# CHAPTER 5
# PAST FINANCIAL PERFORMANCE

# 5. PAST FINANCIAL PERFORMANCE

## 5.1 General

One of the major problems usually encountered in ARMM in general and, more specifically, in the different local government units (LGUs) that compose the ARMM, is compliance to the financial reporting system of the national government. Thus, historical records of revenues and expenditures of the various ARMM LGUs are difficult to collect and, when available, the veracity of the information contained is usually questioned. Even the regular audit of these LGUs are often not undertaken due to security concerns for the Commission on Audit (COA) teams that would normally undertake the audits.

In addition, the procedural aspects of the LGU planning, programming, budgeting and expenditure process may have not been followed as required under the ARMM Local Government Code (ARMM-LGC). Thus, the reliability, consistency and truthfulness of the financial information of these LGUs should be considered seriously.

## 5.2 Financial Performance of the LGU

The provincial and municipals governments' financial performance for the period 1999 to 2001, which are the only available information, was generated from the Bureau of Local Government Finance database together with that of the Department of Budget and Management. At the LGU level, the results of the financial operations could not be released by the LGU Accountants unless clearance from the local chief executive (LCE) is given. In most instances, such clearance for the release of the financial information was not given and the Study Team had to find alternative sources to collect the needed information. could be looked into.

Data on the Internal Revenue Allotment (IRA) for the LGUs were readily available from the DBM, but this only provided information on financial resource availability, not use or allocation.

### 5.2.1 Sources and Uses of Funds

(a) Revenue Sources

The primary source of income is the Internal Revenue Allotment (IRA), which is complemented by local tax revenues and non-tax revenues such as aids and subsidies. In 1999, the IRA composed about 98.9% of total income and this has subsequently somewhat decreased to 93.6% by 2001.

As mandated in Article IX Section 9 of RA 9054, the sharing of Internal Revenue, Natural Resources, Taxes, Fees and Charges are as follows:

(a) Thirty-five percent (35%) to the province or city:

i. The share of the province is apportioned as follows: 45% to the province, 35% to the municipality; and 20% to the barangays;

ii. The share of the city is distributed as follows: 50% to the city and 50% to the barangays.

(b) Thirty-five percent (35%) to the regional government; and

(c) Thirty percent (30%) to the central/national government.

There are subsidies (national aid) and income from its share of natural resources, i.e. operation of the Hydroelectric facility, reported by the province.

Other income usually comes from economic enterprises, but the LGU does not collect any fees from its economic enterprises (if any).

Table 5-1 presents the actual income and expenditures of the Province for the 1999-2001 period. Local revenues, which was less than 2.53% of the total revenues of the province, consisted of its share of real property tax, business taxes and licenses, and miscellaneous taxes. IRA's annual average share to total income was at least 94%, which indicates that the province has historically been dependent on IRA, given with its low tax and non-tax revenue collections.

The results of the financial operations of the various municipalities in Lanao del Sur are given in Appendix 5-1.

(b) Uses of Funds in the Province

Actual expenditure of the provincial government for general government services was 20.4% in 1999 but subsequently increased to 21.3% of total expenditures. Expenditure on economic development activities has increased substantially from 7.83% in 1999 to 59.03% by 2001. Other charges, such as interest payments on loans has already decreased from 26.1% in 1999 to 19.7% by 2001. While the province enjoys some revenue surplus, this is quite marginal. However, compared to provinces outside of the ARMM, ARMM provinces have less

responsibilities as some services have not been devolved such as social services, agriculture, education, etc.

**Table 5-1 Actual Results of the Financial Operations of the Province (1999-2001)**

| Description of Items | 1999 | 2000 | 2001 |
|---|---|---|---|
| **INCOME** | | | |
| **LOCAL SOURCES** | **4,828,978** | **4,340,125** | **15,933,329** |
| **REVENUE FROM TAXATION** | **374,682** | **4,340,125** | **5,397,003** |
| Real Property Tax | 374,682 | 217,174 | 1,064,098 |
| Local Taxes | 0 | 4,122,951 | 4,332,905 |
| | | | |
| **NON-TAX REVENUES** | **4,454,296** | **0** | **10,536,326** |
| Receipt from Eco. Ent. | 0 | 0 | 0 |
| Fees/Charges | 4,454,296 | 0 | 10,536,326 |
| Loans and Borrowings | 0 | 0 | 0 |
| Other Receipts | 0 | 0 | 0 |
| | | | |
| **AIDS AND ALLOTMENTS** | **353,212,181** | **424,955,222** | **389,903,966** |
| BIR Allotments | 347,900,575 | 423,346,242 | |
| National Aids | 0 | 0 | 389,467,760 |
| National Wealth | 5,311,606 | 1,608,980 | 436,206 |
| **TOTAL INCOME** | **358,041,159** | **429,295,347** | **405,837,295** |
| | | | |
| **EXPENDITURES** | | | |
| **CURRENT EXPENDITURES** | **201,904,878** | **201,659,711** | **404,830,764** |
| General Government | 70,809,986 | 70,172,927 | 86,111,580 |
| Public Welfare & Int. Safety | 10,966,932 | 11,230,389 | 50,000 |
| Economic Development | 27,142,058 | 25,667,210 | 238,990,243 |
| Operation of Econ. Ent. | 2,490,176 | 0 | 0 |
| Other Charges | 90,495,726 | 94,589,184 | 79,678,941 |
| **CAPITAL OUTLAY** | **144,559,120** | **226,976,837** | |
| | | | |
| **TOTAL EXPENDITURES** | **346,463,998** | **428,636,547** | **404,830,764** |
| | | | |
| **EXCESS (DEFICIT) OF INCOME OVER EXPENDITURES** | **11,577,161** | **658,800** | **1,006,530** |

*Source: Bureau of Local Government Finance*

### 5.2.2 Availability of Funds

As previously noted, the IRA comprises 96% of total income of the province, which is used to finance most of its expenditures including capital outlays. The amount of IRA that will be received by the province is known in advance before the end of the preceding year. Thus, for budgeting purposes, the province just uses the actual amount of IRA it received in the preceding year as its estimate of IRA for the budget year. In the case where the IRA received is larger than that of the preceding year, the province prepares a supplemental budget.

For 2000, the 20% Development Fund (20% of IRA) amounted to about P79.97 million. By 2003, the estimated share of the Development Fund from the IRA is now P99.45 million. These are usually spent for development/infrastructure projects contained in the Annual Investment Plan of the province (AIP).

## 5.3 Annual Investment Plans

The LGU uses its 20% DF for expenditures on economic and social services, including water supply projects.

### 5.3.1 Budgetary Allocation to the Sector

The Budget Office of the province consolidates the budget proposal submitted by all offices of the Provincial Government. While, the DBM issues a Local Budget Memorandum every October of the preceding budget year to guide the provinces in their budget preparation, the sector allotment usually comes from the 20% DF, depending on the priorities set and approved by the Provincial Development Council (PDC) and the Governor.

The Governor endorses the AIP to the Sanggunian Panlalawigan for approval and appropriation. Unfortunately, the Governor can change the budget allocation in the AIP, based on his own priorities, with the approval of the PDC.

## 5.4 Cost Sharing Arrangements/ Counterpart Funding

The Province has implemented recently water supply projects funded by Mindanao Basic Urban Services Sector Project (MBUSS). No information could be gathered on cost sharing among concerned parties (LGUs, central government agencies and barangay people).

The PEO implements the Provincial government-funded projects under the General Fund. The implementation of these projects is closely monitored with reference to progressive

disbursements. For the sector implementation, the following are the local funding sources and corresponding implementing agencies.

| Funding Source | Implementing Agency/ Unit |
|---|---|
| Provincial Government | PEO/PPDO |
| CDF (Congressmen) | DPWH – District Engineering Office |
| Municipal Government | MEO/MPDO |

A new cost-sharing scheme was authorized in 2003 in accordance with the policy on national government grants. Cost sharing arrangements for levels I, II and III systems are shown as follows:

**Table 5-2 PGB-approved Cost Sharing (% share)**

| Level and Type of Service | Income Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1st/ 2nd | | | 3rd/ 4th | | | 5th/ 6th | | |
| | NG[1] | LGU[2] | | NG[1] | LGU[2] | | NG[1] | LGU[2] | |
| | | Equity[1] | Loan[1] | | Equity[1] | Loan[1] | | Equity[1] | Loan[1] |
| Level I/II WS | 30 | 20 | 50 | 40 | 15 | 45 | 50 | 10 | 40 |
| Level III WS | 0 | 0 | 0 | 20 | 10 | 70 | 50 | 10 | 40 |
| Sanitation | 20 | 20 | 60 | 40 | 15 | 45 | 50 | 10 | 40 |

For any central government grants that are provided for the development of Level I water supply systems and sanitation facilities to the limited classes of municipalities, the LGUs and beneficiaries concerned shall share the capital cost required. No subsidies from the central government will be provided for the construction of Level II and III water supply systems.

Any grants from the national government that are provided for the development of Level I water supply systems and sanitation facilities are based on the income classification of the municipalities. The LGUs and beneficiaries concerned shall share the capital cost required.

[1] NG – National Government grant for the respective level and type of service and respective income class of the LGU.
Equity – refers to the minimum cash equity contribution to be put up by the LGU.
Loan – refers to the portion of the project cost that the LGU must finance either through loan from MDFO or other Government Financing Institutions (GFIs), e.g., Land Bank, DBP, etc.

[2] If the LGU can raise the equity portion more than the minimum required amount, then the portion of the project cost it needs to raise through loan would be lower. Loan terms of MDFO: Interest Rate - currently at 14% per annum fixed until maturity of the sub-loan; Repayment Period - payable in 15 years inclusive of a 3-year grace period.

## 5.5 LGU Financing Options

Other external source of funds of the province is foreign assisted projects either directly coursed through the province as in the case of the funds from ADB. The water districts in Lanao del Sur could avail of funding through loans that are directly obtained from LWUA.

LGUs have the following financing options :IRA, ODA, private sector financing and debt (both public and private sector debts). The LGU can also avail of funds through conduits, e.g., MDFO, GFIs, and through foreign lending agencies and private sector financing institutions.

### 5.5.1 Municipal Development Fund Office (MDFO)

The MDF is a revolving fund created under Presidential Decree No. 1914 to provide LGUs access to foreign loans, assistance or grants, but. Operations of the MDF, as well as the evaluation and control of local government transactions of the fund, are guided by the financial policies defined in the Joint Circular No. 6-87 of the DOF, COA and DBM. The policies include, among others, the following:

- On-lending terms for local governments or government corporations to be in accordance with the terms and conditions of the international agreements with foreign financial institutions;
- Loan repayments to conform with the terms and conditions of the corresponding Loan and Project Agreements;
- Annual debt service liabilities to all creditors to be at least 120 per cent of total net annual revenues from all sources after operating costs, unless otherwise provided in a mutual agreement among all parties concerned;
- Repayment to MDF to take precedence over all subsequent borrowings incurred;
- Payment of additional interest, charges and fees on amounts to be relent to local governments may be required by the Secretary of Finance in consultation or agreement with foreign lending institutions and LGUs/Project Cities to cover foreign exchange risks, commitment charges and front-end fees applied on foreign borrowings by lending institutions; and

- Internal revenue/specific tax allotments to be withheld by the DOF in case of default or arrears for more than three months.

The MDF-Policy Governing Board (PGB) formulates its policies: It is composed of representatives from the DPWH, DBM, NEDA and the DILG and chaired by the DOF. The funds administered by the MDF come from loan proceeds from multilateral and bilateral sources, contributions from domestic and foreign institutions, various grants and donations, and repayments by borrowing LGUs.

### 5.5.2 Governmental Financing Institutions (GFI)

In the past, the LGUs could not access financing institutions for direct assistance. But with the devolution of the sector to the LGUs, the LGUs could now access direct financing from banks and other financing institutions.

Among the GFIs through which LGUs can access ODA loans are the Land Bank of the Philippines (LBP), Philippine National Bank and the Development Bank of the Philippines (DBP). For the LGU to enter into a loan, the respective legislative council (Sangguniang Panlalawigan, SP for the Province; Sangguniang Panglunsod, SP for the City; and Sangguniang Bayan, SB for the Municipality) will authorize the Chief Executive Officer (Governor or Mayor, as the case may be). The collateral that the LGU may use in order to avail of loans from the bank could be any of the following: deposit hold out, public land and assignment of IRA.

In a deposit hold out loan, the loan is based on the amount in the time deposit account of the LGU in the bank. The LGU is allowed a maximum loan amount of up to 90 per cent of the total amount of its time deposit account in the bank. One of the terms for this kind of loan includes deduction of the amount due from the LGU's IRA deposited in that bank.

Another condition that the bank usually imposes on the loan is the signing of a MOA between the LGU and the bank, where the LGU guarantees that the loan will be honored despite a change in administration in the next election. Interest rate is not fixed.

Loanable amount may be based on the amount of time deposit of the province in the bank.

Other collaterals accepted by the bank are: public land and assignment of IRA. Interest rate is not fixed but fluctuating depending on the current interest rates prevailing during repayment. Penalty charges are imposed whenever the IRA of the province is delayed.

### 5.5.3 Foreign Lending Agencies

The external assistance to the Sector in the province comes from foreign assisted projects. With the LGC 1991, the province can become the direct recipient of foreign grants.

### 5.5.4 Private Sector Financing Institutions

There are several private sector financing modalities that can be promoted to finance WATSAN sector projects particularly in urban areas, where existing service area coverage may warrant viability of WATSAN investments for a profit by the private sector proponent. Further, Level III water supply expansion projects are now increasingly financed through private sector financing mainly thru concession contracts and BOT schemes.

## 5.6 Financial Status of Water Service Providers in the Province

The two (2) Water District in Lanao del Sur has availed of loans from LWUA, which have already been paid. The Marawi City WD availed of a P32.491 million loan while Wao WD availed of a P4.324 million loan from LWUA.

## 5.7 Cost Recovery Practices by the LGU

### 5.7.1 Capital Cost

In the past, the capital cost for Level I systems was given as grant to the community. As for Level II systems, the capital cost was shouldered by the RWSA through loan or grants. Water charges collected by each association cover the cost of operation and maintenance and loan amortization. According to the Loan Department of LWUA, new loan disbursements to RWSAs have been stopped.

### 5.7.2 Operation and Maintenance Cost

The operation and maintenance cost for Level I and II water supply systems is the responsibility of the users upon turnover of the facilities. As such, an organization (or association) to handle the collection of water charges should have been formed beforehand by the implementer.

When DPWH had been undertaking the construction of Level I water supply facilities, the DPWH through DEOs and PEOs assisted in the formation of BWSAs. However, most of these BWSAs are no longer operational, due to the non-collection or low rates of water fees. As a consequence, the users had to go to the LGUs (usually barangay or municipal governments) to address the problem. In some cases, the users likewise requested the PEOs for assistance.

Although the DEO had no budget for operation and maintenance, it extended assistance in the form of materials from their supplies, if these items were available. Because of this situation, the emphasis was placed on the need for monthly contributions from the users for O&M.

Cost recovery for Level III systems, particularly those covered by Water Districts, is managed through a different system. Because of the individual connections, the households covered by the Water Service Provider can be disconnected in case of non-payment by the users.

Average monthly rates range from P2 to P262 per $m^3$ while collection efficiencies range from 25% to 100%.

## 5.8 Affordability

### 5.8.1 Capital Cost Contribution

Based on the workshop discussion with the PSPT and the MPDCs of some municipalities of the Province, their experience in the implementation of water supply projects was with the CVWSP, and contribution from the community was only in kind, i.e., mostly free labor. The LGU however, provided cash equity as its counterpart.

### 5.8.2 Operation and Maintenance Cost

Since there are no data on average water rate for the RWSAs, no affordability analysis could be made for Lanao del Sur.

# CHAPTER 6
# WATER SOURCE DEVELOPMENT

# 6. WATER SOURCE DEVELOPMENT

## 6.1 General

This chapter discusses the potential water sources and their development for domestic water supply for the province of Lanao del Sur. More emphasis is given to the available groundwater because of its better quality and economical use as this can require minimal treatment or none at all. The potential of major rivers as possible water source were also considered.

A Groundwater Availability Map (also referred to as Hydrogeologic Map, Figure 6-1) for the province was prepared to identify areas or geologic formations with available groundwater. This was done through the correlation and evaluation of pump well and ground geology data to determine the groundwater potential of the different geologic units.

In its Rapid Assessment of Water Supply Sources, the National Water Resources Board (NWRB) classifies groundwater as shallow well, deep well or difficult areas. Instead of using this classification, this study categorized groundwater availability in terms of the potentials and hydrogeologic properties of geologic units underlying the province.

Most of the data and information used in this study were obtained from the following sources:

- Mines and Geosciences Bureau (MGB),
- National Mapping and Resources Information Administration (NAMRIA),
- National Water Resources Board (NWRB),
- Local Waterworks Utilities Administration (LWUA),
- Local Government Units (LGUs),
- Provincial Planning and Development Office (PPDO), and
- Department of Public Works and Highways (DPWH).

Majority of the geologic reports and maps and some hydrogeologic reports were obtained from the MGB and LWUA. Some water resources investigation reports and well data were gathered from the NWRB and LWUA. These gathered data and information were supplemented by those gathered from field investigations and through questionnaires provided to the local government offices.

The Groundwater Availability Map may be used for provincial or even municipal level master plans and feasibility studies. However, certain investigations may have to be conducted prior to detailed design and implementation of the water supply work.

## 6.2 Geology

### 6.2.1 General Statement

The uplifted igneous and sedimentary rocks in Lanao del Sur were formed during pre-Cretaceous to recent. They are the result of magmatic and tectonic action generated by westward and northeast crustal dipping plates that were subducted during the course of the province's evolution. The subduction zones south of Cotabato, along the Agusan-Davao Trough and east of Surigao are considered most significant in the geologic development of Lanao del Sur and its adjoining provinces.

The sedimentary rocks which were intercalated with the igneous rocks were formed during the Cretaceous to Pleistocene. The oldest known rocks are the partly metamorphosed Cretaceous to Paleogene dense, relatively impervious tuffaceous mudstone and greywacke which are intercalated with lava flows. These are mostly transformed sedimentary deposits derived from basic oceanic crust. Final uplift of younger deposits above sea level occurred during the Pleistocene to Recent time.

In general, none of the igneous and well cemented, compacted sedimentary rocks can be considered as dependable sources of pumpable groundwater. Only the Pleistocene to Recent deposits can be considered as potential sources of significant quantity of pumpable groundwater.

### 6.2.2 Groundwater in the Geologic Units

The crystalline igneous and metamorphic rocks and the hard, indurated, well-cemented sedimentary rocks do not contain pumpable groundwater unless they are sufficiently fractured and/or weathered.

None of the fair to excellent sources of pumpable groundwater is homogeneous. These sources are the Pliocene to Pleistocene siltstone, sandstone and conglomerate ($N_3S$), Quaternary pyroclastic deposits (QVP) and the Recent unconsolidated deposits (R).

In the limestone areas, majority of the wells, if there are, show only small yields. They however, may be dependable sources of spring water. Several springs were noted in Quaternary volcanic and pyroclastics rocks. It may also exist in some of the metamorphic and older sedimentary rocks.

The following geologic units that are present in the study area are grouped as either sedimentary or igneous and metamorphic. Their capabilities to contain groundwater are also discussed.

Sedimentary Rocks

*Cretaceous to Paleogene (Kpg).* This rock unit which is intercalated with the Cretaceous to Paleogene lava flows consists of dense, relatively impervious tuffaceous mudstone and greywacke that have been partly metamorphosed. The soil cover is reported to be thin. Pumpable groundwater, if any, occurs in the fractured and/or weathered zones.

*Early to Middle Miocene Rocks ($N_1S$).* The bulk of the formation includes massive layers of hard, well-cemented, coarse sandstone. Light brown silty shale and pale greenish-gray siltstone are intercalated with the sandstone. These rocks are partly folded and faulted but dense and impervious when fresh. They occur in rugged ridges and are partly covered with primary and secondary forest growth and partly cultivated. This formation is generally not considered a good water-bearing formation. Groundwater may occur in the fractured and/or weathered zones and in the leached sandstone and conglomerate.

*Pliocene to Pleistocene Clastic Rocks ($N_3S$).* This unit consists of thin bedded soil, fossiliferous mudstone, locally topped by siltstone, sandstone and conglomerate interbeds, rarely intercalated with impure limestone.

The municipalities of Kapai, Tagoloan and Tagoloan II are underlain by this rock formation. Generally wells drilled in this formation are low-yielding though the possibility of drilling fairly good yielding wells is not being discarded.

*Pliocene to Pleistocene Limestone ($N_3L$).* This consists of coralline, megafossiliferous, cavernous limestone, interbedded with sandstone, marl, local volcanic sandstone and conglomerate. Springs are generally common in the limestone formation. Groundwater may be present within the sandstone and conglomerate beds and within the fractured zones and solution cavities.

*Recent Alluvium (R).* This unit consists of outwash, valley fill, river and coastal deposits of clay, silt, sand, gravel, organic remains such as coral reefs and shells. They occupy several square kilometers of lowlands in Lanao del Norte particularly those within the periphery of Lake Lanao.

These unconsolidated, partly compacted but uncemented deposits are from less than a meter to over tens of meter thick. Though generally considered as shallow well areas this can also be considered as shallow to deep well areas in some localities.

Available well records in the municipalities of Tamparan, Taraka, Marawi City, Ramain and Malabang show well depths of about 13m to as deep as 77m which proves that the Recent deposits particularly those located east of Lake Lanao can be classified as both shallow and deep well area. Recorded static water levels ranged from 0.30 m to 2.13 m. Reported actual capacities ranged from 0.63 to less than 2 lps. Specific capacities ranged from 0.37 to 2.48 lps per meter of drawdown. Properly designed and constructed wells may show higher actual and specific capacities.

Water-bearing zones in this unit can be classified as fair to very good.

Igneous Rocks

*Quaternary Volcanics (QV).* The volcanic cone central areas are reported to consist of Pliocene to Pleistocene hornblende andesite which is generally gray, massive and hard. The dacitic phases occur as lava flows. Agglomerates and ash flows also occur.

Pumpable groundwater, if any, is likely to be surficial and may be rendered partly not potable by sulfuric solutions derived from sulfur deposits. There are no reported wells in this formation but springs are common.

*Pliocene to Recent Pyroclastics (QVP).* This formation consisting predominantly of tuffaceous sandstone, siltstone, shale, agglomerates and tuff, practically covers major portions of the study area. Bombs, scoriaceous and pumiceous materials are also present. The pyroclastic rocks are partly cemented to loosely compacted and in some places, partly faulted.

The aquifers occur as lenses and pods; of larger area when reworked. Groundwater occurs under water table (unconfined) and artesian (confined) conditions.

Major portions of Lanao del Sur are underlain by this rock formation. Several productive wells have been drilled in this formation. Available well records in Marawi City, municipalities of Saguiran, Wao, Malundo, Mandalum, Marantao, Bayabao, Ganassi and Bubong show well depths of less than 10 m to more than 100 m. Measured static water levels ranged from 0.30 m to about 7.0m below ground surface. Piezometric water level above ground surface is possible in some localities. Reported actual capacities and actual specific capacities ranged from 0.32 to about 7.0 lps and 0.44 to more than 5.0 lps per meter of drawdown respectively. The low capacities of these wells can be attributed to improper well design and construction. In addition most of these wells are made of small diameter pipes. Properly designed and constructed wells will therefore be expected to give higher capacities.

The three wells of Marawi City Water District with depths of 28.7 to 37.5 m show static water levels from 2.67 m to 9.13 m and pumping water levels from 2.83 m to 22.7 m. Specific capacities ranged from 2.0 to 10.70 lps per meter of drawdown. These wells are pumped at the rate of 7.0 to 16.70 lps.

Several springs with significant discharges emanate from this formation. Table 6-1 shows some of the municipalities which have spring as the main and/or additional source of potable water supply.

## 6.3 Groundwater Availability in the Province

The Groundwater Availability Map of the province is presented in Figure 6-1. Majority of the data used in the preparation of the map were obtained from the MGB and NWRB. The available well data by barangay are presented in Table 6-2 while the summary of water well data for some of the municipalities is presented in Table 6-3 and shown in Figure 6-2.

On the map, each geologic unit is described separately as to their lithologic composition and their groundwater holding capability. The hydrogeologic properties are included in the explanation.

In general, none of the igneous, metamorphic and well-cemented, compacted sedimentary rocks can be considered as dependable sources of pumpable groundwater. The Quaternary Pyroclastics (QVP) which underlie major portion of the province and the Recent deposits (R) can be considered as potential sources of significant quantity of pumpable groundwater. The

Quaternary Pyroclastics can be considered as both shallow and deep well area though most of the wells drilled in this formation are relatively deep. The Recent deposits are generally shallow well areas but can also be considered as deep well areas in places where pervious deposits are relatively thick

**Table 6-1 Existing Water Supply Systems in Lanao del Sur**

| City/Municipality | Income Class | No. of Barangays | Existing Water Supply System |
|---|---|---|---|
| 1. Marawi City | 3rd Class | 96 | Level III System, 5 DW, serving 30% of the barangays.<br>Level I in the remaining unserved barangays, DW and lake. |
| 2. Bacolod Grande | 5th Class | 26 | Level III in 4 barangays, spring.<br>Level I in 22 barangays, spring, lake water and DW. |
| 3. Balabagan | 6th Class | 27 | Level II in 2 barangays, spring.<br>Level I in 25 barangays, spring and DW. |
| 4. Balindong | 6th Class | 38 | Level III in 3 barangays, spring.<br>Level I in 35 barangays, lake, river and spring. |
| 5. Bayang | 6th Class | 49 | Level I in 50 barangays, spring, river and DW. |
| 6. Binidayan | 5th Class | 26 | Level I in all barangays, spring and lake. |
| 7. Buadiposo | 6th Class | 33 | Level I in all barangays, spring, lake and DW. |
| 8. Bubong | 6th Class | 36 | Level II in 10 barangays, spring.<br>Level I in 6 barangays, DW.<br>Level I in 20 barangays, river, spring, rainwater. |
| 9. Bumbaran | 6th Class | 17 | Level I in all barangays, spring, river and DW. |
| 10. Butig | 6th Class | 16 | Level II in 1 barangay, spring.<br>Level I in 15 barangays, spring and SW. |
| 11. Calanogas | 6th Class | 17 | Level I in all barangays, spring, lake and river. |
| 12. Ditsaan –Ramain | 6th Class | 34 | Level III in 5 barangays, spring.<br>Level I in 29 barangays, lake and spring. |
| 13. Ganassi | 6th Class | 32 | Level III in 5 barangays, spring.<br>Level II in 5 barangays, spring.<br>Level I in 22 barangays, spring, river, lake, rainwater and DW. |
| 14. Kapai | 6th Class | 20 | Level II in 5 barangays, spring.<br>Level I in 15 barangays, spring, river, DW and rainwater. |
| 15. Kapatagan | 6th Class | 15 | Level I in all barangays, spring and DW. |
| 16. Lumba Bayabao | 5th Class | 38 | Level I in all barangays, spring, river and DW. |
| 17. Lumbatan | 6th Class | 29 | Level II in 2 barangays, spring.<br>Level I in 27 barangays, dugwell, lake, spring and rainwater. |

**Table 6-1 Existing Water Supply Systems in Lanao del Sur (Continuation)**

| City/Municipality | Income Class | No. of Barangays | Existing Water Supply System |
|---|---|---|---|
| 18. Lumbayanague | 6th Class | 22 | Level I in all barangays, spring, lake and river |
| 19. Madalum | 6th Class | 37 | Level II in 12 barangays, spring.<br>Level I in 26 barangays, DW, spring, lake and river. |
| 20. Madamba | 6th Class | 24 | Level II in 5 barangays, spring.<br>Level I in 19 barangays, lake, spring and river. |
| 21. Maguing | 6th Class | 32 | Level I or II in all barangays, spring and river. |
| 22. Malabang | 4th Class | 37 | Level I in all barangays, spring and DW. |
| 23. Marantao | 6th Class | 34 | Level I in all barangays, spring and lake. |
| 24. Marogong | 6th Class | 24 | Level II in 2 barangays, spring.<br>Level I in 22 barangays, spring, river and rainwater. |
| 25. Masiu | 5thClass | 35 | Level II in 6 barangays, spring.<br>Level II in 5 barangays, DW.<br>Level I in 25 barangays, spring, DW, lake and river. |
| 26. Mulondo | 6th Class | 26 | Level III in 3 barangays, spring.<br>Level I in 23 barangays, river, lake, DW and spring. |
| 27. Pagayawan | 6th Class | 18 | Level I in all barangays, spring, river and DW. |
| 28. Piagapo | 6th Class | 37 | Level I in all barangays, spring, lake and DW. |
| 29. Poona Bayabao | 6th Class | 25 | Level I in all barangays, spring and river. |
| 30. Pualas | 6th Class | 23 | Level I in all barangays, spring, lake and DW. |
| 31. Saguiaran | 6th Class | 30 | Level I in all barangays, spring and DW. |
| 32. Sultan Domalondong | 6th Class | 7 | Level I in all barangays, spring. |
| 33. Sultan Gumander | 6th Class | 19 | Level I in all barangays, spring, lake and DW. |
| 34. Tagoloan II | 6th Class | 19 | Level I in all barangays spring, river and DW. |
| 35. Tamparan | 6th Class | 44 | Level I in all barangays spring, lake and DW. |
| 36. Taraka | 6th Class | 43 | Level I in all barangays spring, lake and river. |
| 37. Tubaran | 6th Class | 21 | Level I in all barangays, spring and river. |
| 38. Tubaran | 6th Class | 23 | Level III in 3 barangays, spring.<br>Level I in 22 barangays, lake, spring and DW. |
| 39. Wao | 4th Class | 26 | Level III in 5 barangays, spring.<br>Level I in 21 barangays, spring, river and DW. |

WITH GROUNDWATER POTENTIAL

***Recent Alluvium*** Consists of outwash, valley fill, river and coastal and swamp deposits that consists of clay, silt, sand, gravel and organic remains such as coral reefs and shells. It covers most of the Lanao Lake vicinity, coastal lowland and floodplains. Water-bearing zones in this unit can be classified as fair to very good.

