

JAPAN INTERNATIONAL COOPERATION AGENCY

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

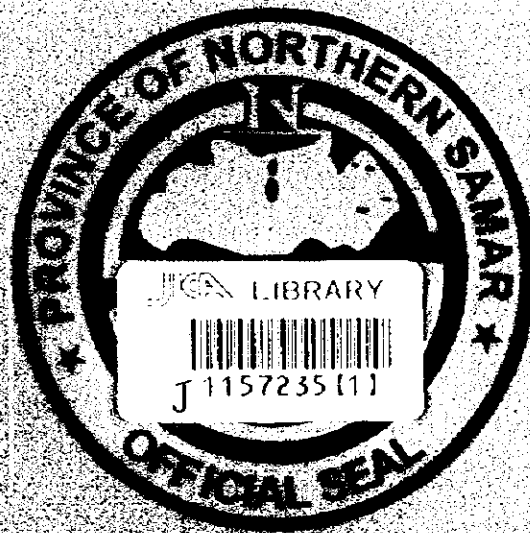
THE STUDY ON THE  
PROVINCIAL WATER SUPPLY, SEWERAGE AND  
SANITATION SECTOR PLAN  
IN  
THE REPUBLIC OF THE PHILIPPINES

VOLUME II - (4)

SUPPORTING REPORT

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

NORTHERN SAMAR



DECEMBER 1999

NIHON JOGESUDO SEIKI CO., LTD.









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**PROVINCIAL WATER SUPPLY, SEWERAGE AND  
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**VOLUME II SUPPORTING REPORT**

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**PROVINCIAL WATER SUPPLY, SEWERAGE AND  
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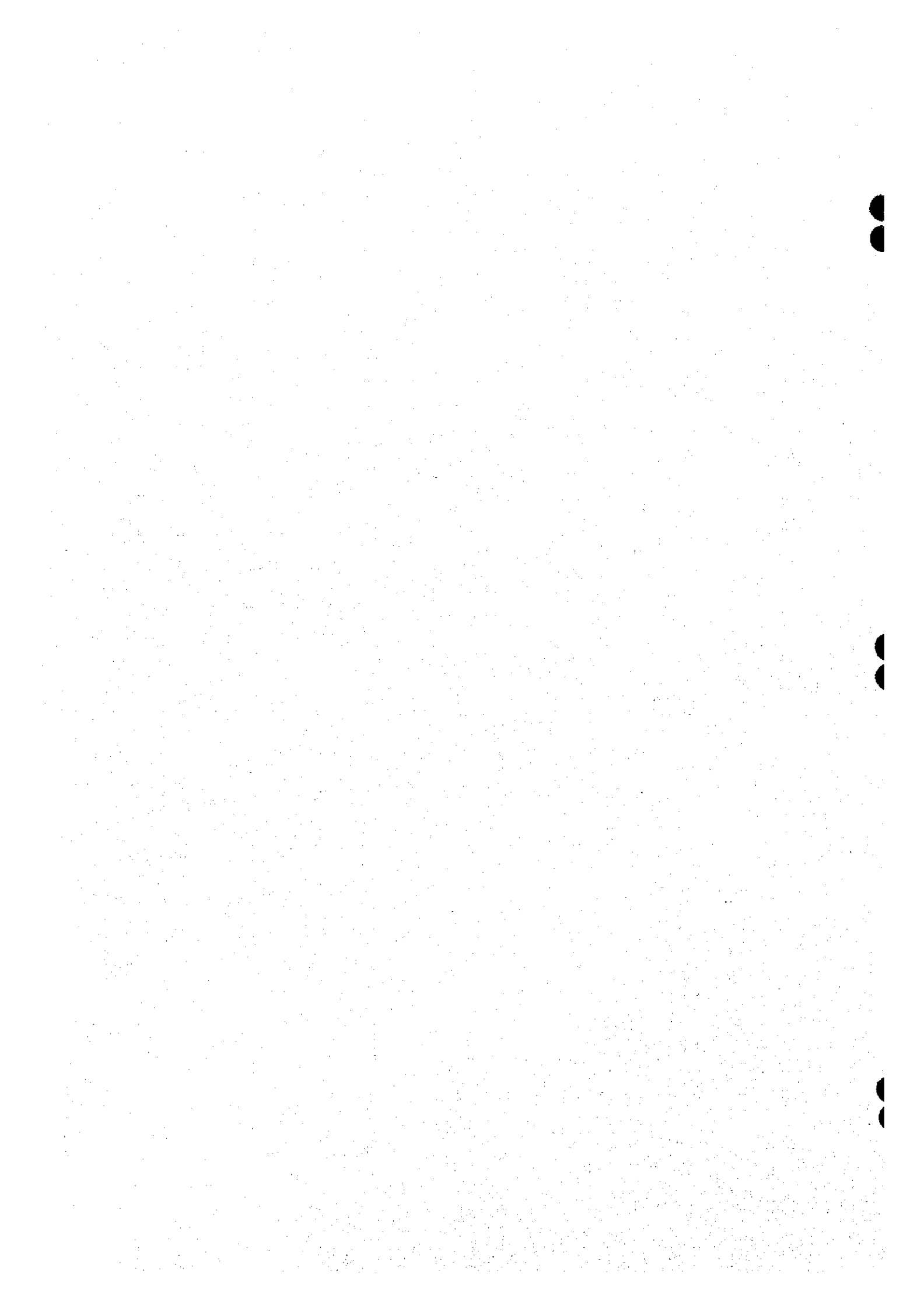
**PROVINCIAL WATER SUPPLY, SEWERAGE AND  
SANITATION SECTOR PLAN**

