based on the monitoring reports, annual review of sector accomplishments compared with objectives and efficiency will be done. This will lead to the reformulation of objectives, strategies, new policies and policy revisions, and updated sector investment program.



2. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF RIZAL

2.1 Provincial Profile

Rizal province lies on the southwestern part of the island of Luzon and adjacent to Metro Manila. It is composed of 14 municipalities. There are 186 barangays, of which 148 are urban and 38 rural. The population of the province in 1990 was 980,194. An annual growth rate between 1980 and 1990 was reported at 5.8%, higher than that of the region at 3.1%. This trend reflects urbanization and migration to the province because of its proximity to Metro Manila.

Climate in the province is characterized by pronounced wet (from May to November) and dry (rest of the year) seasons. The terrain consists of hilly to mountainous in the eastern part and relatively flat areas in the west portion. There are two (2) major natural drainage systems that generally flow on westward and southward directions. With almost half of the municipalities fully urbanized, about 43% of the total land area is already developed and devoted to agriculture and built-up areas. Only 31% remains as forestland.

The province features a highly industrialized economy. The average annual household income in 1991 was P93,000, very much higher than the national average of P65,000. Still, about 31% of the total number of families lived within and below the established poverty threshold income of P51,400 in Region IV. The unemployment rate in 1990 was 9%.

All municipalities have electricity with 91% household coverage. Also, every municipality has telecommunication services. A large number of banking institution as well as industrial/commercial and tourism establishment exists, which reflects a relatively high level of urbanization. In terms of social services, there are 397 schools, 6 hospitals, and 184 health units/main centers and barangay health stations.

An indicator of health problems related to water supply and sanitation is the high incidence of water-related diseases. The reported water-related diseases in the province were typhoid/paratyphoid, viral hepatitis, diarrhea, intestinal parasitism, conjunctivitis and skin diseases. Diarrhea, intestinal parasitism and skin diseases were among the ten leading causes of morbidity.

Environmental problems related to wastewater discharge and unsanitary solid waste disposal are occurring in some parts of the province. Major water pollution sources in urban areas are domestic wastewater and dumped refuse. Approximately 66% of the total households in the province relies on the municipal refuse collection services.

2.2 Existing Facilities and Service Coverage

The service coverage of each sub-sector is estimated as percentages of served population/households/utilities against the total number. In water supply, safe and unsafe classification of Level I facilities is introduced. Aside from household toilets, school toilets and public toilets are included in the sanitation components in view of public hygiene improvement. Preliminary discussions on solid waste management are also considered.

In water supply sector, there are 16 public Level III systems located in Angono, Binangonan, Cardona, Morong, Pililla and Tanay. In addition, MWSS extends its services to Antipolo, Rodriguez and San Mateo. Individual private Level III systems for a total of 227 subdivisions in the province are verified. All the Level III facilities utilize deep wells. Level II systems are limited to 5 systems at barangay level in Baras, Binangonan, Morong, Rodriguez and Tanay. Four of these systems use deep wells and one is served by a spring. Of the total 848 Level I facilities, 701 are considered as safe sources. Most of the unsafe sources, 147 facilities, are shallow wells.

In the study area, approximately 77% or 532,800 persons of the present population (692,000 persons) are considered as adequately served (of which 85% in urban area and 15% in rural area). Under area classification, 82% of urban population and 58% of rural population have access to safe water sources/facilities. It is noteworthy that of the 287,300 persons served by Level III systems, about 58% are covered by the subdivisions located mostly in urban area. On the other hand, 46% or about 245,000 persons out of the served population depend on Level I facilities, while Level II coverage is only about 440 persons.

Three (3) types of sanitary toilets are available to 92,800 households covering 70% of the total households in the study area compared with the national average of 77%. The facilities consist of 49% flush type, 29% pour-flush and 22% VIP. In urban area, service coverage is 74%, while in rural area, only 53% of the households has sanitary toilets.

The province has a total of 1,366 toilet units found in 219 public schools. Only 37% of the public school students is adequately served by sanitary toilets in the study area. The present average ratio of 139 students per sanitary toilet is quite low to meet the service level standard of 50 students per facility. Likewise, there are 12 public toilets located at public markets and bus terminals in the study area. About 92% of the public utilities has at least one sanitary toilet. The manner of usage however, is inappropriate that renders these facilities unsanitary. There are no existing sewerage facilities in the province.

2.3 Existing Sector Arrangements and Institutional Capacity

The Local Government Code has re-defined the role, relationship and linkages of central, provincial, municipal and barangay institutions in the provision of basic services, including water and sanitation. The responsibility for water supply and sanitation functions was lodged with various national agencies. The new direction mandates the LGUs to play a larger role in planning and implementing water supply and sanitation projects. This raises serious institutional capacity and resource reallocation issues. New Implementing Rules and Regulations (IRR) reflecting the new sector role of the LGU and national agencies are being prepared.

At the central level, there are three (3) line departments (DILG, DPWH and DOH) and two (2) government owned and controlled corporations (LWUA and MWSS) responsible for planning and implementation. Other departments are concerned with macro-planning, national resource allocation decisions, as well as exercise of regulatory powers for tariff setting, environmental protection and management issues.

At the provincial and municipal levels, there are central agency field offices (of DPWH and DILG) and LGU offices working on the sector. Water districts, RWSAs and BWSAs have been organized to deal with the actual delivery of services. Some LGUs implement and operate municipal or provincial water and sanitation systems. Project management offices (PMOs, at the central level), ad hoc inter-agency committees and task forces have been organized to address coordination issues.

The current major institutional issues are those of management of the transition process and of re-establishing the leadership for the sector. Major resource realignments and capacity building initiatives are needed. At the local level, LGU capacity for sector project is insufficient and will require substantial input and support.

There is wide dissatisfaction among implementors themselves over the existing monitoring system. This leads to the problem of reliability of information coming from the field. There is a need to establish a system which is perceived as having a direct link to performance, similar to project-based monitoring.

2.4 Past Financial Performance in Water Supply and Sanitation

Investments for Level I facilities by DPWH during the period 1990 to 1992 amounted at P34,034 thousand, covering 789 wells, 59 spring development, 40 rain collectors and 5 rehabilitation works. LWUA had released a total of P4,298 thousand during the period of 1990 to 1993 to the 3 Water Districts and 1 RWSA. DOH accomplished 6 school toilets in 1993 under the IW4SP program. The provincial government invested P2,795 thousand for the water supply sub-sector in 1993.

The IRA to the province between 1990 and 1993 accounted for about 1.3 to 1.6% of the national total IRA for all provinces. On the other hand, the IRA to the municipalities of the province was arranged with 1.2 to 1.6% to the national total IRA for all municipalities. The IRA was only partial source of total revenue in 1990 and 1991, because the province had large amount of receipts from its property (land) sales. However, it turned to be a major one in 1992 and 1993, which accounted for almost half of the total revenue of the provincial government. The expenditures for the water supply sector amounted at P2,795 thousand, about 2.4% of the provincial government IRA.

The capital cost for the Level I system is free to the community, while operation and maintenance are the responsibility of the associations. As for Level II systems, water charges for the repayment of capital expenses and the cost of operation and maintenance are collected by each association from the beneficiaries. For Level III system, WDs or RWSAs bear all capital cost borrowed from LWUA. Regarding sanitation sector, toilet bowls have been distributed to households without charges, although construction of the superstructure and the depository of private toilets is through self-help.

At present, water rates in the province are within affordable range based on the experiences. On the other hand, construction cost of private toilet seems to be expensive comparing with the family income.

Operation and maintenance costs of the three (3) WDs exceeded the revenues. One of 3 water districts is in arrears. The financial performances of the RWSAs and BWSAs tend to face difficulties partly because the beneficiaries do not recognize the cost requirements.

2.5 Water Source Development

The study on water source development covers all the municipalities in the province. It gives an emphasis on groundwater sources rather than surface water considering its economic advantages.

The geologic rock units observed in the provinces are classified into three (3) main groups based on the ages of the rock formations: Pliocene and Older Rocks, Pleistocene to Pliocene Rocks and Recent Deposits. The Pliocene and Older rock units cover about 30% of the total provincial area and are largely distributed in the northern and eastern portions of Antipolo, Cainta, Rodriguez, San Mateo, Tanay and Taytay. Rocks classified as Pliocene to Pleistocene, which underlie about 65% of the total land area of Rizal, are extensive in the gently sloping to hilly southern half section. This section includes Angono, Baras, Binangonan, Cordona, Jala-jala, Morong, Pililla, Teresa, Tanay and Taytay. The Recent deposits make up about 5% of the province and are limited to the western plains of Rodriguez, San Mateo, Cainta and Taytay.

For planning purposes in the development of groundwater sources, the provincial area is divided into shallow well, deep well and difficult areas. No shallow well area is defined in the province. Deep well area covers about 40% of Rizal, while the remaining 60% is classified as difficult area. The groundwater in the province is generally potable. However, high manganese and calcium concentrations are noted in San Mateo and Binangonan, respectively. High color and turbidity are also reported in San Mateo.

Considering the existing wells in the province, the potential source of groundwater occurs between 2 to 200 mg/l in the Recent alluviums, the Plio-Pleistocene rocks and Miocene limestone formations. The development of deep wells is more advantageous than shallow wells considering the safe quality and invariable yields of deeper aquifers.

2.6 Future Requirements in Water Supply and Sanitation Improvement

Phased requirements for the sector development in the study area are assessed to meet the provincial targets established as percentages of beneficiaries or utilities to be served by sub-sector. Development priority in water supply sector is given to uplift service coverage in

rural area, while the urban area is considered to maintain the present service level as shown in Table 2.6.1. Sanitation sector target is applied equally to urban and rural area in the same manner as the NSMP. Sewerage target is set for only part of urban centers in the long-term development, while solid waste management considered the medium-term household requirements.