R

***Pliocene to Recent Pyroclastics*** Consists predominantly of tuffaceous sandstone, siltstone, shale, agglomerates and tuff. Bombs, scoriaceous and pumiceous materials are also present. The aquifers occur as lenses and pods; of larger area when reworked. Groundwater occurs under water table (unconfined) and artesian (confined) conditions. Can be considered as good to excellent water-bearing formation. Several springs with significant discharges emanate from this formation.

$N_3S$

***Pliocene to Pleistocene Clastic Rocks*** Consists of thin bedded soil, fossiliferous, mudstone, locally topped by siltstone, sandstone and conglomerate interbeds, rarely intercalated with impure limestone. It crops out north of the area along the Iligan City border. Its carbonized plants indicate it to be shallow marine deposition. Generally wells drilled in this formation are low-yielding though the possibility of drilling fairly good yielding wells is not being discarded.

WITH LIMITED OR NO SIGNIFICANT GROUNDWATER POTENTIAL

***Pliocene to Pleistocene Limestone*** Consists of coralline, megafossiliferrous, cavernous limestone, interbedded with sandstone, marl, local volcanic sandstone and conglomerate. Groundwater may be present within the sandstone and conglomerate beds and within the fractured zones and solution cavities of limestone. Springs are generally common in the limestone formation.

$N_3L$

***Late Miocene to Pliocene Clastic Rocks*** Made up of interbeds of conglomerate, sandstone, fossiliferous siltstone, mudstone and light-colored reefal limestone. Limited groundwater occurs mainly within the sandstone and conglomerate.

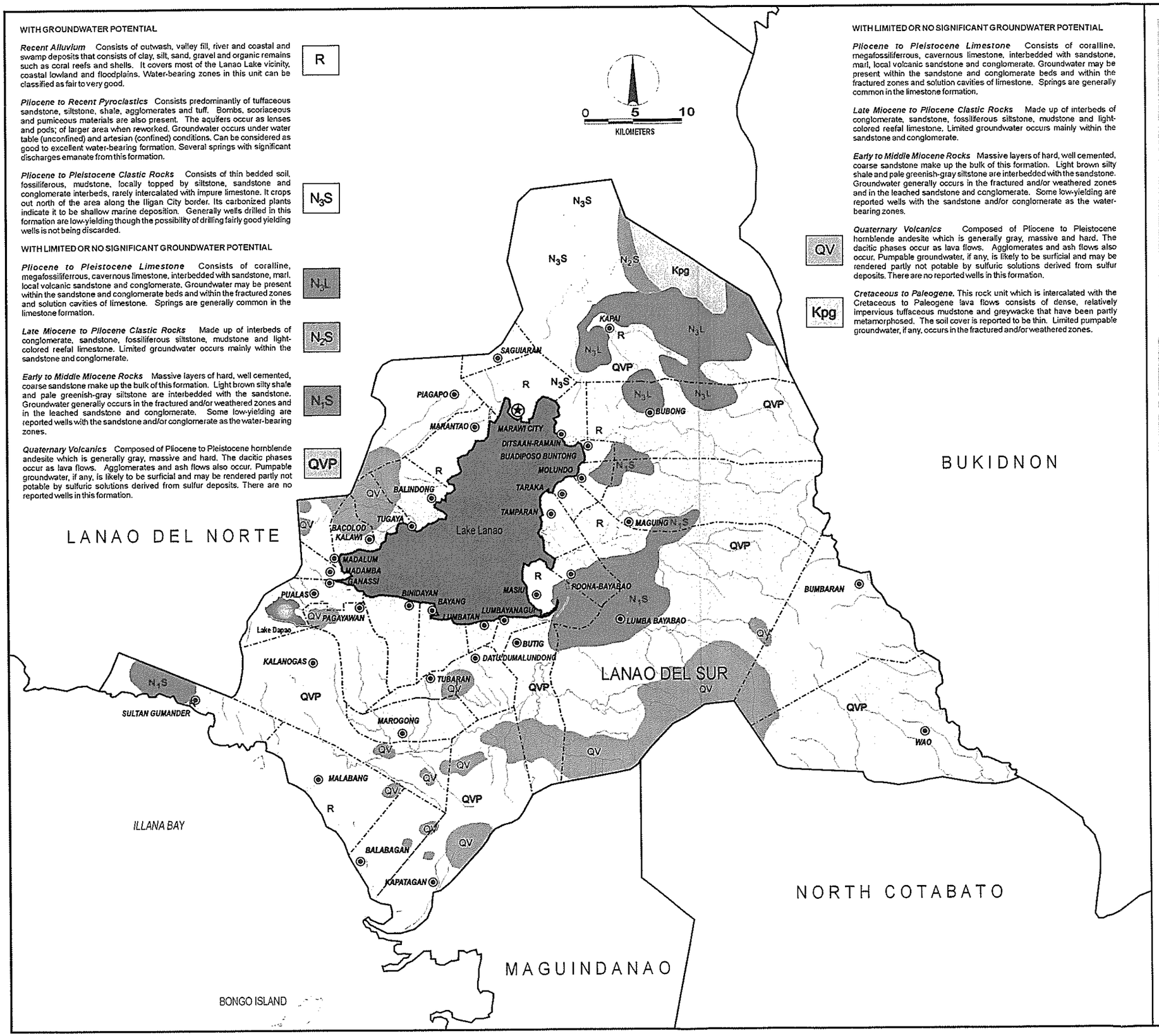
$N_2S$

***Early to Middle Miocene Rocks*** Massive layers of hard, well cemented, coarse sandstone make up the bulk of this formation. Light brown silty shale and pale greenish-gray siltstone are interbedded with the sandstone. Groundwater generally occurs in the fractured and/or weathered zones and in the leached sandstone and conglomerate. Some low-yielding are reported wells with the sandstone and/or conglomerate as the water-bearing zones.

$N_1S$

***Quaternary Volcanics*** Composed of Pliocene to Pleistocene hornblende andesite which is generally gray, massive and hard. The dacitic phases occur as lava flows. Agglomerates and ash flows also occur. Pumpable groundwater, if any, is likely to be surficial and may be rendered partly not potable by sulfuric solutions derived from sulfur deposits. There are no reported wells in this formation.

QVP




WITH LIMITED OR NO SIGNIFICANT GROUNDWATER POTENTIAL

***Pliocene to Pleistocene Limestone*** Consists of coralline, megafossiliferrous, cavernous limestone, interbedded with sandstone, marl, local volcanic sandstone and conglomerate. Groundwater may be present within the sandstone and conglomerate beds and within the fractured zones and solution cavities of limestone. Springs are generally common in the limestone formation.

***Late Miocene to Pliocene Clastic Rocks*** Made up of interbeds of conglomerate, sandstone, fossiliferous siltstone, mudstone and light-colored reefal limestone. Limited groundwater occurs mainly within the sandstone and conglomerate.

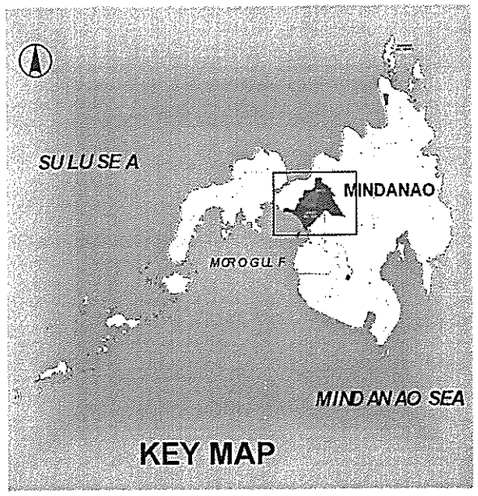
***Early to Middle Miocene Rocks*** Massive layers of hard, well cemented, coarse sandstone make up the bulk of this formation. Light brown silty shale and pale greenish-gray siltstone are interbedded with the sandstone. Groundwater generally occurs in the fractured and/or weathered zones and in the leached sandstone and conglomerate. Some low-yielding are reported wells with the sandstone and/or conglomerate as the water-bearing zones.

QV

***Quaternary Volcanics*** Composed of Pliocene to Pleistocene hornblende andesite which is generally gray, massive and hard. The dacitic phases occur as lava flows. Agglomerates and ash flows also occur. Pumpable groundwater, if any, is likely to be surficial and may be rendered partly not potable by sulfuric solutions derived from sulfur deposits. There are no reported wells in this formation.

Kpg

***Cretaceous to Paleogene.*** This rock unit which is intercalated with the Cretaceous to Paleogene lava flows consists of dense, relatively impervious tuffaceous mudstone and greywacke that have been partly metamorphosed. The soil cover is reported to be thin. Limited pumpable groundwater, if any, occurs in the fractured and/or weathered zones.




LEGEND:

- Provincial Boundary
- Municipal Boundary
- River
- City Center
- Town Center

Figure 6-1
**GROUNDWATER AVAILABILITY MAP OF LANAO DEL SUR**

**Table 6-2 Water Well Data by Barangay, Lanao del Sur**

| LOCATION (MUNICIPALITY, Barangay) | WELL NUMBER | DRILLING DEPTH (m) | ACTUAL CAPACITY (lps) | SPECIFIC CAPACITY (lps/m) | STATIC WATER LEVEL (mbgs) |
|---|---|---|---|---|---|
| *SAGUIRAN* | | | | | |
| 1. Bantangan | NWSA 11303 | 41.77 | 1.76 | 5.17 | 0.305 |
| 2. Saguiaran | NWSA 11301 | 32.01 | 2.52 | 1.65 | 1.52 |
| 3. Batangan | NWSA 11302 | 73.17 | 0.95 | 1.55 | 0.61 |
| *TAMPARAN* | | | | | |
| 1. Linuk | NWSA 236131 | 24.09 | 0.63 | 0.413 | 1.52 |
| 2. Dinsansan | NWSA 276241 | 14.33 | 0.76 | - | - |
| 3. Original | NWSA 276152 | 20.43 | 0.76 | 1.24 | 0.61 |
| 4. Lumbak Ingud | NWSA 276232 | 14.94 | - | - | - |
| 5. Lalabwan | NWSA 276261 | 15.24 | 0.95 | 1.55 | 0.61 |
| 6. Tatayowan | - | 19.82 | 1.01 | 1.10 | 0.915 |
| 7. Saguiaran | NWSA 11300 | 51.83 | 0.95 | 0.44 | 2.13 |
| *TARAKA* | | | | | |
| 1. Talub | NWSA 276141 | 20.73 | 0.76 | 2.48 | 0.305 |
| 2. Tuha | NWSA 276241 | 14.33 | - | - | - |
| 3. Sambilawan | NWSA 276242 | 35.37 | - | - | - |
| 4. Municipal Taraka | NWSA 276142 | 24.70 | 0.63 | - | - |
| 5. Taraka Central School | BPW 367202 | 26.22 | - | - | - |
| 6. Ilian | NWSA 27634 | 20.43 | - | - | - |
| *WAO* | | | | | |
| 1. Cadingilan | NWSA 27612 | 46.95 | - | - | - |
| 2. Narra School Site | NWSA 27613 | 24.40 | - | - | - |
| 3. Poblacion Wao | NWSA 14189 | 9.76 | - | - | - |
| 4. Hospital Site | NWSA 19932 | 14.94 | - | - | - |
| 5. Narra Milaya | NWSA 27611 | 54.88 | - | - | - |
| 6. Narra Bodega Site | NWSA 19930 | 25.30 | 0.63 | 0.69 | 0.915 |
| 7. Chapel Site | NWSA 19934 | 18.30 | 0.95 | 0.62 | 1.52 |
| 8. Bonifacio Street | NWSA 19930 | 25.90 | 0.95 | 0.62 | 1.52 |
| 9. Poblacion Wao | NWSA 14189 | 13.72 | - | - | - |
| 10.Kili-Kili | NWSA 276041 | 44.21 | 0.38 | 0.25 | 1.52 |
| 11.Market Site | NWSA 27621 | 23.78 | - | - | - |
| *MARAWI CITY* | | | | | |
| 1. Mindanao State University | BPW 27081 | 45.7 | - | - | - |
| 2. Preparatory High School | BPW 27682 | 71.65 | 6.56 | 1.43 | 4.57 |
| 3. Mindanao State University | - | 68.60 | 4.42 | 0.63 | 6.71 |
| 4. Bacolod | NWSA 6475 | 15.24 | 1.01 | 0.37 | 2.74 |
| 5. Provincial Capitol | NWSA 11034 | 29.90 | 9.47 | 4.45 | 2.13 |
| 6. Basak | NWSA 6476 | 18.30 | 1.89 | 1.24 | 1.52 |

Table 6-2 Water Well Data by Barangay, Lanao del Sur (Continuation)

| LOCATION (MUNICIPALITY, Barangay) | WELL NUMBER | DRILLING DEPTH (m) | ACTUAL CAPACITY (lps) | SPECIFIC CAPACITY (lps/m) | STATIC WATER LEVEL (mbgs) |
|---|---|---|---|---|---|
| *MALUNDO* | | | | | |
| 1. Guilopa | NWSA 276264 | 25.91 | 0.63 | - | - |
| 2. Poblacion Malundo | NWSA 276263 | 21.04 | 0.07 | - | - |
| 3. Poblacion Malundo | NWSA 27631 | 22.60 | 0.44 | - | - |
| 4. Buadi-Suba | NWSA 27635 | 57.93 | 0.63 | 0.11 | 5.82 |
| 5. Kabasaran | NWSA 276267 | 29.90 | 0.95 | - | - |
| *MADALUM* | | | | | |
| 1. Inudaran | NWSA 6033 | 36.60 | 0.95 | 0.45 | 2.13 |
| *MARANTAO* | | | | | |
| 1. Kawayan | NWSA 5971 | 26.83 | 1.89 | 1.03 | 1.83 |
| 2. Maul | NWSA 6473 | 27.44 | 0.95 | 0.45 | 2.13 |
| 3. Kamalig | NWSA 6472 | 41.16 | 0.88 | 0.58 | 1.52 |
| 4. Bakayawan | NWSA 6474 | 25.61 | 0.95 | 0.52 | 1.83 |
| 5. Bacong | NWSA 5970 | 22.87 | 0.95 | 0.78 | 1.22 |
| *RAMAIN* | | | | | |
| 1. Pagalongan | NWSA 276233 | 20.43 | - | - | - |
| 2. Ditsa-an School | NWSA 276161 | 30.49 | 0.63 | 0.413 | 0.61 |
| 3. Busya-an | NWSA 276232 | 19.50 | 0.63 | - | - |
| 4. Raya | NWSA 276253 | 13.41 | 0.32 | - | - |
| 5. Ditsa-an | NWSA 276111 | 77.13 | 0.95 | - | - |
| 6. Rantian | NWSA 276252 | 31.71 | 0.32 | 0.053 | 6.09 |
| 7. Ditsa-an | NWSA 276171 | 18.60 | - | - | - |
| *BAYABAO* | | | | | |
| 1. Borocot | NWSA 276284 | 32.32 | 0.63 | 1.03 | 0.61 |
| 2. Mondiad Lumba | NWSA 276382 | 21.34 | 0.63 | 0.41 | 1.52 |
| 3. Bacolod | NWSA 276283 | 22.87 | 0.63 | 0.41 | 1.52 |
| *MALABANG* | | | | | |
| 1. Sitio Calilangan | NWSA 5663 | 101.22 | 1.26 | 0.83 | 1.52 |
| 2. Itil | NWSA 5134 | 132.62 | 0.32 | 0.13 | 2.44 |
| 3. Purakan Plantation | NWSA 11308 | 49.40 | 2.52 | 8.26 | 0.305 |
| 4. Purakan Plantation | NWSA 11307 | 59.80 | 4.42 | 7.24 | 0.61 |
| 5. Tambara | NWSA 276266 | 15.24 | 0.63 | 2.06 | 0.305 |
| 6. Purakan Plantation | NWSA 5836 | 55.80 | 2.52 | 0.69 | 3.66 |
| *GANASSI* | | | | | |
| 1. Lumbak | NWSA 6131 | 65.90 | 0.76 | 0.62 | 1.22 |
| *BUBONG* | | | | | |
| 1. Montian | NWSA 276262 | 30.49 | 0.76 | 0.36 | 2.13 |
| 2. Bubong | NWSA 276281 | 22.9 | 0.63 | 0.69 | 0.92 |
| 3. Montian | NWSA 276223 | 30.49 | - | - | - |
| 4. Panalawan | NWSA 276257 | 21.34 | 0.63 | 0.52 | 1.22 |

Table 6.3 Water Well Data Summary, Province of Lanao del Sur

| Municipality / City | No. of Wells Based on Static Water Level | | | No. of Wells Consi-dered | Specific Capacity (lps/m) | | Well Depth (m) | | Static Water Level (m) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 - 3 mbgs | 3.1 - 6 mbgs | >6 mbgs | | Average | Range | Average | Range | Average | Range |
| 1. Bacolod Balawi | | | | | | | | | | |
| 2. Balabagan | | | | | | | | | | |
| 3. Balindong | 1 | - | 1 | 2 | 0.3 | 0.07 - 0.52 | 46.65 | 24.7 - 68.6 | 5.96 | 1.22 - 10.7 |
| 4. Bayang | | | | | | | | | | |
| 5. Binidayan | | | | | | | | | | |
| 6. Buadso Buntong | | | | | | | | | | |
| 7. Bubong | 3 | - | - | 4 | 0.52 | 0.36 - 0.52 | 26.31 | 21.34 - 30.49 | 1.42 | 0.92 - 2.13 |
| 8. Bumbaran | | | | | | | | | | |
| 9. Butig | | | | | | | | | | |
| 10. Calanoga | | | | | | | | | | |
| 11. Ditsaan Ramain | | | | | | | | | | |
| 12. Ganassi | - | - | - | 1 | 0.62 | - | 65.9 | - | 1.22 | - |
| 13. Kapai | | | | | | | | | | |
| 14. Kapatagan | | | | | | | | | | |
| 15. Lumba Bayabao | 3 | - | - | 3 | 0.62 | 0.41 - 1.03 | 25.51 | 21.34 - 32.32 | 1.22 | 0.61 - 1.52 |
| 16. Lumbatan | | | | | | | | | | |
| 17. Lumbayanague | | | | | | | | | | |
| 18. Madalum | | | | | | | | | | |
| 19. Madamba | | | | | | | | | | |
| 20. Maguing | | | | | | | | | | |
| 21. Malabang | 5 | - | 1 | 7 | 3.2 | 0.13 - 8.26 | 68.95 | 15.24 - 132.62 | 1.47 | 0.305 - 3.66 |
| 22. Marantao | 6 | | | 6 | 0.64 | 0.45 - 2.13 | 30.08 | 22.87 - 41.16 | 1.78 | 1.22 - 2.13 |
| 23. Marogong | | | | | | | | | | |
| 24. Masiu | - | - | - | 1 | - | - | 23.78 | - | - | - |

| Municipality / City | No. of Wells Based on Static Water Level | | | No. of Wells Consi-dered | Specific Capacity (lps/m) | | Well Depth (m) | | Static Water Level (m) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 - 3 mbgs | 3.1 - 6 mbgs | >6 mbgs | | Average | Range | Average | Range | Average | Range |
| 25. Molundo | - | 1 | - | 5 | 0.11 | - | 31.48 | 21.04 - 57.93 | 5.82 | - |
| 26. Pagayawan | | | | | | | | | | |
| 27. Piagapo | | | | | | | | | | |
| 28. Poona Bayabao | | | | | | | | | | |
| 29. Pualas | | | | | | | | | | |
| 30. Saguiaran | 3 | 1 | - | 4 | 2.2 | 0.44 - 5.17 | 49.69 | 32.01 - 73.17 | 1.14 | 0.305 - 2.13 |
| 31. Sultan Gumander | | | | | | | | | | |
| 32. Tagoloan | | | | | | | | | | |
| 33. Tamparan | 4 | - | - | 6 | 1.08 | 0.413 - 1.55 | 14.17 | 14.33 - 24.09 | 0.91 | 0.61 - 1.52 |
| 34. Taraka | 1 | - | - | 6 | 2.48 | - | 23.63 | 14.33 - 35.37 | 0.305 | - |
| 35. Tubaran | | | | | | | | | | |
| 36. Tugaya | | | | | | | | | | |
| 37. Sultan Dumalondong | | | | | | | | | | |
| 38. Wao | 4 | - | - | 11 | 0.54 | 0.915 - 1.52 | 27.47 | 9.76 - 54.88 | 1.37 | 0.915 - 1.52 |
| | | | | | | | | | | |
| * Marawi City | - | 1 | 1 | 3 | 1.62 | 0.63 - 1.43 | 41.56 | 45.7 - 71.65 | 3.53 | 4.57 - 6.71 |

*Source: Rapid Assessment of Water Supply Sources, Province of Lanao del Sur, National Water Resources Council*

mbgs – meter below ground surface
SWL – static water level
lps – liters per second
m - meter

| SAGUIRAN | |
|---|---|
| WD | 32.01-73.17 |
| SC | 0.44-5.17 |
| SWL | 0.30-2.13 |

| MARAWI CITY | |
|---|---|
| WD | 45.7-71.65 |
| SC | 0.63-1.43 |
| SWL | 4.57-6.71 |

| MARANTAO | |
|---|---|
| WD | 22.87-41.16 |
| SC | 0.45-2.13 |
| SWL | 1.22-2.13 |

| BALINDONG | |
|---|---|
| WD | 24.7-68.6 |
| SC | 0.07-0.52 |
| SWL | 1.22-10.7 |

| GANASSI | |
|---|---|
| WD | 65.9 |
| SC | 0.62 |
| SWL | 1.22 |

| MALABANG | |
|---|---|
| WD | 15.24-132.62 |
| SC | 0.13-8.26 |
| SWL | 0.30-3.66 |

| RAMAIN | |
|---|---|
| WD | 13.41-77.13 |
| SC | 0.053-0.413 |
| SWL | 0.61-6.09 |

| BUBONG | |
|---|---|
| WD | 21.34-30.5 |
| SC | 0.36-0.52 |
| SWL | 0.92-2.13 |

| MOLUNDO | |
|---|---|
| WD | 21.04-57.93 |
| SC | 0.11 |
| SWL | 5.82 |

| TARAKA | |
|---|---|
| WD | 14.33-35.37 |
| SC | 2.48 |
| SWL | 0.30 |

| TAMPARAN | |
|---|---|
| WD | 14.33-24.09 |
| SC | 0.41-1.55 |
| SWL | 0.61-1.52 |

| WAO | |
|---|---|
| WD | 9.76-54.88 |
| SC | 0.54 |
| SWL | 0.92-1.52 |

| LUMBA BAYABAO | |
|---|---|
| WD | 21.34-32.32 |
| SC | 0.41-1.03 |
| SWL | 0.61-1.52 |

ILIGAN BAY

0 5 10
KILOMETERS

BUKIDNON

LANAO DEL NORTE

LANAO DEL SUR

NORTH COTABATO

MAGUINDANAO

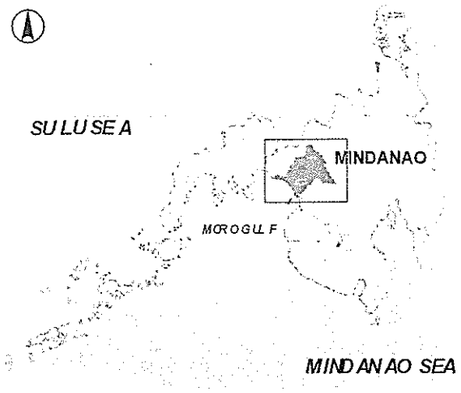
ILLANA BAY

BONGO ISLAND

Lake Lanao

Lake Dapao

SAGUIARAN
KAPAI
PIAGAPO
MARANTAO
MARAWI CITY
BUBONG
DITSAAN-RAMAIN
BUADIPOSO BUNTONG
MOLUNDO
BALINDONG
TARAKA
TAMPARAN
TUGAYA
MAGUING
BACOLOD KALAWI
MADALUM
MADAMBA
GANASSI
PUALAS
BINIDAYAN
BAYANG
MASIU
RDONA-BAYABAO
PAGAYAWAN
LUMBATAN
LUMBAYANAGUN
LUMBA BAYABAO
BUTIG
KALANOGAS
DATU DUMALUNDONG
TUBARAN
SULTAN GUMANDER
MAROGONG
MALABANG
BALABAGAN
KAPATAGAN
BUMBARAN
WAO




KEY MAP

LEGEND:

- Provincial Boundary
- Municipal Boundary
- River
- National Road
- Provincial Road
- City Center
- Town Center
- WD — Well Depth in meters
- SC — Specific Capacity in liters per second per meter of drawdown (lps/m)
- SWL — Static Water Level in meters below ground surface

Figure 6-2
WATER WELL DATA
OF
LANAO DEL SUR

The Pliocene to Pleistocene clastic rocks ($N_3S$) may also contain groundwater but not as significant as those of the QVP and R, especially those at higher elevations.

Several springs emanated from the Quaternary Volcanics (QV) and the Quaternary Pyroclastics. Table 6-1 shows that several barangays of different municipalities rely on springs as their water supply source.

For planning purposes, the different rock units in the province can be classified into the following in terms of groundwater availability. It should be noted that there are rock units wherein both groundwater occurs both in unconfined and confined conditions can be classified as both shallow and deep well areas like those underlain by the Recent Alluvium (R) and Pliocene to Recent Pyroclstics (QVP).

- ***Shallow well areas.*** By definition these are areas having water-bearing formations where water can be withdrawn up to the depth of not more than 20m from the ground surface. These are the areas underlain mostly by Recent Alluvium and Pliocene to Recent Pyroclastics (QVP). Though generally classified as deep well areas, in some cases shallow groundwater also occur within the Pliocene to Pleistocene Clastic Rocks ($N_3S$) and Late Miocene to Pliocene Clastic Rocks ($N_2S$).

- ***Deep well areas.*** In deep well areas, the aquifers exist to depth of more than 20m from the ground surface. These can be found in areas underlain by R, QVP, $N_3S$, and $N_2S$ wherein the first two are more productive. Where sandstone and conglomerate are low-yielding well can also be drilled in the $N_1S$. High yielding deep wells are common in the QVP.

- ***Difficult areas.*** These are areas not suitable for well development. In the province the areas under this category are Cretaceous to Paleogene (Kpg), Early to Middle Miocene Rocks ($N_1S$), and Quaternary Volcanics (QV). Limestone deposits generally fall under this category. Limited groundwater, if any, occurs in the fractured and/or weathered zones. Springs are the common sources of water in these areas.

### 6.3.1 Groundwater Quality

The analyses of the physical properties such as color, turbidity and odor indicate that no impurities were present in the tested water samples from the Marawi City Water District wells. The pH values of the groundwater were in the range of 7.5 to 7.7, indicating alkaline type of groundwater. The total dissolved solids contents vary from 94 to 142 mg/l which are within the permissible limits. Chloride (Cl) content is generally low and found to be below 10 mg/l. Total hardness as CaCO3 is approximately 50 mg/l indicating soft water. However, some water samples from springs and from Marawi City private wells show a tendency towards moderate to hard water.

The tested groundwater samples from wells in Malabang have total hardness (expressed as CaCO3) ranging from 120 to 565 mg/l. All wells indicate that the water is slightly basic with pH ranging from 7.5 to 8.0. Iron contents ranged from zero to 3.6 mg/l. Majority of the analyzed samples have no manganese content. The values of total hardness, total dissolved solids, chloride, sulfate and turbidity are all below the limit of permissible concentration. No manganese content and offensive odor were noted in the spring water. The physico-chemical analysis shows that the sampled spring water is generally within the permissible concentration set by the National Standard for Drinking Water (NSDW).

Some of the tested water samples from springs did not meet the bacteriological standards set for drinking water; efficient treatment is therefore necessary.

## 6.4 Surface Water Sources

Lake Lanao and Agus River with their large storage of water and flow rates may be considered as an alternative source of water supply of Marawi City, if not heavily polluted. In the municipality of Malabang, the Matling River is the biggest and the major surface water source. Another is the Malabang River which stretches for only about two kilometers with flows coming from several important springs found in the lava and pyroclastic rocks outcropping in the area.

The other rivers which flow towards Lake Lanao are the Siguan, Maguin, Gata, Rugun and Malaig Rivers.

## 6.5 Future Development Potential of Water Sources

### 6.5.1 Groundwater

Based on the study of existing water sources, groundwater is considered as the safer and more economical source for future water supply requirements of the province.

Shallow wells are possible source for Level I service and also for Level II in some places. Potential aquifers for shallow wells occur even from less than 3 and 20 mbgs. One disadvantage of shallow well is its high susceptibility to direct infiltration of surface pollutants.

In general deep wells have better quality and invariable yields when developed with appropriate technology. It reduces the hazards of groundwater pollution. In this province the Recent deposits and the Pliocene to Pleistocene sediments have good aquifers from 20 to 150 meters, may even more in some localities.

### 6.5.2 Spring

There are still several untapped spring sources for future development in barangay level. As shown in Table 6-1, several barangays are already tapping springs for their water supply requirements.

### 6.5.3 Surface Water

With the existence of major and good water-bearing formations in the province, tapping surface water as water supply source is the least priority except for Marawi City where water demand is expected to be higher.

Potential sources of surface water for Marawi City are Lake Lanao and Agus River, if they not heavily polluted.

In the municipality of Malabang, the Matling River is the biggest and the major surface water source. Another is the Malabang River which stretches for only about two kilometers with flows coming from several important springs found in the lava and pyroclastic rocks outcropping in the area.

If necessary, the Siguan, Maguin, Gata, Rugun and Malaig Rivers, which flow towards Lake Lanao, can also be considered as alternative sources.

Prior to their usage as sources of potable water their flow frequency and water quality must first be considered.

# CHAPTER 7

# FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION IMPROVEMENT

# 7. FUTURE REQUIREMENTS IN WATER SUPPLY AND SANITATION

## 7.1 General

The future needs of each city and municipality was evaluated based on its current condition. The proposed development was also based on respective LGU's priority service areas, water source availability, and service area population. For other LGUs with no data generated, evaluation was made based on LGUs with similar case and profile.

## 7.2 Targets of Provincial Sector Plan

The master plan aims to provide a ten-year design period for water and sanitation project in the Province of Lanao del Sur. It was envisioned that the project would be done in two phases. Phase I will cover the need of the province from year 2005 to 2010, and the second Phase from 2010 to 2015. The targets for the water and sanitation projects are summarized below.