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**BACKGROUND INFORMATION  
AND EXISTING CONDITIONS**





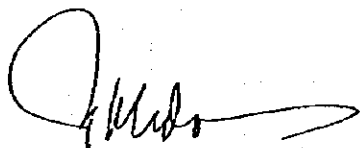


1. INTRODUCTION
- 1.3 The Provincial Plan for the Province of Northern Samar
- 1.3.1 Preparation of the Plan

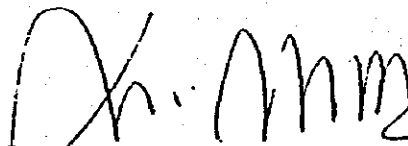
**MINUTES OF DISCUSSIONS**  
**ON**  
**THE INCEPTION REPORT**  
**FOR**  
**THE STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND**  
**SANITATION SECTOR PLANS**  
**FOR**  
**VISAYAS AND MINDANAO**  
**IN**  
**THE REPUBLIC OF THE PHILIPPINES**

**AGREED UPON BETWEEN**  
**THE DEPARTMENT OF THE INTERIOR AND**  
**LOCAL GOVERNMENT**  
**AND**  
**THE STUDY TEAM OF**  
**JAPAN INTERNATIONAL COOPERATION AGENCY**

MANILA, JANUARY 26, 1998



**MR. NORMANDO J. TOLEDO**  
Director  
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**MR. MASATOSHI MOMOSE**  
Team Leader, Study Team  
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Agency

Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, dispatched the Study Team to the Republic of the Philippines on January 13, 1998 to conduct "The Study on Provincial Water Supply, Sewerage and Sanitation Sector Plans for Visayas and Mindanao" (hereinafter referred to as "the Study") in accordance with the Implementing Arrangement for the Study executed between the JICA and the Department of the Interior and Local Government (hereinafter referred to as "DILG") on August 27, 1997.

A series of discussions were made on the Inception Report for the Study between the Study Team and the officials of DILG and other agencies concerned. In the course of the discussions, both parties have agreed with the general approach and methodology, and implementation arrangements detailed in the Inception Report. Also agreed upon were the changes made as to which provinces are to be covered in 1<sup>st</sup> batch and 2<sup>nd</sup> batch (refer to 1. Study Area). The list of attendees in the series of discussions is presented in Appendix A.

### 1. Study Area

The subject twenty-one (21) provinces were grouped into four batches in the "Implementing Arrangement on the Study". However, a delay in the organization of the Provincial Sector Planning Team (PSPT) in the 1<sup>st</sup> batch provinces of Misamis Oriental and Surigao del Sur prompted their transfer to the 2<sup>nd</sup> batch. Instead, Davao del Sur and Davao Oriental from the 2<sup>nd</sup> batch whose PSPTs were already formed were moved up in their place. In this connection, the DILG completed to exchange MOA with the provinces on the participation and full support by the provinces.

The present study area covers the following 21 provinces grouped into four batches.