Table 2.6.1 Present Service Coverage and Sector Targets

<i>Sub-Sector</i>	<i>Area/Type</i>	<i>Base Year Service Coverage</i>	<i>Provincial Sector Targets</i>	
			<i>Phase I</i>	<i>Phase II</i>
<i>Water Supply</i>	<i>Urban Area</i>	82%	82%	93%
	<i>Rural Area</i>	59%	85%	95%
<i>Sanitation</i>	<i>Household Toilet</i>	71%	93%	95%
	<i>School Toilet</i>	37%	50%	70%
	<i>Public Toilet</i>	92%	100%	100%
<i>Sewerage</i>	<i>Urban Area</i>	-	<i>Not Applicable</i>	50%
<i>Solid Waste</i>	<i>Urban Area</i>	73%	85%	<i>Not Applicable</i>

Frame values are projected by municipality for respective sub-sectors; future population by urban and rural area, the number of students in public schools and the number of public utilities, referring to the 1990 Census of Population and Housing and other vital sources as base figures.

Types of required facilities and their implementation criteria are determined according to service level standards currently adopted by the sector agencies. Urban populace is planned to be served by Level III systems, however, existing Level I and II facilities are to be used during Phase I period. Level I facilities are adopted for rural water supply with limited application of Level II systems where houses are clustered and suitable untapped springs are confirmed. However, it does not exclude Level I and II facilities from being implemented in urban area as individual cases in the future as well as Level III systems in rural area. Rehabilitation work is planned only for new deep wells (Level D) to be constructed under PW4SP, considering the difficulty of rehabilitating the existing wells constructed by means of conventional methods.

In sanitation sector, pour flush and/or flush type household toilets are planned, while VIP type household toilet is considered in rural area as an intermediate measure. Sewerage program is planned in Phase II for limited urban areas. The study on solid waste considered only the number of required trucks for the year 2000. Additional service coverage of the sector by phase is shown in Table 2.6.2.

Table 2.6.2 Additional Service Coverage by Phase

Sub-Sector	Area/Type	Unit	Additional Service Coverage	
			Phase I	Phase II
Water Supply	Urban Area	Persons	126,600	508,000
	Rural Area	Persons	72,700	86,000
Sanitation	Household Toilet	No. of Households	73,600	155,200
	School Toilet	No. of Students	47,200	103,600
	Public Toilet	No. of Utilities	10	11
Sewerage	Urban Area	Persons	Not Applicable	489,300
Solid Waste	Urban Area	No. of Households	39,600	Not Applicable

The additional water supply facilities required to meet the Phase I target coverage include 16 deep wells for 24,587 house connections for Level III and a total of 971 deep and shallow wells for Level I. For Phase II, Level III systems will need additional 47 deep wells for 126,999 connectors, while Level I services will need a total of 1,439 deep and shallow wells. Rehabilitation requirements are estimated at 10% of the total number of deep wells to be constructed under PW4SP. Moreover, for Phase I, urban sanitation will require additional 55,633 household toilets, 140 public school toilets and 10 public toilets, while rural sanitation needs a total of 17,946 household toilets and 49 public school toilets. For Phase II, urban area will require 121,611 household toilets, 307 public school toilets and 11 public toilets. In rural area, 33,550 household toilets and 106 public school toilets are necessary. As for solid waste management, 11 refuse collection trucks are required for Phase I.

2.7 Sector Management Plan

To effectively manage the water and sanitation sector, the provincial and municipal governments will have to make some adjustments in their current policies and structures. One glaring basic institutional need at the local level is a common vision and mission statement for the sector. A critical mass of people and resources who share in the vision must be identified and harnessed for sector management. Local planners need to focus on the long-term requirements.

The following policy and strategy statements will be adopted by the Provincial Government:

- (1) Sustainability shall be promoted through increased community responsibility for management of facilities.
- (2) Selection and prioritization of projects shall be based on demonstrated commitment of the beneficiaries to participate in the project, willingness to pay, the current water and sanitation and overall health conditions, potential for growth and costs.
- (3) Technology shall be appropriate to local conditions and resources. Economical facilities shall be pursued not necessarily insisting on low-cost construction.

- (4) An integrated approach to the provision of potable water supply, sanitation and hygiene education shall be promoted.
- (5) The LGU shall seek to provide water and sanitation in an equitable manner between rural and urban areas; between wealthy and depressed areas.
- (6) Cost Recovery and Cost Sharing (Subsidy): The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation.
- (7) Private Sector Participation: The LGU will gradually transfer its technical assistance functions to the private sector and provide incentives, as needed, and establish the regulatory framework for their participation.
- (8) The LGU shall actively seek out and negotiate with other potential sources of local and external funds (loans and grants) to finance the capital requirements of the sector.
- (9) Sector development shall be consistent with broader concerns for the environmental protection and management.
- (10) Disaster Response and Emergency Coordination: The LGU shall formulate, as part of its contingency plans, a program to provide water supply and sanitation services under emergency conditions.

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework considering, among others, the following: water allocation and water rights policies (conflict resolution); water rate review; association registration; water quality, etc.

It is assumed that, in the medium-term, national and external funds will, although diminishing, continue to be channeled through local offices of central agencies. In the long term, the Provincial Sector Trust Fund approach is an additional mechanism for financing project-related activities. The Trust Fund raises the LGU responsibility for effective and efficient utilization of these funds.

In the medium-term, a full-time Provincial Sector Team (PST) shall be set up for coordination and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This Team may be supplemented by staff detailed full-time from national and local agencies, as needed. In the long-term, the core group from the Team for a new Provincial Water Supply and Sanitation Office (PWSO) could be approved to continue to promote, assist and monitor all water supply and sanitation services in cooperation with the municipalities. The DILG-PMO shall continue to provide technical and managerial assistance in the formative years of the PST/PWSO.

Regarding the models formulated for the community development in three different service levels, deep wells will be feasible for Level I and III model sites, while a spring for Level II. To implement the projects for Level I and II systems, the existing Parents-Teachers Associations shall be strengthened to assume the roles of the RWSA, while for Level III, the consumers shall be organized into RWSA. The community, especially the women sector, shall be involved in all phases of project management (planning, construction and O&M) and in undertaking health and hygiene education program. To provide the members with the necessary skills, training programs will be conducted by concerned national agencies and by the provincial and municipal governments. The water districts shall extend assistance to the community organizations.

2.8 Cost Estimates for Future Sector Development

The investment cost includes direct cost for construction/rehabilitation of required facilities and sector management, and physical and price contingencies, while recurrent cost is incurred for operation and maintenance of facilities. Unit construction cost per person/household/facility was first prepared under contract-out basis in 1995 price level. In this regard, the cost for procurement and distribution of toilet bowl for pour flush toilets is only counted for household toilets. Investment cost required by phase for the province is summarized in Table 2.8.1.

The investment cost for Phase I is estimated at about P1.5 billion. A total of P735 million is required as the construction/rehabilitation cost in Phase I, of which 51% is for urban water supply, while only 10% for sanitation sector.

Table 2.8.1 Investment Cost Required by Phase

Unit: 1,000 Pesos

<i>Item</i>	<i>Component</i>	<i>Phase I</i>	<i>Phase II</i>
<i>Construction/ Rehabilitation</i>	<i>Water Supply</i>	<i>656,169</i>	<i>1,880,031</i>
	<i>Urban Area</i>	<i>377,903</i>	<i>1,473,171</i>
	<i>Rural Area</i>	<i>278,266</i>	<i>406,860</i>
	<i>Sanitation</i>	<i>79,168</i>	<i>3,762,164</i>
	<i>Household Toilet</i>	<i>23,113</i>	<i>28,372</i>
	<i>School Toilet</i>	<i>52,949</i>	<i>158,758</i>
	<i>Public Toilet</i>	<i>2,991</i>	<i>3,291</i>
	<i>Disinfection of Well</i>	<i>115</i>	<i>101</i>
	<i>Urban Sewerage</i>	<i>-</i>	<i>3,571,642</i>
	<i>Sub-Total</i>	<i>735,337</i>	<i>5,642,195</i>
<i>Sector Management</i>	<i>Engineering Studies</i>	<i>92,917</i>	<i>713,449</i>
	<i>Community Development and Training</i>	<i>54,215</i>	<i>543,259</i>
	<i>Sub-Total</i>	<i>147,132</i>	<i>1,256,708</i>
<i>Total Direct Cost</i>		<i>882,469</i>	<i>6,898,903</i>
<i>Contingencies</i>		<i>644,447</i>	<i>1,034,835</i>
<i>Total Investment Cost</i>		<i>1,526,916</i>	<i>7,933,738</i>

Note: Price contingency is not included in Phase II.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 18 sets of well drilling equipment, 1 set of well rehabilitation equipment, 16 units of service truck with crane and 4 units of support vehicle, and 11 units of refuse collection truck. The total procurement cost is estimated at approximately P252 million. Likewise, annual recurrent cost in 1995 price level is estimated at P42.4 to P61.9 million/year during Phase I period.

2.9 Financial Arrangements

Projected IRA as potential funds for Phase I sector development revealed considerable needs of additional funds. The IRA in a total of the province accounts for only 6.8% (P103 million) of the provincial cost requirements (P1,527 million). In terms of municipal achievement by the IRA, percentages of Cardona, Teresa and Baras are relatively higher than the provincial average, but they are still 20 to 40% at most to the requirements.

For implementation arrangements, three reference scenarios in assumption of different funding levels are referred to in view of (1) acquisition of external funds, (2) augmentation of sector finance under current arrangements (IRA), (3) introduction of private sector to mitigate public investment needs and (4) effective and economical investments.

The PW4SP advocates the imposition of tariffs for the recovery of capital and O&M cost. The water rates for all service levels were confirmed to be affordable. With regard to household toilets, the construction cost is beyond the affordability under the current income level, especially in rural areas. To expedite sanitation improvements, introduction of specific loans with a revolving character may be an effective solution. For urban sanitation, the linkage with existing housing loan shall be established to cover construction of sanitary toilets.

2.10 Monitoring

The sector monitoring system must support a well-defined and accepted sector development process-model. It includes information collection, tracing the flow of raw data from the field to the central level information analysis and data feedback. With the sector monitoring, planners should be able to take a fresh objective view of the way it implements current strategies. A sector monitoring system should reinforce the linkage between water, sanitation and health; be reliable and involve the beneficiaries; be accepted by all sectors; be practical; and be followed through with effective feedback. The best monitors are the community

members themselves since accurate monitoring reports are in their best interest. A consensus on common and practical definition of terms for monitoring purpose is needed.