**Table 7-1 Provincial Sector Targets**

| FACILITIES | | Phase I (2005-2010) | | Phase II (2010-2015) | |
|---|---|---|---|---|---|
| **WATER SUPPLY** | **Existing Service Coverage** | **Population Coverage** | **Additional Population to be served** | **Population Coverage** | **Additional Population to be served** |
| Urban | 39% | 53% | 107,708 | 70% | 78,349 |
| Rural | 44% | 52% | 106,962 | 74% | 145,793 |
| Total | 42% | 52% | 214,670 | 73% | 224,141 |
| SANITATION - HOUSEHOLD TOILETS | | Household Coverage | Additional Household to be served | Household Coverage | Additional Household to be served |
| Urban | 15,363 | 28,740 | 13,303 | 41,024 | 11,974 |
| Rural | 26,493 | 54,828 | 31,431 | 75,685 | 21,770 |
| Total | 41,856 | 83,568 | 44,734 | 116,709 | 33,744 |
| SANITATION - SCHOOL TOILETS | | No. of Schools | Additional Schools to be served | No. of Schools | Additional Schools to be served |
| | 740 | 826 | 86 | 889 | 62 |
| SANITATION - PUBLIC UTILITIES | | No. of Public Utilities | Additional PUs to be served | No. of Public Utilities | Additional Pus to be served |
| | 52 | 91 | 39 | 130 | 39 |

The planned service coverage was calculated based on the 2003 existing facilities, planned and on-going projects and scheduled to be completed by year 2005. Considering the existing

condition, water sector targets were determined by urban and rural area. Tables 7-2, 7-3, and 7-4 show the base year coverage of water supply and sanitation.

**Table 7-2 Base Year Coverage of Water Supply**

| City/ Municipality | Type | Popula-tion (2003) | Population Served by 2003 Facilities | | | | |
|---|---|---|---|---|---|---|---|
| | | | Level III | Level II | Level 1 | Total | % Coverage |
| 1. Marawi City | Urban | 138,228 | 14,911 | 0 | 30,439 | 45,350 | 33% |
| | Rural | 0 | 0 | 0 | 0 | 0 | 0% |
| | Total | 138,228 | 14,911 | 0 | 30,439 | 45,350 | 33% |
| 2. Bacolod Grande | Urban | 16,423 | 0 | 0 | 6,569 | 6,569 | 40% |
| | Rural | 2,332 | 0 | 0 | 933 | 933 | 40% |
| | Total | 18,755 | 0 | 0 | 7,502 | 7,502 | 40% |
| 3. Balabagan | Urban | 2,206 | 0 | 1,103 | 0 | 1,103 | 50% |
| | Rural | 23,735 | 0 | 736 | 8,905 | 9,641 | 41% |
| | Total | 25,940 | 0 | 1,839 | 8,905 | 10,744 | 41% |
| 4. Balindong | Urban | 5,859 | 0 | 0 | 2,344 | 2,344 | 40% |
| | Rural | 19,988 | 0 | 0 | 7,995 | 7,995 | 40% |
| | Total | 25,847 | 0 | 0 | 10,339 | 10,339 | 40% |
| 5. Bayang | Urban | 4,197 | 0 | 973 | 901 | 1,873 | 45% |
| | Rural | 18,005 | 0 | 816 | 6,550 | 7,365 | 41% |
| | Total | 22,202 | 0 | 1,788 | 7,450 | 9,239 | 42% |
| 6. Binidayan | Urban | 3,518 | 0 | 0 | 1,407 | 1,407 | 40% |
| | Rural | 15,580 | 0 | 0 | 6,232 | 6,232 | 40% |
| | Total | 19,097 | 0 | 0 | 7,639 | 7,639 | 40% |
| 7. Buadiposo Buntong | Urban | 663 | 0 | 0 | 265 | 265 | 40% |
| | Rural | 13,633 | 0 | 0 | 5,453 | 5,453 | 40% |
| | Total | 14,296 | 0 | 0 | 5,718 | 5,718 | 40% |
| 8. Bubong | Urban | 613 | 0 | 0 | 245 | 245 | 40% |
| | Rural | 19,459 | 0 | 3,333 | 5,117 | 8,450 | 43% |
| | Total | 20,073 | 0 | 3,333 | 5,363 | 8,696 | 43% |
| 9. Bumbaran | Urban | 0 | 0 | 0 | 0 | 0 | 0% |
| | Rural | 6,957 | 0 | 0 | 2,783 | 2,783 | 40% |
| | Total | 6,957 | 0 | 0 | 2,783 | 2,783 | 40% |
| 10. Butig | Urban | 1,979 | 0 | 0 | 791 | 791 | 40% |
| | Rural | 15,220 | 0 | 1,745 | 4,692 | 6,437 | 42% |
| | Total | 17,199 | 0 | 1,745 | 5,484 | 7,228 | 42% |
| 11. Calanogas | Urban | 0 | 0 | 0 | 0 | 0 | 0% |
| | Rural | 10,546 | 0 | 0 | 4,218 | 4,218 | 40% |
| | Total | 10,546 | 0 | 0 | 4,218 | 4,218 | 40% |
| 12. Ditsaan-Ramain | Urban | 13,883 | 0 | 0 | 5,553 | 5,553 | 40% |
| | Rural | 6,344 | 0 | 0 | 2,538 | 2,538 | 40% |
| | Total | 20,227 | 0 | 0 | 8,091 | 8,091 | 40% |

**Table 7-2 Base Year Coverage of Water Supply (Continuation)**

| City/ Municipality | Type | Popula-tion (2003) | Population Served by 2003 Facilities | | | | |
|---|---|---|---|---|---|---|---|
| | | | Level III | Level II | Level 1 | Total | % Coverage |
| 13. Ganassi | Urban | 3,605 | 1,117 | 175 | 409 | 1,700 | 47% |
| | Rural | 16,391 | 1,291 | 552 | 5,083 | 6,925 | 42% |
| | Total | 19,997 | 2,408 | 726 | 5,492 | 8,626 | 43% |
| 14. Kapai | Urban | 726 | 0 | 0 | 726 | 726 | 100% |
| | Rural | 16,770 | 0 | 2,768 | 4,493 | 7,261 | 43% |
| | Total | 17,495 | 0 | 2,768 | 5,219 | 7,987 | 46% |
| 15. Kapatagan | Urban | 0 | 0 | 0 | 0 | 0 | 0% |
| | Rural | 8,241 | 0 | 1,647 | 1,978 | 3,626 | 44% |
| | Total | 8,241 | 0 | 1,647 | 1,978 | 3,626 | 44% |
| 16. Lumba Bayabao | Urban | 916 | 0 | 0 | 366 | 366 | 40% |
| | Rural | 23,915 | 0 | 1,322 | 8,508 | 9,830 | 41% |
| | Total | 24,830 | 0 | 1,322 | 8,874 | 10,197 | 41% |
| 17. Lumbatan | Urban | 3,361 | 0 | 1,681 | 0 | 1,681 | 50% |
| | Rural | 15,058 | 0 | 0 | 6,023 | 6,023 | 40% |
| | Total | 18,419 | 0 | 1,681 | 6,023 | 7,704 | 42% |
| 18. Lumbayanague | Urban | 0 | 0 | 0 | 0 | 0 | 0% |
| | Rural | 13,553 | 0 | 0 | 5,421 | 5,421 | 40% |
| | Total | 13,553 | 0 | 0 | 5,421 | 5,421 | 40% |
| 19. Madalum | Urban | 1,083 | 0 | 0 | 433 | 433 | 40% |
| | Rural | 18,357 | 0 | 0 | 7,343 | 7,343 | 40% |
| | Total | 19,441 | 0 | 0 | 7,776 | 7,776 | 40% |
| 20. Madamba | Urban | 16,311 | 0 | 2,301 | 4,684 | 6,985 | 43% |
| | Rural | 0 | 0 | 0 | 0 | 0 | 0% |
| | Total | 16,311 | 0 | 2,301 | 4,684 | 6,985 | 43% |
| 21. Maguing | Urban | 0 | 0 | 0 | | 0 | 0% |
| | Rural | 19,096 | 0 | 0 | 7,638 | 7,638 | 40% |
| | Total | 19,096 | 0 | 0 | 7,638 | 7,638 | 40% |
| 22. Malabang | Urban | 6,774 | 0 | 3,387 | 0 | 3,387 | 50% |
| | Rural | 28,251 | 0 | 1,979 | 9,717 | 11,696 | 41% |
| | Total | 35,026 | 0 | 5,366 | 9,717 | 15,084 | 43% |
| 23. Marantao | Urban | 4,307 | 0 | 0 | 1,723 | 1,723 | 40% |
| | Rural | 21,718 | 0 | 0 | 8,687 | 8,687 | 40% |
| | Total | 26,025 | 0 | 0 | 10,410 | 10,410 | 40% |
| 24. Marogong | Urban | 1,976 | 0 | 0 | 790 | 790 | 40% |
| | Rural | 15,704 | 0 | 0 | 0 | 0 | 0% |
| | Total | 1,976 | 0 | 0 | 790 | 790 | 40% |
| 25. Masiu | Urban | 10,813 | 0 | 3,162 | 1,795 | 4,958 | 46% |
| | Rural | 14,641 | 0 | 2,112 | 4,167 | 6,279 | 43% |
| | Total | 25,454 | 0 | 5,274 | 5,962 | 11,237 | 44% |
| 26. Mulondo | Urban | 6,678 | 0 | 0 | 2,671 | 2,671 | 40% |
| | Rural | 6,386 | 0 | 0 | 2,554 | 2,554 | 40% |
| | Total | 13,064 | 0 | 0 | 5,225 | 5,225 | 40% |

Table 7-2 Base Year Coverage of Water Supply (Continuation)

| City/ Municipality | Type | Population (2003) | Population Served by 2003 Facilities | | | | |
|---|---|---|---|---|---|---|---|
| | | | Level III | Level II | Level 1 | Total | % Coverage |
| 27. Pagayawan | Urban | 1,435 | 0 | 0 | 574 | 574 | 40% |
| | Rural | 8,871 | 0 | 0 | 3,548 | 3,548 | 40% |
| | Total | 10,306 | 0 | 0 | 4,122 | 4,122 | 40% |
| 28. Piagapo | Urban | 1,855 | 0 | 0 | 742 | 742 | 40% |
| | Rural | 23,392 | 0 | 0 | 9,357 | 9,357 | 40% |
| | Total | 25,247 | 0 | 0 | 10,099 | 10,099 | 40% |
| 29. Poona Bayabao | Urban | 1,221 | 0 | 0 | 488 | 488 | 40% |
| | Rural | 17,138 | 0 | 0 | 6,855 | 6,855 | 40% |
| | Total | 18,359 | 0 | 0 | 7,344 | 7,344 | 40% |
| 30. Pualas | Urban | 490 | 0 | 0 | 196 | 196 | 40% |
| | Rural | 7,838 | 0 | 0 | 3,135 | 3,135 | 40% |
| | Total | 8,327 | 0 | 0 | 3,331 | 3,331 | 40% |
| 31. Saguiaran | Urban | 2,511 | 0 | 0 | 1,004 | 1,004 | 40% |
| | Rural | 21,395 | 0 | 0 | 8,558 | 8,558 | 40% |
| | Total | 23,906 | 0 | 0 | 9,563 | 9,563 | 40% |
| 32. S. Domalondong | Urban | 0 | 0 | 0 | 0 | 0 | 0% |
| | Rural | 11,725 | 0 | 0 | 4,690 | 4,690 | 40% |
| | Total | 11,725 | 0 | 0 | 4,690 | 4,690 | 40% |
| 33. S. Gumander | Urban | 1,852 | 0 | 0 | 741 | 741 | 40% |
| | Rural | 11,053 | 0 | 0 | 4,421 | 4,421 | 40% |
| | Total | 12,905 | 0 | 0 | 5,162 | 5,162 | 40% |
| 34. Tagoloan II | Urban | 0 | 0 | 0 | 0 | 0 | 0% |
| | Rural | 9,204 | 0 | 0 | 3,681 | 3,681 | 40% |
| | Total | 9,204 | 0 | 0 | 3,681 | 3,681 | 40% |
| 35. Tamparan | Urban | 0 | 0 | 0 | 0 | 0 | 0% |
| | Rural | 21,093 | 0 | 0 | 8,437 | 8,437 | 40% |
| | Total | 21,093 | 0 | 0 | 8,437 | 8,437 | 40% |
| 36. Taraka | Urban | 14,210 | 0 | 0 | 3,438 | 3,438 | 24% |
| | Rural | 5,679 | 0 | 0 | 4,518 | 4,518 | 80% |
| | Total | 19,889 | 0 | 0 | 7,956 | 7,956 | 40% |
| 37. Tubaran | Urban | 683 | 0 | 0 | 273 | 273 | 40% |
| | Rural | 10,955 | 0 | 0 | 4,382 | 4,382 | 40% |
| | Total | 11,638 | 0 | 0 | 4,655 | 4,655 | 40% |
| 38. Tugaya | Urban | 0 | 0 | 0 | 0 | 0 | 0% |
| | Rural | 21,268 | 0 | 0 | 8,507 | 8,507 | 40% |
| | Total | 21,268 | 0 | 0 | 8,507 | 8,507 | 40% |
| 39. Wao | Urban | 11,839 | 4,182 | 180 | 7,296 | 11,658 | 98% |
| | Rural | 25,678 | 3,338 | 8,504 | 14,449 | 26,291 | 100% |
| | Total | 37,516 | 7,520 | 8,684 | 21,745 | 37,949 | 100% |
| Provincial Total | Urban | 280,212 | 20,210 | 12,961 | 76,864 | 110,036 | 39% |
| | Rural | 564,540 | 4,629 | 25,514 | 211,570 | 241,713 | 44% |
| | Total | 844,752 | 24,839 | 38,475 | 288,434 | 351,748 | 42% |

Table 7-3 Base Year Coverage of Household Toilet

| City/Municipality | Type | 2003 | | Households with Sanitary Toilet | | |
|---|---|---|---|---|---|---|
| | | Population | No. of HH | No. of HH | Served Population | Coverage |
| 1. Marawi City | Urban | 138,228 | 21,484 | 8,594 | 55,291 | 40% |
| | Rural | 0 | 0 | 0 | 0 | 0% |
| | Total | 138,228 | 21,484 | 8,594 | 55,291 | 40% |
| 2. Bacolod Grande | Urban | 16,423 | 2,279 | 707 | 5,091 | 31% |
| | Rural | 2,332 | 324 | 100 | 723 | 31% |
| | Total | 18,755 | 2,603 | 807 | 5,814 | 31% |
| 3. Balabagan | Urban | 2,206 | 343 | 106 | 684 | 31% |
| | Rural | 23,735 | 3,693 | 1,145 | 7,358 | 31% |
| | Total | 25,940 | 4,036 | 1,251 | 8,042 | 31% |
| 4. Balindong | Urban | 5,859 | 771 | 239 | 1,816 | 31% |
| | Rural | 19,988 | 2,630 | 815 | 6,196 | 31% |
| | Total | 25,847 | 3,401 | 1,054 | 8,013 | 31% |
| 5. Bayang | Urban | 4,197 | 557 | 173 | 1,301 | 31% |
| | Rural | 18,005 | 2,389 | 741 | 5,582 | 31% |
| | Total | 22,202 | 2,946 | 913 | 6,883 | 31% |
| 6. Binidayan | Urban | 3,518 | 515 | 160 | 1,090 | 31% |
| | Rural | 15,580 | 2,279 | 707 | 4,830 | 31% |
| | Total | 19,097 | 2,794 | 866 | 5,920 | 31% |
| 7. Buadiposo Buntong | Urban | 663 | 95 | 29 | 205 | 31% |
| | Rural | 13,633 | 1,952 | 605 | 4,226 | 31% |
| | Total | 14,296 | 2,047 | 635 | 4,432 | 31% |
| 8. Bubong | Urban | 613 | 78 | 24 | 190 | 31% |
| | Rural | 19,459 | 2,462 | 763 | 6,032 | 31% |
| | Total | 20,073 | 2,539 | 787 | 6,223 | 31% |
| 9. Bumbaran | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 6,957 | 1,196 | 371 | 2,157 | 31% |
| | Total | 6,957 | 1,196 | 371 | 2,157 | 31% |
| 10. Butig | Urban | 1,979 | 369 | 114 | 613 | 31% |
| | Rural | 15,220 | 2,840 | 880 | 4,718 | 31% |
| | Total | 17,199 | 3,209 | 995 | 5,332 | 31% |
| 11. Calanogas | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 10,546 | 1,564 | 485 | 3,269 | 31% |
| | Total | 10,546 | 1,564 | 485 | 3,269 | 31% |
| 12. Ditsaan-Ramain | Urban | 13,883 | 1,944 | 603 | 4,304 | 31% |
| | Rural | 6,344 | 888 | 275 | 1,967 | 31% |
| | Total | 20,227 | 2,832 | 878 | 6,270 | 31% |
| 13. Ganassi | Urban | 3,605 | 577 | 179 | 1,118 | 31% |
| | Rural | 16,391 | 2,624 | 813 | 5,081 | 31% |
| | Total | 19,997 | 3,201 | 992 | 6,199 | 31% |
| 14. Kapai | Urban | 726 | 99 | 31 | 225 | 31% |
| | Rural | 16,770 | 2,298 | 712 | 5,199 | 31% |
| | Total | 17,495 | 2,398 | 743 | 5,423 | 31% |

Table 7-3 Base Year Coverage of Household Toilet (Continuation)

| City/Municipality | Type | 2003 | | Households with Sanitary Toilet | | |
|---|---|---|---|---|---|---|
| | | Population | No. of HH | No. of HH | Served Population | Coverage |
| 15. Kapatagan | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 8,241 | 1,486 | 461 | 2,555 | 31% |
| | Total | 8,241 | 1,486 | 461 | 2,555 | 31% |
| 16. Lumba Bayabao | Urban | 916 | 141 | 44 | 284 | 31% |
| | Rural | 23,915 | 3,693 | 1,145 | 7,414 | 31% |
| | Total | 24,830 | 3,834 | 1,189 | 7,697 | 31% |
| 17. Lumbatan | Urban | 3,361 | 424 | 131 | 1,042 | 31% |
| | Rural | 15,058 | 1,899 | 589 | 4,668 | 31% |
| | Total | 18,419 | 2,323 | 720 | 5,710 | 31% |
| 18. Lumbayanague | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 13,553 | 2,120 | 657 | 4,202 | 31% |
| | Total | 13,553 | 2,120 | 657 | 4,202 | 31% |
| 19. Madalum | Urban | 1,083 | 165 | 51 | 336 | 31% |
| | Rural | 18,357 | 2,797 | 867 | 5,691 | 31% |
| | Total | 19,441 | 2,962 | 918 | 6,027 | 31% |
| 20. Madamba | Urban | 16,311 | 2,446 | 758 | 5,056 | 31% |
| | Rural | 0 | 0 | 0 | 0 | 0% |
| | Total | 16,311 | 2,446 | 758 | 5,056 | 31% |
| 21. Maguing | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 19,096 | 3,002 | 931 | 5,920 | 31% |
| | Total | 19,096 | 3,002 | 931 | 5,920 | 31% |
| 22. Malabang | Urban | 6,774 | 997 | 309 | 2,100 | 31% |
| | Rural | 28,251 | 4,158 | 1,289 | 8,758 | 31% |
| | Total | 35,026 | 5,155 | 1,598 | 10,858 | 31% |
| 23. Marantao | Urban | 4,307 | 629 | 195 | 1,335 | 31% |
| | Rural | 21,718 | 3,170 | 983 | 6,733 | 31% |
| | Total | 26,025 | 3,799 | 1,178 | 8,068 | 31% |
| 24. Marogong | Urban | 1,976 | 296 | 92 | 613 | 31% |
| | Rural | 15,074 | 2,261 | 701 | 4,673 | 0% |
| | Total | 17,049 | 2,557 | 793 | 5,285 | 31% |
| 25. Masiu | Urban | 10,813 | 1,368 | 424 | 3,352 | 31% |
| | Rural | 14,641 | 1,852 | 574 | 4,539 | 31% |
| | Total | 25,454 | 3,220 | 998 | 7,891 | 31% |
| 26. Mulondo | Urban | 6,678 | 889 | 276 | 2,070 | 31% |
| | Rural | 6,386 | 851 | 264 | 1,980 | 31% |
| | Total | 13,064 | 1,740 | 539 | 4,050 | 31% |
| 27. Pagayawan | Urban | 1,435 | 193 | 60 | 445 | 31% |
| | Rural | 8,871 | 1,192 | 369 | 2,750 | 31% |
| | Total | 10,306 | 1,385 | 429 | 3,195 | 31% |
| 28. Piagapo | Urban | 1,855 | 526 | 84 | 575 | 31% |
| | Rural | 23,392 | 3,157 | 1,058 | 7,252 | 31% |
| | Total | 25,247 | 3,683 | 1,142 | 7,827 | 31% |

**Table 7-3 Base Year Coverage of Household Toilet (Continuation)**

| City/Municipality | Type | 2003 | | Households with Sanitary Toilet | | |
|---|---|---|---|---|---|---|
| | | Population | No. of HH | No. of HH | Served Population | Coverage |
| 29. Poona Bayabao | Urban | 1,221 | 172 | 53 | 379 | 31% |
| | Rural | 17,138 | 2,416 | 749 | 5,313 | 31% |
| | Total | 18,359 | 2,589 | 802 | 5,691 | 31% |
| 30. Pualas | Urban | 490 | 89 | 28 | 152 | 31% |
| | Rural | 7,838 | 1,429 | 443 | 2,430 | 31% |
| | Total | 8,327 | 1,518 | 471 | 2,581 | 31% |
| 31. Saguiaran | Urban | 2,511 | 341 | 106 | 778 | 31% |
| | Rural | 21,395 | 2,906 | 901 | 6,633 | 31% |
| | Total | 23,906 | 3,247 | 1,006 | 7,411 | 31% |
| 32. S. Domalondong | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 11,725 | 1,400 | 434 | 3,635 | 31% |
| | Total | 11,725 | 1,400 | 434 | 3,635 | 31% |
| 33. S. Gumander | Urban | 1,852 | 260 | 81 | 574 | 31% |
| | Rural | 11,053 | 1,554 | 482 | 3,426 | 31% |
| | Total | 12,905 | 1,815 | 563 | 4,001 | 31% |
| 34. Tagoloan II | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 9,204 | 1,124 | 348 | 2,853 | 31% |
| | Total | 9,204 | 1,124 | 348 | 2,853 | 31% |
| 35. Tamparan | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 21,093 | 3,040 | 942 | 6,539 | 31% |
| | Total | 21,093 | 3,040 | 942 | 6,539 | 31% |
| 36. Taraka | Urban | 14,210 | 1,923 | 596 | 4,405 | 31% |
| | Rural | 5,679 | 768 | 238 | 1,761 | 31% |
| | Total | 19,889 | 2,691 | 834 | 6,166 | 31% |
| 37. Tubaran | Urban | 683 | 104 | 32 | 212 | 31% |
| | Rural | 10,955 | 1,670 | 518 | 3,396 | 31% |
| | Total | 11,638 | 1,774 | 550 | 3,608 | 31% |
| 38. Tugaya | Urban | 0 | 0 | 0 | 0 | 0% |
| | Rural | 21,268 | 2,525 | 783 | 6,593 | 31% |
| | Total | 21,268 | 2,525 | 783 | 6,593 | 31% |
| 39. Wao | Urban | 11,839 | 2,168 | 1,086 | 5,927 | 50% |
| | Rural | 25,678 | 4,703 | 2,354 | 12,855 | 50% |
| | Total | 37,516 | 6,871 | 3,440 | 18,782 | 50% |
| **Provincial Total** | Urban | 280,212 | 42,244 | 15,363 | 101,563 | 36% |
| | Rural | 564,540 | 82,312 | 26,493 | 179,903 | 32% |
| | Total | 844,752 | 124,556 | 41,856 | 281,466 | 33% |

**Table 7-4 Base Year Coverage of Public School Toilets and Public Toilets**

| Municipality | Public School Toilets (2003) | | | Public Utilities (2003) | | |
|---|---|---|---|---|---|---|
| | Total Public Schools | No. of Schools with toilets | Coverage | Total Public Utilities | No. Public Utilities with toilets | Coverage |
| 1 Marawi City | 82 | 80 | 98% | 8 | 7 | 88% |
| 2 Bacolod Grande | 21 | 15 | 71% | 1 | 1 | 100% |
| 3 Balabagan | 17 | 17 | 100% | 1 | 1 | 100% |
| 4 Balindong | 32 | 29 | 91% | 1 | 1 | 100% |
| 5 Bayang | 14 | 11 | 79% | 1 | 1 | 100% |
| 6 Binidayan | 16 | 10 | 63% | 1 | 1 | 100% |
| 7 Buadiposo Buntong | 12 | 12 | 100% | 1 | 1 | 100% |
| 8 Bubong | 16 | 12 | 75% | 1 | 1 | 100% |
| 9 Bumbaran | 7 | 6 | 86% | 1 | 1 | 100% |
| 10 Butig | 21 | 15 | 71% | 1 | 1 | 100% |
| 11 Calanogas | 8 | 7 | 88% | 1 | 1 | 100% |
| 12 Ditsaan-Ramain | 14 | 11 | 79% | 1 | 1 | 100% |
| 13 Ganassi | 17 | 17 | 100% | 2 | 1 | 50% |
| 14 Kapai | 17 | 15 | 88% | 1 | 1 | 100% |
| 15 Kapatagan | 7 | 6 | 86% | 1 | 1 | 100% |
| 16 Lumba Bayabao | 26 | 21 | 81% | 1 | 1 | 100% |
| 17 Lumbatan | 20 | 19 | 95% | 1 | 1 | 100% |
| 18 Lumbayanague | 22 | 15 | 68% | 1 | 1 | 100% |
| 19 Madalum | 18 | 14 | 78% | 1 | 1 | 100% |
| 20 Madamba | 13 | 12 | 92% | 1 | 1 | 100% |
| 21 Maguing | 12 | 10 | 83% | 1 | 1 | 100% |
| 22 Malabang | 23 | 22 | 96% | 3 | 2 | 67% |
| 23 Marantao | 28 | 25 | 89% | 1 | 1 | 100% |
| 24 Marogong | 19 | 16 | 84% | 1 | 1 | 100% |
| 25 Masiu | 37 | 30 | 81% | 1 | 1 | 100% |
| 26 Mulondo | 11 | 8 | 73% | 1 | 1 | 100% |
| 27 Pagayawan | 10 | 8 | 80% | 1 | 1 | 100% |
| 28 Piagapo | 20 | 16 | 80% | 1 | 1 | 100% |
| 29 Poona Bayabao | 14 | 11 | 79% | 1 | 1 | 100% |
| 30 Pualas | 18 | 10 | 56% | 1 | 1 | 100% |
| 31 Saguiaran | 27 | 25 | 93% | 1 | 1 | 100% |
| 32 S. Domalondong | 3 | 3 | 100% | 1 | 1 | 100% |
| 33 S. Gumander | 14 | 14 | 100% | 1 | 1 | 100% |
| 34 Tagoloan II | 17 | 10 | 59% | 1 | 1 | 100% |
| 35 Tamparan | 12 | 11 | 92% | 1 | 1 | 100% |
| 36 Taraka | 14 | 11 | 79% | 1 | 1 | 100% |
| 37 Tubaran | 14 | 11 | 79% | 1 | 1 | 100% |
| 38 Tugaya | 19 | 16 | 84% | 1 | 1 | 100% |
| 39 Wao | 28 | 28 | 100% | 4 | 4 | 100% |
| **Provincial Total** | **740** | **629** | **85%** | **52** | **49** | **94%** |
| | | | | | | |

## 7.3 Projection of Frame Values

### 7.3.1 Population Projection

Future population for all municipalities was projected for the target year 2005, 2010, and 2015. The references used in the projection were the census data for the year 1980, 1990, 1995, and 2000. The NSO 1995 to 2005 population projection was also used as reference and integrated with the past trends. In projecting future population, the ratio method was applied. The mathematical formula used is shown as:

$$P_1 = P_0 \times (1+r)^n$$

where:

$P_1$ = population after n years

$P_0$ = population in base year

Population projections for the 38 towns and one city broken down by urban and rural are shown in Table 7-5.

### 7.3.2 Household Toilets

Projection of household toilets was based on the number of households computed from the population projection by municipality. Household toilet coverage for 2003 was set at 31% of total households based data from the PPDO. The projected number of household toilets is shown in Table 7-6.

### 7.3.3 Public Schools and Public Utilities

Projection of the number of public schools was made using available data on provincial total number of students and number of schools per municipality. Thus, the ratio of the number of students to total number of schools was correlated to come up with the projected number of students and schools per municipality. Projection of the number of public utilities per municipality was made based on its annual population growth rate. The projected number of public schools and public utilities are shown in Table 7-7.