1 <sup>st</sup> BATCH	2 <sup>nd</sup> BATCH	3 <sup>rd</sup> BATCH	4 <sup>th</sup> BATCH
1. Agusan del Norte	1. Davao	1. Biliran	1. Aklan
2. Agusan del Sur	2. Misamis Oriental	2. Eastern Samar	2. Antique
3. Davao del Sur	3. Sarangani	3. Leyte	3. Capiz
4. Davao Oriental	4. South Cotabato	4. Northern Samar	4. Iloilo
5. Surigao del Norte	5. Surigao del Sur	5. Southern Leyte	5. Negros
		6. Western Samar	Occidental

With regard to Davao province, the separation into two provinces is currently under legislative process. Upon the formalization of an additional province, the total number of the provinces in the study area would be 22. The DILG has requested that the forthcoming province be included in the study area. The JICA Study Team will relay the request to JICA headquarters for consideration. The DILG is expected to complete the execution of the MOAs of the 2<sup>nd</sup> batch provinces by early July to catch up with the planned schedule. The required arrangements in terms of subject provinces and study period will be discussed between the DILG and JICA.

## 2. General Approach and Methodology to the Study

The PW4SPs will be prepared with the full participation of the respective PSPTs together with DILG coordinators and the Study team in accordance with the approach and methodology outlined in the Inception Report. The following topics were confirmed during the discussions:

### (1) Planning framework for future sector development

- a) Planning base year is 1997 for 1<sup>st</sup> and 2<sup>nd</sup> batches and 1998 for 3<sup>rd</sup> and 4<sup>th</sup> batches. Medium-term and long-term target years are 2005 (implementation program: year 2001 to year 2005) and 2010, respectively.
- b) Plan will be prepared in compliance with "Implementing Rules and Regulations of NEDA Board Resolution No. 4".

### (2) Standard provision of school toilets

Discussions and confirmation on the provision of school toilets will be arranged with DECS.

- (3) Options on the sludge removal from septic tank and its disposal will be shown in the plan.

- (4) Model province for 1<sup>st</sup> batch is Agusan del Sur.

## 3. Sector Information Collection

The DILG and the JICA Study Team will continuously collect information on the projects/programs assisted by various financial sources. The information will be reflected in the plans.

## 4. Implementation Set-Up for the Study

In accordance with the Implementing Arrangements between the DILG and the JICA, the DILG shall:

- (1) Secure the safety of the JICA Study Team;
- (2) Assign DILG counterpart staff members who will coordinate and assist PSPTs at the provincial level;
- (3) Set-up PSPTs by respective provincial governments in the study area and secure budget to carry out the Study;
- (4) Through PSPT in each study area province; facilitate and coordinate in data gathering with municipal government and other agencies concerned, and participate in workshops and preparation of PW4SP;

- (5) Facilitate coordination with concerned agencies like DPWH, DOH, NEDA, LWUA and with appropriate bodies.

The JICA Study Team shall:

- (1) Pursue technology transfer to the Philippine counterpart personnel in the course of the Study and;
- (2) Assist PSPTs in the preparation of the PW4SP.

