

## 6. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF ILOCOS NORTE

### 6.1 Provincial Profile

Ilocos Norte province is located on the northwestern part of Luzon. Laoag City, the provincial capital, is approximately 487km from Metro Manila. It is composed of 22 municipalities and 1 city with 557 barangays, of which 131 are urban and 426 rural. The population of the province in 1990 was 461,661 with an annual growth rate of 1.68% between 1980 to 1990.

The climate in the province is characterized by pronounced dry (from October to April) and wet (the rest of the year) seasons. The mean annual rainfall is registered at 2,080mm. The topography of the province is characterized by flat land on the west and mountain ranges on the east. The province is principally drained by Laoag and Vintar rivers that empty into the Luzon Sea. Of the total land area of the province, 28% still remains as forestland. Agricultural land comprises about 68%, while built-up area is limited to a mere 0.61%.

Agriculture is the major economic activity in the province. Other important activities are commerce and tourism. The mean annual household income of the province in 1991 was P58,330, below the national average of P65,000. Approximately 62% of the total number of families lived within and below the established poverty threshold income of P48,700 in Region I. The unemployment rate in 1990 was 7%.

Most of municipalities/city have electricity service with a high household coverage of 98%. Telecommunication services are also available to 98% of the municipalities/city. Transportation is available by means of jeepneys and buses. The province has 1 international airport. Likewise, there are 30 banking institutions and 2,415 industrial/commercial and tourism establishments. As to social services, there are 441 schools, 15 hospitals/clinics, and 150 health units/main centers and barangay health stations.

An indicator of health problem 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, gastroenteritis/colitis, intestinal parasitism, scabies, conjunctivitis, skin diseases, dengue fever 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 pollution sources in urban areas are domestic wastewater and dumped refuse. There is no existing sanitary sewerage system in the province. Of the 23 municipalities, only 8 have municipal refuse collection and disposal service (13% of the total households).

## 6.2 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 24 existing Level III systems covering the city of Laoag and 16 municipalities. These systems utilize shallow, deep and dug wells, and springs. A total of 79 Level II systems serves 2 urban and 101 rural barangays in 13 municipalities. Out of the existing Level II systems, only 2 systems avail deep wells and the rest are using springs. As for Level I facilities, a total of 31,190 has been accounted, which consist of shallow, deep and dug wells, and springs. Of these Level I facilities, 18,123 are classified as safe sources. Among the unsafe sources are 7,911 dug wells.

Approximately 70% or 349,700 persons of the present population (502,500) are adequately served (34% in urban area and 66% in rural area). Under area classification, 83% of urban population and 64% of rural population have access to safe water sources/facilities. Of the served population, 28% or 97,800 persons are served by Level III systems. About 59% or 207,700 persons depend on Level I facilities, while 13% or 44,300 persons by Level II systems.

Sanitary toilets are available to 90,321 households covering 91% of the total households compared with national coverage of 77%. These facilities are composed of 9% flush type toilets, 90% pour-flush type and 1% VIP type. In urban area, service coverage is approximately 96%, while in rural area, 88% of the households has sanitary toilets.

The province has a total of 1,754 toilet units found in 429 schools. About 80% of the students is adequately served by sanitary toilets. The current average ratio of 56 students per sanitary toilet is a little below the service level standard of 50 students per sanitary facility.

There are 63 public utilities that include markets, bus/jeepney/airport terminals and parks/playgrounds in the province. All these public utilities have at least one sanitary toilet. Although culturally acceptable, these facilities are improperly used and maintained resulting in unsanitary conditions. Furthermore, there is no existing sewerage facilities in the province.

### 6.3 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.

#### **6.4 Past Financial Performance in Water Supply and Sanitation**

Investments for Level I from the local fund of DPWH amounted at P15,129 thousand during the years 1990 and 1991, covering 519 wells, 10 spring development and 44 rehabilitation works. The LWUA had released a total of P92,388 thousand during the period of 1991 to 1994 to the 6 Water Districts. The provincial government financed an amount of P4,419 thousand for the sector in 1990 and 1991.

The IRA allocation to the province between 1990 and 1994 ranged from 0.8 to 1.1% of the national total IRA for all provinces. The IRA to Laoag City ranged from 0.8 to 0.9% of the national total IRA for all cities. Moreover, the total IRA to all municipalities of the province was arranged with 0.9 to 1.1% to the national total IRA for the municipalities nationwide. The IRA accounted for 80% of the total revenue of the provincial government between 1993 and 1994. In 1994, the IRA to the province amounted at P388 million, of which 32% was allotted to the provincial government, 23% to Laoag City and 45% to the municipalities. Of the provincial government IRA, about 0.6% was availed for the sector.

The capital cost for Level I systems is free to the community, while operation and maintenance is 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 systems, WDs or RWSAs bear the entire capital cost financed by LWUA through concessional terms or soft loans for less capable WDs. Regarding sanitation sector, 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 household toilet seems to be expensive comparing with the family income.

Five (5) WDs are currently operational in the province. These WDs, except Batac Water District, are financially sound, although some arrears are reported. As of now, the WDs had received loans of P127,764 thousand from LWUA. The financial performances of the RWSAs and BWSAs tend to face difficulty partly because the beneficiaries do not recognize the cost requirements.