Table 7-5 Future Population by Urban and Rural Area by Municipality

| | City/Municipality | 2000 | | | 2003 | | | 2005 | | | 2010 | | | 2015 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Urban | Rural | Total | Urban | Rural | Total | Urban | Rural | Total | Urban | Rural | Total | Urban | Rural | Total |
| 1 | Marawi City | 131,090 | 0 | 131,090 | 138,228 | 0 | 138,228 | 143,618 | 0 | 143,618 | 154,804 | 0 | 154,804 | 166,860 | 0 | 166,860 |
| 2 | Bacolod Grande | 15,538 | 2,223 | 17,761 | 16,423 | 2,332 | 18,755 | 17,050 | 2,408 | 19,458 | 18,407 | 2,567 | 20,974 | 19,870 | 2,737 | 22,607 |
| 3 | Balabagan | 2,088 | 22,470 | 24,558 | 2,206 | 23,735 | 25,940 | 2,288 | 24,617 | 26,905 | 2,466 | 26,535 | 29,000 | 2,658 | 28,601 | 31,259 |
| 4 | Balindong | 5,544 | 18,926 | 24,470 | 5,859 | 19,988 | 25,847 | 6,079 | 21,342 | 27,420 | 6,556 | 22,340 | 28,897 | 7,071 | 24,076 | 31,147 |
| 5 | Bayang | 3,942 | 17,078 | 21,020 | 4,197 | 18,005 | 22,202 | 4,376 | 19,430 | 23,806 | 4,745 | 20,052 | 24,797 | 4,265 | 22,491 | 26,756 |
| 6 | Binidayan | 3,317 | 14,764 | 18,081 | 3,518 | 15,580 | 19,097 | 3,658 | 16,151 | 19,809 | 3,965 | 17,387 | 21,352 | 4,292 | 18,722 | 23,015 |
| 7 | Buadiposo Buntong | 630 | 12,905 | 13,535 | 663 | 13,633 | 14,296 | 686 | 14,143 | 14,829 | 734 | 15,249 | 15,983 | 787 | 16,441 | 17,228 |
| 8 | Bubong | 580 | 18,423 | 19,003 | 613 | 19,459 | 20,073 | 637 | 20,182 | 20,819 | 687 | 21,753 | 22,441 | 742 | 23,447 | 24,188 |
| 9 | Bumbaran | 0 | 6,589 | 6,589 | 0 | 6,957 | 6,957 | 0 | 7,219 | 7,219 | 0 | 7,781 | 7,781 | 0 | 8,387 | 8,387 |
| 10 | Butig | 1,876 | 14,407 | 16,283 | 1,979 | 15,220 | 17,199 | 2,050 | 15,789 | 17,839 | 2,205 | 17,024 | 19,229 | 2,372 | 18,355 | 20,726 |
| 11 | Calanogas | 0 | 9,989 | 9,989 | 0 | 10,546 | 10,546 | 0 | 10,944 | 10,944 | 0 | 11,796 | 11,796 | 0 | 12,715 | 12,715 |
| 12 | Ditsaan-Ramain | 13,083 | 6,074 | 19,157 | 13,883 | 6,344 | 20,227 | 14,455 | 6,533 | 20,988 | 15,699 | 6,923 | 22,622 | 17,035 | 7,350 | 24,384 |
| 13 | Ganassi | 3,378 | 15,569 | 18,947 | 3,605 | 16,391 | 19,997 | 3,766 | 16,992 | 20,758 | 4,098 | 18,276 | 22,374 | 4,439 | 19,678 | 24,117 |
| 14 | Kapai | 696 | 15,868 | 16,564 | 726 | 16,770 | 17,495 | 746 | 17,401 | 18,147 | 789 | 18,772 | 19,560 | 837 | 20,247 | 21,084 |
| 15 | Kapatagan | 0 | 7,804 | 7,804 | 0 | 8,241 | 8,241 | 0 | 8,550 | 8,550 | 0 | 9,216 | 9,216 | 0 | 9,933 | 9,933 |
| 16 | Lumba Bayabao | 852 | 22,669 | 23,521 | 916 | 23,915 | 24,830 | 961 | 24,808 | 25,769 | 1,058 | 26,718 | 27,776 | 1,157 | 28,782 | 29,939 |
| 17 | Lumbatan | 3,062 | 14,383 | 17,445 | 3,361 | 15,058 | 18,419 | 3,577 | 15,536 | 19,112 | 4,060 | 16,541 | 20,601 | 4,558 | 17,647 | 22,205 |
| 18 | Lumbayanague | 0 | 12,835 | 12,835 | 0 | 13,553 | 13,553 | 0 | 14,062 | 14,062 | 0 | 15,157 | 15,157 | 0 | 16,337 | 16,337 |
| 19 | Madalum | 1,027 | 17,378 | 18,405 | 1,083 | 18,357 | 19,441 | 1,123 | 19,041 | 20,164 | 1,207 | 20,527 | 21,734 | 1,299 | 22,128 | 23,427 |
| 20 | Madamba | 15,442 | 0 | 15,442 | 16,311 | 0 | 16,311 | 16,918 | 0 | 16,918 | 18,235 | 0 | 18,235 | 19,656 | 0 | 19,656 |
| 21 | Maguing | 0 | 18,095 | 18,095 | 0 | 19,096 | 19,096 | 0 | 19,824 | 19,824 | 0 | 21,368 | 21,368 | 0 | 23,033 | 23,033 |
| 22 | Malabang | 6,303 | 26,874 | 33,177 | 6,774 | 28,251 | 35,026 | 7,113 | 29,234 | 36,348 | 7,857 | 31,322 | 39,179 | 8,634 | 33,596 | 42,230 |
| 23 | Marantao | 4,119 | 20,528 | 24,647 | 4,307 | 21,718 | 26,025 | 4,438 | 22,564 | 27,002 | 4,553 | 24,391 | 28,944 | 5,020 | 26,352 | 31,372 |
| 24 | Marogong | 1,938 | 14,227 | 16,165 | 1,976 | 15,074 | 17,049 | 2,002 | 15,708 | 17,710 | 2,030 | 17,059 | 19,089 | 2,062 | 18,513 | 20,576 |
| 25 | Masiu | 10,325 | 13,780 | 24,105 | 10,813 | 14,641 | 25,454 | 11,158 | 15,251 | 26,409 | 11,893 | 16,573 | 28,465 | 12,707 | 17,976 | 30,682 |
| 26 | Mulondo | 6,342 | 6,026 | 12,368 | 6,678 | 6,386 | 13,064 | 6,912 | 6,638 | 13,550 | 7,419 | 7,186 | 14,605 | 7,970 | 7,772 | 15,743 |
| 27 | Pagayawan | 1,357 | 8,400 | 9,757 | 1,435 | 8,871 | 10,306 | 1,490 | 10,689 | 12,180 | 1,610 | 9,912 | 11,522 | 1,738 | 10,682 | 12,419 |
| 28 | Piagapo | 1,755 | 22,148 | 23,903 | 1,855 | 23,392 | 25,247 | 2,665 | 23,522 | 26,187 | 2,780 | 25,319 | 28,099 | 2,236 | 28,189 | 30,425 |
| 29 | Poona Bayabao | 1,147 | 16,243 | 17,390 | 1,221 | 17,138 | 18,359 | 1,273 | 17,779 | 19,052 | 1,383 | 19,153 | 20,536 | 1,496 | 20,639 | 22,135 |
| 30 | Pualas | 458 | 7,429 | 7,887 | 490 | 7,838 | 8,327 | 512 | 8,129 | 8,641 | 559 | 8,754 | 9,314 | 609 | 9,430 | 10,039 |
| 31 | Saguiaran | 2,390 | 20,246 | 22,636 | 2,511 | 21,395 | 23,906 | 2,595 | 21,673 | 24,268 | 2,774 | 23,957 | 26,731 | 2,968 | 25,845 | 28,813 |
| 32 | S. Domalondong | 0 | 11,105 | 11,105 | 0 | 11,725 | 11,725 | 0 | 12,166 | 12,166 | 0 | 13,114 | 13,114 | 0 | 14,135 | 14,135 |
| 33 | S. Gumander | 1,696 | 10,534 | 12,230 | 1,852 | 11,053 | 12,905 | 1,964 | 11,434 | 13,399 | 2,209 | 12,234 | 14,442 | 2,458 | 13,109 | 15,567 |
| 34 | Tagoloan II | 0 | 8,714 | 8,714 | 0 | 9,204 | 9,204 | 0 | 9,547 | 9,547 | 0 | 10,290 | 10,290 | 0 | 11,092 | 11,092 |
| 35 | Tamparan | 0 | 19,975 | 19,975 | 0 | 21,093 | 21,093 | 0 | 21,884 | 21,884 | 0 | 23,588 | 23,588 | 0 | 25,426 | 25,426 |
| 36 | Taraka | 13,482 | 5,350 | 18,832 | 14,210 | 5,679 | 19,889 | 14,721 | 5,911 | 20,632 | 15,824 | 6,414 | 22,239 | 17,021 | 6,950 | 23,971 |
| 37 | Tubaran | 642 | 10,379 | 11,021 | 683 | 10,955 | 11,638 | 711 | 11,363 | 12,074 | 772 | 12,242 | 13,015 | 837 | 13,192 | 14,028 |
| 38 | Tugaya | 0 | 20,139 | 20,139 | 0 | 21,268 | 21,268 | 0 | 22,064 | 22,064 | 0 | 23,782 | 23,782 | 0 | 25,634 | 25,634 |
| 39 | Wao | 11,208 | 24,309 | 35,517 | 11,839 | 25,678 | 37,516 | 12,279 | 26,633 | 38,911 | 13,235 | 28,707 | 41,942 | 14,265 | 30,943 | 45,208 |
| | **Provincial Total** | **265,307** | **534,855** | **800,162** | **280,212** | **564,540** | **844,752** | **291,819** | **587,162** | **878,981** | **314,614** | **629,979** | **944,592** | **337,918** | **680,582** | **1,018,500** |

## Table 7-6 Additional Number of Households by Target Year (HH toilet)

| City/Municipality | | Type | Phase I (2010) | | | Phase II (2015) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total Households | Served Households | Add No. of HH to be served | Total Households | Served Households | Add No. of HH to be served |
| 1 | Marawi City | Urban | 24,061 | 14,436 | 5,843 | 25,935 | 20,748 | 5,947 |
| | | Rural | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Total | 24,061 | 14,436 | 5,843 | 25,935 | 20,748 | 5,947 |
| 2 | Bacolod Grande | Urban | 2,555 | 1,533 | 826 | 2,758 | 2,206 | 665 |
| | | Rural | 356 | 214 | 113 | 380 | 304 | 90 |
| | | Total | 2,911 | 1,747 | 940 | 3,138 | 2,510 | 755 |
| 3 | Balabagan | Urban | 384 | 230 | 124 | 414 | 331 | 101 |
| | | Rural | 4,129 | 2,477 | 1,332 | 4,450 | 3,560 | 1,083 |
| | | Total | 4,512 | 2,707 | 1,456 | 4,864 | 3,891 | 1,184 |
| 4 | Balindong | Urban | 801 | 481 | 259 | 865 | 692 | 211 |
| | | Rural | 3,001 | 1,801 | 968 | 3,234 | 2,587 | 786 |
| | | Total | 3,802 | 2,281 | 1,227 | 4,099 | 3,279 | 997 |
| 5 | Bayang | Urban | 630 | 378 | 205 | 688 | 551 | 173 |
| | | Rural | 2,661 | 1,596 | 856 | 2,862 | 2,289 | 693 |
| | | Total | 3,290 | 1,974 | 1,061 | 3,550 | 2,840 | 866 |
| 6 | Binidayan | Urban | 580 | 348 | 188 | 628 | 377 | 29 |
| | | Rural | 2,543 | 1,526 | 820 | 2,739 | 1,643 | 117 |
| | | Total | 3,123 | 1,874 | 1,008 | 3,367 | 2,020 | 146 |
| 7 | Buadiposo Buntong | Urban | 105 | 63 | 34 | 113 | 90 | 27 |
| | | Rural | 2,184 | 1,310 | 705 | 2,354 | 1,884 | 573 |
| | | Total | 2,289 | 1,373 | 739 | 2,467 | 1,974 | 600 |
| 8 | Bubong | Urban | 87 | 52 | 28 | 94 | 75 | 23 |
| | | Rural | 2,752 | 1,651 | 888 | 2,966 | 2,373 | 722 |
| | | Total | 2,839 | 1,703 | 916 | 3,060 | 2,448 | 745 |
| 9 | Bumbaran | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 1,338 | 803 | 432 | 1,442 | 1,154 | 351 |
| | | Total | 1,338 | 803 | 432 | 1,442 | 1,154 | 351 |
| 10 | Butig | Urban | 411 | 247 | 132 | 442 | 354 | 107 |
| | | Rural | 3,176 | 1,906 | 1,025 | 3,425 | 2,740 | 834 |
| | | Total | 3,588 | 2,153 | 1,158 | 3,867 | 3,094 | 941 |
| 11 | Calanogas | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 1,749 | 1,049 | 565 | 1,885 | 1,508 | 459 |
| | | Total | 1,749 | 1,049 | 565 | 1,885 | 1,508 | 459 |
| 12 | Ditsaan-Ramain | Urban | 2,198 | 1,319 | 716 | 2,385 | 1,908 | 589 |
| | | Rural | 969 | 582 | 306 | 1,029 | 823 | 229 |
| | | Total | 3,167 | 1,900 | 1,022 | 3,414 | 2,731 | 818 |
| 13 | Ganassi | Urban | 656 | 394 | 215 | 711 | 426 | 33 |
| | | Rural | 2,926 | 1,755 | 942 | 3,150 | 1,890 | 146 |
| | | Total | 3,582 | 2,149 | 1,157 | 3,861 | 2,316 | 179 |

| City/Municipality | | Type | Phase I (2010) | | | Phase II (2015) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total Households | Served Households | Add No. of HH to be served | Total Households | Served Households | Add No. of HH to be served |
| 14 | Kapai | Urban | 108 | 65 | 34 | 115 | 92 | 27 |
| | | Rural | 2,573 | 1,544 | 831 | 2,775 | 2,220 | 676 |
| | | Total | 2,681 | 1,608 | 865 | 2,889 | 2,312 | 703 |
| 15 | Kapatagan | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 1,662 | 997 | 536 | 1,791 | 1,433 | 436 |
| | | Total | 1,662 | 997 | 536 | 1,791 | 1,433 | 436 |
| 16 | Lumba Bayabao | Urban | 163 | 98 | 54 | 179 | 143 | 45 |
| | | Rural | 4,126 | 2,475 | 1,331 | 4,444 | 3,555 | 1,080 |
| | | Total | 4,289 | 2,573 | 1,385 | 4,623 | 3,698 | 1,125 |
| 17 | Lumbatan | Urban | 512 | 307 | 176 | 575 | 460 | 153 |
| | | Rural | 2,086 | 1,252 | 663 | 2,225 | 1,780 | 511 |
| | | Total | 2,598 | 1,559 | 839 | 2,800 | 2,240 | 664 |
| 18 | Lumbayanague | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 2,371 | 1,423 | 765 | 2,556 | 2,045 | 622 |
| | | Total | 2,371 | 1,423 | 765 | 2,556 | 2,045 | 622 |
| 19 | Madalum | Urban | 184 | 110 | 59 | 198 | 158 | 48 |
| | | Rural | 3,127 | 1,876 | 1,009 | 3,371 | 2,697 | 821 |
| | | Total | 3,311 | 1,987 | 1,069 | 3,569 | 2,855 | 869 |
| 20 | Madamba | Urban | 2,367 | 1,420 | 662 | 2,758 | 2,206 | 787 |
| | | Rural | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Total | 2,367 | 1,420 | 662 | 2,758 | 2,206 | 787 |
| 21 | Maguing | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 3,359 | 2,016 | 1,085 | 3,621 | 2,897 | 832 |
| | | Total | 3,359 | 2,016 | 1,085 | 3,621 | 2,897 | 832 |
| 22 | Malabang | Urban | 1,156 | 694 | 385 | 1,271 | 1,017 | 323 |
| | | Rural | 4,610 | 2,766 | 1,477 | 4,945 | 3,956 | 1,190 |
| | | Total | 5,766 | 3,460 | 1,862 | 6,215 | 4,972 | 1,513 |
| 23 | Marantao | Urban | 665 | 399 | 204 | 733 | 586 | 188 |
| | | Rural | 3,561 | 2,136 | 1,154 | 3,847 | 3,078 | 941 |
| | | Total | 4,225 | 2,535 | 1,357 | 4,580 | 3,664 | 1,129 |
| 24 | Marogong | Urban | 2,863 | 1,718 | 925 | 3,086 | 2,469 | 751 |
| | | Rural | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Total | 2,863 | 1,718 | 925 | 3,086 | 2,469 | 751 |
| 25 | Masiu | Urban | 1,505 | 903 | 479 | 1,607 | 1,286 | 383 |
| | | Rural | 2,097 | 1,258 | 684 | 2,274 | 1,819 | 561 |
| | | Total | 3,601 | 2,161 | 1,162 | 3,882 | 3,105 | 945 |
| 26 | Mulondo | Urban | 988 | 593 | 317 | 1,062 | 849 | 256 |
| | | Rural | 957 | 574 | 311 | 1,035 | 828 | 254 |
| | | Total | 1,945 | 1,167 | 628 | 2,097 | 1,677 | 510 |
| 27 | Pagayawan | Urban | 216 | 130 | 70 | 234 | 187 | 57 |
| | | Rural | 1,332 | 799 | 430 | 1,435 | 1,148 | 349 |
| | | Total | 1,548 | 929 | 500 | 1,669 | 1,335 | 406 |

| City/Municipality | | Type | Phase I (2010) | | | Phase II (2015) | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total Households | Served Households | Add No. of HH to be served | Total Households | Served Households | Add No. of HH to be served |
| 28 | Piagapo | Urban | 284 | 170 | 86 | 326 | 261 | 91 |
| | | Rural | 3,815 | 2,289 | 1,231 | 4,112 | 3,290 | 1,001 |
| | | Total | 4,099 | 2,459 | 1,318 | 4,438 | 3,551 | 1,091 |
| 29 | Poona Bayabao | Urban | | 117 | 64 | 211 | 169 | 52 |
| | | Rural | 2,701 | 1,620 | 871 | 2,910 | 2,328 | 687 |
| | | Total | 2,896 | 1,737 | 935 | 3,121 | 2,497 | 739 |
| 30 | Pualas | Urban | 102 | 61 | 34 | 111 | 89 | 28 |
| | | Rural | 1,596 | 958 | 515 | 1,719 | 1,375 | 387 |
| | | Total | 1,698 | 1,019 | 549 | 1,830 | 1,464 | 415 |
| 31 | Saguiaran | Urban | 190 | 114 | 60 | 201 | 161 | 47 |
| | | Rural | 3,440 | 2,064 | 1,112 | 3,712 | 2,969 | 905 |
| | | Total | 3,630 | 2,178 | 1,172 | 3,913 | 3,130 | 952 |
| 32 | S. Domalondong | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 1,566 | 940 | 505 | 1,688 | 1,350 | 411 |
| | | Total | 1,566 | 940 | 505 | 1,688 | 1,350 | 411 |
| 33 | S. Gumander | Urban | 311 | 186 | 106 | 346 | 277 | 90 |
| | | Rural | 1,720 | 1,032 | 550 | 1,844 | 1,475 | 442 |
| | | Total | 2,031 | 1,219 | 656 | 2,189 | 1,751 | 532 |
| 34 | Tagoloan II | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 1,256 | 754 | 406 | 1,354 | 1,083 | 330 |
| | | Total | 1,256 | 754 | 406 | 1,354 | 1,083 | 330 |
| 35 | Tamparan | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 3,400 | 2,040 | 1,097 | 3,665 | 2,932 | 884 |
| | | Total | 3,400 | 2,040 | 1,097 | 3,665 | 2,932 | 884 |
| 36 | Taraka | Urban | 2,141 | 1,285 | 689 | 2,303 | 1,842 | 558 |
| | | Rural | 868 | 521 | 282 | 940 | 752 | 232 |
| | | Total | 3,009 | 1,805 | 971 | 3,243 | 2,595 | 789 |
| 37 | Tubaran | Urban | 118 | 71 | 38 | 128 | 102 | 31 |
| | | Rural | 1,866 | 1,120 | 602 | 2,011 | 1,609 | 474 |
| | | Total | 1,984 | 1,190 | 640 | 2,138 | 1,711 | 505 |
| 38 | Tugaya | Urban | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 2,824 | 1,694 | 911 | 3,043 | 2,435 | 741 |
| | | Total | 2,824 | 1,694 | 911 | 3,043 | 2,435 | 741 |
| 39 | Wao | Urban | 2,424 | 1,454 | 369 | 2,613 | 2,090 | 636 |
| | | Rural | 5,258 | 3,155 | 800 | 5,667 | 4,534 | 1,379 |
| | | Total | 7,682 | 4,609 | 1,169 | 8,280 | 6,624 | 2,015 |
| Provincial Total | | Urban | 48,959 | 29,376 | 13,380 | 53,086 | 42,201 | 12,454 |
| | | Rural | 89,953 | 53,972 | 28,112 | 96,901 | 76,343 | 22,228 |
| | | Total | 138,913 | 83,348 | 41,492 | 149,987 | 118,544 | 34,682 |

Table 7-7 Projected Schools and Public Utilities by Municipality

| City/Municipality | | Public Schools | | | Public Utilities | | |
|---|---|---|---|---|---|---|---|
| | | 2003 | 2010 | 2015 | 2003 | 2010 | 2015 |
| 1 | Marawi City | 82 | 91 | 98 | 8 | 9 | 10 |
| 2 | Bacolod Grande | 21 | 23 | 24 | 1 | 2 | 3 |
| 3 | Balabagan | 17 | 19 | 20 | 1 | 2 | 3 |
| 4 | Balindong | 32 | 36 | 39 | 1 | 2 | 3 |
| 5 | Bayang | 14 | 17 | 19 | 1 | 2 | 3 |
| 6 | Binidayan | 16 | 17 | 19 | 1 | 2 | 3 |
| 7 | Buadiposo Buntong | 12 | 13 | 14 | 1 | 2 | 3 |
| 8 | Bubong | 16 | 18 | 19 | 1 | 2 | 3 |
| 9 | Bumbaran | 7 | 8 | 9 | 1 | 2 | 3 |
| 10 | Butig | 21 | 23 | 25 | 1 | 2 | 3 |
| 11 | Calanogas | 8 | 9 | 9 | 1 | 2 | 3 |
| 12 | Ditsaan-Ramain | 14 | 15 | 16 | 1 | 2 | 3 |
| 13 | Ganassi | 17 | 19 | 21 | 2 | 3 | 4 |
| 14 | Kapai | 17 | 19 | 21 | 1 | 2 | 3 |
| 15 | Kapatagan | 7 | 8 | 8 | 1 | 2 | 3 |
| 16 | Lumba Bayabao | 26 | 29 | 32 | 1 | 2 | 3 |
| 17 | Lumbatan | 20 | 22 | 24 | 1 | 2 | 3 |
| 18 | Lumbayanague | 22 | 24 | 25 | 1 | 2 | 3 |
| 19 | Madalum | 18 | 20 | 21 | 1 | 2 | 3 |
| 20 | Madamba | 13 | 14 | 15 | 1 | 2 | 3 |
| 21 | Maguing | 12 | 13 | 14 | 1 | 2 | 3 |
| 22 | Malabang | 23 | 25 | 27 | 3 | 4 | 5 |
| 23 | Marantao | 28 | 31 | 33 | 1 | 2 | 3 |
| 24 | Marogong | 19 | 21 | 22 | 1 | 2 | 3 |
| 25 | Masiu | 37 | 42 | 45 | 1 | 2 | 3 |
| 26 | Mulondo | 11 | 13 | 14 | 1 | 2 | 3 |
| 27 | Pagayawan | 10 | 12 | 13 | 1 | 2 | 3 |
| 28 | Piagapo | 20 | 22 | 23 | 1 | 2 | 3 |
| 29 | Poona Bayabao | 14 | 15 | 16 | 1 | 2 | 3 |
| 30 | Pualas | 18 | 20 | 21 | 1 | 2 | 3 |
| 31 | Saguiaran | 27 | 31 | 33 | 1 | 2 | 3 |
| 32 | S. Domalondong | 3 | 4 | 4 | 1 | 2 | 3 |
| 33 | S. Gumander | 14 | 15 | 16 | 1 | 2 | 3 |
| 34 | Tagoloan II | 17 | 19 | 21 | 1 | 2 | 3 |
| 35 | Tamparan | 12 | 14 | 15 | 1 | 2 | 3 |
| 36 | Taraka | 14 | 16 | 17 | 1 | 2 | 3 |
| 37 | Tubaran | 14 | 15 | 17 | 1 | 2 | 3 |
| 38 | Tugaya | 19 | 21 | 23 | 1 | 2 | 3 |
| 39 | Wao | 28 | 32 | 35 | 4 | 5 | 6 |
| **Provincial Total** | | **740** | **826** | **889** | **52** | **91** | **130** |

## 7.4 Types of Facilities and Implementation Criteria

### 7.4.1 Water Supply

*A. Urban Water Supply*

*Service Level.* The levels of water service for each municipality were determined based on the different conditions as mentioned in section 3.1. Generally, a Level III water system is appropriate for urban areas but Levels I and II facilities can also be implemented in urban areas in the future.

*Utilization of Existing Facilities.* The existing Level I and II facilities are considered to be utilized during Phase I period. However, the population served by these facilities are assumed to be absorbed by Level III service in Phase II.

*Water Source.* Most of the existing level III systems use deep wells. In this context, a deep well source would be used as the primary source in the project development plan, wherever applicable.

*Number of System.* Generally, there is one Level III system considered for each municipality. Whenever a Level III system exists in the municipality, the future requirements are considered as an expansion of the existing system, otherwise a new system was considered.

*Rehabilitation.* Rehabilitation of existing and future facilities is assumed to be undertaken by the operating organization or individual.

### 7.4.2 Sanitation

The type of toilet facilities is dependent on the service level of water supply in the community. A flush type toilet is considered in Level III areas while a typical pour-flush type will be considered in Level I and II service areas.

## 7.5 Service Coverage by Target Year

### 7.5.1 Water Supply

The service coverage in terms of population to be served by target year was estimated by urban and rural area by municipality. Additional service coverage for Level II and/or III are

considered as expansion of the existing systems. Rehabilitation and improvement shall be shouldered by the water service provider.

Every Poblacion of all municipalities with existing Level I shall be upgraded to Level II. Other barangays shall be served with Level I. Existing and additional service coverage through Phases I and II is based on the following assumptions:

Existing Coverage:

| System | Present Coverage |
|---|---|
| Level I | 40% of service population |
| Level II | 50% of service population, unless actual number of connection is available |
| Level III | 50% of service population, unless actual number of connection is available |

Additional Service Coverage:

| System | Additional Coverage | |
|---|---|---|
| | Phase I (Year 2005-2010) | Phase II (Year 2010-2015) |
| Level I | 50% | 70% |
| Level II | 50% | 70% |
| Level III | 50 % | 70% |

Table 7-8 shows the population to be served by target years.