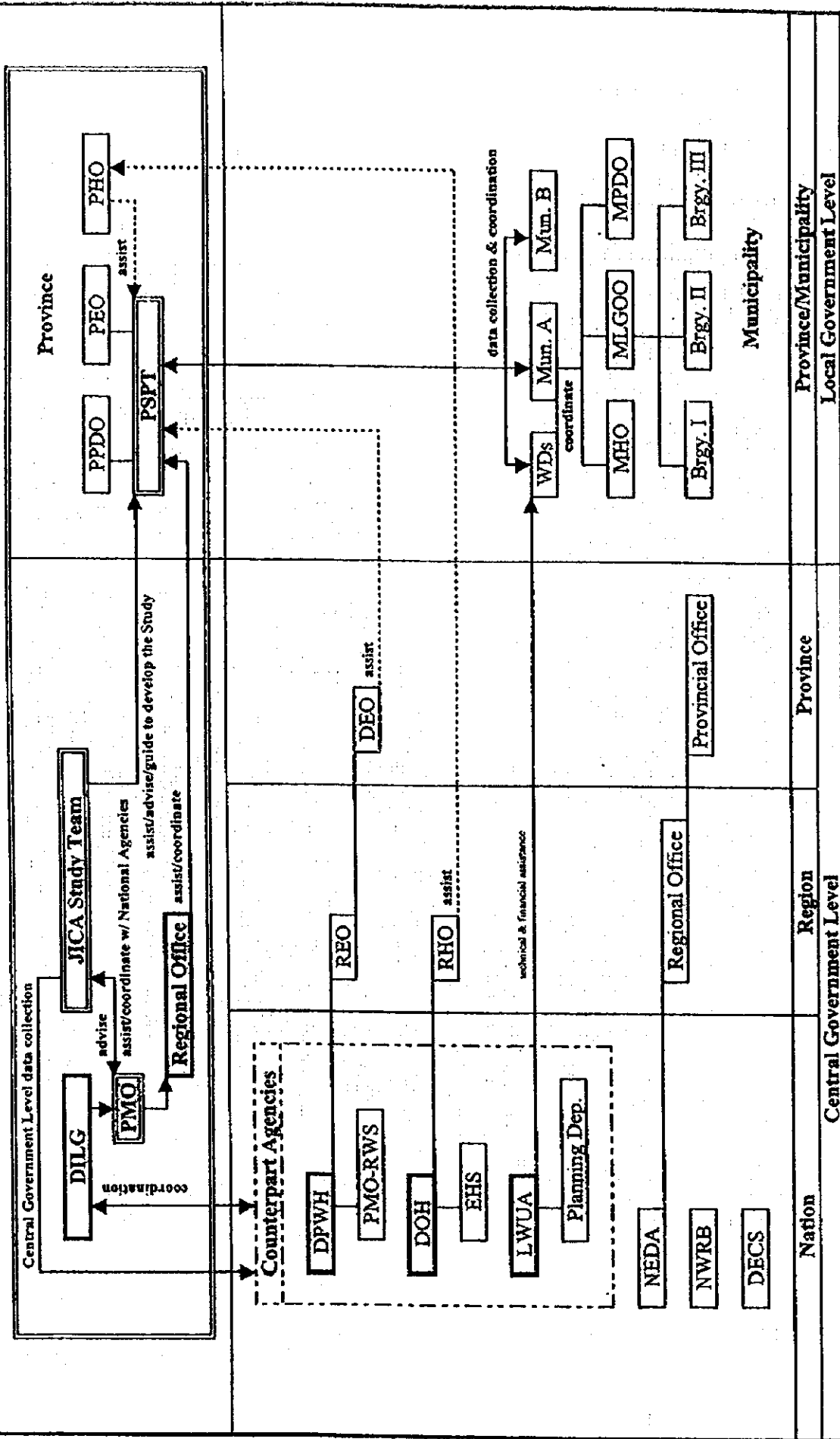
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**LIST OF ATTENDEES IN THE SERIES OF DISCUSSIONS**

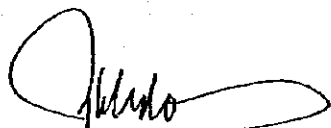
<b><u>ATTENDEES</u></b>	<b><u>DESIGNATION</u></b>
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2. Mr. Orville M. Roque	Program Manager, WSS-PMO
3. Ms. Ellen I. Pascua	Asst. Program Manager, WSS-PMO
4. Mr. Rogelio B. Ocampo	Chief, Planning Division, WSS-PMO
5. Ms. Fe Crisilla M. Banluta	PW4SP Project Officer, WSS-PMO
<b>B. Other Agencies</b>	
1. Mr. Sam Siao	Officer, PMO-RWS, DPWH
2. Dr. Mario Villaverde	Director, EHS, DOH
<b>C. JICA Advisory Committee</b>	
1. Ms. Keiko Yamamoto	Chairman, Advisory Committee
2. Mr. Keiichi Kanaya	Member, Advisory Committee
<b>D. JICA Headquarters</b>	
1. Mr. Shigeyuki Matsumoto	Second Development Study Division, Social Development Study Dept.
<b>E. JICA Study Team</b>	
1. Mr. Masatoshi Momose	Team Leader/Water Supply Planning
2. Mr. Nobuki Abe	Water Supply/Sanitation Engineer
3. Ms. Consuelo B. Estepa	Community Dev't/WID Specialist
4. Ms. Elizabeth L. Verzola	Socio-Economic/Financial Specialist
5. Mr. Kenji Takayanagi	Water Source Development Specialist
6. Mr. Emmanuel L. Patingo	Data Management Specialist

Figure 1.3.1  
Organization Chart for Study Implementation

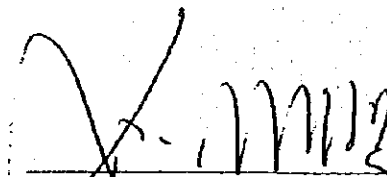


**MINUTES OF DISCUSSIONS**  
**ON**  
**THE PROGRESS REPORT**  
**FOR**  
**THE STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND**  
**SANITATION SECTOR PLANS**  
**FOR**  
**VISAYAS AND MINDANAO**  
**IN**  
**THE REPUBLIC OF THE PHILIPPINES**  
**AGREED UPON BETWEEN**  
**THE DEPARTMENT OF THE INTERIOR AND**  
**LOCAL GOVERNMENT**  
**AND**  
**THE STUDY TEAM OF**  
**JAPAN INTERNATIONAL COOPERATION AGENCY**

MANILA, MARCH 18, 1998



**MR. NORMANDO J. TOLEDO**  
Director  
Office of the Project Development  
Service  
Dept. of the Interior and Local Government



**MR. MASATOSHI MOMOSE**  
Team Leader, Study Team  
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The Stage I fieldwork for "the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan" started on January 13, 1998 and completed on March 23, 1998.