A three-phased monitoring system is proposed with each phase progressively increasing the number and complexity of indicators to be used. It is envisaged that this will be linked up with the national sector monitoring system being developed.

There are existing Project Monitoring Committees (PMCs) at the provincial and municipal levels. At the provincial level, monitoring will include projects implemented and managed at this level with funds directly released to the province as provided under MO 175. The PMC shall be established in the province consisting of NGOs and representatives from the administration.

This PW4SP should be updated at least every five years. Based on the monitoring reports, annual review of sector accomplishments compared with objectives and efficiency will be done. This will lead to the reformulation of objectives, strategies, new policies and policy revisions, and updated sector investment program.



3. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF ORIENTAL MINDORO

3.1 Provincial Profile

Oriental Mindoro, the nearest island province from Metro Manila lies 45km south of Batangas. It is composed of 15 municipalities with Calapan as the provincial capital. There are 424 barangays, of which 47 are urban and 377 rural. The provincial population was 550,049 in 1990, of which 85% resided in rural areas. An annual population growth rate between 1980 and 1990 was reported at 2.1%, much lower than that of the region at 3.1%.

Climate in the province is characterized by unpronounced dry and wet seasons with rainfall evenly distributed throughout the year. The terrain consists of hilly to mountainous and relatively flat areas. There are four (4) major natural drainage systems that generally flow eastward and empty into Tablas Strait. Almost half (49%) of the total land area still remain as forestland. Approximately 35% is devoted for agricultural use, while less than 1% for built-up area.

Agriculture is the major economic activity. The average annual household income in 1991 was P51,725, below the national average of P65,000. Moreover, about 75% of the total number of families lived within and below the established poverty threshold income of P51,486 in Region IV. The unemployment rate in 1990 was 8%.

More than 90% of the municipalities are covered with electricity service with a low 68% household coverage. However, telecommunication services are available to all municipalities. A total of 35 banking facilities and 3,902 industrial/commercial and tourism establishments can be found in urban areas. In terms of social services, there are 462 schools, 41 hospitals/clinics, and 335 rural health units/main centers and barangay health stations. The ratio to population of these facilities is above the national figures.

An indicator of health problems related to water supply and sanitation is the high incidence of water-related diseases. The reported water-related diseases in the province were typhoid/paratyphoid, viral hepatitis, diarrhea, dysentery, schistosomiasis, intestinal parasitism, conjunctivitis, skin diseases and malaria. Diarrhea, intestinal parasitism and skin diseases were among the ten leading causes of morbidity.

Environmental problems related to wastewater discharge and unsanitary solid waste disposal are occurring in some parts of the province. Major water pollution sources in urban areas are domestic wastewater and dumped refuse. Only 11% of the total households in the province relies on the municipal refuse collection services.

3.2 Existing Facilities and Service Coverage

The service coverage of each sub-sector is estimated as percentage of served population/households/utilities against the total number. In water supply, safe classification of Level I facilities is introduced. Aside from household toilets, school toilets and public toilets are included in the sanitation components in view of public hygiene improvement. Preliminary discussions on solid waste management are also considered.

In water supply sector, there exist 7 public Level III systems located in Naujan, Pinamalayan, Pola, Roxas, Calapan and Baco. The largest Level III system is privately operated by Calapan Waterworks System and Development Corp. There are only 2 Level II systems at barangay level in the municipalities of Bansud and Victoria using a deep well and a spring, respectively. There are 28,217 Level I facilities. Of the total Level I facilities, 20,322 sources are classified as safe sources. Among the unsafe sources, approximately 90% or 7,100 are shallow wells.

Approximately 65% or 392,600 persons of the present population (606,600 persons) are considered as adequately served (of which 18% in urban area and 82% in rural area). Under area classification, 82% of urban population and 62% of rural population have access to safe water sources/facilities. Of the served population, approximately 19% or 76,000 persons are served by Level III systems, while 80% or about 315,000 persons depend on Level I facilities. Level II coverage is only about 1,500 persons.

There are three (3) types of sanitary toilets available to 56,439 households covering 50% of the total households compared with national average of 77%. The facilities consist of 13% flush type, 57% pour-flush and 30% VIP. In urban area, service coverage is 80%, while in rural area, only 45% of the households has sanitary toilets.

The province has a total of 1,418 toilet units found in 449 schools. Only 36% of the students is adequately served by sanitary toilets. The present average ratio of 140 students per sanitary toilet is quite low to meet the service level standard of 50 students per facility. Likewise,

there are 21 public toilets located at public markets and bus terminals in the province. About 57% of the public utilities has at least one sanitary toilet. The manner of usage, however, is inappropriate that renders these facilities unsanitary. There are no existing sewerage facilities in the province.

3.3 Existing Sector Arrangements and Institutional Capacity

The Local Government Code has re-defined the role, relationship and linkages of central, provincial, municipal and barangay institutions in the provision of basic services, including water and sanitation. The responsibility for water supply and sanitation functions was lodged with various national agencies. The new direction mandates the LGUs to play a larger role in planning and implementing water supply and sanitation projects. This raises serious institutional capacity and resource reallocation issues. New Implementing Rules and Regulations (IRR) reflecting the new sector role of the LGU and national agencies are being prepared.

At the central level, there are three (3) line departments (DILG, DPWH and DOI) and two (2) government owned and controlled corporations (LWUA and MWSS) responsible for planning and implementation. Other departments are concerned with macro-planning, national resource allocation decisions, as well as exercise of regulatory powers for tariff setting, environmental protection and management issues.

At the provincial and municipal levels, there are central agency field offices (of DPWH and DILG) and LGU offices working on the sector. Water districts, RWSAs and BWSAs have been organized to deal with the actual delivery of services. Some LGUs implement and operate municipal or provincial water and sanitation systems. Project management offices (PMOs, at the central level), ad hoc inter-agency committees and task forces have been organized to address coordination issues.

The current major institutional issues are those of management of the transition process and of re-establishing the leadership for the sector. Major resource realignments and capacity building initiatives are needed. At the local level, LGU capacity for sector project is insufficient and will require substantial input and support.

There is wide dissatisfaction among implementors themselves over the existing monitoring system. This leads to the problem of reliability of information coming from the field. There

is a need to establish a system which is perceived as having a direct link to performance, similar to project-based monitoring.

3.4 Past Financial Performance in Water Supply and Sanitation

Investments for Level I facilities by DPWH during the period 1990 to 1992 amounted at P16,424 thousand, covering 422 wells, 18 spring development, 4 rain collectors and 186 rehabilitation works. The provincial government and LIUCP financed for Level I facilities from 1990 to 1993 an amount of P3,613 thousand and P548 thousand, respectively. DILG financed a total of P550 thousand in 1992 for one Level II system. LWUA had released a total of P2,460 thousand during the period of 1990 to 1992 to the 4 Water Districts.

The IRA to the province between 1990-1993 accounted for 1.2 to 1.3% of the national total IRA for all provinces. On the other hand, the IRA to the municipalities of the province was arranged with 1.2% to the national total IRA for all municipalities. The IRA accounted for 60 - 90% of the total revenue of the provincial government during 1990 and 1992. In 1993, the IRA to the province amounted at P256 million, of which 41% was allocated to provincial government and 59% to the municipalities. Of the provincial government IRA, P2,663 thousand or 2.6% was spent for the relevant sector.

The capital cost for the Level I system is free to the community, while operation and maintenance are the responsibility of the associations. As for Level II systems, water charges for the repayment of capital expenses and the cost of operation and maintenance are collected by each association from the beneficiaries. For Level III system, WDs or RWSAs bear all capital cost borrowed from LWUA. Regarding sanitation sector, toilet bowls have been distributed to households without charges, although construction of the superstructure and the depository of private toilets is through self-help.

At present, water rates in the province are within affordable range based on the experiences. On the other hand, construction cost of private toilet seems to be expensive comparing with the family income.

Operating and maintenance cost of the 4 existing water districts exceeded their revenues. At present, they received loans of P4,026 thousand from LWUA. Three of them are in arrears. The financial performances of the RWSAs and BWSAs tend to face difficulties partly because the beneficiaries do not recognize the cost requirements.

3.5 Water Source Development

The study on water source development covers all the municipalities in the province. It gives an emphasis on groundwater sources rather than surface water considering its economic advantages.

The geologic rock units observed in the provinces are classified into three (3) main groups based on the ages of the rock formations: Pliocene and Older Rocks, Pleistocene to Pliocene Rocks and Recent Deposits. The Pliocene and Older rock units cover about 50% of the total provincial area and are largely distributed in the Mindoro mountain range on the west. Rocks classified as Pliocene to Pleistocene, which underlie about 15% of the total land area of the province, are fairly extensive in the south-southwestern area of Lake Naujan. The Recent deposits make up about 35% of the province and are widespread in the eastern coastal and alluvial plains of Baco, Calapan, Naujan, Victoria, Socorro, Pinamalayan, Gloria, Bansud, Bongabong, Roxas and Mansalay.

For planning purposes in the development of groundwater sources, the provincial area is divided into shallow well, deep well and difficult areas. No shallow well area is defined in the province. Deep well area covers about 30% of the Oriental Mindoro, while the remaining 70% is classified as difficult area. The groundwater in the province is generally potable except for saline water identified in the parts of Calapan, Naujan, Pinamalayan and Gloria. High iron and manganese concentrations are likewise reported in Baco, Pola, Gloria, Victoria and Pinamalayan.

Considering the existing wells in the province, the potential source of groundwater occurs between 1 to 180 mbgl in the Recent alluviums, the Plio-Pleistocene rocks and Miocene limestone formations. The development of deep wells is more advantageous than shallow wells considering the safe quality and invariable yields of deeper aquifers.