## Table 7-8 Population to be Served by Target Year

| City/Municipality | Type | Phase I (2005-2010) | | | | | | | | | Phase II (2010-2015) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Service Coverage | | | | Additional Population to be served | | | | | Service Coverage | | | | Aadditional Population to be served | | | |
| | | Total Population | Level III | Level II | Level I | Total | Level III | Level II | Level I | Total | Total Population | Level III | Level II | Level I | Total | Level III | Level II | Level I | Total |
| 1 Marawi City | Urban | 154,804 | 33,561 | 43,841 | 0 | 77,402 | 18,649 | 43,841 | 0 | 62,490 | 166,860 | 49,599 | 67,203 | 0 | 116,802 | 16,038 | 23,362 | 0 | 39,400 |
| | Rural | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Total | 154,804 | 33,561 | 43,841 | 0 | 77,402 | 18,649 | 43,841 | 0 | 62,490 | 166,860 | 49,599 | 67,203 | 0 | 116,802 | 16,038 | 23,362 | 0 | 39,400 |
| 2 Bacolod Grande | Urban | 18,407 | 0 | 2,951 | 6,253 | 9,204 | 0 | 2,951 | 1,701 | 4,652 | 19,870 | 0 | 6,002 | 7,907 | 13,909 | 0 | 3,051 | 2,608 | 5,659 |
| | Rural | 2,567 | 0 | 1,283 | 0 | 1,283 | 0 | 1,283 | 0 | 1,283 | 2,737 | 0 | 1,916 | 0 | 1,916 | 0 | 633 | 0 | 633 |
| | Total | 20,974 | 0 | 4,234 | 6,253 | 10,487 | 0 | 4,234 | 1,701 | 5,935 | 22,607 | 0 | 7,918 | 7,907 | 15,825 | 0 | 3,684 | 2,608 | 6,292 |
| 3 Balabagan | Urban | 2,466 | 0 | 1,233 | 0 | 1,233 | 0 | 130 | 0 | 130 | 2,658 | 0 | 1,860 | 0 | 1,860 | 0 | 628 | 0 | 628 |
| | Rural | 26,535 | 0 | 823 | 12,444 | 13,267 | 0 | 87 | 3,539 | 3,626 | 28,601 | 0 | 1,242 | 18,779 | 20,021 | 0 | 419 | 6,335 | 6,754 |
| | Total | 29,000 | 0 | 2,056 | 12,444 | 14,500 | 0 | 217 | 3,539 | 3,756 | 31,259 | 0 | 3,102 | 18,779 | 21,881 | 0 | 1,047 | 6,335 | 7,381 |
| 4 Balindong | Urban | 2,912 | 0 | 0 | 1,456 | 1,456 | 0 | 0 | 417 | 417 | 3,144 | 0 | 0 | 2,201 | 2,201 | 0 | 0 | 744 | 744 |
| | Rural | 25,984 | 0 | 3,278 | 9,714 | 12,992 | 0 | 3,278 | 2,758 | 6,036 | 28,003 | 0 | 4,949 | 19,602 | 24,552 | 0 | 1,671 | 4,939 | 6,610 |
| | Total | 28,897 | 0 | 3,278 | 11,170 | 14,448 | 0 | 3,278 | 3,175 | 6,453 | 31,147 | 0 | 4,949 | 21,803 | 26,752 | 0 | 1,671 | 5,683 | 7,355 |
| 5 Bayang | Urban | 4,745 | 0 | 2,373 | 0 | 2,373 | 0 | 1,400 | 0 | 1,400 | 5,188 | 0 | 3,632 | 0 | 3,632 | 0 | 1,259 | 0 | 1,259 |
| | Rural | 20,052 | 0 | 909 | 9,117 | 10,026 | 0 | 94 | 2,567 | 2,661 | 21,567 | 0 | 1,369 | 13,728 | 15,097 | 0 | 460 | 4,611 | 5,071 |
| | Total | 24,797 | 0 | 3,282 | 9,117 | 12,399 | 0 | 1,493 | 2,567 | 4,061 | 26,756 | 0 | 5,001 | 13,728 | 18,729 | 0 | 1,719 | 4,611 | 6,330 |
| 6 Binidayan | Urban | 3,965 | 0 | 1,982 | 0 | 1,982 | 0 | 1,982 | 0 | 1,982 | 4,292 | 0 | 3,005 | 0 | 3,005 | 0 | 1,022 | 0 | 1,022 |
| | Rural | 17,387 | 0 | 0 | 8,693 | 8,693 | 0 | 0 | 2,462 | 2,462 | 18,722 | 0 | 0 | 13,106 | 13,106 | 0 | 0 | 4,412 | 4,412 |
| | Total | 21,352 | 0 | 1,982 | 8,693 | 10,676 | 0 | 1,982 | 2,462 | 4,444 | 23,015 | 0 | 3,005 | 13,106 | 16,110 | 0 | 1,022 | 4,412 | 5,434 |
| 7 Buadiposo Buntong | Urban | 734 | 0 | 367 | 0 | 367 | 0 | 367 | 0 | 367 | 787 | 0 | 551 | 0 | 551 | 0 | 0 | 0 | 0 |
| | Rural | 15,249 | 0 | 0 | 7,625 | 7,625 | 0 | 0 | 2,171 | 2,171 | 16,441 | 0 | 720 | 10,789 | 11,509 | 0 | 720 | 3,646 | 4,366 |
| | Total | 15,983 | 0 | 367 | 7,625 | 7,992 | 0 | 367 | 2,171 | 2,538 | 17,228 | 0 | 1,271 | 10,789 | 12,060 | 0 | 720 | 3,646 | 4,366 |
| 8 Bubong | Urban | 687 | 0 | 344 | 0 | 344 | 0 | 344 | 0 | 344 | 742 | 0 | 519 | 0 | 519 | 0 | 176 | 0 | 176 |
| | Rural | 21,753 | 0 | 3,730 | 7,146 | 10,877 | 0 | 397 | 2,029 | 2,426 | 23,447 | 0 | 5,633 | 10,780 | 16,413 | 0 | 1,902 | 3,634 | 5,536 |
| | Total | 22,441 | 0 | 4,074 | 7,146 | 11,220 | 0 | 741 | 2,029 | 2,770 | 24,188 | 0 | 6,152 | 10,780 | 16,932 | 0 | 2,078 | 3,634 | 5,712 |
| 9 Bumbaran | Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Rural | 7,781 | 0 | 400 | 3,491 | 3,890 | 0 | 400 | 1,012 | 1,412 | 8,387 | 0 | 581 | 5,290 | 5,871 | 0 | 181 | 1,799 | 1,980 |
| | Total | 7,781 | 0 | 400 | 3,491 | 3,890 | 0 | 400 | 1,012 | 1,412 | 8,387 | 0 | 581 | 5,290 | 5,871 | 0 | 181 | 1,799 | 1,980 |
| 10 Butig | Urban | 2,205 | 0 | 1,102 | 0 | 1,102 | 0 | 1,102 | 0 | 1,102 | 2,372 | 0 | 1,660 | 0 | 1,660 | 0 | 558 | 0 | 558 |
| | Rural | 17,024 | 0 | 1,944 | 6,568 | 8,512 | 0 | 199 | 1,876 | 2,075 | 18,355 | 0 | 2,926 | 9,922 | 12,848 | 0 | 983 | 3,354 | 4,336 |
| | Total | 19,229 | 0 | 3,046 | 6,568 | 9,614 | 0 | 1,301 | 1,876 | 3,177 | 20,726 | 0 | 4,586 | 9,922 | 14,508 | 0 | 1,540 | 3,354 | 4,894 |
| 11 Calanogas | Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Rural | 11,796 | 0 | 351 | 5,547 | 5,898 | 0 | 351 | 1,589 | 1,940 | 12,715 | 0 | 2,128 | 6,772 | 8,900 | 0 | 1,777 | 2,238 | 4,015 |
| | Total | 11,796 | 0 | 351 | 5,547 | 5,898 | 0 | 351 | 1,589 | 1,940 | 12,715 | 0 | 2,128 | 6,772 | 8,900 | 0 | 1,777 | 2,238 | 4,015 |
| 12 Ditsaan-Ramain | Urban | 15,699 | 0 | 7,850 | 0 | 7,850 | 0 | 7,850 | 0 | 7,850 | 17,035 | 0 | 11,924 | 0 | 11,924 | 0 | 4,074 | 0 | 4,074 |
| | Rural | 6,923 | 0 | 0 | 3,462 | 3,462 | 0 | 0 | 885 | 885 | 7,350 | 0 | 0 | 5,145 | 5,145 | 0 | 0 | 1,683 | 1,683 |
| | Total | 22,622 | 0 | 7,850 | 3,462 | 11,311 | 0 | 7,850 | 885 | 8,735 | 24,384 | 0 | 11,924 | 5,145 | 17,069 | 0 | 4,074 | 1,683 | 5,758 |
| 13 Ganassi | Urban | 4,098 | 1,286 | 763 | 0 | 2,049 | 170 | 588 | 0 | 758 | 4,439 | 1,965 | 1,143 | 0 | 3,108 | 679 | 380 | 0 | 1,058 |
| | Rural | 18,276 | 1,505 | 620 | 7,263 | 9,388 | 214 | 69 | 2,180 | 2,463 | 19,678 | 2,315 | 935 | 10,524 | 13,774 | 810 | 315 | 3,465 | 4,590 |
| | Total | 22,374 | 2,791 | 1,383 | 7,263 | 11,437 | 383 | 657 | 2,180 | 3,220 | 24,117 | 4,280 | 2,078 | 10,524 | 16,882 | 1,489 | 695 | 3,465 | 5,648 |
| 14 Kapai | Urban | 789 | 0 | 394 | 0 | 394 | 0 | 394 | 0 | 394 | 837 | 0 | 586 | 0 | 586 | 0 | 191 | 0 | 191 |
| | Rural | 18,772 | 0 | 3,085 | 6,300 | 9,386 | 0 | 317 | 1,807 | 2,124 | 20,247 | 0 | 4,648 | 9,525 | 14,173 | 0 | 1,563 | 3,225 | 4,787 |
| | Total | 19,560 | 0 | 3,480 | 6,300 | 9,780 | 0 | 711 | 1,807 | 2,519 | 21,084 | 0 | 5,234 | 9,525 | 14,759 | 0 | 1,754 | 3,225 | 4,978 |
| 15 Kapatagan | Urban | 2,973 | 0 | 254 | 1,232 | 1,487 | 0 | 33 | 372 | 405 | 3,244 | 0 | 389 | 1,882 | 2,271 | 0 | 135 | 649 | 784 |
| | Rural | 6,242 | 0 | 1,535 | 1,586 | 3,121 | 0 | 109 | 469 | 577 | 6,689 | 0 | 2,272 | 2,410 | 4,682 | 0 | 737 | 824 | 1,561 |
| | Total | 9,216 | 0 | 1,789 | 2,819 | 4,608 | 0 | 142 | 840 | 982 | 9,933 | 0 | 2,661 | 4,292 | 6,953 | 0 | 872 | 1,473 | 2,346 |
| 16 Lumba Bayabao | Urban | 1,058 | 0 | 529 | 0 | 529 | 0 | 529 | 0 | 529 | 1,157 | 0 | 810 | 0 | 810 | 0 | 281 | 0 | 281 |
| | Rural | 26,718 | 0 | 1,526 | 11,833 | 13,359 | 0 | 204 | 3,325 | 3,529 | 28,782 | 0 | 2,339 | 17,808 | 20,147 | 0 | 813 | 5,798 | 6,611 |
| | Total | 27,776 | 0 | 2,055 | 11,833 | 13,888 | 0 | 732 | 3,325 | 4,058 | 29,939 | 0 | 3,149 | 17,808 | 20,957 | 0 | 1,094 | 5,798 | 6,892 |
| 17 Lumbatan | Urban | 4,060 | 0 | 2,030 | 0 | 2,030 | 0 | 349 | 0 | 349 | 4,558 | 0 | 3,191 | 0 | 3,191 | 0 | 1,161 | 0 | 1,161 |
| | Rural | 16,541 | 0 | 0 | 8,270 | 8,270 | 0 | 0 | 2,247 | 2,247 | 17,647 | 0 | 0 | 12,353 | 12,353 | 0 | 0 | 3,940 | 3,940 |
| | Total | 20,601 | 0 | 2,030 | 8,270 | 10,300 | 0 | 349 | 2,247 | 2,597 | 22,205 | 0 | 3,191 | 12,353 | 15,544 | 0 | 1,161 | 3,940 | 5,101 |
| 18 Lumbayanague | Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Rural | 15,157 | 0 | 538 | 7,041 | 7,578 | 0 | 538 | 1,945 | 2,483 | 16,337 | 0 | 801 | 10,635 | 11,436 | 0 | 263 | 3,432 | 3,695 |

| City/Municipality | Type | Phase I (2005-2010) | | | | | | | | | Phase II (2010-2015) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Total Population | Service Coverage | | | Additional Population to be served | | | | | Total Population | Service Coverage | | | Additional Population to be served | | | | | |
| | | | Level III | Level II | Level I | Level III | Level II | Level I | Total | | | Level III | Level II | Level I | Total | Level III | Level II | Level I | Total | |
| 19 Madalum | Total | 15,157 | 0 | 538 | 7,041 | 0 | 538 | 1,945 | 2,483 | | 16,337 | 0 | 801 | 10,635 | 11,436 | 0 | 263 | 3,432 | 3,695 | |
| | Urban | 1,207 | 0 | 604 | 0 | 0 | 604 | 0 | 604 | | 1,299 | 0 | 909 | 0 | 909 | 0 | 306 | 0 | 306 | |
| | Rural | 20,527 | 0 | 0 | 10,263 | 0 | 0 | 2,921 | 2,921 | | 22,128 | 0 | 0 | 15,490 | 15,490 | 0 | 0 | 5,226 | 5,226 | |
| | Total | 21,734 | 0 | 604 | 10,263 | 0 | 604 | 2,921 | 3,524 | | 23,427 | 0 | 909 | 15,490 | 16,399 | 0 | 306 | 5,226 | 5,532 | |
| 20 Madamba | Urban | 18,235 | 0 | 2,572 | 6,545 | 0 | 272 | 1,861 | 2,133 | | 19,656 | 0 | 3,882 | 9,877 | 13,759 | 0 | 1,310 | 3,332 | 4,641 | |
| | Rural | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Total | 18,235 | 0 | 2,572 | 6,545 | 0 | 272 | 1,861 | 2,133 | | 19,656 | 0 | 3,882 | 9,877 | 13,759 | 0 | 1,310 | 3,332 | 4,641 | |
| 21 Maguing | Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Rural | 21,368 | 0 | 425 | 10,259 | 0 | 425 | 2,799 | 3,224 | | 23,033 | 0 | 654 | 15,469 | 16,123 | 0 | 229 | 5,164 | 5,394 | |
| | Total | 21,368 | 0 | 425 | 10,259 | 0 | 425 | 2,799 | 3,224 | | 23,033 | 0 | 654 | 15,469 | 16,123 | 0 | 229 | 5,164 | 5,394 | |
| 22 Malabang | Urban | 7,857 | 0 | 3,928 | 0 | 0 | 541 | 0 | 541 | | 8,634 | 0 | 6,044 | 0 | 6,044 | 0 | 2,116 | 0 | 2,116 | |
| | Rural | 31,322 | 0 | 2,069 | 13,591 | 0 | 90 | 3,874 | 3,964 | | 33,596 | 0 | 3,000 | 20,516 | 23,517 | 0 | 931 | 6,818 | 7,749 | |
| | Total | 39,179 | 0 | 5,998 | 13,591 | 0 | 631 | 3,874 | 4,506 | | 42,230 | 0 | 9,044 | 20,516 | 29,561 | 0 | 3,047 | 6,818 | 9,865 | |
| 23 Marantao | Urban | 4,553 | 0 | 2,276 | 0 | 0 | 2,276 | 0 | 2,276 | | 5,020 | 0 | 3,514 | 0 | 3,514 | 0 | 1,238 | 0 | 1,238 | |
| | Rural | 24,391 | 0 | 0 | 12,196 | 0 | 0 | 3,497 | 3,497 | | 26,352 | 0 | 0 | 18,446 | 18,446 | 0 | 0 | 6,251 | 6,251 | |
| | Total | 28,944 | 0 | 2,276 | 12,196 | 0 | 2,276 | 3,497 | 5,773 | | 31,372 | 0 | 3,514 | 18,446 | 21,961 | 0 | 1,238 | 6,251 | 7,489 | |
| 24 Marogong | Urban | 2,030 | 0 | 1,015 | 0 | 0 | 1,015 | 0 | 1,015 | | 2,062 | 0 | 1,444 | 0 | 1,444 | 0 | 429 | 0 | 429 | |
| | Rural | 17,059 | 0 | 518 | 8,012 | 0 | 53 | 2,355 | 2,407 | | 18,513 | 0 | 772 | 12,188 | 12,959 | 0 | 254 | 4,176 | 4,430 | |
| | Total | 19,089 | 0 | 1,533 | 8,012 | 0 | 1,068 | 2,355 | 3,422 | | 20,576 | 0 | 2,215 | 12,188 | 14,403 | 0 | 683 | 4,176 | 4,859 | |
| 25 Masiu | Urban | 11,893 | 0 | 3,365 | 2,581 | 0 | 203 | 786 | 989 | | 12,707 | 0 | 4,939 | 3,956 | 8,895 | 0 | 1,573 | 1,375 | 2,948 | |
| | Rural | 16,573 | 0 | 2,370 | 5,916 | 0 | 258 | 1,749 | 2,007 | | 17,976 | 0 | 3,580 | 9,003 | 12,583 | 0 | 1,211 | 3,086 | 4,297 | |
| | Total | 28,465 | 0 | 5,735 | 8,497 | 0 | 461 | 2,535 | 2,996 | | 30,682 | 0 | 8,519 | 12,959 | 21,478 | 0 | 2,784 | 4,461 | 7,245 | |
| 26 Mulondo | Urban | 498 | 0 | 249 | 0 | 0 | 249 | 0 | 249 | | 509 | 0 | 356 | 0 | 356 | 0 | 107 | 0 | 107 | |
| | Rural | 14,107 | 0 | 3,461 | 3,593 | 0 | 3,461 | 1,039 | 4,499 | | 15,234 | 0 | 5,223 | 5,441 | 10,664 | 0 | 1,763 | 1,848 | 3,610 | |
| | Total | 14,605 | 0 | 3,710 | 3,593 | 0 | 3,710 | 1,039 | 4,748 | | 15,743 | 0 | 5,579 | 5,441 | 11,020 | 0 | 1,870 | 1,848 | 3,717 | |
| 27 Pagayawan | Urban | 1,610 | 0 | 805 | 0 | 0 | 805 | 0 | 805 | | 1,738 | 0 | 1,216 | 0 | 1,216 | 0 | 412 | 0 | 412 | |
| | Rural | 9,912 | 0 | 0 | 4,956 | 0 | 0 | 1,408 | 1,408 | | 10,682 | 0 | 0 | 7,477 | 7,477 | 0 | 0 | 2,521 | 2,521 | |
| | Total | 11,522 | 0 | 805 | 4,956 | 0 | 805 | 1,408 | 2,213 | | 12,419 | 0 | 1,216 | 7,477 | 8,694 | 0 | 412 | 2,521 | 2,933 | |
| 28 Piagapo | Urban | 1,946 | 0 | 973 | 0 | 0 | 973 | 0 | 973 | | 2,236 | 0 | 1,565 | 0 | 1,565 | 0 | 592 | 0 | 592 | |
| | Rural | 26,152 | 0 | 0 | 13,076 | 0 | 0 | 3,719 | 3,719 | | 28,189 | 0 | 0 | 19,733 | 19,733 | 0 | 0 | 6,656 | 6,656 | |
| | Total | 28,099 | 0 | 973 | 13,076 | 0 | 973 | 3,719 | 4,692 | | 30,425 | 0 | 1,565 | 19,733 | 21,298 | 0 | 592 | 6,656 | 7,248 | |
| 29 Poona Bayabao | Urban | 1,383 | 0 | 691 | 0 | 0 | 691 | 0 | 691 | | 1,496 | 0 | 1,047 | 0 | 1,047 | 0 | 356 | 0 | 356 | |
| | Rural | 19,153 | 0 | 0 | 9,577 | 0 | 0 | 2,721 | 2,721 | | 20,639 | 0 | 0 | 14,447 | 14,447 | 0 | 0 | 4,871 | 4,871 | |
| | Total | 20,536 | 0 | 691 | 9,577 | 0 | 691 | 2,721 | 3,413 | | 22,135 | 0 | 1,047 | 14,447 | 15,495 | 0 | 356 | 4,871 | 5,227 | |
| 30 Pualas | Urban | 559 | 0 | 280 | 0 | 0 | 280 | 0 | 280 | | 609 | 0 | 426 | 0 | 426 | 0 | 147 | 0 | 147 | |
| | Rural | 8,754 | 0 | 0 | 6,128 | 0 | 0 | 2,993 | 2,993 | | 9,430 | 0 | 0 | 6,601 | 6,601 | 0 | 0 | 487 | 487 | |
| | Total | 9,314 | 0 | 280 | 6,128 | 0 | 280 | 2,993 | 3,273 | | 10,039 | 0 | 426 | 6,601 | 7,027 | 0 | 147 | 487 | 634 | |
| 31 Saguiaran | Urban | 2,774 | 0 | 1,387 | 0 | 0 | 1,387 | 0 | 1,387 | | 2,968 | 0 | 2,077 | 0 | 2,077 | 0 | 690 | 0 | 690 | |
| | Rural | 23,957 | 0 | 0 | 11,978 | 0 | 0 | 3,420 | 3,420 | | 25,845 | 0 | 0 | 18,091 | 18,091 | 0 | 0 | 6,113 | 6,113 | |
| | Total | 26,731 | 0 | 1,387 | 11,978 | 0 | 1,387 | 3,420 | 4,807 | | 28,813 | 0 | 2,077 | 18,091 | 20,169 | 0 | 690 | 6,113 | 6,803 | |
| 32 S. Domalondong | Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Rural | 13,114 | 0 | 1,943 | 4,614 | 0 | 1,943 | 1,168 | 3,111 | | 14,135 | 0 | 3,111 | 6,784 | 9,895 | 0 | 1,168 | 2,170 | 3,338 | |
| | Total | 13,114 | 0 | 1,943 | 4,614 | 0 | 1,943 | 1,168 | 3,111 | | 14,135 | 0 | 3,111 | 6,784 | 9,895 | 0 | 1,168 | 2,170 | 3,338 | |
| 33 S. Gumander | Urban | 2,209 | 0 | 1,104 | 0 | 0 | 1,104 | 0 | 1,104 | | 2,458 | 0 | 1,721 | 0 | 1,721 | 0 | 616 | 0 | 616 | |
| | Rural | 12,234 | 0 | 0 | 6,117 | 0 | 0 | 1,695 | 1,695 | | 13,109 | 0 | 0 | 9,176 | 9,176 | 0 | 0 | 3,054 | 3,054 | |
| | Total | 14,442 | 0 | 1,104 | 6,117 | 0 | 1,104 | 1,695 | 2,800 | | 15,567 | 0 | 1,721 | 9,176 | 10,897 | 0 | 616 | 3,054 | 3,670 | |
| 34 Tagoloan II | Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | Rural | 10,290 | 0 | 446 | 4,699 | 0 | 446 | 1,339 | 1,785 | | 11,092 | 0 | 671 | 7,093 | 7,764 | 0 | 225 | 2,394 | 2,619 | |
| | Total | 10,290 | 0 | 446 | 4,699 | 0 | 446 | 1,339 | 1,785 | | 11,092 | 0 | 671 | 7,093 | 7,764 | 0 | 225 | 2,394 | 2,619 | |
| 35 Tamparan | Urban | 0 | 0 | 252 | 0 | 0 | 252 | 0 | 252 | | 0 | 0 | 381 | 0 | 381 | 0 | 129 | 0 | 129 | |
| | Rural | 23,588 | 0 | 895 | 10,647 | 0 | 895 | 3,064 | 3,959 | | 25,426 | 0 | 1,316 | 16,101 | 17,417 | 0 | 421 | 5,454 | 5,875 | |
| | Total | 23,588 | 0 | 1,147 | 10,647 | 0 | 1,147 | 3,064 | 4,211 | | 25,426 | 0 | 1,697 | 16,101 | 17,798 | 0 | 549 | 5,454 | 6,004 | |
| 36 Taraka | Urban | 15,824 | 0 | 7,912 | 0 | 0 | 7,912 | 0 | 7,912 | | 17,021 | 0 | 11,915 | 0 | 11,915 | 0 | 4,002 | 0 | 4,002 | |
| | Rural | 6,414 | 0 | 0 | 3,207 | 0 | 0 | 935 | 935 | | 6,950 | 0 | 0 | 4,865 | 4,865 | 0 | 0 | 1,658 | 1,658 | |
| | Total | 22,239 | 0 | 7,912 | 3,207 | 0 | 7,912 | 935 | 8,848 | | 23,971 | 0 | 11,915 | 4,865 | 16,779 | 0 | 4,002 | 1,658 | 5,660 | |

| City/Municipality | | Type | Phase I (2005-2010) | | | | | | | | Phase II (2010-2015) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total Population | Service Coverage | | | | Additional Population to be served | | | Total Population | Service Coverage | | | | Additional Population to be served | | |
| | | | | Level III | Level II | Level I | Total | Level III | Level II | Level I | Total | Level III | Level II | Level I | Total | Level III | Level II | Level I | Total |
| 37 | Tubaran | Urban | 772 | 0 | 386 | 0 | 386 | 0 | 386 | 0 | 386 | 837 | 0 | 586 | 0 | 586 | 0 | 200 | 0 | 200 |
| | | Rural | 12,242 | 0 | 0 | 6,121 | 6,121 | 0 | 0 | 1,739 | 1,739 | 13,192 | | 0 | 9,234 | 9,234 | 0 | 0 | 3,113 | 3,113 |
| | | Total | 13,015 | 0 | 386 | 6,121 | 6,507 | 0 | 386 | 1,739 | 2,125 | 14,028 | 0 | 586 | 9,234 | 9,820 | 0 | 200 | 3,113 | 3,312 |
| 38 | Tugaya | Urban | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | Rural | 23,782 | 0 | 663 | 11,228 | 11,891 | 0 | 663 | 3,215 | 3,878 | 25,634 | 0 | 977 | 16,967 | 17,944 | 0 | 314 | 5,739 | 6,053 |
| | | Total | 23,782 | 0 | 663 | 11,228 | 11,891 | 0 | 663 | 3,215 | 3,878 | 25,634 | 0 | 977 | 16,967 | 17,944 | 0 | 314 | 5,739 | 6,053 |
| 39 | Wao | Urban | 1,417 | 0 | 1,417 | 0 | 1,417 | 0 | 1,075 | 0 | 1,075 | 14,265 | 0 | 1,527 | 0 | 1,527 | 0 | 110 | 0 | 110 |
| | | Rural | 40,525 | 8,564 | 26,114 | 3,243 | 37,921 | 1,044 | 17,772 | 233 | 19,049 | 30,943 | 9,231 | 29,271 | 3,495 | 41,998 | 667 | 3,157 | 253 | 4,076 |
| | | Total | 41,942 | 8,564 | 27,531 | 3,243 | 39,338 | 1,044 | 18,847 | 233 | 20,124 | 45,208 | 9,231 | 30,798 | 3,495 | 43,525 | 667 | 3,267 | 253 | 4,187 |
| Total | | Urban | 294,370 | 34,847 | 95,231 | 18,068 | 148,146 | 18,819 | 81,887 | 5,137 | 105,842 | 330,697 | 51,564 | 146,024 | 25,823 | 223,410 | 16,717 | 50,609 | 8,708 | 76,034 |
| | | Rural | 650,222 | 10,069 | 58,925 | 275,524 | 344,518 | 1,258 | 33,329 | 78,746 | 113,333 | 687,802 | 11,546 | 81,035 | 413,786 | 506,367 | 1,477 | 22,109 | 134,386 | 157,972 |
| | | Total | 944,592 | 44,916 | 154,156 | 293,591 | 492,664 | 20,077 | 115,216 | 83,882 | 219,175 | 1,018,500 | 63,110 | 227,058 | 439,609 | 729,778 | 18,194 | 72,718 | 143,094 | 234,006 |

During Phase I development, approximately 348,346 persons in the province will served by additional water supply services, of which 136,478 persons or 39% of the total will be urban population and 211,868 persons or 69% 0f the total will be rural population.

For the Phase II period, a total of 192,667 persons in the province will served by additional water supply services, of which 90,007 persons or 47% of the total will be urban population and 102,680 persons or 53% of the total will be rural population.

### 7.5.2 Sanitation

***Household toilets.*** The household to be served by different types of sanitary facilities is estimated by urban and rural area by municipality.

Existing service coverage was computed at 31% of the number of households based on provincial data on sanitation. Additional service coverage based on provincial targets shall be 60% and 80% of households for Phase I and II, respectively.

Table 7-9 shows the additional number of households by target years.

## Table 7-9 Additional Number of Households by target year (HH toilet)

| City/Municipality | | Type | Phase I (2050-2010) | | | | | | | Phase II (2010-2015) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total Households | Number of HH to be served | | | Additional Number of HH to be served | | | Total Households | Number of HH to be served | | | Additional Number of HH to be served | | |
| | | | | Flush | Pour Flush | Total | Flush | Pour Flush | Total | | Flush | Pour Flush | Total | Flush | Pour Flush | Total |
| 1. | Marawi City | Urban | 24,061 | 6,260 | 8,177 | 14,436 | 2,397 | 3,446 | 5,843 | 25,935 | 8,810 | 11,937 | 20,748 | 2,350 | 3,597 | 5,947 |
| | | Rural | 0 | | | 0 | | | 0 | 0 | | | 0 | | | 0 |
| | | Total | 24,061 | 6,260 | 8,177 | 14,436 | 2,397 | 3,446 | 5,843 | 25,935 | 8,810 | 11,937 | 20,748 | 2,350 | 3,597 | 5,947 |
| 2. | Bacolod Grande | Urban | 2,555 | | 1,533 | 1,533 | | 826 | 826 | 2,758 | | 2,206 | 2,206 | | 665 | 665 |
| | | Rural | 356 | | 214 | 214 | | 113 | 113 | 380 | | 304 | 304 | | 90 | 90 |
| | | Total | 2,911 | 0 | 1,747 | 1,747 | 0 | 940 | 940 | 3,138 | 0 | 2,510 | 2,510 | 0 | 755 | 755 |
| 3. | Balabagan | Urban | 384 | | 230 | 230 | | 124 | 124 | 414 | | 331 | 331 | | 101 | 101 |
| | | Rural | 4,129 | | 2,477 | 2,477 | | 1,332 | 1,332 | 4,450 | | 3,560 | 3,560 | | 1,083 | 1,083 |
| | | Total | 4,512 | 0 | 2,707 | 2,707 | 0 | 1,456 | 1,456 | 4,864 | 0 | 3,891 | 3,891 | 0 | 1,184 | 1,184 |
| 4. | Balindong | Urban | 801 | | 481 | 481 | | 259 | 259 | 865 | | 692 | 692 | | 211 | 211 |
| | | Rural | 3,001 | | 1,801 | 1,801 | | 968 | 968 | 3,234 | | 2,587 | 2,587 | | 786 | 786 |
| | | Total | 3,802 | 0 | 2,281 | 2,281 | 0 | 1,227 | 1,227 | 4,099 | 0 | 3,279 | 3,279 | 0 | 997 | 997 |
| 5. | Bayang | Urban | 630 | | 378 | 378 | | 205 | 205 | 688 | | 551 | 551 | | 173 | 173 |
| | | Rural | 2,661 | | 1,596 | 1,596 | | 856 | 856 | 2,862 | | 2,289 | 2,289 | | 693 | 693 |
| | | Total | 3,290 | 0 | 1,974 | 1,974 | 0 | 1,061 | 1,061 | 3,550 | 0 | 2,840 | 2,840 | 0 | 866 | 866 |
| 6. | Binidayan | Urban | 580 | | 348 | 348 | | 188 | 188 | 628 | | 377 | 377 | | 29 | 29 |
| | | Rural | 2,543 | | 1,526 | 1,526 | | 820 | 820 | 2,739 | | 1,643 | 1,643 | | 117 | 117 |
| | | Total | 3,123 | 0 | 1,874 | 1,874 | 0 | 1,008 | 1,008 | 3,367 | 0 | 2,020 | 2,020 | 0 | 146 | 146 |
| 7. | Buadiposo Buntong | Urban | 105 | | 63 | 63 | | 90 | 90 | 113 | | 90 | 90 | | 27 | 27 |
| | | Rural | 2,184 | | 1,310 | 1,310 | | 1,884 | 1,884 | 2,354 | | 1,884 | 1,884 | | 573 | 573 |
| | | Total | 2,289 | 0 | 1,373 | 1,373 | 0 | 1,974 | 1,974 | 2,467 | 0 | 1,974 | 1,974 | 0 | 600 | 600 |
| 8. | Bubong | Urban | 87 | | 52 | 52 | | 28 | 28 | 94 | | 75 | 75 | | 23 | 23 |
| | | Rural | 2,752 | | 1,651 | 1,651 | | 888 | 888 | 2,966 | | 2,373 | 2,373 | | 722 | 722 |
| | | Total | 2,839 | 0 | 1,703 | 1,703 | 0 | 916 | 916 | 3,060 | 0 | 2,448 | 2,448 | 0 | 745 | 745 |
| 9. | Bumbaran | Urban | 0 | | 0 | 0 | | 0 | 0 | 0 | | 0 | 0 | | 0 | 0 |
| | | Rural | 1,338 | | 803 | 803 | | 432 | 432 | 1,442 | | 1,154 | 1,154 | | 351 | 351 |
| | | Total | 1,338 | 0 | 803 | 803 | 0 | 432 | 432 | 1,442 | 0 | 1,154 | 1,154 | 0 | 351 | 351 |
| 10. | Butig | Urban | 411 | | 247 | 247 | | 132 | 132 | 442 | | 354 | 354 | | 107 | 107 |
| | | Rural | 3,176 | | 1,906 | 1,906 | | 1,025 | 1,025 | 3,425 | | 2,740 | 2,740 | | 834 | 834 |
| | | Total | 3,588 | 0 | 2,153 | 2,153 | 0 | 1,158 | 1,158 | 3,867 | 0 | 3,094 | 3,094 | 0 | 941 | 941 |
| 11. | Calanogas | Urban | 0 | | | 0 | | | 0 | 0 | | | 0 | | | 0 |
| | | Rural | 1,749 | | 1,049 | 1,049 | | 565 | 565 | 1,885 | | 1,508 | 1,508 | | 459 | 459 |
| | | Total | 1,749 | 0 | 1,049 | 1,049 | 0 | 565 | 565 | 1,885 | 0 | 1,508 | 1,508 | 0 | 459 | 459 |
| 12. | Ditsaan-Ramain | Urban | 2,198 | | 1,319 | 1,319 | | 716 | 716 | 2,385 | | 1,908 | 1,908 | | 589 | 589 |
| | | Rural | 969 | | 582 | 582 | | 306 | 306 | 1,029 | | 823 | 823 | | 229 | 229 |
| | | Total | 3,167 | 0 | 1,900 | 1,900 | 0 | 1,022 | 1,022 | 3,414 | 0 | 2,731 | 2,731 | 0 | 818 | 818 |
| 13. | Ganassi | Urban | 656 | 247 | 147 | 394 | 136 | 78 | 215 | 711 | 270 | 157 | 426 | 23 | 10 | 33 |
| | | Rural | 2,926 | 289 | 1,466 | 1,755 | 161 | 781 | 942 | 3,150 | 318 | 1,572 | 1,890 | 29 | 117 | 146 |
| | | Total | 3,582 | 536 | 1,613 | 2,149 | 297 | 859 | 1,157 | 3,861 | 587 | 1,729 | 2,316 | 51 | 128 | 179 |