A series of discussions were held throughout the course of the Study, between JICA Study Team and officials concerned including DILG, NEDA, DOH, DPWH and other central government agencies and provinces. The general approach and methodologies, as presented in the Inception Report, have been employed for the fieldwork.

A Progress Report, which covers all outputs during the work period, was prepared entailing part of PW4SP for the respective provinces. The contents of the report were basically agreed upon on March 18, 1998 between JICA Study Team and officials of the DILG. The list of attendees to the meeting is presented in Appendix A. The following issues/problems on the arrangements required for the implementation of the Study were discussed, and the Study Team will relay the modified arrangements required to JICA headquarters.

(1) Modified Arrangements Required for 1<sup>st</sup> batch Study

1) Due to the presidential election scheduled on May 11, 1998, the second workshop may be held from May 18 to May 22, 1998 after the election, and tentatively starting the 2<sup>nd</sup> field work on May 13, 1998.

2) The venue for the final workshop was requested by concerned PPDCs to be held in Mindanao rather than in Manila as originally planned. This is because of the financial constraint on the travel expenses required for 7 members of respective PSPTs under the current GOP instruction to LGUs to reduce its planned annual expenditures of up to 25%.

(2) Provinces to be Covered by the 2<sup>nd</sup> Batch

The total number of provinces for the 2<sup>nd</sup> batch (5 provinces) will be kept as previously agreed between the two parties. However, Surigao del Sur will be omitted from the Study, since timely establishment of the PSPT by the province seems to be difficult. Instead of the said province, either the newly created Compostela Valley or Bukidnon (Region X) would be included.

The DILG will inform the Study Team of the possibility in the setting up of PSPT by the administration of Compostela Valley by the middle of June 1998. If not, DILG will make an advanced arrangement with Bukidnon.

(3) Electric Resistivity Prospecting and Test Boring

Comparatively reliable data to evaluate the development potential of water source were collected for 1<sup>st</sup> batch provinces during the fieldwork. It is assumed that the conduct of the field test for groundwater analysis, given a limited period, cannot be able to contribute significantly to the level of accuracy in the preparation of M/P and F/S. The situation will remain the same for 2<sup>nd</sup> batch provinces. Accordingly, it is not recommended to conduct field test for this study.



The required areas and the scope of work/surveys, such as field tests, will be recommended in the PW4SP and will be considered during detailed design and construction stages.

(4) Time Constraint in Data Collection/Validation/Follow-up

It was found, both by the Study Team and the DILG through the fieldwork, the following problems on data collection/validation/follow-up:

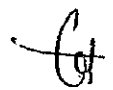
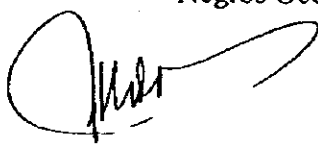
- 1) The summary reports on the sector status prepared by NEDA Regional Office through UNICEF fund were field confirmed as the materials to provide approximate sector situations in the fact of no existence of sector related information at present.
- 2) Data collection by PSPTs had sometimes to be done at the barangay level, due to limited data available in the municipal level. Thus, additional time was required for PSPTs to access to remote rural barangays.
- 3) Comprehensive planning work by the province in Mindanao area is still initial stage. It is necessary for the activities to ensure much more time through intensive technology transfer to DILG coordinators and PSPTs.

Based on the lessons learned, the Study Team and the DILG recognized the need of the review on the allotted period for the activities. The Study Team will relay this matter to JICA headquarters.

(5) Cities to be Covered in the Preparation of PW4SP

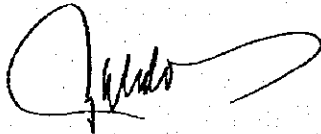
Of the three classes of cities in the Local Government Code, only component cities, which are under the jurisdiction of the provincial government will be considered. The subject cities are as follows:

<u>Province</u>	<u>Component City</u>
Surigao del Norte	Surigao City
Davao	Tagum City and Island Garden City
Leyte	Tacloban City
Western Samar	Calbayog City
Capiz	Roxas City
Iloilo	Passi City
Negros Occidental	Bago City, Cadiz City, La Carlota City, San Carlos City and Silay City