#### **6.5 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 70% of the total provincial area and are largely distributed in the Ilocos Mountain Range and foothills of Luzon Central Cordillera. Rocks classified as Pliocene to Pleistocene, which underlie about 15% of the total land area of Ilocos Norte, are extensive in the gently sloping to hilly parts of Pagudpud, Bangui, Pasuquin, Bacarra, Laoag, San Nicolas, Paoay, Batac, Currimao, Piddig, Espiritu, Pinili and Badoc. The Recent deposits make up about 15% of the province and are widespread in the western half of the province from Pasuquin to Badoc and in Dingras, Piddig, Solsona, Marcos, Espiritu and Nueva Era.

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 70% of the Ilocos Norte, mostly on the western section. The remaining 30% of the provincial domain is classified as difficult area. The groundwater in the province is generally potable except for the area where saline water has been identified; portions of Bacarra, Laoag, San Nicolas, Sarrat, Batac and Paoay. High iron concentration was also noted in some wells in Paoay and Batac and high manganese was determined in the adjoining municipalities of Pasuquin, Bacarra and Vintar. In Laoag, hydrogen sulfide gas and yellowish color water were reported.

Considering the existing wells in the province, the potential source of groundwater occurs between 6 to 120 mbgl in the Recent alluviums, the Plio-Pleistocene rocks and Miocene limestone formations. The development of deep wells is encouraged than shallow wells considering the safe quality and invariable yields of deeper aquifers.

## **6.6 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 6.6.1. 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 6.6.1 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	83%	85%	95%
	Rural Area	65%	80%	95%
Sanitation	Household Toilet	91%	96%	98%
	School Toilet	88%	90%	95%
	Public Toilet	100%	100%	100%
Sewerage	Urban Area	-	Not Applicable	50%
Solid Waste	Urban Area	46%	50%	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 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 6.6.2.

**Table 6.6.2 Additional Service Coverage by Phase**

Sub-Sector	Area/Type	Unit	Additional Service Coverage	
			Phase I	Phase II
Water Supply	Urban Area	Persons	13,200	66,000
	Rural Area	Persons	73,200	95,000
Sanitation	Household Toilet	No. of Households	13,200	44,400
	School Toilet	No. of Students	11,400	12,600
	Public Toilet	No. of Utilities	23	36
Sewerage	Urban Area	Persons	Not Applicable	49,800
Solid Waste	Urban Area	No. of Households	7,300	Not Applicable

The necessary water supply facilities for Phase I include 13 deep wells for 2,565 house connections in urban area, and 3 Level II systems with spring sources and 940 deep wells for rural area. For Phase II, 20 deep wells for additional 15,723 connections and 1,247 deep and shallow wells 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 3,156 household toilets, 15 public school toilets and 23 public toilets for urban area. In rural area, 10,090 household toilets and 29 public school toilets are necessary. Solid waste disposal will need 15 refuse collection trucks. For Phase II, urban area will require 13,403 household toilets, 8 public school toilets and 36 public toilets. In rural area, a total of 31,029 household toilets and 41 public school toilets are required.

## **6.7 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, water sources and institutional arrangements will vary from one site to another. For water sources, deep wells will be utilized for Level I, existing free-flowing wells for Level II, and springs and deep wells for Level III. A women's group shall be deputized as the BWSA to implement Level I project, an existing cooperative for Level II, while the RWSA shall be organized by the barangay council to supervise Level III project. The municipal officials supported by the Provincial Sector Team (PST) will play an active role in the organization of these institutions. 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.

## 6.8 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. The construction cost of required facilities for target years in the public investment needs is estimated by sub-sector by municipality. 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 6.8.1.

The investment cost for Phase I is estimated at about P494 million. A total of P235 million is required as the construction/rehabilitation cost in Phase I, of which 69% is for rural water supply, while only 11% for sanitation sector.

**Table 6.8.1 Investment Cost Required by Phase**

Unit: 1,000 Pesos

Item	Component	Phase I	Phase II
Construction/ Rehabilitation	Water Supply	209,683	425,024
	Urban Area	46,223	215,867
	Rural Area	163,460	209,157
	Sanitation	25,604	405,456
	Household Toilet	5,544	16,126
	School Toilet	12,447	13,677
	Public Toilet	7,296	11,425
	Disinfection of Well	317	338
	Urban Sewerage	-	363,890
	<b>Sub-Total</b>	<b>235,287</b>	<b>830,480</b>
Sector Management	Engineering Studies	30,023	106,465
	Community Development and Training	21,761	76,478
	<b>Sub-Total</b>	<b>51,784</b>	<b>182,943</b>
<b>Total Direct Cost</b>		<b>287,071</b>	<b>1,013,423</b>
<b>Contingencies</b>		<b>206,570</b>	<b>152,013</b>
<b>Total Investment Cost</b>		<b>493,641</b>	<b>1,165,436</b>

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: 19 sets of well drilling equipment, 2 sets of well rehabilitation equipment, 19 units of service truck with crane and 2 units of support vehicle; and 15 units of refuse collection truck. The total procurement cost is estimated at approxi

mately P306 million. Likewise, annual recurrent cost in 1995 price level is estimated at P21 to P24 million/year during Phase I period.

## 6.9 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 29% (P144 million) of the provincial cost requirements (P494 million). In terms of municipal achievement by the IRA, percentages of Adams, Carassi, Dumalneg, Pagudpud, Espiritu and Nueva Era are much higher than the provincial average. Others are in the range between 15% and 47% 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 component 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.

## 6.10 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 fresh and 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.