3.6 Future Requirements in Water Supply and Sanitation Improvement

Phased requirements for the sector development in the PW4SP area are assessed to meet the provincial targets established as percentages of beneficiaries or utilities to be served by sub-sector. Development priority in water supply sector is given to uplift service coverage in rural area, while the urban area is considered to moderately improve the present service level as shown in Table 3.6.1. Sanitation sector target is applied equally to urban and rural area in the same manner as the NSMP. Sewerage target is set for only part of urban centers in the long-term development, while solid waste management considered medium-term household requirements.

Table 3.6.1 Present Service Coverage and Sector Targets

Sub-Sector	Area/Type	Base Year Service Coverage	Provincial Sector Targets	
			Phase I	Phase II
Water Supply	Urban Area	82%	85%	93%
	Rural Area	63%	85%	95%
Sanitation	Household Toilet	57%	77%	94%
	School Toilet	33%	50%	70%
	Public Toilet	59%	70%	100%
Sewerage	Urban Area	-	Not Applicable	50%
Solid Waste	Urban Area	76%	80%	Not Applicable

Frame values are projected by municipality for respective sub-sectors; future population by urban and rural area, the number of students in public schools and the number of public utilities.

Types of required facilities and their implementation criteria are determined according to service level standards currently adopted by the sector agencies. Urban populace is planned to be served by Level III systems, however, existing Level I and II facilities are to be used during Phase I period. Level I facilities are adopted for rural water supply with limited application of Level II systems where houses are clustered and suitable untapped springs are confirmed. However, it does not exclude Level I and II facilities from being implemented in urban area as individual cases in the future as well as Level III systems in rural area. Rehabilitation work is planned only for new deep wells (Level I) to be constructed under PW4SP, considering the difficulty of rehabilitating the existing wells constructed by means of conventional methods.

In sanitation sector, pour flush and/or flush type household toilets are planned, while VIP type household toilet is considered in rural area as an intermediate measure. Sewerage program is planned in Phase II for limited urban area. The study on solid waste considered only the number of required trucks for the year 2000. Additional service coverage of the sector by phase is shown in Table 3.6.2.

Table 3.6.2 Additional Service Coverage by Phase

Sub-Sector	Area/Type	Unit	Additional Service Coverage	
			Phase I	Phase II
Water Supply	Urban Area	Persons	15,100	75,200
	Rural Area	Persons	159,900	134,500
Sanitation	Household Toilet	No. of Households	37,400	107,600
	School Toilet	No. of Students	34,100	61,200
	Public Toilet	No. of Utilities	18	6
Sewerage	Urban Area	Persons	Not Applicable	38,500
Solid Waste	Urban Area	No. of Households	5,100	Not Applicable

The required water supply facilities for Phase I include 14 deep wells for 2,824 house connections in urban area, while 1,993 deep and shallow wells are required for rural area. Phase II requirements will cover 19 deep wells for 18,795 connectors in the urban area and 1,664 deep and shallow wells for the rural area. Rehabilitation requirements are estimated at 10% of the total number of deep wells to be constructed under PW4SP. Moreover, for Phase I, urban sanitation will need 4,535 household toilets, 14 public school toilets and 18 public toilets, while rural areas need a total of 32,839 household toilets and 126 public school toilets. For Phase II, urban area will need 17,859 household, 37 public school toilets and 6 public toilets. In the rural area, a total of 89,741 household toilets and 208 public school toilets are necessary. As for solid waste management, 10 refuse collection trucks are required for Phase I.

3.7 Sector Management Plan

To effectively manage the water and sanitation sector, the provincial and municipal governments will have to make some adjustments in their current policies and structures. One glaring basic institutional need at the local level is a common vision and mission statement for the sector. A critical mass of people and resources who share in the vision must be identified and harnessed for sector management. Local planners need to focus on the long-term requirements.

The following policy and strategy statements will be adopted by the Provincial Government:

- (1) Sustainability shall be promoted through increased community responsibility for management of facilities.
- (2) Selection and prioritization of projects shall be based on demonstrated commitment of the beneficiaries to participate in the project, willingness to pay, the current water and sanitation and overall health conditions, potential for growth and costs.
- (3) Technology shall be appropriate to local conditions and resources. Economical facilities shall be pursued not necessarily insisting on low-cost construction.
- (4) An integrated approach to the provision of potable water supply, sanitation and hygiene education shall be promoted.
- (5) The LGU shall seek to provide water and sanitation in an equitable manner between rural and urban areas; between wealthy and depressed areas.
- (6) Cost Recovery and Cost Sharing (Subsidy): The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation.

- (7) **Private Sector Participation:** The LGU will gradually transfer its technical assistance functions to the private sector and provide incentives, as needed, and establish the regulatory framework for their participation.
- (8) The LGU shall actively seek out and negotiate with other potential sources of local and external funds (loans and grants) to finance the capital requirements of the sector.
- (9) Sector development shall be consistent with broader concerns for the environmental protection and management.
- (10) **Disaster Response and Emergency Coordination:** The LGU shall formulate, as part of its contingency plans, a program to provide water supply and sanitation services under emergency conditions.

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework considering, among others, the following: water allocation and water rights policies (conflict resolution); water rate review; association registration; water quality, etc.

It is assumed that, in the medium-term, national and external funds will, although diminishing, continue to be channeled through local offices of central agencies. In the long term, the Provincial Sector Trust Fund approach is an additional mechanism for financing project-related activities. The Trust Fund raises the LGU responsibility for effective and efficient utilization of these funds.

In the medium-term, a full-time Provincial Sector Team (PST) shall be set up for coordination and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This Team may be supplemented by staff detailed full-time from national and local agencies, as needed. In the long-term, the core group from the Team for a new Provincial Water Supply and Sanitation Office (PWSO) could be approved to continue to promote, assist and monitor all water supply and sanitation services in cooperation with the municipalities. The DILG-PMO shall continue to provide technical and managerial assistance in the formative years of the PST/PWSO.

Regarding the models formulated for the community development in the different service levels, deep wells will be feasible for the three model sites. To implement the projects, a RWSA shall be organized in Level I and II, while a water cooperative for the Level III. The community, especially the women sector, shall be involved in all phases of project management (planning, construction and O&M) and in undertaking health and hygiene education program. To provide

the members with the necessary skills, training programs are to be implemented by concerned national agencies and by the provincial and municipal governments. The water districts shall also extend assistance to the community organizations.

3.8 Cost Estimates for Future Sector Development

The investment cost includes direct cost for construction/rehabilitation of required facilities and sector management, and physical and price contingencies, while recurrent cost is incurred for operation and maintenance of facilities. Unit construction cost per person/household/facility was first prepared under contract-out basis in 1995 price level. In this regard, the cost for procurement and distribution of toilet bowl for pour flush toilets is only counted for household toilets. Investment cost required by phase for the province is summarized in Table 3.8.1.

Table 3.8.1 Investment Cost Required by Phase

Unit: 1,000 Pesos

Item	Component	Phase I	Phase II
Construction/ Rehabilitation	Water Supply	341,073	475,273
	Urban Area	58,773	240,999
	Rural Area	282,300	234,274
	Sanitation	63,838	407,027
	Household Toilet	16,445	51,919
	School Toilet	38,899	72,071
	Public Toilet	6,573	1,878
	Disinfection of Well	1,921	7
	Urban Sewerage	-	281,152
		Sub-Total	404,911
Sector Management	Engineering Studies	50,882	100,604
	Community Development and Training	43,069	83,662
	Sub-Total	93,951	184,266
Total Direct Cost		498,862	1,066,566
Contingencies		358,731	159,985
Total Investment Cost		857,593	1,226,551

Note: Price contingency is not included in Phase II.

The investment cost for Phase I is estimated at about P858 million. A total of P405 million is required as the construction/rehabilitation cost in Phase I, of which 70% is for rural water supply, while only 16% for sanitation sector.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 33 sets of well drilling equipment, 1 set of well rehabilitation equipment, 27 units of service truck with crane and 7 units of support vehicle; and 10 units of refuse collection truck. The total procurement cost is estimated at approxi-

mately P411 million. Likewise, annual recurrent cost in 1995 price level is estimated at P15.4 to P19.3 million/year during Phase I period.

3.9 Financial Arrangements

Projected IRA as potential funds for Phase I sector development revealed considerable needs of additional funds. The IRA in a total of the province accounts for only 14.3% (P123 million) of the provincial cost requirements (P858 million). In terms of municipal achievement by the IRA, percentage of Baco is outstanding comparing to provincial average. Others are in the range between 10% and 37% to the requirements.

For implementation arrangements, three reference scenarios in assumption of different funding levels are referred to in view of (1) acquisition of external funds, (2) augmentation of sector finance under current arrangements (IRA), (3) introduction of private sector to mitigate public investment needs and (4) effective and economical investments. Among the scenarios, a 25% investment is envisioned as a possible achievement level enlarging the composition of IRA.

The PW4SP advocates the imposition of tariffs for the recovery of capital and O&M cost. The water rates for all service levels were confirmed to be affordable. With regard to household toilets, the construction cost is beyond the affordability under the current income level, especially in rural areas. To expedite sanitation improvements, introduction of specific loans with a revolving character may be an effective solution. For urban sanitation, the linkage with existing housing loan shall be established to cover construction of sanitary toilets.

3.10 Monitoring

The sector monitoring system must support a well-defined and accepted sector development process-model. It includes information collection, tracing the flow of raw data from the field to the central level information analysis and data feedback. With the sector monitoring, planners should be able to take a fresh objective view of the way it implements current strategies. A sector monitoring system should reinforce the linkage between water, sanitation and health; be reliable and involve the beneficiaries; be accepted by all sectors; be practical; and be followed through with effective feedback. The best monitors are the community members themselves since accurate monitoring reports are in their best interest. A consensus on common and practical definition of terms for monitoring purpose is needed.

A three-phased monitoring system is proposed with each phase progressively increasing the number and complexity of indicators to be used. It is envisaged that this will be linked up with the national sector monitoring system being developed.

There are existing Project Monitoring Committees (PMCs) at the provincial and municipal levels. At the provincial level, monitoring will include projects implemented and managed at this level with funds directly released to the province as provided under MO 175. The PMC shall be established in the province consisting of NGOs and representatives from the administration.