**LIST OF ATTENDEES IN THE SERIES OF DISCUSSION**


<b><u>ATTENDEES</u></b>	<b><u>DESIGNATION</u></b>
<b>A. DILG</b>	
1. Mr. Orville M. Roque	Program Manager, WSS-PMO
2. Ms. Ellen I. Pascua	Asst. Program Manager, WSS-PMO
3. Mr. Rogelio B. Ocampo	Chief, Planning Division, WSS-PMO
4. Ms. Fe Crisilla M. Banluta	PW4SP Project Officer, WSS-PMO
5. Ms. Charito Araza	Area Coordinator, WSS-PMO
6. Ms. Maria Contessa Navarro	Area Coordinator, WSS-PMO
7. Ms. Josephine Ramos	Area Coordinator, WSS-PMO
8. Ms. Susan Mangoda	Area Coordinator, WSS-PMO
9. Ms. Crisanta Rapirop	Area Coordinator, WSS-PMO
<b>B. JICA Study Team</b>	
1. Mr. Masatoshi Momose	Team Leader/Water Supply Planning
2. Mr. Nobuki Abe	Water Supply/Sanitation Engineer
3. Mr. Kenji Takayanagi	Water Source Development Specialist
4. Ms. Consuelo B. Estepa	Community Dev't./WID Specialist
5. Ms. Elizabeth L. Verzola	Socio-economic/Financial Specialist



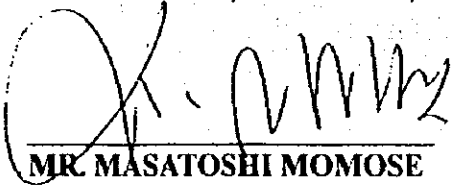
**MINUTES OF DISCUSSIONS**  
**ON**  
**THE DRAFT FINAL REPORT**  
**FOR**  
**THE STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND**  
**SANITATION SECTOR PLANS**  
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**THE STUDY TEAM OF**  
**JAPAN INTERNATIONAL COOPERATION AGENCY**

MANILA, AUGUST 27, 1998



**MR. BENITO R. CATINDIG**  
Assistant Secretary for Support  
Services and Regional Offices  
Dept. of the Interior and Local Government



**MR. MASATOSHI MOMOSE**  
Team Leader, Study Team  
Japan International Cooperation  
Agency

The Stage II fieldwork for "the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan" (hereinafter referred to as "the Study") resumed on May 20, 1998 and will be completed on March 30, 1999. Upon completion of the 1<sup>st</sup> batch study, the study for the 2<sup>nd</sup> batch will start on August 30 with an "Orientation Workshop". It is further scheduled that the 2<sup>nd</sup> batch study will be finalized by February 1999 and 3<sup>rd</sup> batch work will be commenced before the completion of this fieldwork.

Major conditions and assumptions for the development of Medium-Term and Long-Term sector plans for the subject provinces under the 1<sup>st</sup> batch were discussed and finalized between respective PSPTs and the JICA Study Team (hereinafter referred to as "the Team") through Workshop No. 2 (held between May 26 and 28, 1998) and during planning work thereafter. In this connection, the target year for the Medium-Term development plan was revised from 2005 to 2003 in order to realize the plan earlier.

The Draft Final Reports for the five (5) provinces of the 1<sup>st</sup> batch were prepared and the final workshop was conducted between August 24 and 26, 1998 to present and discuss the contents of the reports. The contents of the reports were basically agreed upon on August 27, 1998 by the Team and officials concerned on the Philippine side. The list of attendees to the meeting is presented in Appendix A. The following were confirmed and agreed upon by both parties.

1. Correction of typographical errors of the Draft Final Report will be undertaken by the Team prior to printing of the Final Report. The Final Report will be submitted by October 1998.
2. Adoption of the Plans by the Provincial Council (Sangguniang Panlalawigan) shall be facilitated by the DILG.
3. Inclusion of the Message of the Governor in the Main Report of respective PW4SPs.

With regard to the 2<sup>nd</sup> batch study, both parties have agreed on the general approach and methodology, and implementation arrangements adopted for the 1<sup>st</sup> batch study. Among them, the following are the basic conditions to be applied for the planning.

(1) Study Area

The DILG completed the exchange of MOA with the 2<sup>nd</sup> batch provinces on the participation and full support by the concerned provinces. The subject provinces are Misamis Oriental, Bukidnon, Davao del Norte, South Cotabato and Sarangani. The province of Bukidnon was selected for model province study.