## 7. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF ILOCOS SUR

### 7.1 Provincial Profile

Ilocos Sur province is located along the western coast of Northern Luzon. Vigan, the provincial capital, is approximately 395km from Metro Manila. It is composed of 34 municipalities with 767 barangays, of which 17% are urban and 83% rural. The population of the province in 1990 was 519,930 with an annual population growth rate of 1.6% between 1980 to 1990. With the reclassification of urban and rural barangays, there are 135 urban and 632 rural barangays.

The climate in the province is characterized by pronounced dry (from October to April) and wet (the rest of the year) seasons. The average annual rainfall in the province is registered at 2,484mm. The topography of the province is flat to undulating on the west, and mountainous on the east. The natural drainage systems in the province generally flow westward and empty into the Luzon Sea. Of the total land area, only 10% remains as forestland. About 24% is devoted for agricultural use, while built-up area comprises 4%.

Agriculture is the major activity in the province. Fishing is also an important activity. The mean annual family income of the province in 1991 was P30,576, quite below the national average of P65,000. Approximately 62% of the total number of families lived within and below the established poverty threshold income of P48,700 in Region I. The unemployment rate in 1990 was as high as 12%.

Electric supply service covers 82% of the municipalities with 76% household coverage. Telecommunication is available to only 47% of the municipalities. There are 40 banking institutions and 1,010 industrial/commercial and tourism establishments. As to the social services, there are 547 schools, 23 hospitals/clinics, and 191 rural health units/main centers and barangay health centers.

An indicator of health problem related to water supply and sanitation is the high incidence of water-related diseases. The reported water-related diseases in the province were typhoid/para-typhoid, dysentery, intestinal parasitism, diarrhea, cholera, dengue fever, viral hepatitis, skin diseases, scabies, filariasis and malaria. Diarrhea and intestinal parasitism were among the ten leading causes of morbidity.

The major environmental problems in the province are the domestic wastewater and dumped refuse. Except for Vigan which has an obsolete sewerage system, there is no sewerage system in other urban areas of the province. Most of the municipalities have no municipal refuse collection and disposal services (only 5% of the total households in the province is served).

## 7.2 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 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.

There are 13 Level III systems in the province operated by 5 Water Districts and 8 Municipal/Barangay Waterworks, which cover 13 municipalities. Majority of water sources of these systems are deep wells and springs. A total of 28 Level II systems provides domestic water to 4 urban and 51 rural barangays in 16 municipalities. All these systems utilize spring sources. There are 29,236 Level I facilities in the province, which include shallow, deep and dug wells, and springs. Of these facilities, 19,398 are considered as safe sources and 9,838 are under unsafe sources. Among the unsafe sources are 9,528 shallow wells.

Approximately 69% or 391,500 of the present population (563,500) are adequately served (24% in urban area and 76% in rural area). Under area classification, 72% of urban population and 69% of the rural population have access to safe water sources/facilities. Of the served population, only 7% or 27,600 persons are served by Level III systems. About 88% or 345,400 persons are depending on Level I facilities, while the remaining 5% relies on Level II systems.

Sanitary toilets are available to 96,445 household covering 90% of the total households compared with national coverage of 77%. These facilities consist of 6% flush type, 86% pour-flush type and 8% VIP type. Service coverage in urban area is 94%, while in rural area the coverage is 89%.

The province has a total of 2,887 sanitary toilet units located in 542 schools. About 77% of the students is adequately served by sanitary toilets. The current average ratio of 54 students per sanitary toilet is a little below the service level standard of 50 students per sanitary

facility. There are 39 public utilities in the province, which include markets, bus/jeepney terminals and parks/play-grounds. About 92% of these public facilities have sanitary toilets. Although culturally accepted, the facilities are improperly used and maintained resulting in unsanitary conditions. Furthermore, Vigan has a sewerage system that has outlived its useful life (built 80 years ago).

### 7.3 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.

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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.

#### 7.4 Past Financial Performance in Water Supply and Sanitation

Investments for Level I from the local fund of DPWH amounted at P24,272 thousand during the years 1990 and 1991, covering 618 wells, 31 spring development and 9 rehabilitation works. The LWUA had released a total of P8,091 thousand during the period of 1991 to 1994 to the 5 Water Districts. DOH released P85 thousand in the same period. The provincial government also financed with an amount of P2,247 thousand for the sector in 1994. Furthermore, CDF disbursed P15,038 thousand for the water supply sub-sector from 1990 to 1994.

The IRA allocated to the province between 1990 and 1994 ranged from 0.9 to 1.1% to the national total IRA for all provinces. On the other hand, the total IRA to all municipalities of the province was arranged with 1.2 to 1.4% to the national total IRA for the municipalities nationwide. The IRA accounted for 70 to 90% of the total revenue of the provincial government between 1990 to 1994. In 1994, the IRA to the province amounted at P351 million, of which 37% was allocated to provincial government and 63% to the municipalities. Of the provincial IRA, P2,247 thousand or 1.7% was availed for the relevant sector.

The capital cost for Level I systems is free to the community, while operation and maintenance is 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 or soft loans for less capable WDs. Regarding sanitation sector, construction of the superstructure and the depository of the household 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.

Five (5) WDs are currently managed in the province. Additional 4 WDs were institutionally established, but they are not operational. The Tagudin and Vigan Metro WDs seem to be financially sound, although some arrears are reported. As of now, 5 WDs have received loans of P31,492 thousand from LWUA. The financial performances of the RWSAs and



BWSAs tend to face difficulty partly because the beneficiaries do not recognize the cost requirements.