| City/Municipality | | Type | Phase I (2050-2010) | | | | | | | Phase II (2010-2015) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total Households | Number of HH to be served | | | Additional Number of HH to be served | | | Total Households | Number of HH to be served | | | Additional Number of HH to be served | | |
| | | | | Flush | Pour Flush | Total | Flush | Pour Flush | Total | | Flush | Pour Flush | Total | Flush | Pour Flush | Total |
| 14 | Kapai | Urban | 108 | | 65 | 65 | | 34 | 34 | 115 | | 92 | 92 | | 27 | 27 |
| | | Rural | 2,573 | | 1,544 | 1,544 | | 831 | 831 | 2,775 | | 2,220 | 2,220 | | 676 | 676 |
| | | Total | 2,681 | 0 | 1,608 | 1,608 | 0 | 865 | 865 | 2,889 | 0 | 2,312 | 2,312 | 0 | 703 | 703 |
| 15 | Kapatagan | Urban | | | | 0 | | | 0 | | | | 0 | | | 0 |
| | | Rural | 1,662 | | 997 | 997 | | 536 | 536 | 1,791 | | 1,433 | 1,433 | | 436 | 436 |
| | | Total | 1,662 | 0 | 997 | 997 | 0 | 536 | 536 | 1,791 | 0 | 1,433 | 1,433 | 0 | 436 | 436 |
| 16 | Lumba Bayabao | Urban | 163 | | 98 | 98 | | 54 | 54 | 179 | | 143 | 143 | | 45 | 45 |
| | | Rural | 4,126 | | 2,475 | 2,475 | | 1,331 | 1,331 | 4,444 | | 3,555 | 3,555 | | 1,080 | 1,080 |
| | | Total | 4,289 | 0 | 2,573 | 2,573 | 0 | 1,385 | 1,385 | 4,623 | 0 | 3,698 | 3,698 | 0 | 1,125 | 1,125 |
| 17 | Lumbatan | Urban | 512 | | 307 | 307 | | 176 | 176 | 575 | | 460 | 460 | | 153 | 153 |
| | | Rural | 2,086 | | 1,252 | 1,252 | | 663 | 663 | 2,225 | | 1,780 | 1,780 | | 511 | 511 |
| | | Total | 2,598 | 0 | 1,559 | 1,559 | 0 | 839 | 839 | 2,800 | 0 | 2,240 | 2,240 | 0 | 664 | 664 |
| 18 | Lumbayanague | Urban | | | | 0 | | | 0 | | | | 0 | | | 0 |
| | | Rural | 2,371 | | 1,423 | 1,423 | | 765 | 765 | 2,556 | | 2,045 | 2,045 | | 622 | 622 |
| | | Total | 2,371 | 0 | 1,423 | 1,423 | 0 | 765 | 765 | 2,556 | 0 | 2,045 | 2,045 | 0 | 622 | 622 |
| 19 | Madalum | Urban | 184 | | 110 | 110 | | 158 | 158 | 198 | | 48 | 48 | | | 0 |
| | | Rural | 3,127 | | 1,876 | 1,876 | | 2,697 | 2,697 | 3,371 | | 821 | 821 | | | 0 |
| | | Total | 3,311 | 0 | 1,987 | 1,987 | 0 | 2,855 | 2,855 | 3,569 | 0 | 869 | 869 | 0 | 0 | 0 |
| 20 | Madamba | Urban | 2,735 | | 1,641 | 1,641 | | 883 | 883 | 2,948 | | 2,358 | 2,358 | | 717 | 717 |
| | | Rural | | | | 0 | | | 0 | | | | 0 | | | 0 |
| | | Total | 2,735 | 0 | 1,641 | 1,641 | 0 | 883 | 883 | 2,948 | 0 | 2,358 | 2,358 | 0 | 717 | 717 |
| 21 | Maguing | Urban | | | | 0 | | | 0 | | | | 0 | | | 0 |
| | | Rural | 3,359 | | 2,016 | 2,016 | | 1,085 | 1,085 | 3,621 | | 2,897 | 2,897 | | 832 | 832 |
| | | Total | 3,359 | 0 | 2,016 | 2,016 | 0 | 1,085 | 1,085 | 3,621 | 0 | 2,897 | 2,897 | 0 | 832 | 832 |
| 22 | Malabang | Urban | 1,156 | | 694 | 694 | | 385 | 385 | 1,271 | | 1,017 | 1,017 | | 323 | 323 |
| | | Rural | 4,610 | | 2,766 | 2,766 | | 1,477 | 1,477 | 4,945 | | 3,956 | 3,956 | | 1,190 | 1,190 |
| | | Total | 5,766 | 0 | 3,460 | 3,460 | 0 | 1,862 | 1,862 | 6,215 | 0 | 4,972 | 4,972 | 0 | 1,513 | 1,513 |
| 23 | Marantao | Urban | 665 | | 399 | 399 | | 204 | 204 | 733 | | 586 | 586 | | 188 | 188 |
| | | Rural | 3,561 | | 2,136 | 2,136 | | 1,154 | 1,154 | 3,847 | | 3,078 | 3,078 | | 941 | 941 |
| | | Total | 4,225 | 0 | 2,535 | 2,535 | 0 | 1,357 | 1,357 | 4,580 | 0 | 3,664 | 3,664 | 0 | 1,129 | 1,129 |
| 24 | Marogong | Urban | 304 | | 1,718 | 1,718 | | 925 | 925 | 309 | | 2,469 | 2,469 | | 751 | 751 |
| | | Rural | 2,559 | | 0 | 0 | | 0 | 0 | 2,777 | | 0 | 0 | | 0 | 0 |
| | | Total | 2,863 | 0 | 1,718 | 1,718 | 0 | 925 | 925 | 3,086 | 0 | 2,469 | 2,469 | 0 | 751 | 751 |
| 25 | Masiu | Urban | 1,505 | | 46 | 46 | | 25 | 25 | 1,607 | | 67 | 67 | | 21 | 21 |
| | | Rural | 2,097 | | 2,114 | 2,114 | | 1,137 | 1,137 | 2,274 | | 3,038 | 3,038 | | 924 | 924 |
| | | Total | 3,601 | 0 | 2,161 | 2,161 | 0 | 1,162 | 1,162 | 3,882 | 0 | 3,105 | 3,105 | 0 | 945 | 945 |
| 26 | Mulondo | Urban | 988 | | 593 | 593 | | 317 | 317 | 1,062 | | 849 | 849 | | 256 | 256 |
| | | Rural | 957 | | 574 | 574 | | 311 | 311 | 1,035 | | 828 | 828 | | 254 | 254 |
| | | Total | 1,945 | 0 | 1,167 | 1,167 | 0 | 628 | 628 | 2,097 | 0 | 1,677 | 1,677 | 0 | 510 | 510 |
| 27 | Pagayawan | Urban | 216 | | 130 | 130 | | 70 | 70 | 234 | | 187 | 187 | | 57 | 57 |
| | | Rural | 1,332 | | 799 | 799 | | 430 | 430 | 1,435 | | 1,148 | 1,148 | | 349 | 349 |
| | | Total | 1,548 | 0 | 929 | 929 | 0 | 500 | 500 | 1,669 | 0 | 1,335 | 1,335 | 0 | 406 | 406 |

| | City/Municipality | Type | Phase I (2050-2010) | | | | | | Phase II (2010-2015) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total Households | Number of HH to be served | | Additional Number of HH to be served | | | Total Households | Number of HH to be served | | | Additional Number of HH to be served | |
| | | | | Flush | Pour Flush | Flush | Pour Flush | Total | | Flush | Pour Flush | Total | Flush | Pour Flush | Total |
| 28 | Piagapo | Urban | 284 | | 170 | | 86 | 86 | 326 | | 261 | 261 | | 91 | 91 |
| | | Rural | 3,815 | | 2,289 | | 1,231 | 1,231 | -4,112 | | 3,290 | 3,290 | | 1,001 | 1,001 |
| | | Total | 4,099 | 0 | 2,459 | 0 | 1,318 | 1,318 | -3,786 | 0 | 3,551 | 3,551 | 0 | 1,091 | 1,091 |
| 29 | Poona Bayabao | Urban | 195 | | 117 | | 64 | 64 | 211 | | 169 | 169 | | 52 | 52 |
| | | Rural | 2,701 | | 1,620 | | 871 | 871 | 2,910 | | 2,328 | 2,328 | | 687 | 687 |
| | | Total | 2,896 | 0 | 1,737 | 0 | 935 | 935 | 3,121 | 0 | 2,497 | 2,497 | 0 | 739 | 739 |
| 30 | Pualas | Urban | 102 | | 61 | | 34 | 34 | 111 | | 89 | 89 | | 28 | 28 |
| | | Rural | 1,596 | | 958 | | 515 | 515 | 1,719 | | 1,375 | 1,375 | | 387 | 387 |
| | | Total | 1,698 | 0 | 1,019 | 0 | 548 | 548 | 1,830 | 0 | 1,464 | 1,464 | 0 | 414 | 414 |
| 31 | Saguiaran | Urban | 190 | | 114 | | 60 | 60 | 201 | | 161 | 161 | | 47 | 47 |
| | | Rural | 3,440 | | 2,064 | | 1,112 | 1,112 | 3,712 | | 2,969 | 2,969 | | 905 | 905 |
| | | Total | 3,630 | 0 | 2,178 | 0 | 1,172 | 1,172 | 3,913 | 0 | 3,130 | 3,130 | 0 | 952 | 952 |
| 32 | S. Domalondong | Urban | | | 0 | | 0 | 0 | | | 0 | 0 | | | 0 |
| | | Rural | 1,566 | | 940 | | 505 | 505 | 1,688 | | 1,350 | 1,350 | | 411 | 411 |
| | | Total | 1,566 | 0 | 940 | 0 | 505 | 505 | 1,688 | 0 | 1,350 | 1,350 | 0 | 411 | 411 |
| 33 | S. Gumander | Urban | 311 | | 186 | | 106 | 106 | 346 | | 277 | 277 | | 90 | 90 |
| | | Rural | 1,720 | | 1,032 | | 550 | 550 | 1,844 | | 1,475 | 1,475 | | 442 | 442 |
| | | Total | 2,031 | 0 | 1,219 | 0 | 656 | 656 | 2,189 | 0 | 1,751 | 1,751 | 0 | 532 | 532 |
| 34 | Tagoloan II | Urban | | | 0 | | 0 | 0 | | | 0 | 0 | | | 0 |
| | | Rural | 1,256 | | 754 | | 406 | 406 | 1,354 | | 1,083 | 1,083 | | 330 | 330 |
| | | Total | 1,256 | 0 | 754 | 0 | 406 | 406 | 1,354 | 0 | 1,083 | 1,083 | 0 | 330 | 330 |
| 35 | Tamparan | Urban | | | 0 | | 0 | 0 | | | 0 | 0 | | | 0 |
| | | Rural | 3,400 | | 2,040 | | 1,097 | 1,097 | 3,665 | | 2,932 | 2,932 | | 884 | 884 |
| | | Total | 3,400 | 0 | 2,040 | 0 | 1,097 | 1,097 | 3,665 | 0 | 2,932 | 2,932 | 0 | 884 | 884 |
| 36 | Taraka | Urban | 2,141 | | 1,285 | | 689 | 689 | 2,303 | | 1,842 | 1,842 | | 558 | 558 |
| | | Rural | 868 | | 521 | | 282 | 282 | 940 | | 752 | 752 | | 232 | 232 |
| | | Total | 3,009 | 0 | 1,805 | 0 | 971 | 971 | 3,243 | 0 | 2,595 | 2,595 | 0 | 789 | 789 |
| 37 | Tubaran | Urban | 118 | | 71 | | 38 | 38 | 128 | | 102 | 102 | | 31 | 31 |
| | | Rural | 1,866 | | 1,120 | | 602 | 602 | 2,011 | | 1,609 | 1,609 | | 474 | 474 |
| | | Total | 1,984 | 0 | 1,190 | 0 | 640 | 640 | 2,138 | 0 | 1,711 | 1,711 | 0 | 505 | 505 |
| 38 | Tugaya | Urban | | | 0 | | 0 | 0 | | | 0 | 0 | | | 0 |
| | | Rural | 2,824 | | 1,694 | | 911 | 911 | 3,043 | | 2,435 | 2,435 | | 741 | 741 |
| | | Total | 2,824 | 0 | 1,694 | 0 | 911 | 911 | 3,043 | 0 | 2,435 | 2,435 | 0 | 741 | 741 |
| 39 | Wao | Urban | 2,424 | 526 | 928 | 134 | 235 | 369 | 2,613 | 756 | 1,334 | 2,090 | 230 | 406 | 636 |
| | | Rural | 5,258 | 415 | 2,740 | 105 | 695 | 800 | 5,667 | 596 | 3,938 | 4,534 | 181 | 1,198 | 1,379 |
| | | Total | 7,682 | 941 | 3,668 | 239 | 930 | 1,169 | 8,280 | 1,353 | 5,271 | 6,624 | 411 | 1,604 | 2,015 |
| | Total | Urban | 46,768 | 7,033 | 21,707 | 2,667 | 10,636 | 13,303 | 50,499 | 9,836 | 31,188 | 41,024 | 2,602 | 9,371 | 11,974 |
| | | Rural | 92,512 | 704 | 54,124 | 266 | 31,165 | 31,431 | 91,453 | 914 | 74,772 | 75,685 | 210 | 21,560 | 21,770 |
| | | Total | 139,280 | 7,737 | 75,831 | 2,933 | 41,801 | 44,734 | 141,952 | 10,750 | 105,959 | 116,709 | 2,812 | 30,931 | 33,744 |

For both Phases, pour flush type toilets shall be utilized in areas with proposed or existing Level I and II systems while automatic flush type shall be used in areas with Level III systems.

The projected number of served households at the end of Phase I period is 83,568. Additional number of households to be served totaled to 44,734, of which 30% is urban households and 70% is rural households. While at the end of the Phase II period, the projected number of served households is 116,709 with an additional household to be served of 33,744.

***Public School and Public Toilet Facilities.*** The additional number of public school toilets are based on the present number of schools with toilet facilities and projected based on the increase in the number of students by municipality.

Public toilet facilities are projected based on existing number of public utilities with sanitary toilet facilities. Table 7-10 shows the corresponding projections, where the additional number of public schools and public utilities is equal to the number of additional toilet facilities:

**Table 7-10 Projected Schools and Public Utilities by Municipality**

| City/Municipality | | Public Schools | | | Public Utilities | | |
|---|---|---|---|---|---|---|---|
| | | 2003 | 2010 | 2015 | 2003 | 2010 | 2015 |
| 1 | Marawi City | 82 | 91 | 98 | 8 | 9 | 10 |
| 2 | Bacolod Grande | 21 | 23 | 24 | 1 | 2 | 3 |
| 3 | Balabagan | 17 | 19 | 20 | 1 | 2 | 3 |
| 4 | Balindong | 32 | 36 | 39 | 1 | 2 | 3 |
| 5 | Bayang | 14 | 17 | 19 | 1 | 2 | 3 |
| 6 | Binidayan | 16 | 17 | 19 | 1 | 2 | 3 |
| 7 | Buadiposo Buntong | 12 | 13 | 14 | 1 | 2 | 3 |
| 8 | Bubong | 16 | 18 | 19 | 1 | 2 | 3 |
| 9 | Bumbaran | 7 | 8 | 9 | 1 | 2 | 3 |
| 10 | Butig | 21 | 23 | 25 | 1 | 2 | 3 |
| 11 | Calanogas | 8 | 9 | 9 | 1 | 2 | 3 |
| 12 | Ditsaan-Ramain | 14 | 15 | 16 | 1 | 2 | 3 |
| 13 | Ganassi | 17 | 19 | 21 | 2 | 3 | 4 |
| 14 | Kapai | 17 | 19 | 21 | 1 | 2 | 3 |
| 15 | Kapatagan | 7 | 8 | 8 | 1 | 2 | 3 |
| 16 | Lumba Bayabao | 26 | 29 | 32 | 1 | 2 | 3 |
| 17 | Lumbatan | 20 | 22 | 24 | 1 | 2 | 3 |
| 18 | Lumbayanague | 22 | 24 | 25 | 1 | 2 | 3 |
| 19 | Madalum | 18 | 20 | 21 | 1 | 2 | 3 |
| 20 | Madamba | 13 | 14 | 15 | 1 | 2 | 3 |
| 21 | Maguing | 12 | 13 | 14 | 1 | 2 | 3 |
| 22 | Malabang | 23 | 25 | 27 | 3 | 4 | 5 |
| 23 | Marantao | 28 | 31 | 33 | 1 | 2 | 3 |

| City/Municipality | | Public Schools | | | Public Utilities | | |
|---|---|---|---|---|---|---|---|
| | | 2003 | 2010 | 2015 | 2003 | 2010 | 2015 |
| 24 | Marogong | 19 | 21 | 22 | 1 | 2 | 3 |
| 25 | Maslu | 37 | 42 | 45 | 1 | 2 | 3 |
| 26 | Mulondo | 11 | 13 | 14 | 1 | 2 | 3 |
| 27 | Pagayawan | 10 | 12 | 13 | 1 | 2 | 3 |
| 28 | Piagapo | 20 | 22 | 23 | 1 | 2 | 3 |
| 29 | Poona Bayabao | 14 | 15 | 16 | 1 | 2 | 3 |
| 30 | Pualas | 18 | 20 | 21 | 1 | 2 | 3 |
| 31 | Saguiaran | 27 | 31 | 33 | 1 | 2 | 3 |
| 32 | S. Domalondong | 3 | 4 | 4 | 1 | 2 | 3 |
| 33 | S. Gumander | 14 | 15 | 16 | 1 | 2 | 3 |
| 34 | Tagoloan II | 17 | 19 | 21 | 1 | 2 | 3 |
| 35 | Tamparan | 12 | 14 | 15 | 1 | 2 | 3 |
| 36 | Taraka | 14 | 16 | 17 | 1 | 2 | 3 |
| 37 | Tubaran | 14 | 15 | 17 | 1 | 2 | 3 |
| 38 | Tugaya | 19 | 21 | 23 | 1 | 2 | 3 |
| 39 | Wao | 28 | 32 | 35 | 4 | 5 | 6 |
| Provinciual Total | | 740 | 826 | 889 | 52 | 91 | 130 |

## 7.6 Facilities and Equipment to Meet the Target Services

### 7.6.1 Water Supply

*Urban water supply*: Physical requirements of Level III systems were estimated as the number of required household connections.

*Rural water supply.* Physical requirements of Level II were estimated as the number of communal faucets while that of Level I were estimated as the number of wells either as deep wells or shallow wells.

The required water supply facilities are listed in Table 7-11, and are shown in Figures 7-1 and 7-2 for Phases I and II development, respectively.

## Table 7-11 Water Supply Facilities Required by Target Year

| City/Municipality | | Phase I (2005-2010) Requirement | | | | | Phase II (2010-2015) Requirement | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Level III | | Level II | | Level I | Level III | Level II | Level I |
| | | Mode of Project | No. of Connections | Mode of Project | No. of stand faucets | Total No. of wells | No. of Connections | No. of stand faucets | No. of add'l wells |
| 1 | Marawi City | Expansion | 3,416 | New | 1,606 | 0 | 2,937 | 856 | 0 |
| 2 | Bacolod Grande | | | New | 118 | 16 | | 102 | 24 |
| 3 | Balabagan | | | Expansion | 7 | 37 | | 33 | 66 |
| 4 | Balindong | | | New | 86 | 28 | | 44 | 50 |
| 5 | Bayang | | | Expansion | 40 | 23 | | 46 | 41 |
| 6 | Binidayan | | | New | 58 | 24 | | 30 | 43 |
| 7 | Buadiposo Buntong | | | New | 11 | 21 | | 21 | 35 |
| 8 | Bubong | | | Expansion | 19 | 17 | | 53 | 31 |
| 9 | Bumbaran | | | New | 14 | 12 | | 6 | 21 |
| 10 | Butig | | | Expansion | 49 | 23 | | 57 | 42 |
| 11 | Calanogas | | | New | 10 | 16 | | 53 | 22 |
| 12 | Ditsaan-Ramain | | | New | 220 | 8 | | 114 | 16 |
| 13 | Ganassi | Expansion | 61 | Expansion | 21 | 23 | 238 | 22 | 37 |
| 14 | Kapai | | | Expansion | 19 | 17 | | 48 | 29 |
| 15 | Kapatagan | | | New | 5 | 10 | | 31 | 18 |
| 16 | Lumba Bayabao | | | New | 23 | 34 | | 34 | 60 |
| 17 | Lumbatan | | | Expansion | 9 | 19 | | 29 | 33 |
| 18 | Lumbayanague | | | New | 17 | 20 | | 8 | 36 |
| 19 | Madalum | | | Expansion | 18 | 30 | | 9 | 53 |
| 20 | Madamba | | | Expansion | 8 | 19 | | 39 | 33 |
| 21 | Maguing | | | New | 13 | 29 | | 7 | 54 |
| 22 | Malabang | | | Expansion | 19 | 38 | | 90 | 67 |
| 23 | Marantao | | | New | 66 | 34 | | 36 | 61 |
| 24 | Marogong | | | Expansion | 32 | 24 | | 20 | 42 |
| 25 | Masiu | | | Expansion | 12 | 21 | | 70 | 38 |
| 26 | Mulondo | | | New | 99 | 9 | | 50 | 16 |
| 27 | Pagayawan | | | New | 22 | 13 | | 11 | 23 |
| 28 | Piagapo | | | New | 28 | 36 | | 17 | 65 |
| 29 | Poona Bayabao | | | New | 19 | 26 | | 10 | 46 |
| 30 | Pualas | | | New | 10 | 36 | | 5 | 6 |
| 31 | Saguiaran | | | New | 38 | 31 | | 19 | 55 |
| 32 | S. Domalondong | | | New | 46 | 9 | | 28 | 17 |
| 33 | S. Gumander | | | New | 31 | 16 | | 17 | 29 |
| 34 | Tagoloan II | | | New | 11 | 11 | | 5 | 19 |
| 35 | Tamparan | | | New | 33 | 29 | | 16 | 52 |
| 36 | Taraka | | | New | 231 | 8 | | 108 | 15 |
| 37 | Tubaran | | | New | 12 | 18 | | 6 | 32 |
| 38 | Tugaya | | | New | 16 | 25 | | 7 | 45 |
| 39 | Wao | Expansion | 191 | Expansion | 690 | 3 | 122 | 120 | 3 |
| | **Provinciual Total** | | 3,668 | | 3,786 | 812 | 3,298 | 2,280 | 1,373 |

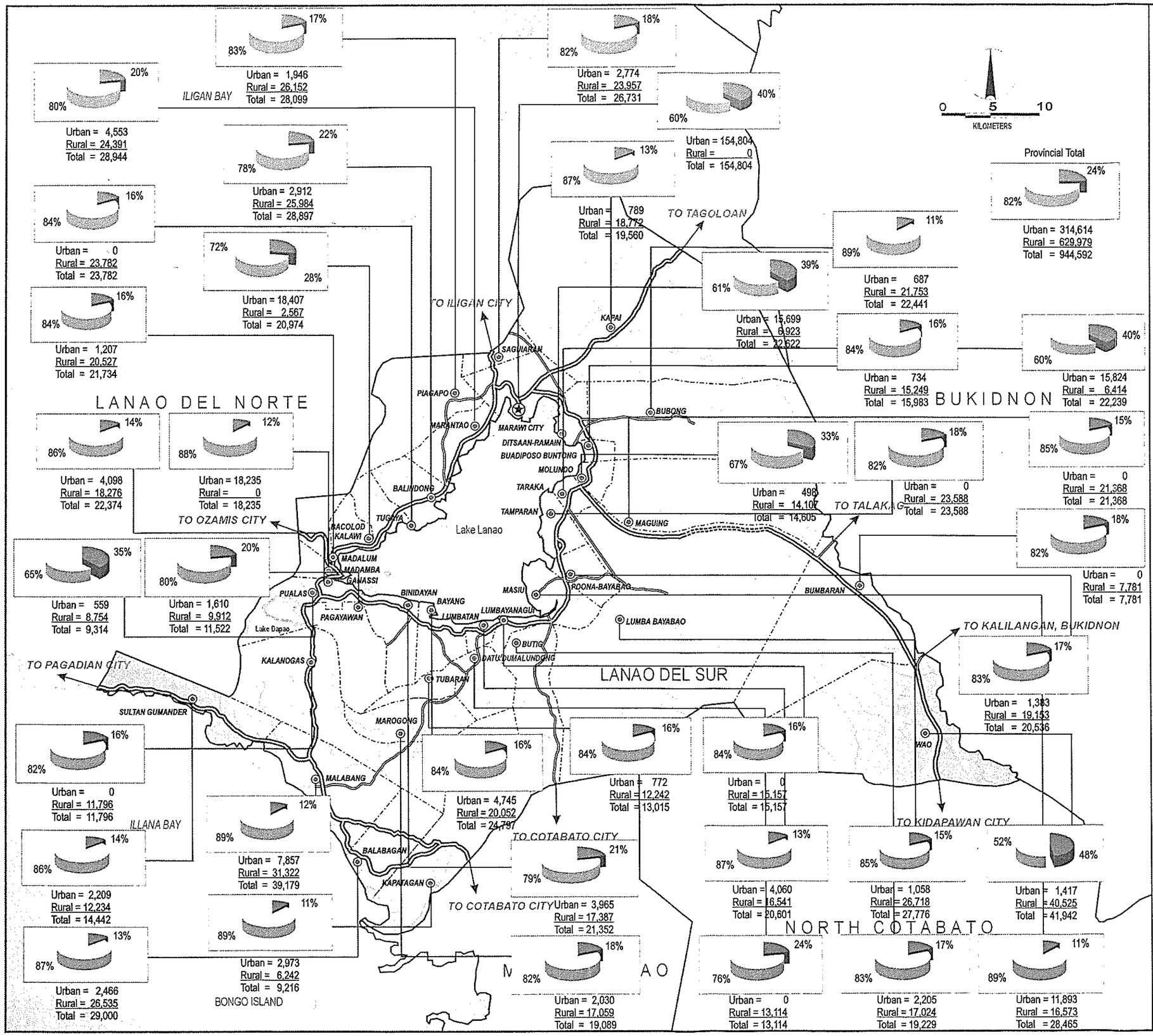



Figure 7-1
WATER SUPPLY FACILITIES
FUTURE REQUIREMENT
PHASE I (2005-2010)
LANAO DEL SUR

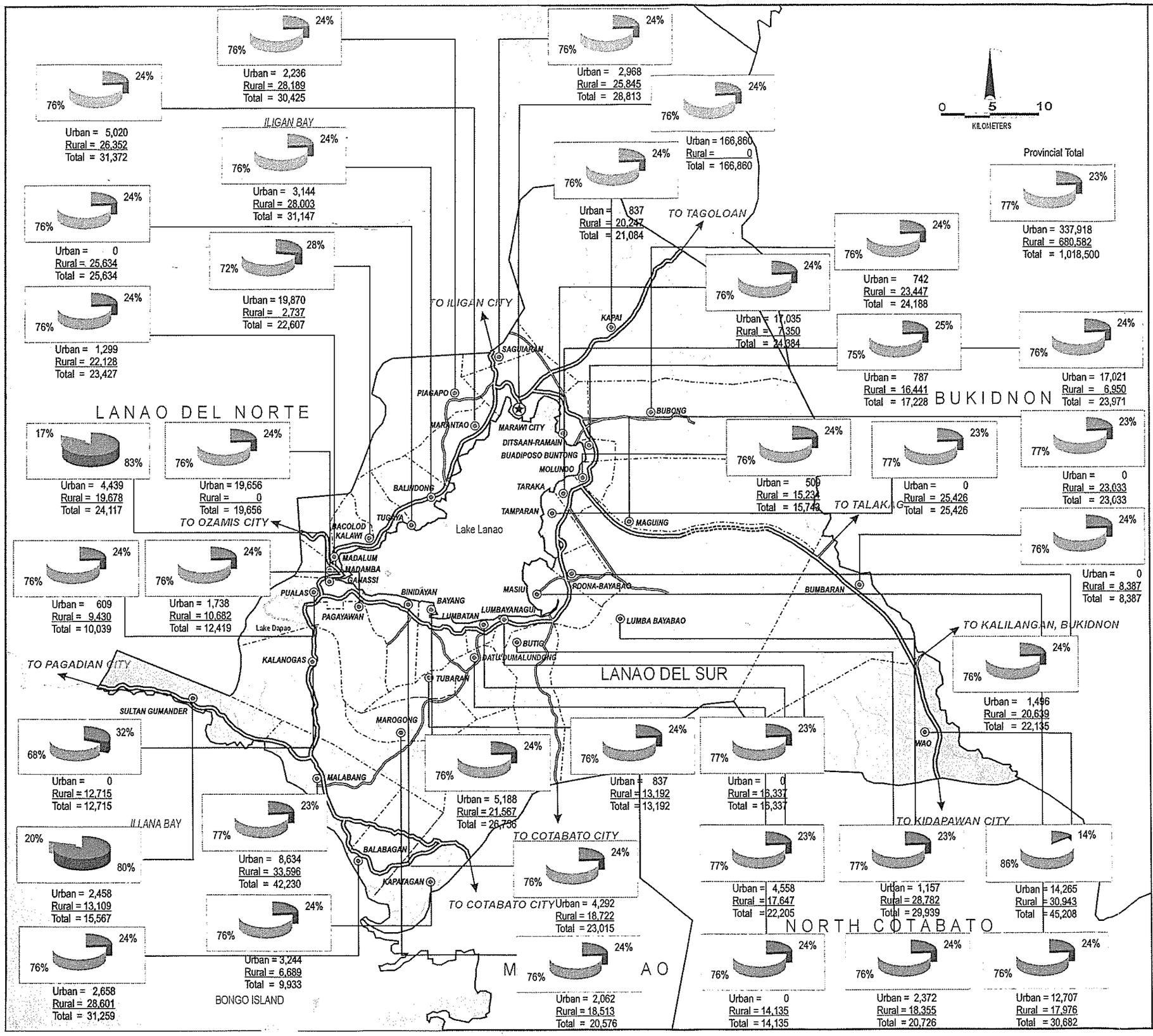



Figure 7-2
WATER SUPPLY FACILITIES
FUTURE REQUIREMENT
PHASE II (2010-2015)
LANAO DEL SUR

### 7.6.2 Sanitation

***Household Toilets.*** Future requirements on the number of household toilets were estimated based on the additional number of households to be served both for urban and rural population by municipality.