(2) Planning Framework for Future Sector Development

- a) Planning base year is 1997 and Medium-Term and Long-Term target years are 2003 (implementation program: year 1999 to year 2003) and 2010, respectively.
- b) Plans will be prepared in compliance with the "Implementing Rules and Regulations of NEDA Board Resolution No. 4".

(3) Implementation Set-Up/Arrangements for the Study

The study will be conducted in accordance with the Implementing Arrangements between the DILG and the JICA, as done with the 1<sup>st</sup> batch study.

Both parties will make timely and effective arrangements through the study period to achieve the purpose of the Study within the set time-table based on the lessons learned from the 1<sup>st</sup> batch study. In this regard, the following are put into practice.

- a) Data collection by the PSPTs will be commenced in advance (overlapped activity with the preceding batch study) to ensure longer period for this activity as compared with the original time allotted.
- b) Planning period by the PSPTs will be extended by adjusting the timing for the conduct of 2<sup>nd</sup> workshop for data encoding and discussions to set-up planning fundamentals.
- c) Practical arrangements will be made to increase the opportunities for further collaboration in the planning work among PSPTs, DILG coordinators and the Team.

For the arrangement of the 3<sup>rd</sup> batch study, the DILG will confirm the subject provinces including the model province through the MOA by December 1998.

LIST OF ATTENDEES IN THE SERIES OF DISCUSSIONS

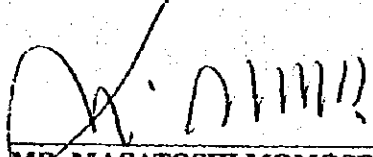
<u>ATTENDEES</u>	<u>DESIGNATION</u>
<i>A. DILG</i>	
1. Mr. Normando J. Toledo	Director, Office of Project Development Services
2. Ms. Ellen I. Pascua	Acting Program Manager, WSS-PMO
3. Mr. Rogelio B. Ocampo	Chief, Planning Division, WSS-PMO
4. Ms. Fe Crisilla M. Banluta	PW4SP Project Officer, WSS-PMO
<i>B. Other Agencies</i>	
1. Ms. Cristina Santiago	PIS, NEDA
<i>C. JICA Advisory Committee</i>	
1. Ms. Keiko Yamamoto	Chairman, Advisory Committee
2. Mr. Keiichi Kanaya	Member, Advisory Committee
<i>D. JICA Headquarters</i>	
1. Ms. Akiko Hayashi	Second Development Study Division, Social Development Study Depart.
<i>E. JICA Study Team</i>	
1. Mr. Masatoshi Momose	Team Leader/Water Supply Planning
2. Mr. Nobuki Abe	Water Supply/Sanitation Engineer
3. Mr. Kenji Hiramatsu	Institutional Specialist
4. Ms. Consuelo B. Estepa	Community Dev't./Gender Specialist
5. Ms. Elizabeth L. Versola	Socio-Economic/Financial Specialist
6. Mr. Emmanuel L. Patingo	Data Management Specialist

**MINUTES OF DISCUSSIONS**  
**ON**  
**THE DRAFT FINAL REPORT (2<sup>nd</sup> BATCH)**  
**FOR**  
**THE STUDY ON PROVINCIAL WATER SUPPLY, SEWERAGE AND**  
**SANITATION SECTOR PLANS**  
**FOR**  
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**AGREED UPON BETWEEN**  
**THE DEPARTMENT OF THE INTERIOR AND**  
**LOCAL GOVERNMENT**  
**AND**  
**THE STUDY TEAM OF**  
**JAPAN INTERNATIONAL COOPERATION AGENCY**

QUEZON CITY, FEBRUARY 22, 1999

  
**MR. BENITO R. CATINDIG**  
Assistant Secretary  
Dept. of the Interior and Local Government

  
**MR. MASATOSHI MOMOSE**  
Team Leader, Study Team  
Japan International Cooperation Agency

The Stage II fieldwork for "the Study on Provincial Water Supply, Sewerage and Sanitation Sector Plan" (hereinafter referred to as "the Study") resumed on May 20, 1998 and will be completed on March 30, 1999.

The study for the 2<sup>nd</sup> batch started on August 30, 1998 and will be completed with the final workshop scheduled between February 24 and 26, 1999. During the finalization stage of the 2<sup>nd</sup> batch study, the study for the 3<sup>rd</sup> batch was started with an "Orientation Workshop" on February 8 to 10, 1999. It is further scheduled that the 3<sup>rd</sup> batch study will be finalized by the end of this year.