## **7.5 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 80% of the total provincial area and are mostly found in the southern half. Rocks classified as Pliocene to Pleistocene, which underlie about 5% of the total land area of Ilocos Sur, are sporadically occurring in the northern gentle and hilly part from Sto. Domingo to Sinit. The Recent deposits make up about 15% of the province and are widespread in the western coastal plain and lower extension of large river systems from Tagudin to Sinit.

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 approximately 80% of Ilocos Sur, mostly on the northern and western parts. The remaining 20% of the provincial domain is classified as difficult area. The groundwater in the province is generally potable. However, saline has been delineated in western coastal area. High iron, manganese and calcium are likewise reported in Tagudin and Vigan.

Considering the existing wells in the province, the potential source of groundwater occurs between 4 to 140 mg/l in the Recent alluviums, the Plio-Pleistocene rocks and Miocene clastic formations. The development of deep wells is more advantageous than shallow wells considering the safe quality and invariable yields of deeper aquifers.

## **7.6 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 equally given to uplift service

coverage both in urban and rural areas as shown in Table 7.6.1. Sanitation sector target is also 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 7.6.1 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>	76%	85%	95%
	<i>Rural Area</i>	71%	85%	95%
<i>Sanitation</i>	<i>Household Toilet</i>	90%	94%	95%
	<i>School Toilet</i>	87%	90%	95%
	<i>Public Toilet</i>	93%	100%	100%
<i>Sewerage</i>	<i>Urban Area</i>	-	<i>Not Applicable</i>	50%
<i>Solid Waste</i>	<i>Urban Area</i>	21%	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 system 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 7.6.2.

**Table 7.6.2 Additional Service Coverage by Phase**

<i>Sub-Sector</i>	<i>Area/Type</i>	<i>Unit</i>	<i>Additional Service Coverage</i>	
			<i>Phase I</i>	<i>Phase II</i>
<i>Water Supply</i>	<i>Urban Area</i>	<i>Persons</i>	<i>19,100</i>	<i>110,700</i>
	<i>Rural Area</i>	<i>Persons</i>	<i>82,600</i>	<i>90,900</i>
<i>Sanitation</i>	<i>Household Toilet</i>	<i>No. of Households</i>	<i>14,600</i>	<i>57,200</i>
	<i>School Toilet</i>	<i>No. of Students</i>	<i>19,600</i>	<i>23,200</i>
	<i>Public Toilet</i>	<i>No. of Utilities</i>	<i>5</i>	<i>29</i>
<i>Sewerage</i>	<i>Urban Area</i>	<i>Persons</i>	<i>Not Applicable</i>	<i>76,800</i>
<i>Solid Waste</i>	<i>Urban Area</i>	<i>No. of Households</i>	<i>9,700</i>	<i>Not Applicable</i>

The necessary water supply facilities for Phase I include 27 deep wells for 3,669 house connections in urban area, and 8 Level II systems with spring sources and 999 Level I deep wells for rural area. For Phase II, 35 deep wells for additional 27,692 connections and 1,150 Level I deep wells 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 2,928 household toilets, 6 public school toilets and 5 public toilets for urban area. In rural area, 11,715 household toilets and 70 public school toilets are necessary. Solid waste disposal will need 30 refuse collection trucks. For Phase II, urban area will require 14,113 household toilets, 7 public school toilets and 29 public toilets. In rural area a total of 43,049 household toilets and 84 public school toilets are necessary.

## **7.7 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, springs will be utilized for Level II and III projects, while a deep well for Level I. BWSA/RWSA shall be organized to manage each model system with distinctive features both in facilities and users. 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.

## 7.8 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 7.8.1.

**Table 7.8.1 Investment Cost Required by Phase**

Unit: 1,000 Pesos

Item	Component	Phase I	Phase II
Construction/ Rehabilitation	Water Supply	208,525	522,430
	Urban Area	67,667	356,668
	Rural Area	140,858	165,762
	Sanitation	28,101	618,321
	Household Toilet	5,512	23,125
	School Toilet	20,514	24,853
	Public Toilet	1,586	9,201
	Disinfection of Well	489	507
	Urban Sewerage		560,635
		<b>Sub-Total</b>	<b>236,626</b>
Sector Management	Engineering Studies	29,872	145,088
	Community Development and Training	21,774	103,293
	<b>Sub-Total</b>	<b>51,646</b>	<b>248,381</b>
<b>Total Direct Cost</b>		<b>288,272</b>	<b>1,389,132</b>
<b>Contingencies</b>		<b>162,328</b>	<b>208,370</b>
<b>Total Investment Cost</b>		<b>450,600</b>	<b>1,597,502</b>

Note: Price contingency is not included in Phase II.

The investment cost for Phase I is estimated at about P451 million. A total of P237 million is required as the construction/rehabilitation cost in Phase I, of which 60% is for rural water supply, while only 12% for sanitation sector.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 17 sets of well drilling equipment, 2 sets of well rehabilitation equipment, 17 units of service truck with crane and 3 units of support vehicle; and 30 units of refuse collection truck. The total procurement cost is estimated at approximately P288 million. Likewise, annual recurrent cost in 1995 price level is estimated at P13 to P18 million/year during Phase I period.