This PW4SP should be updated at least every five years. Based on the monitoring reports, annual review of sector accomplishments compared with objectives and efficiency will be done. This will lead to the reformulation of objectives, strategies, new policies and policy revisions, and updated sector investment program.



4. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF OCCIDENTAL MINDORO

4.1 Provincial Profile

Occidental Mindoro is one of the two provinces in the Mindoro Island. It is located south of Batangas and north of the Visayas. The province covers several islets, namely, Cabra, Lubang, Ambil and Galo on the northeast; Ambulong and Ilin on the southwest; and Apo and Menor on the west. It is composed of 11 municipalities with Mamburao as the provincial capital. There are 162 barangays, of which 49 are urban and 113 rural. The province had a population of 282,593 in 1990, of which 72% resided in rural areas. An annual population growth rate between 1980 and 1990 was reported at 2.4%, much lower than that of the region at 3.1%.

Climate in the province is characterized by wet (from June to October) and dry (rest of the year) seasons. The terrain consists of rugged mountains rising moderately to steeply sloping and moderately flat areas along the coast. There are four (4) major natural drainage systems that generally flow westward into the South China Sea. More than half (58%) of the total land area still remain as forestland. About 12% is for agricultural use, while only 1.38% for built-up areas.

Agriculture is the major economic activity. The average annual household income in 1991 was P61,132, a little lower than the national average of P65,000. Moreover, about 60% of the total number of families lived within and below the established poverty threshold income of P51,486 in Region IV. The unemployment rate in 1990 was 9%.

All municipalities are covered with electricity service but with a low 24% household coverage. Telecommunication services are not available in any municipality. Only 7 banking facilities as well as 1,008 industrial/commercial and tourism establishments exist in the whole province. In terms of social service, there are 261 schools, 8 hospitals/clinics and 43 rural health units/barangay health stations. The ratio to population of these facilities is quite below the national figures.

An indicator of health problems related to water supply and sanitation is the high incidence of water-related diseases. The reported water-related diseases in the province were typhoid/paratyphoid, diarrhea, dysentery, conjunctivitis, skin diseases and malaria. Diarrhea, and

malaria were among the ten leading causes of morbidity. Diarrhea also ranked in the ten leading causes of mortality.

Environmental problems related to wastewater discharge and unsanitary solid waste disposal are occurring in some parts of the province. Major water pollution sources in urban areas are domestic wastewater and dumped refuse. A mere 10% of the total households in the province relies on the municipal refuse collection services.

4.2 Existing Facilities and Service Coverage

The service coverage of each sub-sector is estimated as percentage of served population/households/utilities against the total number. In water supply, safe classification of Level I facilities is introduced. Aside from household toilets, school toilets and public toilets are included in the sanitation components in view of public hygiene improvement. Preliminary discussions on solid waste management are also considered.

In water supply sector, there are 6 existing Level III systems located in Abra de Ilog, Lubang, Mamburao, Sablayan and San Jose. A total of 6 Level II systems is being operated at barangay level in the municipalities of Abra de Ilog, Paluan, Sablayan and San Jose. Most of these Level II systems use spring sources. There are 26,058 Level I facilities consisting of more than 99% shallow wells. Of the total Level I facilities, 11,545 are classified as safe sources.

Approximately 49% or 152,700 persons of the present population (310,400 persons) are considered as adequately served (of which 37% in urban area and 63% in rural area). Under area classification, 63% of urban population and 43% of rural population have access to safe water sources/facilities. Of the served population, approximately 21% or 31,900 persons are served by Level III systems, while 77% or about 117,300 persons depend on Level I facilities. Level II coverage is only about 3,400 persons.

Three (3) types of sanitary toilets are available to 37,765 households covering 62% of the total households compared with national coverage of 77%. The facilities consist of 8% flush type, 89% pour-flush and 3% VIP. In urban area, service coverage is 69%, while in rural area, only 60% of the households has sanitary toilets.

The province has a total of 600 toilet units found in 223 schools. Only 16% of the students is adequately served by sanitary toilets. The present average ratio of 319 students per sanitary

toilet is quite low to meet the service level standard of 50 students per facility. Likewise, there are 7 public toilets located at public markets and bus terminals in the province. About 25% of the public utilities has at least one sanitary toilet. The manner of usage however, is inappropriate that renders these facilities unsanitary. There are no existing sewerage facilities in the province.

4.3 Existing Sector Arrangements and Institutional Capacity

The Local Government Code has re-defined the role, relationship and linkages of central, provincial, municipal and barangay institutions in the provision of basic services, including water and sanitation. The responsibility for water supply and sanitation functions was lodged with various national agencies. The new direction mandates the LGUs to play a larger role in planning and implementing water supply and sanitation projects. This raises serious institutional capacity and resource reallocation issues. New Implementing Rules and Regulations (IRR) reflecting the new sector role of the LGU and national agencies are being prepared.

At the central level, there are three (3) line departments (DILG, DPWH and DOH) and two (2) government owned and controlled corporations (LWUA and MWSS) responsible for planning and implementation. Other departments are concerned with macro-planning, national resource allocation decisions, as well as exercise of regulatory powers for tariff setting, environmental protection and management issues.

At the provincial and municipal levels, there are central agency field offices (of DPWH and DILG) and LGU offices working on the sector. Water districts, RWSAs and BWSAs have been organized to deal with the actual delivery of services. Some LGUs implement and operate municipal or provincial water and sanitation systems. Project management offices (PMOs, at the central level), ad hoc inter-agency committees and task forces have been organized to address coordination issues.

The current major institutional issues are those of management of the transition process and of re-establishing the leadership for the sector. Major resource realignments and capacity building initiatives are needed. At the local level, LGU capacity for sector project is insufficient and will require substantial input and support.

There is wide dissatisfaction among implementors themselves over the existing monitoring system. This leads to the problem of reliability of information coming from the field. There

is a need to establish a system which is perceived as having a direct link to performance, similar to project-based monitoring.

4.4 Past Financial Performance in Water Supply and Sanitation

Investments for Level I facilities by DPWH during the period 1990 to 1992 amounted at P13,186 thousand, covering 511 wells, 12 spring development, 1 rain collector and 125 rehabilitation works. LWUA had released a total of P4,215 thousand during the period of 1990 to 1993 to the 2 Water Districts. DILG financed with a total of P3,317 thousand during the period of 1990 to 1992 for one Level III system. DOH invested with a total of P245 thousand for Level III facilities. The provincial government financed an amount of P6,400 thousand for Level I and Level III facilities and toilets from 1989 to 1993. Municipal governments also disbursed a total amount of P120 thousand for Level I facilities. Other sources of fund invested to the sector came from congressman's office, DECS, LIUCP and OSCM.

The IRA to the province between 1990 and 1993 accounted for approximately 1.0% of the national total IRA for all provinces. On the other hand, the IRA to the municipalities of the province was arranged with 0.9 to 1.0% to the national total IRA for all municipalities. The IRA accounted for 65 to 80% of the total revenue of the provincial government during 1990 and 1992. In 1993, the IRA to the province amounted at P217 million, of which 43% was allocated to provincial government and 57% to the municipality. Of the provincial IRA, P2,525 thousand or 2.7% was availed for the relevant sector.

The capital cost for the Level I system is free to the community, while operation and maintenance are the responsibility of the associations. As for Level II systems, the capital cost is shouldered by the RWSA through a loan or grant. For Level III system, WDs or RWSAs bear the entire capital cost financed by LWUA through concessional terms on soft loans for less capable WDs. Regarding the sanitation sector, toilet bowls have been distributed to households without charges, although construction of the superstructure and the depository of private toilets is through self-help.

At present, water rates in the province are within affordable range based on the experiences. On the other hand, construction cost of private toilet seems to be expensive comparing with the family income.

Financial records of WDs show that the revenue was short for O&M costs of the facilities despite high collection efficiency. The financial performances of the RWSAs and BWSAs tend to face difficulties partly because the beneficiaries do not recognize the cost requirements.

4.5 Water Source Development

The study on water source development covers all the municipalities in the province. It gives an emphasis on groundwater sources rather than surface water considering its economic advantages.

The geologic rock units observed in the provinces are classified into three (3) main groups based on the ages of the rock formations: Pliocene and Older Rocks, Pleistocene to Pliocene Rocks and Recent Deposits. The Pliocene and Older rock units cover about 50% of the total provincial area and are largely distributed in the north and southeastern portions. Rocks classified as Pliocene to Pleistocene, which underlie about 20% of the total land area of Occidental Mindoro, are limited to Sablayan area towards the South. The Recent deposits make up about 30% of the province and are widespread in the coastal and flood plains of San Jose, Magsaysay, Mamburao and Sablayan.

For planning purposes in the development of groundwater sources, the provincial area is divided into shallow well, deep well and difficult areas. The islets of Lubang and Ambulong are categorized as shallow well areas. Deep well area covers about 20% of the mainland, while 70% of the provincial domain is classified as difficult areas. The groundwater in the province is generally potable except for saline water mapped out in San Jose and Magsaysay. High iron and manganese concentrations are reported in adjoining municipalities of Abra de Ilog, Paluan and Mamburao.

Considering the existing wells in the province, the potential source of groundwater occurs between 2 to 100 mbgl in the Recent alluviums and the Plio-Pleistocene rocks. The development of deep wells is more advantageous than shallow wells considering the safe quality and invariable yields of deeper aquifers.

4.6 Future Requirements in Water Supply and Sanitation Improvement

Phased requirements for the sector development in the PW4SP area are assessed to meet the provincial targets established as percentages of beneficiaries or utilities to be served by sub-

sector. Development priority in water supply sector is given to uplift service coverage in rural area, while the urban area is considered to moderately improve the present service level as shown in Table 4.6.1. Sanitation sector target is applied equally to urban and rural area in the same manner as the NSMP. Sewerage target is set for only part of urban centers in the long-term development, while solid waste management considered the medium-term household requirements.