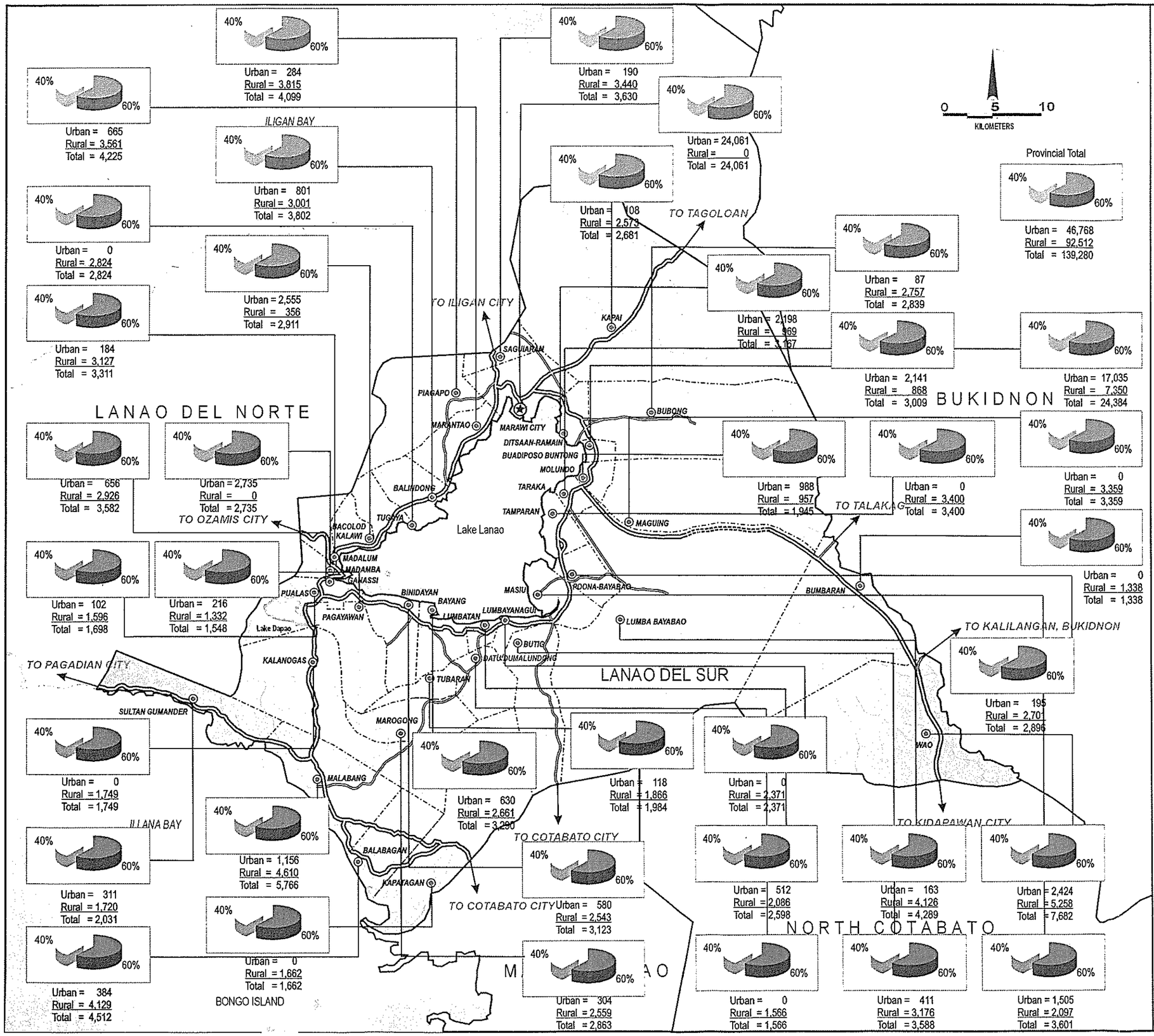
***Public School and Public Toilets.*** The future requirements for public school and public toilets were estimated based on the projected increase in the number of public school and public utilities.

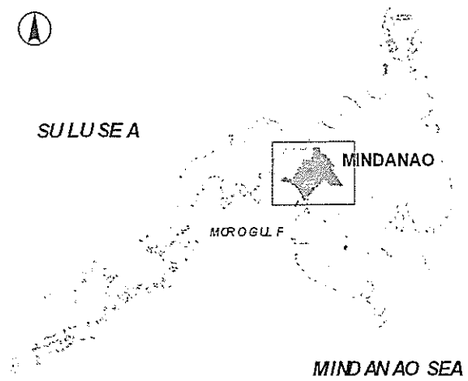
The required sanitation facilities are listed in Table 7-12, and are shown in Figures 7-3 and 7-4 for Phase I and II development, respectively.

**Table 7-12 Sanitation Facilities Required by Target Year**

| City/Municipality | | Phase I (2005-2010) Requirement | | | Phase II (2010-2015) Requirement | | |
|---|---|---|---|---|---|---|---|
| | | No. of Household Toilet | No. of School Toilet | No. of Public Toilet | No. of Household Toilet | No. of School Toilet | No. of Public Toilet |
| 1 | Marawi City | 5,843 | 9 | 1 | 5,947 | 7 | 1 |
| 2 | Bacolod Grande | 940 | 2 | 1 | 755 | 1 | 1 |
| 3 | Balabagan | 1,456 | 2 | 1 | 1,184 | 1 | 1 |
| 4 | Balindong | 1,227 | 4 | 1 | 997 | 3 | 1 |
| 5 | Bayang | 1,061 | 3 | 1 | 866 | 2 | 1 |
| 6 | Binidayan | 1,008 | 1 | 1 | 146 | 1 | 1 |
| 7 | Buadiposo Buntong | 739 | 1 | 1 | 600 | 1 | 1 |
| 8 | Bubong | 916 | 2 | 1 | 745 | 1 | 1 |
| 9 | Bumbaran | 432 | 1 | 1 | 351 | 1 | 1 |
| 10 | Butig | 1,158 | 2 | 1 | 941 | 2 | 1 |
| 11 | Calanogas | 565 | 1 | 1 | 459 | 1 | 1 |
| 12 | Ditsaan-Ramain | 1,022 | 1 | 1 | 818 | 1 | 1 |
| 13 | Ganassi | 1,157 | 2 | 1 | 179 | 2 | 1 |
| 14 | Kapai | 865 | 2 | 1 | 703 | 2 | 1 |
| 15 | Kapatagan | 536 | 1 | 1 | 436 | 0 | 1 |
| 16 | Lumba Bayabao | 1,385 | 3 | 1 | 1,125 | 2 | 1 |
| 17 | Lumbatan | 839 | 2 | 1 | 664 | 2 | 1 |
| 18 | Lumbayanague | 765 | 2 | 1 | 622 | 1 | 1 |
| 19 | Madalum | 1,069 | 2 | 1 | 869 | 1 | 1 |
| 20 | Madamba | 883 | 1 | 1 | 717 | 1 | 1 |
| 21 | Maguing | 1,085 | 1 | 1 | 832 | 1 | 1 |
| 22 | Malabang | 1,862 | 2 | 1 | 1,513 | 2 | 1 |
| 23 | Marantao | 1,357 | 3 | 1 | 1,129 | 2 | 1 |
| 24 | Marogong | 925 | 2 | 1 | 751 | 1 | 1 |
| 25 | Masiu | 1,162 | 5 | 1 | 945 | 3 | 1 |
| 26 | Mulondo | 628 | 2 | 1 | 510 | 1 | 1 |

| City/Municipality | | Phase I (2005-2010) Requirement | | | Phase II (2010-2015) Requirement | | |
|---|---|---|---|---|---|---|---|
| | | No. of Household Toilet | No. of School Toilet | No. of Public Toilet | No. of Household Toilet | No. of School Toilet | No. of Public Toilet |
| 27 | Pagayawan | 500 | 2 | 1 | 406 | 1 | 1 |
| 28 | Piagapo | 1,318 | 2 | 1 | 1,091 | 1 | 1 |
| 29 | Poona Bayabao | 935 | 1 | 1 | 739 | 1 | 1 |
| 30 | Pualas | 548 | 2 | 1 | 414 | 1 | 1 |
| 31 | Saguiaran | 1,172 | 4 | 1 | 952 | 3 | 1 |
| 32 | S. Domalondong | 505 | 1 | 1 | 411 | 1 | 1 |
| 33 | S. Gumander | 656 | 1 | 1 | 532 | 1 | 1 |
| 34 | Tagoloan II | 406 | 2 | 1 | 330 | 2 | 1 |
| 35 | Tamparan | 1,097 | 2 | 1 | 884 | 1 | 1 |
| 36 | Taraka | 971 | 2 | 1 | 789 | 1 | 1 |
| 37 | Tubaran | 640 | 1 | 1 | 505 | 1 | 1 |
| 38 | Tugaya | 911 | 2 | 1 | 741 | 2 | 1 |
| 39 | Wao | 1,169 | 4 | 1 | 2,015 | 3 | 1 |
| | **Total** | **41,712** | **86** | **39** | **34,612** | **62** | **39** |




## KEY MAP

LEGEND:

- Provincial Boundary
- Municipal Boundary
- River
- National Road
- Non-Passable National Road
- Provincial Road
- City Center
- Town Center
- Population served by sanitation facilities (%)
- Population un-served by sanitation facilities (%)

Source: PPDO & ACTUAL FIELD VERIFICATION

Figure 7-3

SANITATION FACILITIES
FUTURE REQUIREMENT
PHASE I (2005-2010)
LANAO DEL SUR

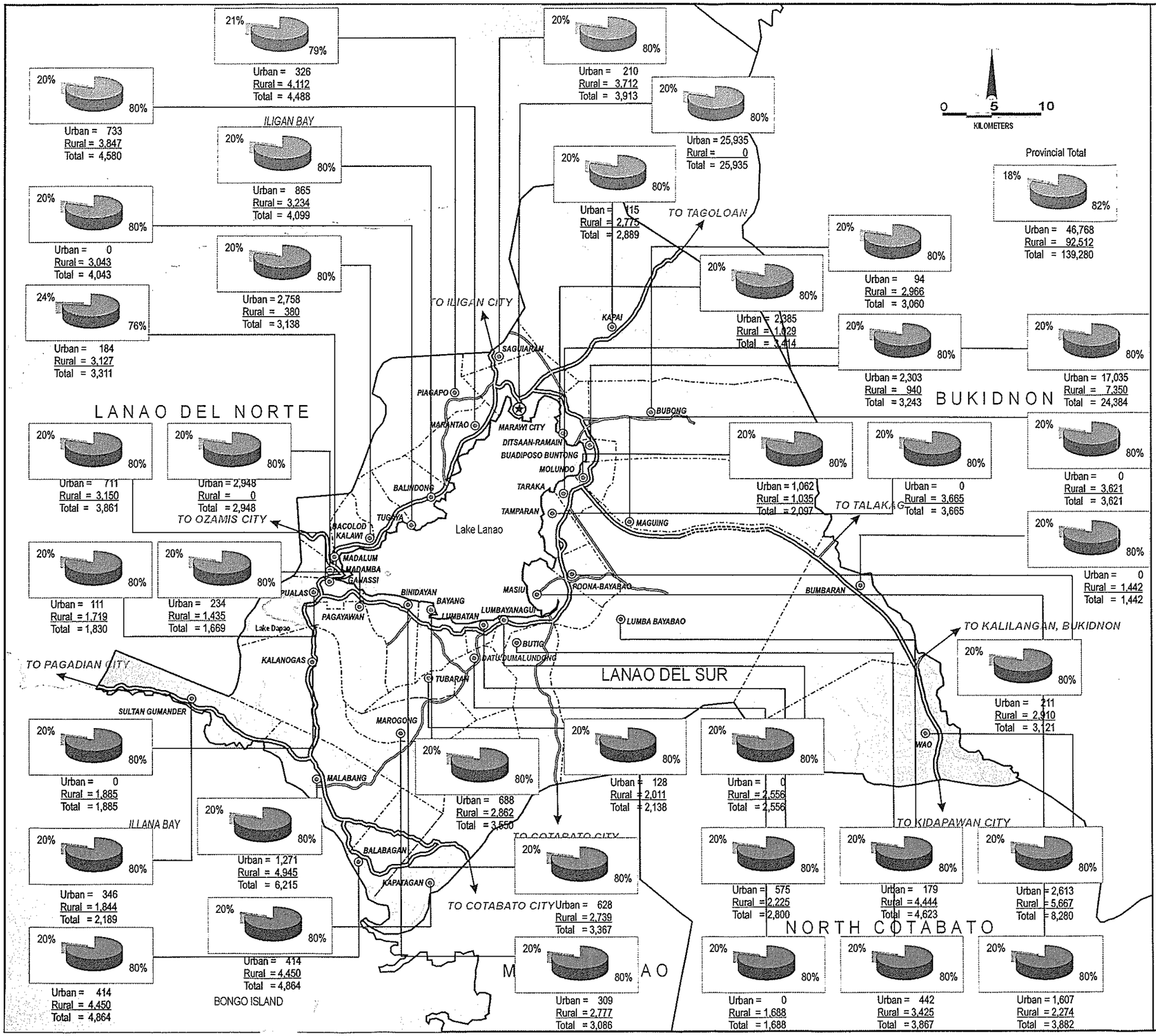



Figure 7-4

SANITATION FACILITIES
FUTURE REQUIREMENT
PHASE II (2010-2015)
LANAO DEL SUR

# CHAPTER 8

# INSTITUTIONAL STRENGTHENING PLAN

# 8. INSTITUTIONAL STRENGTHENING PLAN

## 8.1 General

This Chapter recommends the initial mechanisms, processes and structures needed to achieve the goals and targets of the sector.

### 8.1.1 Development Framework for the Sector

One basic institutional deficiency at the local level is the absence of a common goal and strategy for the sector. The Province has to set the specific goals, objectives/targets and strategy for the sector. While the province has a Physical Framework Plan, this is not sufficient to establish sector priorities and considering the problems besetting the sector, the province needs identify priority activities that must be funded.

### 8.1.2 Operating Policies

The following general policy and strategy statements as established already in the PW4SP could form the initial policy set for sector for adoption and approval by the Provincial Government:

- Sustainability shall be promoted through community-based organizing, training and information dissemination to increase willingness to organize, willingness to pay and willingness to learn O&M of facility;
- Criteria for selection and prioritizing projects to the community should consider sustainability factors and should be based on the demonstrated commitment of the beneficiaries to participate in the project, the current needs for water and sanitation and overall health conditions, potentials for growth and costs;
- Appropriate service level shall be determined based on sustainability parameters, goals and purposes of the Province, the needs of the community based on demographics and demonstrated capacity and willingness to participate in the project by the communities;
- Technology to be used for the projects shall be appropriate to the local conditions and resources. Upgrading of existing systems and facilities will be promoted based on needs of the community. In urban areas, a range of technologies may be needed integrating wastewater collection and treatment, as well as drainage;

- All projects developed by the LGU must involve an integrated approach to the provision of potable water supply, sanitation and hygiene education;
- Cost Recovery and Cost Sharing (Subsidy Policies). The LGU shall enforce a rational and consistent policy on the application of subsidies and loans for water supply and sanitation;
- Private Sector Participation policies and incentives shall be primarily encouraged, but regulated by the LGU. The LGU should take measures to institutionalize its regulatory functions in order to regulate private water service providers;
- In terms of financing, capital costs generally used to construct water supply projects shall be financed mainly out of the concerned LGU's own resources given that in ARMM, non-devolved services provide the LGUs with surplus funds;
- Concerns for environmental protection and management including water pollution control, conservation and proper utilization of water and land resources should be part of the LGU's programs;
- Policies to be formulated should be gender-responsive. The different aspects of the sector project – technical, economic, financial, institutional and community participation – should provide for equal participation of women and men in the beneficiary community.

### 8.1.3 Regulatory Policies

In coordination with appropriate national and local agencies, the LGU shall endeavor to set up a coordinated regulatory framework on the following:

- Water allocation and water rights policies and rate review, which are within the mandate of the National Water Resources Board.
- Water Service Providers Registration/Accreditation - The LGU shall adopt a registration and franchising system for water service associations/ providers. Annual reporting requirements will have to be established for monitoring and auditing purposes.

- Water Quality - The LGU will have to establish a viable mechanism, including water testing and standards enforcement, to ensure that water delivered meet the potability standards set by the National Drinking Water Standards. The DOH currently has the responsibility and the regulatory power to stop the operations of water systems not delivering potable water. The LGU shall establish Water Surveillance Program thru the creation of a Local Drinking Water Quality Monitoring Committee (per Implementing Rules and Regulations of Chapter II, Water Supply, of the Code of Sanitation of the Philippines, P.D.856).

## 8.2 Institutional Arrangements

In the medium-term, a full-time Provincial (WATSAN) Sector Team (PST) to provide a focal point in the Province shall be set up for coordination, monitoring and institution-building. The LGU should ensure that adequate logistics and incentives are provided. This may be replicated at the municipal and barangay level of the LGU.

In the long term, the PST may be formed as a Provincial Water and Sanitation Office (PWSO) under the office of the Chief Executive of the LGU. For LGU-run water systems, this would be the office of the economic enterprise within the LGU with duties and functions beyond coordination and monitoring. It would become the focal point of WATSAN activities of the Province and coordination and monitoring of all WATSAN activities would emanate from that office. It would also be the regulating arm of the Province for all WATSAN activities within its provincial jurisdiction. This should be replicated at the municipal level. A PMO for water supply and sanitation at the DILG-ARMM to provide technical and managerial assistance in the formative years of the PST/PWSO is highly recommended to be set up.

Both the Province and Municipality may set up such a Team (for the medium-term) or Office (for the long-term) in their respective LGUs.

With the devolution of water supply and sanitation to the LGU, the DPWH-DEO-ARMM may still provide technical services at cost and in competition with other private contractors. Sharing of resources (equipment and staff) with the LGU at cost may be looked into subject to policy decision and guidelines approved at the national level.

The initial professional-level staffing of the PST/PWSO is estimated, as follows:

- Provincial Water Supply & Sanitation Coordinator 1
- Community Development, Gender & Training Specialist 2
- Water Supply & Sanitation Engineer 2
- Monitoring and Evaluation Specialist 1
- Total Personnel Required 6

The recommended roles for the various staff positions are as follows:

- The **Provincial Waterworks & Sanitation Coordinator** shall lead an interdisciplinary Provincial Sector Team, shall be responsible for coordination and supervision of all development planning, implementation, monitoring and evaluation, database development and progress reporting of all activities in the water supply and sanitation sector, shall also liaise with all project implementers and key players in the sector and shall be the key contact person of the DILG for WATSAN concerns.

- The **Community Development, Gender and Training Specialist** shall be responsible for implementing community organizing and community participation aspects of the sector with a gender-responsive approach, shall be responsible for developing and implementing community-based programs and activities for the sector in the various barangays and municipalities, including criteria for community and site selection, conducting regular dialogues and disseminating information among local leaders on water supply, sanitation and health and hygiene education program province-wide, shall oversee accreditation of community-based organizations responsible for the water supply and sanitation facilities, and shall annually review past training programs and develop and implement the province's training programs for water supply and sanitation, hygiene and sanitation education, and community organization and development, including any manuals or other training materials used.

- The **Water Supply and Sanitation Engineer** shall be responsible for all the technical aspects of the project including feasibility studies, design, construction, operation and maintenance, review of the existing technical and environmental situation relating to WSS facilities, proper construction supervision and monitoring in coordination with the municipal liaison, adequate maintenance of LGU equipment and tools for water and sanitation facilities, including drilling rigs and vehicles supervise major repair or

rehabilitation work beyond the capacity of communities to undertake and implement, in coordination with the IPHO, the water quality surveillance system.

- The **Monitoring and Evaluation Specialist** shall assist the Coordinator in all monitoring and evaluation activities including development of database and data processing and reporting for baseline, monitoring and evaluation data.

The same can be done at the municipal level, with the Municipal Waterworks and Sanitation Coordinator also acting as Sector Liaison for the municipality to the Province.

At the barangay level, the Barangay Councils will continue to play a major role in fulfilling the community's aspirations for improved water and sanitation services. It will play a key role particularly in the preparatory stages before the organization of the association (or the appointment of the responsible group). By default, many of the previously failed systems have ended up as responsibilities of the barangay councils. Although the Councils will not have any supervisory role over the associations operating the water systems, it is important that they monitor the performance of the associations.

## 8.3 Project Management Arrangements

### 8.3.1 Levels I and II

**Project Selection.** A community-responsive approach should be used as primary process for project selection. The initiative of the community should be encouraged. All barangays should be properly and consistently informed about sector opportunities and policies by the Provincial through its municipal LGUs. The barangays should take the first step by assessing their needs, deciding that they want to improve their water and sanitation above all other needs and express this needs to the Municipal LGU's WATSAN Unit. The barangay should also decide on desired service levels, with a full understanding of the cost recovery aspects and other responsibilities.

**Organization of associations.** More flexibility is needed in order to tap into local community resources.The basic principle is for the community to agree on what type of organization, association, community-based organization, cooperative, etc. they want to form in preparation for accepting the responsibility for the facilities. Existing community-based groups with an active track record and with leaders and members who are ready, willing and able to take on the

O&M functions may be tasked with the responsibility for the facilities. LGUs will assess the readiness of the communities and approve the arrangements and accredit the organization. Failure of community-based organizations to live up to their responsibilities can be grounds for removing their accreditation and giving the responsibility to another accredited group. The organization can decide how to organize itself internally in coordination with the municipal liaison ensuring that roles, responsibilities and accountabilities are adhered.

**Technology and Technical Design Standards.** The former Rural Waterworks Development Corporation (whose functions were absorbed by LWUA) and the DPWH have developed a simplified procedure for conducting the initial data gathering. The format used is recommended for adaptation by the LGUs. These forms can also be revised to suit the specific needs of the LGU.

For Level II systems, technical standards have been in use by LWUA for RWSAs and by DPWH. As these are considered as national standards, their adoption is recommended.

## 8.4 Community-Based Organizations

The traditional view of communities as mere beneficiaries and recipients of projects has been undergoing changes and transformation in recent years through the policy reforms and transition in the sector. Communities are now provided avenues for more participation in terms of decision-making and initiation of resolution of issues in critical aspects of the sector's project management and implementation.

This implies the need for the LGU to establish an institutional mechanism at the provincial and municipal levels to enhance trust and confidence of communities on its ability for provision of such basic services as water supply and sanitation. Communities will be encouraged to collectively take stock of their resources and constraints and agree on a development program appropriate for their needs.

The LGU shall promote the participation of NGOs, people's organizations (POs), and community-based organizations (CBOs) to catalyze the involvement of women, youth, people's organizations (POs) and other segments of the community in project decision-making and management. It will focus on the role of women in the context of the design of institutional arrangements at all levels. Towards increasing community involvement, the LGU shall develop

a community-based implementation strategy and delivery mechanism to ensure the sustainability of sector projects. It shall review the roles and responsibilities of central and local government, NGOs, the private sector and communities themselves. It shall assess the community participation activities and related institutional arrangements of past community projects and recommend workable community participation approaches.

## 8.5 Human Resources Development Training

The main objective for training human resources is to improve individual competence, organizational effectiveness and efficiency, and espouse national development. Training is a function and a responsibility of every leader. It ensures the availability of qualified and able manpower, the shortage of which is considered as one of the major obstacles to improvements in the water supply and sanitation sector.

Training shall be designed and implemented for implementers, planners from national level to regional to LGUs and down to the community level. Needs Assessments will be conducted as the basis for the design of the courses. Participants will be selected based on the their tasks and responsibilities. The PST/PWSO shall establish and maintain a reference library and information/documentation center and shall include training materials and equipment to service needs of the municipalities. The DILG-ARMM shall provide inputs to these training activities.

The LGU role is not to run courses but to ensure that training programs take place and are effective. Actual training activities may be organized or contracted out to well-functioning water districts and government-accredited training, technical and vocational schools. Training may cover but should not be limited to the following areas: source development principally for deep wells, shallow wells, spring development and surface water intake structures, operation and maintenance, plumbing and pipe-laying and basic hydraulics, bookkeeping and management and special courses for water and sanitation caretakers.

## 8.6 Health and Hygiene Education

The LGUs shall establish an on-going hygiene education program through appropriate methods and channels. These shall include immediate short-run programs: information campaigns; as well as, long-term value formation interventions, possibly through the formal school system. Household and individual hygiene practices, such as hand washing, in house water storage, etc.,

are part of benefit assessment since these are part of improvement in lifestyle and practices. Three approaches are recommended:

- Community-based Approach: Direct house-to-house campaigns can be implemented through the Rural Health Units as part of their current functions. Special presentations can also be done during the regular meetings of community-based socio-civic clubs. Multi-media presentations may be developed and prepared for information dissemination and campaign.

- School-based Approach: Students are the main targets of this approach, either directly or through their teachers. Special focus activities, such as Water and Sanitation Week or Nutrition Week can be introduced with programs or convocations to make the student aware of the issues and solutions. Posters, flip charts, and other audio-visual materials would be helpful.

- Media-based Approach: This approach utilizes radio and print media to introduce and reinforce health messages. Many NGOs and the Philippines Information Agency (in coordination with the DOH) have developed interesting and attractive materials.

The community development specialist at the PST/PWSO shall be given the responsibility for the health and hygiene education function. The CDS will formulate an action plan; implementation will be done with the municipal liaison staff and other local officials. At the barangay level, its implementation will involve the close coordination among the midwives, the barangay health workers and the Committee on Health of the barangay council. Materials for this efforts have been previously developed and can be found with the various PHOs and RHUs. UNICEF has provided strong support in the preparation of these materials.

A continuous health and hygiene education program will be launched by the LGU. Simple, clear messages and approaches will have to be defined. These messages may include the following: Relationship among health, water supply and sanitation; sector opportunities; services available at the rural health units. For Levels I and II systems, the protection of household storage containers from contamination; hand washing; conservation; pay bills/fees on time; etc. The relevance of these, or other messages will have to be determined by the PST/PWSO.

## 8.7 Gender and Development

Consistent with the national policy of fundamental equality of men and women before the law, as well as of providing equal opportunities to both genders, the water supply and sanitation sector shall promote the full participation of men and women in all the phases of the project development cycle. Sustainability of the WATSAN facilities shall be achieved through the partnership of men and women, and their total involvement in its management, operation and maintenance. The socio-cultural norms and practices in the Province, however, should be taken into consideration in conceptualizing gender-responsive influences in the WATSAN institutional set-up in the Province. Nevertheless, women should be encouraged to participate in all aspects and phases of the project cycle.

A gender-responsive approach should consider the following:

- The training of the LGU officials and employees from the regional, provincial, municipal and barangay levels on gender and development.
- The conscious integration of gender concerns in all aspects of project development, that is, from project identification, planning, design and implementation, where the unique needs and requirements of both genders are recognized.
- The equal representation and distribution of responsibilities to the men and women of the beneficiary community, particularly in sharing work, making decisions, cooperation and control of activities such as but not limited to institutional and CD structures and processes, the organization and management of the WATSAN facilities, the training of managers, operators and maintenance personnel.

To provide the LGU insight on how to conceptualize gender-responsive approaches in the Province, it shall conduct a provincial survey to review the role of women in the context of the design of the community participation structure of the project. The review shall include: brief overview of women's socio-economic situation and their role in water and sanitation; gender analysis; analysis of relevant NGOs, women's groups and private agencies that will support community and women's activities; assessment of support action for women's participation essential for project sustainability; and proposed steps to enhance women's role and participation in the project.

# CHAPTER 9

# COST ESTIMATES FOR FUTURE SECTOR DEVELOPMENT

# 9. COST ESTIMATES FOR FUTURE SECTOR DEVELOPMENT

## 9.1 General

The total investment cost required for the two phase implementation as identified in Chapter 7 is defined to include direct costs for construction of required facilities and sector management, as well as physical and price contingencies. Cost requirements for the equipment and vehicle are considered for O& M and long-term development.

Conditions and assumptions used to come up with investment costs covering all sub-sector components were established in coordination with concerned provincial and municipal LGUs and to current standards of relevant sector agencies like the DILG, LWUA, DOH and DPWH.

With regards to construction cost, unit costs per person/household facility were prepared under contract-out basis for respective sub-sector component facilities in current 2003 price levels.

## 9.2 Assumptions for Cost Estimates

***Unit Construction Cost.*** The unit construction cost per person, household, or facility of each sector component was established based on the PW4SP study unit analysis model for each component. To come up with the current 2003 price level of sanitation facilities, the unit price of the items of work in the PW4SP cost was further escalated at 2% per annum. However, the unit price of shallow and deep well water sources was based on the latest implementation cost. of the DILG-RWSSP V project at year 2003 levels.

Unit construction costs consist of direct cost (mobilization/demobilization, material and labor), indirect cost (profit and inclusive taxes) and government expenses (detailed engineering and institutional development).

Freight cost of construction materials, excluding locally available materials such as sand and gravel, was considered for sanitation and water supply facilities in consideration of the hauling distance from Manila. The cost is estimated as fixed percentage (11%) based on the standard practice being adopted by other agencies. Table 9-1 shows a summary of unit construction costs and their components are described in the succeeding paragraphs. Details of unit cost estimates are presented in Appendix 9.2.1 to Appendix 9.2.13.