## 7.9 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 29% (P131 million) of the provincial cost requirements (P451 million). In terms of municipal achievement by the IRA, percentages of Banayoyo, Cabugao, Galimuyod, G. del Pilar, Lidlidda, Sigay, Sugpon, San Emilio, Nagbukel and San Ildefonso are much higher than the provincial average. Others are in the range between 12% and 53% 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 component 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.

## 7.10 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 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.





## 8. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF BATANES

### 8.1 Provincial Profile

Batanes is the northernmost province of the country consisting of several islets. It is about 280km north of Aparri, Cagayan, the nearest municipality in mainland Luzon. It is composed of 6 municipalities with Basco as the provincial capital. There are 29 barangays, of which 6 are urban and 23 rural. The provincial population in 1990 was 15,026 with an annual growth rate of 2.2% between 1980 to 1990.

Climate in the province is characterized by unpronounced dry and wet seasons. Rainfall is evenly distributed with registered mean annual average precipitation of 2,769mm. The islands in the province have contrasting morphological expressions from small flat coasts to steep interiors as in Batan and Sabtang or karstic features such as Itbayat and Ivujos. Rivers in the islands are short with small catchment areas. About a half (47%) of the total land area still remains as forestland. About 52% is devoted for agricultural use, while less than 1% for built-up area.

Agriculture is the major activity in the province. The mean annual family income in 1988 was P31,701, quite below the national average of P40,400 in the same year. About 49% of the total number of families lived with and below the poverty threshold income of P30,912 in Region II. The unemployment rate in 1990 was only 2%.

About 67% of the municipalities have electric supply with low household coverage of 42%. However, telecommunication services are available to all municipalities. There are only two banks and 396 industrial/commercial and tourism establishments. In terms of social services, there are 26 schools, 2 hospitals/clinics and 12 rural/barangay health units.

An indicator of health problem related to water supply and sanitation is the high incidence of water-related diseases such as skin diseases, gastroenteritis, diarrhea, and intestinal parasitism, which were among the ten leading causes of morbidity in the province.

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

are domestic wastewater and dumped refuse. Only 37% of the households in the province relies on the municipal refuse collection services.

## 8.2 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 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 the province, there are 6 Level III systems covering Basco, Ivana, Mahatao, Sabtang and Uyugan. Except for Sabtang, all other systems entail Level II services. All the Level III systems utilize spring sources. Only 2 Level II systems with spring sources are operating in the province, which serve the rural barangays in Itbayat and Sabtang. Of the 36 Level I facilities, 21 are considered as safe sources.

About 91% or 15,259 of the present population (16,800) is adequately served (36% in urban area and 64% in rural area). Under area classification, 92% of the urban population and 90% of the rural population have access to safe water sources/facilities. Of the served population, 70% or 10,600 persons are served by Level III systems. About 26% or 4,000 persons depend on Level II services, while only 4% relies on Level I facilities. Although a high service coverage (Levels II and III) has been achieved, an intermittent supply is prevalent mainly caused by the unbalance between supply capacity and demand.

Sanitary toilets are available to 3,126 households covering 95% of the total households compared with national coverage of 77%. These facilities consist of 1% flush type, 96% pour-flush type and 3% VIP type. The high service coverage is reported both in urban and rural areas.

The province has a total of 88 toilet units found in 24 schools. About 86% of the students is adequately served by sanitary toilets. The present average ratio of 46 students per sanitary toilet meets the service level standard of 50 students per sanitary facility. There is a total of 6 public utilities; public markets, bus/jeepney/airport terminals and parks/playgrounds. About 67% of these public utilities has sanitary toilets. Although culturally acceptable, these facilities are improperly used and managed resulting in unsanitary conditions.

### 8.3 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 were 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.

#### **8.4 Past Financial Performance in Water Supply and Sanitation**

Investments for Level I from the local fund of DPWH amounted at P6,926 thousand during the years 1990 and 1991, covering 32 deep wells, 2 spring development and 20 rehabilitation works. As for foreign fund through DPWH (ADB's SIPRWSSP), P5,440 thousand was provided for the water supply sub-sector from 1990 to 1994, covering 2 deep wells and 14 spring development. DILG released P180 thousand for Level I facilities from 1990 to 1994. The provincial government financed with an amount of P5,550 thousand for the sector in 1990 and 1994. Also, CDF and other funds provided P5,270 thousand for the sector.

The IRA allotted to the province between 1990 and 1994 ranged from 0.2 to 0.4% to the national total IRA for all provinces. On the other hand, the total IRA to all municipalities of the province was arranged with 0.1 to 0.2% to the national total IRA for the municipalities nationwide. The IRA accounted for 90% of the total revenue of the provincial government during 1992 and 1993. In 1994, the IRA to the province amounted at P 65 million, of which 66% was allotted to the provincial government and 34% to the municipalities. About 4.7% of the provincial government IRA in 1994 was spent for the relevant sector.

In general, the capital cost for Level I systems is free to the community, while operation and maintenance is 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, municipal waterworks bear the capital cost through grant or loans. Regarding sanitation sector, 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.

There are 5 municipal waterworks systems and 1 Level III system being managed by the RWSA. The waterworks are financially sound, while the financial performances of the RWSAs and BWSAs tend to face difficulties partly because the beneficiaries do not recognize the cost requirements.

#### **8.5 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 framework of the province is basically made up of Pliocene to Pleistocene rocks. Andesite flows and pyroclastics of non-active volcanoes mainly underlie the islands of Batan and Sabtang. Raised limestone on the other hand chiefly occupies Itbayat and Ivujos islands. Likewise, Recent alluvium thinly covers the lowland portion of Basco.