Table 4.6.1 Present Service Coverage and Sector Targets

<i>Sub-Sector</i>	<i>Area/Type</i>	<i>Base Year Service Coverage</i>	<i>Provincial Sector Targets</i>	
			<i>Phase I</i>	<i>Phase II</i>
<i>Water Supply</i>	<i>Urban Area</i>	70%	77%	93%
	<i>Rural Area</i>	44%	71%	95%
<i>Sanitation</i>	<i>Household Toilet</i>	69%	77%	94%
	<i>School Toilet</i>	20%	30%	50%
	<i>Public Toilet</i>	25%	50%	100%
<i>Sewerage</i>	<i>Urban Area</i>	-	<i>Not Applicable</i>	50%
<i>Solid Waste</i>	<i>Urban Area</i>	33%	50%	<i>Not Applicable</i>

Frame values are projected by municipality for respective sub-sectors; future population by urban and rural area, the number of students in public schools and the number of public utilities.

Types of required facilities and their implementation criteria are determined according to service level standards currently adopted by the sector agencies. Urban populace is planned to be served by Level III systems, however, existing Level I and II facilities are to be used during Phase I period. Level I facilities are adopted for rural water supply with limited application of Level II systems where houses are clustered and suitable untapped springs are confirmed. However, it does not exclude Level I and II facilities from being implemented in urban area as individual cases in the future as well as Level III systems in rural area. Rehabilitation work is planned only for new deep wells (Level I) to be constructed under PW4SP, considering the difficulty of rehabilitation for existing wells constructed by means of conventional methods.

In sanitation sector, pour flush and/or flush type household toilets are planned, while VIP type household toilet is considered in rural area as an intermediate measure. Sewerage program is planned in Phase II for limited urban area. The study on solid waste considered only the number of required trucks for the year 2000. Additional service coverage of the sector by phase is shown in Table 4.6.2.

Table 4.6.2 Additional Service Coverage by Phase

Sub-Sector	Area/Type	Unit	Additional Service Coverage	
			Phase I	Phase II
Water Supply	Urban Area	Persons	24,700	74,000
	Rural Area	Persons	76,800	95,000
Sanitation	Household Toilet	No. of Households	13,400	47,800
	School Toilet	No. of Students	10,300	24,000
	Public Toilet	No. of Utilities	14	12
Sewerage	Urban Area	Persons	Not Applicable	51,400
Solid Waste	Urban Area	No. of Households	6,300	Not Applicable

The necessary water supply facilities for Phase I include 10 deep wells for 4,997 house connections in urban area, while 1,007 deep and shallow wells are required for rural area. Rehabilitation requirements are estimated as 10% of the total number of deep wells to be constructed under PW4SP. Moreover, for Phase I, urban sanitation will require 5,297 household toilets, 9 school toilets and 14 public toilets, while rural areas need a total of 8,120 household toilets and 32 public school toilets. Solid waste management requires 10 refuse collection trucks for the year 2000. Under Phase II requirements, urban area will require 16,796 household toilets, 33 public school toilets and 12 public toilets. In the rural area, a total of 31,032 household toilets and 65 public school toilets are necessary.

4.7 Sector Management Plan

To effectively manage the water and sanitation sector, the provincial and municipal governments will have to make some adjustments in their current policies and structures. One glaring basic institutional need at the local level is a common vision and mission statement for the sector. A critical mass of people and resources who share in the vision must be identified and harnessed for sector management. Local planners need to focus on the long-term requirements.

The following policy and strategy statements will be adopted by the Provincial Government:

- (1) Sustainability shall be promoted through increased community responsibility for management of facilities.
- (2) Selection and prioritization of projects shall be based on demonstrated commitment of the beneficiaries to participate in the project, willingness to pay, the current water and sanitation and overall health conditions, potential for growth and costs.
- (3) Technology shall be appropriate to local conditions and resources. Economical facilities shall be pursued not necessarily insisting on low-cost construction.
- (4) An integrated approach to the provision of potable water supply, sanitation and hygiene education shall be promoted.

- (5) The LGU shall seek to provide water and sanitation in an equitable manner between rural and urban areas; between wealthy and depressed areas.
- (6) Cost Recovery and Cost Sharing (Subsidy): The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation.
- (7) Private Sector Participation: The LGU will gradually transfer its technical assistance functions to the private sector and provide incentives, as needed, and establish the regulatory framework for their participation.
- (8) The LGU shall actively seek out and negotiate with other potential sources of local and external funds (loans and grants) to finance the capital requirements of the sector.
- (9) Sector development shall be consistent with broader concerns for the environmental protection and management.
- (10) Disaster Response and Emergency Coordination: The LGU shall formulate, as part of its contingency plans, a program to provide water supply and sanitation services under emergency conditions.

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework considering, among others, the following: water allocation and water rights policies (conflict resolution); water rate review; association registration; water quality, etc.

It is assumed that, in the medium-term, national and external funds will, although diminishing, continue to be channeled through local offices of central agencies. In the long term, the Provincial Sector Trust Fund approach is an additional mechanism for financing project-related activities. The Trust Fund raises the LGU responsibility for effective and efficient utilization of these funds.

In the medium-term, a full-time Provincial Sector Team (PST) shall be set up for coordination and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This Team may be supplemented by staff detailed full-time from national and local agencies, as needed. In the long-term, the core group from the Team for a new Provincial Water Supply and Sanitation Office (PWSO) could be approved to continue to promote, assist and monitor all water supply and sanitation services in cooperation with the municipalities. The DILG-PMO shall continue to provide technical and managerial assistance in the formative years of the PST/PWSO.

Regarding the models formulated for the community development in three different service levels, deep wells will be feasible for Level I and III systems, while a spring for Level II. To implement the projects for Level I and II systems, the existing Parents-Teachers Associations shall be strengthened to assume the roles of RWSA, while for Level III, the consumers shall be organized into an RWSA. The community, especially the women sector, shall be involved in all phases of project management (planning, construction and O&M) and in undertaking health and hygiene education program. To provide the members with the necessary skills, training programs are to be implemented by concerned national agencies and by the provincial and municipal governments. The water districts shall also extend assistance to the community organizations.

4.8 Cost Estimates for Future Sector Development

The investment cost includes direct cost for construction/rehabilitation of required facilities and sector management, and physical and price contingencies, while recurrent cost is incurred for operation and maintenance of facilities. Unit construction cost per person/household/facility was first prepared under contract-out basis in 1995 price level. In this regard, the cost for procurement and distribution of toilet bowl for pour flush toilets is only counted for household toilets. Investment cost required by phase for the province is summarized in Table 4.8.1.

The investment cost for Phase I is estimated at about P449 million. A total of P215 million is required as the construction/rehabilitation cost in Phase I, of which 48% is for rural water supply, while only 11% for sanitation sector.

Table 4.8.1 Investment Cost Required by Phase

Unit: 1,000 Pesos

Item	Component	Phase I	Phase II
Construction/ Rehabilitation	Water Supply	192,074	400,980
	Urban Area	88,979	231,750
	Rural Area	103,095	169,230
	Sanitation	23,190	427,683
	Household Toilet	5,519	19,398
	School Toilet	11,405	28,976
	Public Toilet	4,438	3,803
	Disinfection of Well	1,828	9
	Urban Sewerage		375,497
		Sub-Total	215,264
Sector Management	Engineering Studies	27,186	99,815
	Community Development and Training	17,604	78,268
	Sub-Total	44,790	178,083
Total Direct Cost		260,054	1,006,746
Contingencies		189,170	151,012
Total Investment Cost		449,224	1,157,758

Note: Price contingency is not included in Phase II.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 16 sets of well drilling equipment, 2 sets of well rehabilitation equipment, 11 units of service truck with crane and 7 units of support vehicle; and 10 units of refuse collection truck. The total procurement cost is estimated at approximately P184 million. Likewise, annual recurrent cost in 1995 price level is estimated at P7 to P12 million/year during Phase I period.

4.9 Financial Arrangements

Projected IRA as potential funds for Phase I sector development revealed considerable needs of additional funds. The IRA in a total of the province accounts for only 22.6% (P101 million) of the provincial cost requirements (P449 million). In terms of municipal achievement by the IRA, percentages of Calintaan, Paluan and Sablayan are much higher than the provincial average. Others are in the range between 13% and 36% to the requirements.

For implementation arrangements, three reference scenarios in assumption of different funding levels are referred to in view of (1) acquisition of external funds, (2) augmentation of sector finance under current arrangements (IRA), (3) introduction of private sector to mitigate public investment needs and (4) effective and economical investments. Among the scenarios, a 25% investment is envisioned as a possible achievement level enlarging the composition of IRA.

The PW4SP advocates the imposition of tariffs for the recovery of capital and O&M cost. The study on the affordability by different water supply service level was made using estimated water rate and projected income in 2000. The water rates for all service levels were confirmed to be affordable. With regard to household toilets, the construction cost is beyond the affordability under the current income level, especially in rural areas. To expedite sanitation improvements, introduction of specific loans with a revolving character may be an effective solution. For urban sanitation, the linkage with existing housing loan shall be established to cover construction of sanitary toilets.

4.10 Monitoring

The sector monitoring system must support a well-defined and accepted sector development process-model. It includes information collection, tracing the flow of raw data from the field to the central level information analysis and data feedback. With the sector monitoring,

planners should be able to take a fresh objective view of the way it implements current strategies. A sector monitoring system should reinforce the linkage between water, sanitation and health; be reliable and involve the beneficiaries; be accepted by all sectors; be practical; and be followed through with effective feedback. The best monitors are the community members themselves since accurate monitoring reports are in their best interest. A consensus on common and practical definition of terms for monitoring purpose is needed.

A three-phased monitoring system is proposed with each phase progressively increasing the number and complexity of indicators to be used. It is envisaged that this will be linked up with the national sector monitoring system being developed.

There are existing Project Monitoring Committees (PMCs) at the provincial and municipal levels. At the provincial level, monitoring will include projects implemented and managed at this level with funds directly released to the province as provided under MO 175. The PMC shall be established in the province consisting of NGOs and representatives from the administration.

This PW4SP should be updated at least every five years. Based on the monitoring reports, annual review of sector accomplishments compared with objectives and efficiency will be done. This will lead to the reformulation of objectives, strategies, new policies and policy revisions, and updated sector investment program.



5. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF ABRA

5.1 Provincial Profile

Abra is one of the six (6) provinces/city in the Cordillera Autonomous Region (CAR). Bangued, the capital, is about 406 km from Metro Manila. It is composed of 27 municipalities with 303 barangays, of which 40 are urban and 263 rural. The population in the province was 184,743 in 1990 with an annual growth rate of 1.44% between 1980 to 1990.

The climate in the province is characterized by pronounced dry (from November to April) and wet (rest of the year) seasons. The mean annual rainfall was recorded at 3,000mm. The topography of the province is generally mountainous with narrow strip of flat land along Abra and Tineg rivers. The principal natural drainage system is Abra river, which flows northward and empties into the Luzon Sea. About 29% of the total land area still remains as forestland. Only 12% is devoted for agricultural use, while less than 1% for built-up areas.

Agriculture is the major economic activity in the province. Livestock is also an important activity under the extensive grassland and pasture areas. The mean annual family income in 1991 was P30,576, quite below the national average of P65,000. Approximately 76% of the total number of families lived within and below the established poverty threshold income of P39,400 in CAR. The unemployment rate in 1990 was 3%.

Electric supply service in the province covers 85% of the municipalities with a low 12% household coverage. Telecommunication is available to all municipalities. There are 6 banking institutions and 119 industrial/commercial and tourism establishments. Land transportation is available by means of jeeps, tricycles and buses. In terms of social services, there are 305 schools, 5 hospitals/clinics, and 121 health units/main centers and barangay health stations.

An indicator of health problem related to water supply and sanitation shows the incidence of water-related diseases such as diarrhea and malaria, which were among the ten leading causes of morbidity in the province. Also, diarrhea ranked in the ten leading causes of mortality.

Environmental problems related to wastewater discharge and unsanitary solid waste disposal are occurring in some parts of the province. Major pollution sources in urban areas are domestic

waste water and dumped refuse. There is no existing sanitary sewerage system in the province. Of the 27 municipalities, only Bangued has a municipal refuse collection and disposal service.

5.2 Existing Facilities and Service Coverage

The service coverage of each sub-sector is estimated as percentages of served population/households/utilities against the total number. In water supply, safe classification of Level I facilities is introduced. Aside from household toilets, school and public toilets are included in the sanitation components in view of public hygiene improvement. Preliminary discussions on solid waste management are also considered.

There are 31 Level III systems in the province broken down into 3 Water Districts and 28 Barangay Waterworks. Of the 27 municipalities, 12 have Level III systems, which utilize springs except for one deep well in Langangilang. A total of 137 Level II systems are under operation covering 22 urban and 138 rural barangays in a total of 24 municipalities. All these Level II systems avail spring sources excluding the Danglas system with a dug well. There are 2,350 Level I facilities consisting of shallow and deep wells, and springs. Of these facilities, 188 are classified as unsafe sources. Among the unsafe sources, 52 are undeveloped springs.

Approximately 81% or 160,600 of the present population (199,300) are considered adequately served (of which 27% is in urban area and 73% in rural area). Under area classification, 90% of urban population and 77% of rural population have access to safe water sources/facilities. Of the served population, 16% or 31,300 persons are served by Level III systems. About 45% or 88,800 persons are served by Level I facilities, while 20% or 40,500 persons depend on Level II systems.

Sanitary toilets are available to 19,404 households covering 52% of the total households compared to the national coverage of 77%. The facilities consist of 8% flush type, 85% pour-flush type and 7% VIP. In urban areas, service coverage is 75%, while in rural area, only 45% of the households has sanitary toilets.

Abra has a total of 725 public toilet units found in 301 schools. Only 53% of the students is adequately served by sanitary toilets. The present average ratio of 83 students per sanitary toilet is quite low to meet the service level standard of 50 students per facility. At present, there are 22 public utilities that include markets, bus/jeepney terminals and parks or plaza in the province. About 82% of these public utilities has sanitary toilets. The manner of usage

however, is inappropriate that renders the facilities unsanitary. There is no existing sewerage facility in the province.

5.3 Existing Sector Arrangements and Institutional Capacity

The Local Government Code has re-defined the role, relationship and linkages of central, provincial, municipal and barangay institutions in the provision of basic services, including water and sanitation. The responsibility for water supply and sanitation functions was lodged with various national agencies. The new direction mandates the LGUs to play a larger role in planning and implementing water supply and sanitation projects. This raises serious institutional capacity and resource reallocation issues. New Implementing Rules and Regulations (IRR) reflecting the new sector role of the LGU and national agencies are being prepared.

At the central level, there are three (3) line departments (DILG, DPWH and DOH) and two (2) government owned and controlled corporations (LWUA and MWSS) responsible for planning and implementation. Other departments are concerned with macro-planning, national resource allocation decisions, as well as exercise of regulatory powers for tariff setting, environmental protection and management issues.

At the provincial and municipal levels, there are central agency field offices (of DPWH and DILG) and LGU offices working on the sector. Water districts, RWSAs and BWSAs have been organized to deal with the actual delivery of services. Some LGUs implement and operate municipal or provincial water and sanitation systems. Project management offices (PMOs, at the central level), ad hoc inter-agency committees and task forces have been organized to address coordination issues.

The current major institutional issues are those of management of the transition process and of re-establishing the leadership for the sector. Major resource realignments and capacity building initiatives are needed. At the local level, LGU capacity for sector project is insufficient and will require substantial input and support.

There is wide dissatisfaction among implementors themselves over the existing monitoring system. This leads to the problem of reliability of information coming from the field. There is a need to establish a system which is perceived as having a direct link to performance, similar to project-based monitoring.

5.4 Past Financial Performance in Water Supply and Sanitation

Investments for Level I from the local fund of DPWH amounted at P30,089 thousand during the years 1990 and 1991, covering 95 wells, 295 spring development and 12 rehabilitation works. The LWUA had released a total of P3,614 thousand to the Bangued Water Districts during the period of 1992 to 1994. DOH accomplished 10 school toilets in 1993 under the FW4SP program. The provincial government also financed with an amount of P4,851 thousand for the sector in 1990 and 1994.

The IRA allocated to the province between 1990 and 1994 ranged from 0.7 to 0.9% of the national total IRA for all provinces. On the other hand, the total IRA to all municipalities of the province was arranged with 0.7 to 1.0% to the national total IRA for nationwide municipalities. The IRA accounted for 96% to 98% of the total revenue of the provincial government between 1992 and 1994. In 1994, the IRA to the province amounted at P258 million, of which 38% was allotted to the provincial government and 62% to the municipalities. Of the provincial government IRA, about 0.9% was availed for the sector.

The capital cost for the Level I system is free to the community, while operation and maintenance is the responsibility of the associations. As for Level II systems, water charges for the repayment of capital expenses and the cost of operation and maintenance are collected by each association from the beneficiaries. For Level III system, WDs or RWSAs bear all capital cost borrowed from LWUA. Regarding sanitation sector, toilet bowls have been distributed to households without charges, although construction of the superstructure and the depository of private toilets is through self-help.

At present, the current water rates in the province are within an affordable range. On the other hand, construction cost of private toilet seems to be expensive comparing with the family income.

Only Bangued Water District is currently managed in the province which is financially sound, although some arrears are reported. As of now, the WD had received loans of P7,917 thousand from LWUA. The financial performances of the RWSA and BWSAs tend to face difficulties partly because the beneficiaries do not recognize the cost requirements.

5.5 Water Source Development

The study on water source development covers all the municipalities in the province. It gives an emphasis on groundwater sources rather than surface water considering its economic advantages.

The geologic rock units observed in the provinces are classified into three (3) main groups based on the ages of the rock formations: Pliocene and Older Rocks, Pleistocene to Pliocene Rocks and Recent Deposits. The Pliocene and Older rock units cover about 91% of the total provincial area and are mostly found in the hilly and mountainous portions of Abra. Rocks classified as Pliocene to Pleistocene, which underlie about 3% of the total land area of the province, are limited in the low ridges of Danglas, La Paz and Langiden. The Recent deposits make up about 6% of the province and occur in the flood plains of Abra and Tineg rivers that include San Quintin, Pidigan, Langiden, Bangued, Tayum, La Paz, Lagayan, Bucay, Manabo and Luba.

For planning purposes in the development of groundwater sources, the provincial area is divided into shallow well, deep well and difficult areas. No shallow well area is defined in the province. About 30% of the province is considered as deep well area, found mostly in the central and southwestern sections. The remaining 70% is classified as difficult area. The groundwater in the province is generally potable. However, high calcium concentration has been identified in some parts of Dolores. In La Paz and Bucay, odor problem was also reported.

Considering the existing wells in the province, the potential source of groundwater occurs between 8 to 55 mbgl in the Recent alluviums, the Plio-Pleistocene rocks and Miocene limestone formations. The development of deep wells is advantageous than shallow wells considering safe quality and invariable yields of deeper aquifers.

5.6 Future Requirements in Water Supply and Sanitation Improvement

Phased requirements for the sector development in the PW4SP area are assessed to meet the provincial targets established as percentages of beneficiaries or utilities to be served by sub-sector. Development priority in water supply sector is given to uplift service coverage in rural area, while the urban area is considered to moderately improve the present service level as shown in Table 5.6.1. Sanitation sector target is applied equally to urban and rural area in the same manner as the NSMP. Sewerage target is set for only part of urban centers in the long-term development, while solid waste management considered the medium-term household requirements.

Frame values are projected by municipality for respective sub-sectors; future population by urban and rural area, the number of students in public schools and the number of public utilities.