**Table 9-1 Unit Cost of Facilities by Type and Service Level**

| Sector service Level | | Unit Construction Cost per Facility (Pesos) | Service Coverage | | Unit Cost | |
|---|---|---|---|---|---|---|
| | | | Served Population | Served Households | Pesos/ Person | Pesos/ Household |
| Urban Water Supply | **Level III** | | | | | |
| | New System | | | | | |
| | For 5,000 Population | 31,226,279 | 5,000 | N/A | 6,245 | N/A |
| | For 10,000 Population | 48,128,878 | 10,000 | N/A | 4,813 | N/A |
| | Expansion | | | | | |
| | For 5,000 Population | 29,676,236 | 5,000 | N/A | 5,935 | N/A |
| | For 10,000 Population | 46,578,835 | 10,000 | N/A | 4,658 | N/A |
| Rural Water Supply | **Level II** | | | | | |
| | Deep Well Source | 1,340,746 | 600 | 120 | 2,235 | 11,173 |
| | Spring Source | 1,629,028 | 600 | 120 | 2,715 | 13,575 |
| | **Level I** | | | | | |
| | Deep Well | | | | | |
| | 30 meter depth | 199,000 | N/A | 15 | N/A | 13,267 |
| | 50 meter depth | 240,000 | N/A | 15 | N/A | 16,000 |
| | 70 meter depth | 336,000 | N/A | 15 | N/A | 22,400 |
| | Shallow well | | | | | |
| | 10 meter depth | 101,073 | N/A | 15 | N/A | 6,738 |
| | 20 meter depth | 149,000 | N/A | 15 | N/A | 9,933 |
| Sanitation | Household Toilet | | | | | |
| | Flush | 23,000 | N/A | 1 | N/A | 23,000 |
| | Pour Flush | 13,800 | N/A | 1 | N/A | 13,800 |
| | Public School Toilet | 403,000 | N/A | N/A | N/A | |
| | Public Toilet | 510,000 | N/A | N/A | N/A | |

***Urban Water Supply***

- Unit cost for two sizes of Level III system covering served population of 5,000 and 10,000.
- Unit cost for Level III was estimated utilizing deep well sources. In case of spring source, it is desirable to confirm transmission lengths during the implementation stage.

*Rural Water Supply*

- Unit cost for five types of Level I wells (shallow wells at 10 and 20m depths and deep wells at 30, 50 and 70m depths).
- Unit cost for deep well was estimated using open-hole gravel packed method. Natural gravel pack wells may be considered only after initial implementation when soil formation in prospective sites shall have been established and identified. Facilities requiring appropriate Iron Removal System, and its cost, will be identified during the detailed study.
- Unit cost for Level II system covers 600 served population.

*Sanitation*

- Unit cost for two types of sanitary toilets, the flush and the pour flush to accommodate one served household in urban and rural areas. Cost of toilet includes cost for demolition, water closet, water line and a superstructure made of durable construction materials. However, the cost of LGU investment is limited to procurement of toilet bowls since construction of household toilet is out of public works.
- Public School Toilet: unit cost for one facility with five toilet bowls to cover 250 served students.
- Public toilets: unit cost for one facility with six toilet bowls.

*Price Escalation*

- PW4SP price level in 1999 adjusted to current 2003 prices at 2% per annum.

## 9.3 Unit Cost of Equipment

The unit cost of equipment shown in Table 9-2 was prepared based on current standard procurement cost.

**Table 9-2 Unit Cost of Equipment and Vehicle**

| Name of Equipment | Unit Cost (Peso 1,000) |
|---|---|
| Truck-mounted rotary drilling machine | 34,978 |
| Truck-mounted percussion drilling machine | 27,691 |
| Well rehabilitation equipment | 303 |
| Service truck with crane | 1,299 |
| Support vehicle (Pick-up with winch) | 639 |
| Refuse collection truck | 2,227 |

## 9.4 Sector Management Cost

Sector management cost consists of:

- Engineering studies (F/S, D/D and construction supervision) for water supply, public toilet and school toilet facilities. Community development and training including health and hygiene education and logistic support.
- Cost of engineering studies was estimated based on fixed percentages of 9% for F/S and D/D and 4% for construction supervision of the total direct cost
- Community development and training with logistic support was also estimated at 12% of respective construction costs for rural water supply and sanitation and 3% of construction cost for urban water supply and sanitation.
- Contingency cost covers both physical and price contingencies for water and sanitation facilities. Physical contingency is assumed to be 15% of the direct construction cost. Price contingency is assumed to be 10% of the direct cost and physical contingency.

## 9.5 Cost of Required Facilities and Equipment

The construction costs of required facilities as public investment of LGUs are summarized in Table 9-3 while the summarized (by water supply sector & sanitation sector) costs are shown in Table 9-4 by municipality for each target years.

During the 2005 Medium Term Development period, a total of 864.20 million pesos will be required for construction of required facilities. Of the requirements, urban and rural water supply will share 40 % and 50 %, respectively. The remaining 10 % will be required for urban and rural sanitation.

## Table 9-3 Total Investment Costs (Pesos x 1,000)

| | Municipality | Phase I (2005-2010) Requirement | | | | | | | | | | | | | | Phase II (2010-2015) Requirement | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Urban Area | | | | | | | Rural Area | | | | | | | Urban Area | | | | | | | Rural Area | | | | | | |
| | | Water Supply | | | Sanitation | | | | Water Supply | | | Sanitation | | | | Water Supply | | | Sanitation | | | | Water Supply | | | Sanitation | | | |
| | | Level III | Level II | Level I | HH Flush | HH Pour Flush | Public School | Public Utilities | Level III | Level II | Level I | HH Flush | HH Pour Flush | Public School | Public Utilities | Level III | Level II | Level I | HH Flush | HH Pour Flush | Public School | Public Utilities | Level III | Level II | Level I | HH Flush | HH Pour Flush | Public School | Public Utilities |
| 1 | Marawi City | 110,689 | 97,966 | 0 | 4,484 | 2,779 | 3,702 | 510 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 95,192 | 52,204 | 0 | 4,397 | 2,900 | 2,732 | 510 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | Bacolod Grande | 0 | 6,594 | 2,816 | 0 | 666 | 403 | 510 | 0 | 2,868 | 0 | 0 | 91 | 403 | 0 | 0 | 6,818 | 2,679 | 0 | 536 | 575 | 510 | 0 | 1,514 | 0 | 0 | 73 | 0 | 0 |
| 3 | Balabagan | 0 | 291 | 0 | 0 | 100 | 0 | 0 | 0 | 194 | 940 | 0 | 1,074 | 806 | 510 | 0 | 1,402 | 0 | 0 | 81 | 574 | 510 | 0 | 936 | 6,688 | 0 | 873 | 0 | 0 |
| 4 | Balindong | 0 | 0 | 690 | 0 | 209 | 806 | 510 | 0 | 7,325 | 733 | 0 | 781 | 806 | 0 | 0 | 0 | 788 | 0 | 170 | 403 | 0 | 0 | 3,735 | 5,210 | 0 | 634 | 806 | 510 |
| 5 | Bayang | 0 | 3,128 | 0 | 0 | 165 | 403 | 0 | 0 | 209 | 686 | 0 | 690 | 806 | 510 | 0 | 2,814 | 0 | 0 | 139 | 403 | 510 | 0 | 1,028 | 4,843 | 0 | 559 | 403 | 0 |
| 6 | Binidayan | 0 | 4,430 | 0 | 0 | 152 | 589 | 510 | 0 | 0 | 655 | 0 | 661 | 0 | 0 | 0 | 2,284 | 0 | 0 | 23 | 444 | 510 | 0 | 0 | 4,647 | 0 | 95 | 0 | 0 |
| 7 | Buadiposo Buntong | 0 | 820 | 0 | 0 | 73 | 461 | 510 | 0 | 0 | 576 | 0 | 1,519 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 1,608 | 3,857 | 0 | 462 | 403 | 510 |
| 8 | Bubong | 0 | 768 | 0 | 0 | 23 | 403 | 0 | 0 | 888 | 8,092 | 0 | 716 | 403 | 510 | 0 | 392 | 0 | 0 | 18 | 0 | 510 | 0 | 4,251 | 3,833 | 0 | 582 | 403 | 0 |
| 9 | Bumbaran | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 893 | 8,993 | 0 | 348 | 403 | 510 | 0 | 0 | 0 | 0 | 0 | 342 | 510 | 0 | 406 | 4,324 | 0 | 283 | 0 | 0 |
| 10 | Butig | 0 | 2,463 | 0 | 0 | 107 | 403 | 0 | 0 | 444 | 16,812 | 0 | 827 | 403 | 510 | 0 | 1,246 | 0 | 0 | 86 | 403 | 510 | 0 | 2,196 | 8,004 | 0 | 672 | 403 | 0 |
| 11 | Calanogas | 0 | 0 | 0 | 0 | 0 | 0 | 510 | 0 | 784 | 14,217 | 0 | 455 | 403 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,972 | 5,194 | 0 | 370 | 403 | 510 |
| 12 | Ditsaan-Ramain | 0 | 17,541 | 0 | 0 | 578 | 564 | 510 | 0 | 0 | 3,604 | 0 | 247 | 0 | 0 | 0 | 9,105 | 0 | 0 | 475 | 0 | 510 | 0 | 0 | 1,711 | 2 | 185 | 403 | 0 |
| 13 | Ganassi | 1,006 | 1,314 | 0 | 255 | 63 | 403 | 0 | 1,269 | 153 | 8,419 | 301 | 630 | 403 | 510 | 4,027 | 849 | 0 | 42 | 8 | 403 | 0 | 4,810 | 703 | 3,656 | 54 | 95 | 403 | 510 |
| 14 | Kapai | 0 | 881 | 0 | 0 | 27 | 403 | 510 | 0 | 709 | 16,156 | 0 | 670 | 403 | 0 | 0 | 427 | 0 | 0 | 22 | 403 | 510 | 0 | 3,492 | 7,710 | 0 | 545 | 403 | 0 |
| 15 | Kapatagan | 0 | 75 | 1,387 | 0 | 0 | 259 | 510 | 0 | 243 | 4,118 | 0 | 433 | 0 | 0 | 0 | 302 | 1,587 | 0 | 0 | 195 | 510 | 0 | 1,647 | 1,993 | 0 | 351 | 0 | 0 |
| 16 | Lumba Bayabao | 0 | 1,182 | 0 | 0 | 44 | 403 | 510 | 0 | 455 | 30,085 | 0 | 1,073 | 806 | 0 | 0 | 628 | 0 | 0 | 36 | 403 | 510 | 0 | 1,816 | 13,945 | 0 | 871 | 403 | 0 |
| 17 | Lumbatan | 0 | 781 | 0 | 0 | 142 | 403 | 0 | 0 | 0 | 9,197 | 0 | 535 | 403 | 510 | 0 | 2,594 | 0 | 0 | 123 | 403 | 510 | 0 | 0 | 4,114 | 0 | 412 | 403 | 0 |
| 18 | Lumbayanague | 0 | 0 | 0 | 0 | 0 | 403 | 510 | 0 | 1,201 | 7,593 | 0 | 617 | 403 | 0 | 0 | 0 | 0 | 0 | 0 | 600 | 0 | 0 | 588 | 3,683 | 0 | 502 | 0 | 510 |
| 19 | Madalum | 0 | 1,349 | 0 | 0 | 128 | 403 | 510 | 0 | 0 | 11,632 | 0 | 2,175 | 403 | 0 | 0 | 683 | 0 | 0 | 0 | 0 | 510 | 0 | 0 | 5,519 | 0 | 0 | 403 | 0 |
| 20 | Madamba | 0 | 607 | 3,082 | 0 | 712 | 468 | 510 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,926 | 3,517 | 0 | 579 | 0 | 510 | 0 | 0 | 0 | 0 | 0 | 403 | 0 |
| 21 | Maguing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 949 | 24,509 | 0 | 875 | 403 | 510 | 0 | 0 | 0 | 0 | 0 | 327 | 0 | 0 | 512 | 12,393 | 0 | 671 | 0 | 510 |
| 22 | Malabang | 0 | 1,210 | 0 | 0 | 310 | 403 | 510 | 0 | 201 | 15,415 | 0 | 1,191 | 403 | 0 | 0 | 4,727 | 0 | 0 | 260 | 403 | 510 | 0 | 2,080 | 7,227 | 0 | 959 | 403 | 0 |
| 23 | Marantao | 0 | 5,087 | 0 | 0 | 164 | 403 | 510 | 0 | 0 | 31,082 | 0 | 930 | 806 | 0 | 0 | 2,766 | 0 | 0 | 151 | 403 | 510 | 0 | 0 | 14,963 | 0 | 759 | 0 | 0 |
| 24 | Marogong | 0 | 2,386 | 8,790 | 0 | 746 | 403 | 0 | 0 | 0 | 0 | 0 | 0 | 403 | 510 | 0 | 1,526 | 10,125 | 0 | 606 | 403 | 510 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | Masiu | 0 | 453 | 1,301 | 0 | 20 | 1,209 | 510 | 0 | 577 | 6,814 | 0 | 917 | 806 | 0 | 0 | 3,515 | 1,503 | 0 | 17 | 403 | 0 | 0 | 2,705 | 3,321 | 0 | 745 | 806 | 510 |
| 26 | Mulondo | 0 | 556 | 0 | 0 | 256 | 403 | 510 | 0 | 7,733 | 4,099 | 0 | 250 | 403 | 0 | 0 | 239 | 0 | 0 | 207 | 0 | 510 | 0 | 3,939 | 1,966 | 0 | 205 | 403 | 0 |
| 27 | Pagayawan | 0 | 1,798 | 0 | 0 | 56 | 403 | 510 | 0 | 0 | 5,613 | 0 | 346 | 403 | 0 | 0 | 920 | 0 | 0 | 46 | 495 | 510 | 0 | 0 | 2,660 | 0 | 281 | 0 | 0 |
| 28 | Piagapo | 0 | 2,175 | 0 | 0 | 70 | 403 | 0 | 0 | 0 | 14,817 | 0 | 993 | 403 | 510 | 0 | 1,323 | 0 | 0 | 73 | 562 | 0 | 0 | 0 | 7,028 | 0 | 807 | 0 | 510 |
| 29 | Poona Bayabao | 0 | 1,545 | 0 | 0 | 51 | 574 | 510 | 0 | 0 | 10,847 | 0 | 703 | 0 | 0 | 0 | 796 | 0 | 0 | 42 | 428 | 510 | 0 | 0 | 5,139 | 0 | 554 | 0 | 0 |
| 30 | Pualas | 0 | 625 | 0 | 0 | 27 | 403 | 0 | 0 | 0 | 14,442 | 0 | 415 | 403 | 510 | 0 | 327 | 0 | 0 | 22 | 0 | 510 | 0 | 0 | 2,079 | 0 | 312 | 403 | 0 |
| 31 | Saguiaran | 0 | 3,099 | 0 | 0 | 48 | 806 | 0 | 0 | 0 | 30,657 | 0 | 897 | 806 | 510 | 0 | 1,543 | 0 | 0 | 38 | 403 | 510 | 0 | 0 | 14,583 | 0 | 730 | 806 | 0 |
| 32 | S. Domalondong | 0 | 0 | 0 | 0 | 0 | 323 | 510 | 0 | 4,341 | 11,251 | 0 | 408 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 238 | 0 | 0 | 2,610 | 4,827 | 0 | 331 | 0 | 510 |
| 33 | S. Gumander | 0 | 2,468 | 0 | 0 | 85 | 0 | 510 | 0 | 0 | 6,858 | 0 | 444 | 403 | 0 | 0 | 1,377 | 0 | 0 | 73 | 0 | 510 | 0 | 0 | 3,206 | 0 | 357 | 403 | 0 |
| 34 | Tamloan II | 0 | 0 | 0 | 0 | 0 | 403 | 510 | 0 | 997 | 12,015 | 0 | 327 | 403 | 0 | 0 | 0 | 0 | 0 | 0 | 403 | 510 | 0 | 502 | 5,706 | 0 | 266 | 403 | 0 |
| 35 | Tamparan | 0 | 564 | 0 | 0 | 0 | 403 | 0 | 0 | 1,999 | 12,123 | 0 | 885 | 403 | 510 | 0 | 287 | 0 | 0 | 0 | 445 | 510 | 0 | 941 | 5,787 | 0 | 713 | 0 | 0 |
| 36 | Taraka | 0 | 17,680 | 0 | 0 | 555 | 403 | 510 | 0 | 0 | 3,672 | 0 | 228 | 403 | 0 | 0 | 8,944 | 0 | 0 | 450 | 0 | 0 | 0 | 0 | 1,771 | 0 | 187 | 403 | 510 |
| 37 | Tubaran | 0 | 863 | 0 | 0 | 31 | 581 | 510 | 0 | 0 | 15,634 | 0 | 485 | 0 | 0 | 0 | 446 | 0 | 0 | 25 | 0 | 510 | 0 | 0 | 7,406 | 0 | 382 | 403 | 0 |
| 38 | Tuzuya | 0 | 0 | 0 | 0 | 0 | 403 | 0 | 0 | 1,482 | 12,758 | 0 | 735 | 403 | 510 | 0 | 0 | 0 | 0 | 0 | 403 | 0 | 0 | 702 | 6,079 | 0 | 597 | 403 | 510 |
| 39 | Wao | 0 | 2,402 | 0 | 250 | 190 | 806 | 510 | 6,199 | 39,713 | 386 | 197 | 560 | 806 | 0 | 0 | 246 | 0 | 431 | 327 | 806 | 510 | 3,958 | 7,054 | 418 | 339 | 966 | 403 | 0 |
| 1. Provincial Total | | 111,695 | 183,100 | 18,066 | 4,989 | 8,577 | 19,611 | 12,750 | 7,468 | 74,359 | 375,498 | 498 | 25,132 | 15,314 | 7,140 | 99,219 | 113,657 | 20,200 | 4,869 | 7,557 | 14,406 | 14,280 | 8,768 | 48,837 | 195,487 | 395 | 17,386 | 10,881 | 5,610 |

Table 9-4 Summarized Construction Cost of Required Facilities (Pesos x 1,000)

| | Municipality | Phase I (2005-2010) Requirement | | | | | | | Phase II (2010-2015) Requirement | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Urban Area | | | Rural Area | | | Total | Urban Area | | | Rural Area | | | Total |
| | | Water Supply | Sanitation | Sub-total | Water Supply | Sanitation | Sub-total | | Water Supply | Sanitation | Sub-total | Water Supply | Sanitation | Sub-total | |
| 1 | Marawi City | 208,655 | 11,475 | 220,130 | 0 | 0 | 0 | 220,130 | 147,396 | 10,539 | 157,934 | 0 | 0 | 0 | 157,934 |
| 2 | Bacolod Grande | 9,410 | 1,579 | 10,989 | 2,868 | 494 | 3,362 | 14,351 | 9,496 | 1,621 | 11,118 | 1,414 | 73 | 1,486 | 12,604 |
| 3 | Balabagan | 291 | 100 | 391 | 1,134 | 2,390 | 3,525 | 3,915 | 1,402 | 1,165 | 2,567 | 7,624 | 873 | 8,497 | 11,065 |
| 4 | Balindong | 690 | 1,525 | 2,215 | 8,059 | 1,587 | 9,645 | 11,860 | 788 | 573 | 1,362 | 8,944 | 1,950 | 10,894 | 12,256 |
| 5 | Bayang | 3,128 | 568 | 3,696 | 895 | 2,006 | 2,901 | 6,597 | 2,814 | 1,052 | 3,866 | 5,871 | 962 | 6,833 | 10,699 |
| 6 | Binidayan | 4,430 | 1,251 | 5,680 | 655 | 661 | 1,316 | 6,997 | 2,284 | 977 | 3,262 | 4,647 | 95 | 4,742 | 8,003 |
| 7 | Buadiposo Buntong | 820 | 1,044 | 1,865 | 576 | 1,519 | 2,095 | 3,960 | 0 | 22 | 22 | 5,466 | 1,375 | 6,841 | 6,863 |
| 8 | Bubong | 768 | 426 | 1,194 | 8,980 | 1,629 | 10,609 | 11,802 | 392 | 528 | 921 | 8,084 | 985 | 9,069 | 9,989 |
| 9 | Bumbaran | 0 | 0 | 0 | 9,886 | 1,261 | 11,147 | 11,147 | 0 | 852 | 852 | 4,730 | 283 | 5,013 | 5,865 |
| 10 | Butig | 2,463 | 510 | 2,973 | 17,257 | 1,740 | 18,997 | 21,970 | 1,246 | 999 | 2,245 | 10,200 | 1,075 | 11,275 | 13,521 |
| 11 | Calanogas | 0 | 510 | 510 | 15,001 | 858 | 15,859 | 16,369 | 0 | 0 | 0 | 9,166 | 1,283 | 10,449 | 10,449 |
| 12 | Ditsaan-Ramain | 17,541 | 1,652 | 19,192 | 3,604 | 247 | 3,851 | 23,043 | 9,105 | 985 | 10,090 | 1,711 | 590 | 2,301 | 12,391 |
| 13 | Ganassi | 2,321 | 721 | 3,042 | 9,841 | 1,844 | 11,685 | 14,727 | 4,876 | 453 | 5,329 | 9,169 | 1,061 | 10,230 | 15,560 |
| 14 | Kapai | 881 | 940 | 1,822 | 16,864 | 1,073 | 17,938 | 19,759 | 427 | 935 | 1,362 | 11,201 | 948 | 12,150 | 13,512 |
| 15 | Kapatagan | 1,462 | 769 | 2,231 | 4,361 | 433 | 4,793 | 7,024 | 1,889 | 705 | 2,594 | 3,640 | 351 | 3,992 | 6,586 |
| 16 | Lumba Bayabao | 1,182 | 957 | 2,138 | 30,540 | 1,879 | 32,419 | 34,557 | 628 | 949 | 1,578 | 15,762 | 1,274 | 17,036 | 18,613 |
| 17 | Lumbatan | 781 | 545 | 1,325 | 9,197 | 1,448 | 10,645 | 11,970 | 2,594 | 1,036 | 3,630 | 4,114 | 815 | 4,930 | 8,560 |
| 18 | Lumbayanague | 0 | 913 | 913 | 8,794 | 1,020 | 9,814 | 10,727 | 0 | 600 | 600 | 4,271 | 1,012 | 5,283 | 5,883 |
| 19 | Madalum | 1,349 | 1,041 | 2,390 | 11,632 | 2,578 | 14,210 | 16,599 | 683 | 510 | 1,193 | 5,519 | 403 | 5,922 | 7,115 |
| 20 | Madamba | 3,689 | 1,690 | 5,379 | 0 | 0 | 0 | 5,379 | 6,444 | 1,089 | 7,532 | 0 | 403 | 403 | 7,935 |
| 21 | Maguing | 0 | 0 | 0 | 25,458 | 1,788 | 27,246 | 27,246 | 0 | 327 | 327 | 12,905 | 1,181 | 14,086 | 14,413 |
| 22 | Malabang | 1,210 | 1,223 | 2,433 | 15,616 | 1,594 | 17,210 | 19,643 | 4,727 | 1,173 | 5,901 | 9,307 | 1,362 | 10,669 | 16,570 |
| 23 | Marantao | 5,087 | 1,077 | 6,164 | 31,082 | 1,736 | 32,819 | 38,983 | 2,766 | 1,064 | 3,830 | 14,963 | 759 | 15,722 | 19,552 |
| 24 | Marogong | 11,176 | 1,149 | 12,325 | 0 | 913 | 913 | 13,238 | 11,651 | 1,519 | 13,169 | 0 | 0 | 0 | 13,169 |
| 25 | Masiu | 1,755 | 1,739 | 3,494 | 7,391 | 1,723 | 9,114 | 12,608 | 5,018 | 420 | 5,438 | 6,026 | 2,061 | 8,087 | 13,525 |
| 26 | Mulondo | 556 | 1,169 | 1,725 | 11,832 | 653 | 12,485 | 14,211 | 239 | 717 | 956 | 5,905 | 608 | 6,513 | 7,469 |
| 27 | Pagayawan | 1,798 | 969 | 2,768 | 5,613 | 749 | 6,362 | 9,130 | 920 | 1,051 | 1,971 | 2,660 | 281 | 2,941 | 4,912 |
| 28 | Piagapo | 2,175 | 473 | 2,647 | 14,817 | 1,906 | 16,723 | 19,370 | 1,323 | 635 | 1,958 | 7,028 | 1,317 | 8,345 | 10,302 |
| 29 | Poona Bayabao | 1,545 | 1,136 | 2,680 | 10,847 | 703 | 11,550 | 14,230 | 796 | 980 | 1,775 | 5,139 | 554 | 5,693 | 7,468 |
| 30 | Pualas | 625 | 430 | 1,055 | 14,442 | 1,328 | 15,770 | 16,825 | 327 | 532 | 860 | 2,079 | 715 | 2,793 | 3,653 |
| 31 | Saguiaran | 3,099 | 854 | 3,953 | 30,657 | 2,213 | 32,870 | 36,823 | 1,543 | 951 | 2,494 | 14,583 | 1,536 | 16,119 | 18,613 |
| 32 | S. Domalondong | 0 | 833 | 833 | 15,592 | 408 | 16,000 | 16,833 | 0 | 238 | 238 | 7,437 | 841 | 8,279 | 8,517 |
| 33 | S. Gumander | 2,468 | 595 | 3,063 | 6,858 | 847 | 7,705 | 10,768 | 1,377 | 583 | 1,960 | 3,206 | 760 | 3,966 | 5,926 |
| 34 | Tagoloan II | 0 | 913 | 913 | 13,012 | 730 | 13,742 | 14,655 | 0 | 913 | 913 | 6,207 | 669 | 6,876 | 7,789 |
| 35 | Tamparan | 564 | 403 | 967 | 14,123 | 1,798 | 15,921 | 16,888 | 287 | 955 | 1,242 | 6,728 | 713 | 7,441 | 8,683 |
| 36 | Taraka | 17,680 | 1,468 | 19,149 | 3,672 | 631 | 4,303 | 23,452 | 8,944 | 450 | 9,393 | 1,771 | 1,100 | 2,871 | 12,264 |
| 37 | Tubaran | 863 | 1,121 | 1,985 | 15,634 | 485 | 16,119 | 18,104 | 446 | 535 | 981 | 7,406 | 785 | 8,191 | 9,172 |
| 38 | Tugaya | 0 | 403 | 403 | 14,239 | 1,648 | 15,887 | 16,290 | 0 | 403 | 403 | 6,780 | 1,510 | 8,291 | 8,694 |
| 39 | Wao | 2,402 | 1,756 | 4,157 | 46,297 | 1,563 | 47,861 | 52,018 | 246 | 2,074 | 2,320 | 11,430 | 1,708 | 13,139 | 15,458 |
| I. Provincial Total | | 312,861 | 45,928 | 358,789 | 457,325 | 48,084 | 505,409 | 864,198 | 233,076 | 41,112 | 274,188 | 253,092 | 34,272 | 287,364 | 561,552 |

# CHAPTER 10

# EXAMINATION OF CRITERIA FOR SELECTING PRIORITY PROJECT/AREA

# 10. EXAMINATION OF CRITERIA FOR SELECTING PRIORITY PROJECT/AREA

## 10.1 Criteria for Selecting Projects/Areas

In the province of Basilan, majority of the municipalities are in need of assistance for the improvement of their respective water supply and sanitation facilities. The prioritization and selection, however, depends on various factors. Tables 10-1 to 10-3 respectively lists the technical, socio-economic, and financial criteria established and considered during the course of this study. The above criteria, however, were not fully used primarily due to lack of data and information for making the selection. These criteria may be used by JICA in its future project selection.

**Table 10-1 Technical Criteria for Project/Area Prioritization**

| PARAMETERS | INDICATORS | CRITERIA | POINTS |
|---|---|---|---|
| Water system existing level of service | Presence of existing Level III service | With less existing level 3 service | No existing Level III: 5.0;<br>With existing Level III: 1.0 |
| Availability of water source | With available water sources | Have abundant water sources | =>2 abundant sources: 5.0;<br>< 2 abundant sources: 1.0 |

*Note: Point System: High Priority = 5.0, Low Priority = 1.0*

**Table 10-2 Socio-economic Criteria for Project/Area Prioritization**

| PARAMETERS | INDICATORS | CRITERIA | POINTS |
|---|---|---|---|
| Capacity to Pay | Average Income, Average Water Rate | Ratio of Income to Water Rate (3% or less) | 3%: 5.0;<br>>3%: 1.0 |
| Peace and Order Situation | Crime Rate | With Low Rate in the area | 10/1000 population: 5.0<br>>10/1000 population: 1.0 |
| Health | Water-Borne Diseases Morbidity and Mortality Rates | With highest rates | 10/1000 population: 5.0<br>>10/1000 population: 1.0 |
| Access by the Poor | Number/percentage of poor in the area, Poverty Incidence, Average Household Monthly Income | Highest percentage of poor in the area | Ave. HH Income=< Poverty Level Income: 5.0;<br>Ave. HH Income > Poverty Level Income: 1.0 |
| Served vs. Unserved Population | Percentage of Unserved population in the area | With highest % of unserved in the area | =>50% unserved: 5.0<br><50% unserved: 1.0 |

*Note: Point System: High Priority = 5.0, Low Priority = 1.0*

Table 10-3 Institutional/Financial Criteria for Project/Area Prioritization

| Parameters | Indicators | Criteria | Points |
|---|---|---|---|
| Willingness to Pay | Collection Efficiency (%) | Highest Collection Efficiency | 80%: 5.0<br><80%: 1.0 |
| Willingness to Organize | Number of Functioning Community Organizations | With 2 or more functioning organizations | =>2: 5.0<br><2.0:1.0 |
| Willingness to Learn and to O&M Facilities | Level of Educational Attainment and Training of Population | Population has Mostly College Graduates | =>60% of population are college graduates: 5.0;<br><60%: 1.0 |

*Note: Point System: High Priority = 5.0, Low Priority = 1.0*

## 10.2 Identification of Priority Projects for Medium-Term Development Plan

In the province of Lanao del Sur, almost all towns are in need of assistance for water and sanitation improvement. Likewise, potential water sources are also available in each locality. Based on the investment cost presented in Chapter 9, the viability of each town shall depend on its financial evaluation.

The towns of Lanao del Sur shall be ranked based on the aspects of accessibility of the project area, type of proposed water service, and number of potential served population. From these identified potential projects, a feasibility study shall be conducted to evaluate the priority projects in terms of its requirements and viability. Basically, first level of priority is given to projects with positive feasibility indicator.