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 35% of Batanes. The remaining 65% is classified as difficult area. The groundwater in the province is generally potable. However, saline water has been identified in parts of Basco, Sabtang, Ivana and Uyugan.

The potential aquifer occurs between 8 to 55 mbgl in the Pliocene to Pleistocene pyroclastics and volcanic debris in Batan and Sabtang islands. However, unfavorable geological conditions and the relatively small catchment area of the islands limit the occurrence of substantial groundwater sources. In this regard, springs could be supplemental/foremost alternative sources for the future water supply requirement of the province.

## 8.6 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 equally given to uplift service coverage both in urban and rural areas as shown Table 8.6.1. It is anticipated that the improvement of service quality in the existing service area is urgent and essential. Sanitation sector target is also 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 8.6.1 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	92%	95%	98%
	Rural Area	90%	95%	98%
Sanitation	Household Toilet	95%	98%	98%
	School Toilet	86%	90%	95%
	Public Toilet	67%	100%	100%
Sewerage	Urban Area	-	Not Applicable	50%
Solid Waste	Urban Area	37%	50%	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 system 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 8.6.2.

**Table 8.6.2 Additional Service Coverage by Phase**

<i>Sub-Sector</i>	<i>Area/Type</i>	<i>Unit</i>	<i>Additional Service Coverage</i>	
			<i>Phase I</i>	<i>Phase II</i>
<i>Water Supply</i>	<i>Urban Area</i>	<i>Persons</i>	732	1,317
	<i>Rural Area</i>	<i>Persons</i>	1,604	1,873
<i>Sanitation</i>	<i>Household Toilet</i>	<i>No. of Households</i>	589	1,698
	<i>School Toilet</i>	<i>No. of Students</i>	695	669
	<i>Public Toilet</i>	<i>No. of Utilities</i>	3	3
<i>Sewerage</i>	<i>Urban Area</i>	<i>Persons</i>	Not Applicable	2,879
<i>Solid Waste</i>	<i>Urban Area</i>	<i>No. of Households</i>	148	Not Applicable

The necessary water supply facilities for Phase I include 3 deep wells for 142 house connections in urban area, and 1 Level II system with a spring source and 18 Level I facilities (8 deep wells and 10 spring sources) for rural area. For Phase II, 3 deep wells for additional 330 connections and 26 Level I facilities (11 deep wells and 15 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 264 household toilets and 3 public toilets for urban area. In rural area, 325 household toilets and 2 public school toilets are necessary. Solid waste disposal will need 2

refuse collection trucks. For Phase II, urban area will require 665 household toilets and 3 public toilets. In rural area a total of 1,033 household toilets and 2 public school toilets are necessary.

## 8.7 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, a shallow well is the potential water source for Level I, a deep well for Level II and a spring for Level III. As to the institutional mechanism, the formation of BWSA for Level I and RWSA for Level II and Level III model systems is a prerequisite. 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.

## **8.8 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 8.8.1.



**Table 8.8.1 Investment Cost Required by Phase**

Unit: 1,000 Pesos

Item	Component	Phase I	Phase II
Construction/ Rehabilitation	Water Supply	2,943	8,689
	Urban Area	2,708	4,873
	Rural Area	235	3,816
	Sanitation	1,730	2,129
	Household Toilet	131	521
	School Toilet	627	311
	Public Toilet	969	969
	Disinfection of Well	3	5
	Urban Sewerage	-	323
	Sub-Total	4,673	10,818
Sector Management	Engineering Studies	595	1,359
	Community Development and Training	317	859
	Sub-Total	912	2,218
<b>Total Direct Cost</b>		<b>5,585</b>	<b>13,036</b>
<b>Contingencies</b>		<b>3,986</b>	<b>1,955</b>
<b>Total Investment Cost</b>		<b>9,571</b>	<b>14,991</b>

Note: Price contingency is not included in Phase II.

The investment cost for Phase I is estimated at about P10 million. A total of P5 million is required as the construction/rehabilitation cost in Phase I, of which 58% is for urban water supply, while 37% for sanitation sector. The estimation of these required costs is based on the quantity of facilities to meet the target of the service coverage.

Since the service coverage in almost all the sub-sectors is already very high, the focus of development will then be the improvement of the delivery of basic services such as a safe and reliable water supply. Considering that most of the existing facilities are not functioning well, further study should be undertaken to identify problems and necessary countermeasures to meet basic system requirements. In the absence of a detailed study, additional costs for the improvement of the systems/facilities were roughly estimated. A total of P14 million will be required for the rehabilitation of existing Level III and II water supply systems and another P2 million for the upgrading of public school toilets and public toilets.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 1 set of well drilling equipment, 1 set of well rehabilitation equipment, 1 unit of service truck with crane and 1 unit of support vehicle; and 2 units of refuse collection truck. The total procurement cost is estimated at approximately P15 million. Likewise, annual recurrent cost in 1995 price level is estimated at P2 million/year during Phase I period.

## 8.9 Financial Arrangements

Projected IRA as potential funds for Phase I sector development revealed a surplus of funds. The IRA in a total of the province accounts for more than 100% (P11 million) of the provincial cost requirements (P10 million) in terms service coverage aside from service quality improvement. Only the IRA for Sabtang is short to meet the target requirement. Thus, the IRA

shall be effectively used for the delivery of a safe and reliable water supply and for the upgrading of sanitation sub-sector (quality improvements).