Table 5.6.1 Present Service Coverage and Sector Targets

Sub-Sector	Area/Type	Base Year Service Coverage	Provincial Sector Targets	
			Phase I	Phase II
Water Supply	Urban Area	91%	98%	98%
	Rural Area	77%	90%	95%
Sanitation	Household Toilet	54%	77%	93%
	School Toilet	50%	75%	90%
	Public Toilet	86%	100%	100%
Sewerage	Urban Area	-	Not Applicable	50%
Solid Waste	Urban Area	8%	50%	Not Applicable

Types of required facilities and their implementation criteria are determined according to service level standards currently adopted by the sector agencies. Urban populace is planned to be served by Level III systems, however, existing Level I and II facilities are to be used during Phase I period. Level I facilities are adopted for rural water supply with limited application of Level II systems where houses are clustered and suitable untapped springs are confirmed. However, it does not exclude Level I and II facilities from being implemented in urban area as individual cases in the future as well as Level III systems in rural area. Rehabilitation work is planned only for new deep wells (Level I) to be constructed under PW4SP, considering the difficulty of rehabilitation for existing wells constructed by means of traditional methods.

In sanitation sector, pour flush and/or flush type household toilets are planned, while VIP type household toilet is considered in rural area as an intermediate measure. Sewerage program is planned in Phase II for limited urban areas. The study on solid waste considered only the number of required trucks for the year 2000. Additional service coverage of the sector by phase is shown in Table 5.6.2.

Table 5.6.2 Additional Service Coverage by Phase

Sub-Sector	Area/Type	Unit	Additional Service Coverage	
			Phase I	Phase II
Water Supply	Urban Area	Persons	6,100	30,500
	Rural Area	Persons	27,100	23,800
Sanitation	Household Toilet	No. of Households	11,800	25,300
	School Toilet	No. of Students	14,500	11,200
	Public Toilet	No. of Utilities	5	5
Sewerage	Urban Area	Persons	Not Applicable	8,700
Solid Waste	Urban Area	No. of Households	4,000	Not Applicable

The necessary water supply facilities for Phase I include 19 deep wells and 3 spring sources for 1,137 house connections in urban area, and 2 Level II systems with spring sources and 320 Level I facilities (229 deep wells and 91 spring sources) in rural area. For Phase II, 40

deep wells and 3 spring sources for additional 7,629 connections and 294 Level I facilities (248 deep wells and 46 spring sources) are required for urban and rural water supplies, respectively. Rehabilitation requirements are assumed to be 10% of the total number of deep wells to be constructed under PW4SP. Moreover, Phase I sanitation will require a total of 1,117 household toilets, 9 public school toilets and 5 public toilets for urban area. In rural area, 10,641 household toilets and 51 public school toilets are necessary. Solid waste disposal will need 22 refuse collection trucks. For Phase II, urban area will require 5,626 household toilets, 4 public school toilets and 5 public toilets. In rural area, a total of 19,697 household toilets and 40 public school toilets are required.

5.7 Sector Management Plan

To effectively manage the water and sanitation sector, the provincial and municipal governments will have to make some adjustments in their current policies and structures. One glaring basic institutional need at the local level is a common vision and mission statement for the sector. A critical mass of people and resources who share in the vision must be identified and harnessed for sector management. Local planners need to focus on the long-term requirements.

The following policy and strategy statements will be adopted by the Provincial Government:

- (1) Sustainability shall be promoted through increased community responsibility for management of facilities.
- (2) Selection and prioritization of projects shall be based on demonstrated commitment of the beneficiaries to participate in the project, willingness to pay, the current water and sanitation and overall health conditions, potential for growth and costs.
- (3) Technology shall be appropriate to local conditions and resources. Economical facilities shall be pursued not necessarily insisting on low-cost construction.
- (4) An integrated approach to the provision of potable water supply, sanitation and hygiene education shall be promoted.
- (5) The LGU shall seek to provide water and sanitation in an equitable manner between rural and urban areas; between wealthy and depressed areas.
- (6) Cost Recovery and Cost Sharing (Subsidy): The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation.
- (7) Private Sector Participation: The LGU will gradually transfer its technical assistance functions to the private sector and provide incentives, as needed, and establish the regulatory framework for their participation.

- (8) The LGU shall actively seek out and negotiate with other potential sources of local and external funds (loans and grants) to finance the capital requirements of the sector.
- (9) Sector development shall be consistent with broader concerns for the environmental protection and management.
- (10) Disaster Response and Emergency Coordination: The LGU shall formulate, as part of its contingency plans, a program to provide water supply and sanitation services under emergency conditions.

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework considering, among others, the following: water allocation and water rights policies (conflict resolution); water rate review; association registration; water quality, etc.

It is assumed that, in the medium-term, national and external funds will, although diminishing, continue to be channeled through local offices of central agencies. In the long term, the Provincial Sector Trust Fund approach is an additional mechanism for financing project-related activities. The Trust Fund raises the LGU responsibility for effective and efficient utilization of these funds.

In the medium-term, a full-time Provincial Sector Team (PST) shall be set up for coordination and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This Team may be supplemented by staff detailed full-time from national and local agencies, as needed. In the long-term, the core group from the Team for a new Provincial Water Supply and Sanitation Office (PWSO) could be approved to continue to promote, assist and monitor all water supply and sanitation services in cooperation with the municipalities. The DILG-PMO shall continue to provide technical and managerial assistance in the formative years of the PST/PWSO.

Regarding the models formulated for the community development in three different service levels, all technical and institutional requirements are more or less common to the three model sites. Deep wells are assumed as water sources. The formation of the RWSA/BWSA shall be first performed to undertake the implementation of the projects and the operation and maintenance of the systems. Technically, detailed groundwater survey shall be conducted at the three sites, the results of which may affect the association/s in their management of the systems. The community, especially the women sector, shall be involved in all phases of project management (planning, construction and O&M) and in undertaking health and

hygiene education program. To provide the members with the necessary skills, training programs are to be implemented by concerned national agencies and by the provincial and municipal governments. The water district shall also extend an assistance to the community organizations.

5.8 Cost Estimates for Future Sector Development

The investment cost includes direct cost for construction/rehabilitation of required facilities and sector management, and physical and price contingencies. The recurrent cost is incurred for operation and maintenance of facilities. Unit construction cost per person/household/facility was first prepared under contract-out basis in 1995 price level. In this regard, the cost for procurement and distribution of toilet bowl for pour-flush toilets is only counted for household toilets. Investment cost required by phase for the province is summarized in Table 5.8.1.

Table 5.8.1 Investment Cost Required by Phase

Unit: 1,000 Pesos

<i>Item</i>	<i>Component</i>	<i>Phase I</i>	<i>Phase II</i>
<i>Construction/ Rehabilitation</i>	<i>Water Supply</i>	<i>72,412</i>	<i>155,109</i>
	<i>Urban Area</i>	<i>23,700</i>	<i>108,293</i>
	<i>Rural Area</i>	<i>48,712</i>	<i>46,816</i>
	<i>Sanitation</i>	<i>22,951</i>	<i>85,379</i>
	<i>Household Toilet</i>	<i>5,209</i>	<i>10,281</i>
	<i>School Toilet</i>	<i>16,085</i>	<i>9,870</i>
	<i>Public Toilet</i>	<i>1,585</i>	<i>1,585</i>
	<i>Disinfection of Well</i>	<i>72</i>	<i>82</i>
	<i>Urban Sewerage</i>	<i>-</i>	<i>63,561</i>
	<i>Sub-Total</i>	<i>95,363</i>	<i>240,488</i>
<i>Sector Management</i>	<i>Engineering Studies</i>	<i>11,908</i>	<i>30,310</i>
	<i>Community Development and Training</i>	<i>10,961</i>	<i>26,683</i>
	<i>Sub-Total</i>	<i>22,869</i>	<i>56,993</i>
<i>Total Direct Cost</i>		<i>118,232</i>	<i>297,481</i>
<i>Contingencies</i>		<i>84,716</i>	<i>44,622</i>
<i>Total Investment Cost</i>		<i>202,948</i>	<i>342,103</i>

Note: Price contingency is not included in Phase II.

The investment cost for Phase I is estimated at about P203 million. A total of P95 million is required as the construction/rehabilitation cost in Phase I, of which 51% is for rural water supply, while only 24% for sanitation sector.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 6 sets of well drilling equipment, 1 set of well rehabilitation equipment, 6 units of service truck with crane and 1 unit of support vehicle; and 22 units of refuse collection truck. The total procurement cost is estimated at approximately P121 million. Likewise, annual recurrent cost in 1995 price level is estimated at P6 to P8 million/year during Phase I period.

5.9 Financial Arrangements

Projected IRA as potential funds for Phase I sector development revealed considerable needs of additional funds. The IRA in a total of the province accounts for 46% (P93 million) of the provincial cost requirements (P203 million). In terms of municipal achievement by the IRA, percentages of Danglas, Dolores, Langiden, Peñarubia, Boliney, Licuan, Malibcong and Tineg are much higher than the provincial average. Others are in the range between 29% and 74% to the requirements.

For implementation arrangements, three reference scenarios in assumption of different funding levels are referred to in view of (1) acquisition of external funds, (2) augmentation of sector finance under current arrangements (IRA), (3) introduction of private sector to mitigate public investment needs and (4) effective and economical investments. Among the scenarios, a 50% investment is envisaged as a possible achievement level enlarging the current composition of IRA.

The PW4SP advocates the imposition of tariffs for the recovery of capital and O&M cost. The water rates for all service levels were confirmed to be affordable. With regard to household toilets, the construction cost is beyond the affordability under the current income level, especially in rural areas. To expedite sanitation improvements, introduction of specific loans with a revolving character may be an effective solution. For urban sanitation, the linkage with existing housing loan shall be established to cover construction of sanitary toilets.

5.10 Monitoring

The sector monitoring system must support a well-defined and accepted sector development process-model. It includes information collection, tracing the flow of raw data from the field to the central level information analysis and data feedback. With the sector monitoring, planners should be able to take a fresh objective view of the way it implements current

strategies. A sector monitoring system should reinforce the linkage between water, sanitation and health; be reliable and involve the beneficiaries; be accepted by all sectors; be practical; and be followed through with effective feedback. The best monitors are the community members themselves since accurate monitoring reports are in their best interest. A consensus on common and practical definition of terms for monitoring purpose is needed.

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This PW4SP should be updated at least every five years. Based on the monitoring reports, annual review of sector accomplishments compared with objectives and efficiency will be done. This will lead to the reformulation of objectives, strategies, new policies and policy revisions, and updated sector investment program.