For further improvement of the sector, implementation arrangements shall be made 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.

#### **8.10 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 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 has been 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.

## 9. PROVINCIAL WATER SUPPLY, SEWERAGE AND SANITATION SECTOR PLAN FOR THE PROVINCE OF NUEVA VIZCAYA

### 9.1 Provincial Profile

Nueva Vizcaya is one of the five (5) provinces in Cagayan Valley Region. Its capital town, Bayombong, is about 268 km north of Metro Manila. It is composed of 15 municipalities with 275 barangays, of which 30 are urban and 245 rural. The population of the province was 301,179 in 1990 with an annual growth rate of 2.2% between 1980 to 1990.

The climate in the province is characterized by not very pronounced seasons: relatively dry from November to April and wet during the rest of the year. The annual rainfall is about 1,400mm in the lowland and about 2,400mm in the highland. The topography of the province is generally mountainous with narrow plain on the Magat river valley, the principal natural drainage system in the area. About 29% of the total land area of the province remains as forest land. Only 15% of the provincial area is devoted for agricultural use and built-up area occupies about 1.57%.

Agriculture is the major economic activity in the province. The mean annual family income in 1991 was P52,961, which is below the national average of P65,000. Moreover, about 56% of the total number of families lived within and below the established poverty threshold income of P42,400 in Region II. The unemployment rate in 1990 was 7%.

Electric supply service covers 93% of the municipalities with 54% household coverage. Telecommunication is available to all municipalities. Land transportation is available by means of jeepneys and buses. The province has one airport. There are only 20 banking institutions and 353 industrial/commercial and tourism establishments. In regard to social services, there are 329 schools, 5 hospitals/clinics, and 111 health units/main centers and barangay health stations.

An indicator of health problem 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, intestinal parasitism, scabies, conjunctivitis, skin diseases, malaria and dengue fever. Skin diseases, intestinal parasitism and diarrhea were among the ten leading causes of morbidity.

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

## 9.2 Existing Facilities and Service Coverage

The service coverage of each sub-sector is estimated as percentages of served population/house-holds/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.

There are only 3 Level III systems in the province, which cover Aritao, Bagabag, Bayombong and Solano. Two of these systems utilize springs and the other one a deep well. A total of 93 Level II systems, all of which are using springs, are operating in all the municipalities covering 3 urban and 91 rural barangays. The 16,859 Level I facilities in the province consist of shallow, deep and dug wells, and springs. Of these facilities, 13,447 are considered as safe sources. Among the unsafe sources are 2,523 shallow wells.

About 65% or 221,000 of the present population (341,800) are adequately served (42% in urban area and 58% in rural area). Under area classification, 85% of urban population and 55% of rural population have access to safe water sources/facilities. Of the served population, only 8% or 18,200 persons are served by Level III systems. About 81% or 178,000 persons depend on Level I facilities, while the rest relies on Level II systems.

The service coverage with sanitary toilets in the province is 72% or 47,981 of the total households compared with national coverage of 77%. These toilets consist of 2% flush type, 86% pour-flush type and 12% VIP type. Service coverage in urban area is 87%, while in rural area the coverage is 65%.

The province has a total of 1,094 toilets located in 329 schools. Only 53% of the students is adequately served by sanitary toilets. The present average ratio of 81 students per sanitary toilet is quite below the service level standard of 50 students per sanitary facility. There are 35 public utilities; public markets, bus/jeepney/airport terminals, and parks or plazas. About

49% of these public utilities is served with sanitary toilets. However, the manner of usage and maintenance are improper rendering the facilities unsanitary.

### 9.3 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 were 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.

#### **9.4 Past Financial Performance in Water Supply and Sanitation**

Investments for Level I from the local fund of DPWH amounted at P18,161 thousand during the years 1990 and 1991, covering 191 wells, 100 spring development and 76 rehabilitation works. DOH accomplished 13 school toilets under the FW4SP program in 1993 and 1994. The provincial government also financed with an amount of P1,810 thousand for the sector in 1990 and 1994. Also, the Earthquake Rehabilitation Program (ERP-DA), CDF, NGO, UNICEF and others provided a total of P9,288 thousand for the sector in the same period.

The IRA allotted to the province between 1990 and 1994 ranged from 0.8 to 1.0% to the national total IRA for all provinces. On the other hand, the total IRA to all municipalities of the province was arranged with 0.8 to 0.9% to the national total IRA for the municipalities nationwide. In 1994, the IRA to the province amounted at P261 million, of which 44% was allotted to the provincial government and 56% to the municipalities. About 0.7% of the provincial government IRA in 1994 was used for the relevant sector.

The capital cost for Level I systems is free to the community, while operation and maintenance is the responsibility of the associations or barangays. As for Level II systems, the capital cost is shouldered by the RWSA through a loan or grant. For Level III systems, the provincial waterworks bear the capital cost by loans with concessional terms. On the other hand, municipal waterworks received a grant for the initial cost. Regarding sanitation sector, 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.

Three (3) waterworks for Level III water supply are currently managed in the province. The provincial waterworks are financially sound, although some arrears are reported. The waterworks has received loans of P1,110 thousand. The financial performances of the RWSAs and BWSAs tend to face difficulties partly because the beneficiaries do not recognize the cost requirements.

#### **9.5 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 92% of the total provincial area and are extensively distributed in the mountainous areas. Rocks classified as Pliocene to Pleistocene, which underlie about 2% of the total land area of Nueva Vizcaya, are limited to the gently sloping to hilly parts of Villaverde, Solano, Bayombong and Alfonso Castañeda. The Recent deposits make up about 6% of the province and are widespread in the flood plains of the Magat river and its tributaries.

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 delineated in the province. Deep well area covers about 45% of Nueva Vizcaya, mostly on the northern section. The remaining 55% of the provincial domain is classified as difficult area. The groundwater in the province is generally potable.

Considering the existing wells in the province, the potential source of groundwater occurs between 8 to 30 mbgl in the Recent alluviums and Plio-Pleistocene clastic rocks.

#### 9.6 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 9.6.1. 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 9.6.1 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>	86%	90%	95%
	<i>Rural Area</i>	58%	85%	95%
<i>Sanitation</i>	<i>Household Toilet</i>	73%	87%	94%
	<i>School Toilet</i>	55%	70%	90%
	<i>Public Toilet</i>	52%	80%	100%
<i>Sewerage</i>	<i>Urban Area</i>	-	<i>Not Applicable</i>	50%
<i>Solid Waste</i>	<i>Urban Area</i>	35%	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 system 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 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 9.6.2.

**Table 9.6.2 Additional Service Coverage by Phase**

<i>Sub-Sector</i>	<i>Area/Type</i>	<i>Unit</i>	<i>Additional Service Coverage</i>	
			<i>Phase I</i>	<i>Phase II</i>
<i>Water Supply</i>	<i>Urban Area</i>	<i>Persons</i>	<i>13,900</i>	<i>100,300</i>
	<i>Rural Area</i>	<i>Persons</i>	<i>81,800</i>	<i>57,400</i>
<i>Sanitation</i>	<i>Household Toilet</i>	<i>No. of Households</i>	<i>17,200</i>	<i>42,800</i>
	<i>School Toilet</i>	<i>No. of Students</i>	<i>14,700</i>	<i>24,100</i>
	<i>Public Toilet</i>	<i>No. of Utilities</i>	<i>12</i>	<i>11</i>
<i>Sewerage</i>	<i>Urban Area</i>	<i>Persons</i>	<i>Not Applicable</i>	<i>57,000</i>
<i>Solid Waste</i>	<i>Urban Area</i>	<i>No. of Households</i>	<i>5,300</i>	<i>Not Applicable</i>

The necessary water supply facilities for Phase I include 11 deep wells for 2,660 house connections in urban area, and 6 Level II systems with spring sources and 1,005 deep wells for rural area. For Phase II, 16 deep wells for additional 25,068 connections and 747 Level I deep wells 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 2,869 household toilets, 15 public school toilets and 12 public toilets for urban area. In rural area, 14,328 household



toilets and 45 public school toilets are necessary. Solid waste disposal will need 9 refuse collection trucks. For Phase II, urban area will require 14,009 household toilets, 31 public school toilets and 11 public toilets. In rural area a total of 28,754 household toilets and 65 public school toilets are necessary.

## 9.7 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, springs will be potential sources for Level II and III, while a deep well may be developed for Level I. For institutional arrangement, the formation of BWSA for Level I and RWSA for Level II and III is a prerequisite. 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.

## 9.8 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 9.8.1.

**Table 9.8.1 Investment Cost Required by Phase**

Unit: 1,000 Pesos

Item	Component	Phase I	Phase II
Construction/ Rehabilitation	Water Supply	188,558	404,903
	Urban Area	52,921	300,492
	Rural Area	135,637	104,411
	Sanitation	28,128	468,829
	Household Toilet	7,852	15,514
	School Toilet	16,197	33,219
	Public Toilet	3,759	3,445
	Disinfection of Well	320	266
	Urban Sewerage	-	416,385
	<b>Sub-Total</b>	<b>216,686</b>	<b>873,732</b>
Sector Management	Engineering Studies	26,640	111,023
	Community Development and Training	20,101	76,262
	<b>Sub-Total</b>	<b>46,741</b>	<b>187,285</b>
<b>Total Direct Cost</b>		<b>263,427</b>	<b>1,061,017</b>
<b>Contingencies</b>		<b>189,433</b>	<b>159,153</b>
<b>Total Investment Cost</b>		<b>452,860</b>	<b>1,220,170</b>

Note: Price contingency is not included in Phase II.

The investment cost for Phase I is estimated at about P453 million. A total of P217 million is required as the construction/rehabilitation cost in Phase I, of which 62% is for rural water supply, while only 13% for sanitation sector.

Required equipment and vehicle for construction/rehabilitation of Level I facilities and solid waste management are roughly estimated: 19 sets of well drilling equipment, 3 sets of well rehabilitation equipment, 19 units of service truck with crane and 3 units of support vehicle; and 9 units of refuse collection truck. The total procurement cost is estimated at approximately P289 million. Likewise, annual recurrent cost in 1995 price level is estimated at P7 to P11 million/year during Phase I period.

## 9.9 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% (P94 million) of the provincial cost requirements (P453 million). In terms of municipal achievement by the IRA, percentage of Alfonso Castañeda is much higher than the provincial average. Others are in the range between 14% and 34% 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 current component 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.

## 9.10 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 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. Detailed implementation of the first phase re

quirements is presented in this PW4SP, including institutional arrangements. 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.





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