With regard to the 2<sup>nd</sup> batch study, major conditions and assumptions for the development of Medium-Term and Long-Term sector plans for the subject provinces were discussed and finalized between the respective PSPTs and the JICA Study Team (hereinafter referred to as "the Team") during Workshop No. 2 between November 4 to 6, 1998 and also at the time of the planning work thereafter. For the entire duration of the planning work, the Team stayed intermittently in Davao City, Cagayan de Oro City and Malaybalay City for better collaboration with the PSPTs.

The Draft Final Reports for the five (5) provinces of the 2<sup>nd</sup> batch were prepared and discussed on the contents of the reports between the respective PSPTs and the Team during February 15 and 19, 1999. The contents of the reports were basically agreed upon on February 22, 1999 by the Team and the officials concerned in the Philippine side in consideration of the discussion results with PSPTs.

The list of attendees to the meeting on February 22, 1999 is presented in Appendix A. The followings were confirmed and agreed upon by both parties.

1. Further modification/correction on the Draft Final Report will be undertaken by the Team prior to printing of the Final Report based on the discussions with PSPTs. The Final Report will be sent by May, 1999.
2. Adoption of the Plans by the Provincial Council (Sanggunian Panlalawigan) will be pursued and facilitated by the DILG.
3. Inclusion of the Message of the Governor in the Main Report of respective PW4SPs.

Concerning the 3<sup>rd</sup> batch study, both parties have agreed on the general approach and methodology, and implementation arrangements adopted for the previous batch studies. Among others, the followings are the basic conditions to be applied for the planning.



### (1) Study Area

The DILG completed the exchange of MOAs with the 3<sup>rd</sup> batch provinces regarding the participation and full support by the concerned provinces. The subject provinces are Northern Samar, Eastern Samar, Samar, Biliran, Leyte and Southern Leyte. The province of Leyte was selected for model province study.

### (2) Planning Framework for Future Sector Development

- a) Planning base year is 1998 and Medium-Term and Long-Term target years are 2004 (implementation program: year 2000 to year 2004) and 2010, respectively.
- b) Plans will be prepared in compliance with the "Implementing Rules and Regulations of NEDA Board Resolution No. 4", Series of 1994.

### (3) Implementation Set-Up/Arrangements for the Study

The study will be conducted in accordance with the Implementing Arrangements between the DILG and the JICA, as done with the 1<sup>st</sup> and 2<sup>nd</sup> batch studies.

Both parties will make timely and effective arrangements throughout the study period to achieve the purpose of the Study within the set time-table based on the lessons learned from previous batch studies. In this regard, the following will be put into practice.

- a) Data collection by the PSPTs will start in advance (overlapped activity with the preceding batch study) to ensure longer period for this activity as compared with the original time allotted.
- b) Planning period by the PSPTs will be extended by adjusting the timing for the conduct of the 2<sup>nd</sup> workshop for data encoding and discussions to set-up planning fundamentals.
- c) Practical arrangements will be made to increase the opportunities for further collaboration in the planning work among PSPTs, DILG coordinators and the Team.

For the arrangement of the 4<sup>th</sup> batch study, the DILG will confirm the subject provinces including the model province through a MOA by May, 1999.

## LIST OF ATTENDEES IN THE SERIES OF DISCUSSIONS

	<u>ATTENDEES</u>	<u>DESIGNATION</u>
<i>A.</i>	<i>DILG</i>	
1.	Mr. Benito R. Catindig	Assistant Secretary
2.	Ms. Ellen I. Pascua	Program Manager, WSS-PMO
3.	Mr. Rogelio B. Ocampo	Chief, Planning Division, WSS-PMO
4.	Ms. Fe Crisilla M. Bauluta	PW4SP Project Officer, WSS-PMO
<i>B.</i>	<i>Other Agencies</i>	
1.	Ms. Christina Santiago	PIS, NEDA
<i>C.</i>	<i>JICA Advisory Committee</i>	
1.	Ms. Keiko Yamamoto	Chairman, Advisory Committee
2.	Mr. Keiichi Kanaya	Member, Advisory Committee
<i>D.</i>	<i>JICA Study Team</i>	
1.	Mr. Masatoshi Momose	Team Leader/Water Supply Planning
2.	Mr. Nobuki Abe	Water Supply/Sanitation Engineer
3.	Mr. Kenji Hiramatsu	Institutional Specialist
4.	Mr. Nobukatu Sakiyama	Water Source Specialist
5.	Ms. Consuelo B. Estepa	Community Dev't./Gender Specialist
6.	Ms. Elizabeth L. Versola	Socio-Economic/financial Specialist
7.	Mr. Emmanuel Patingo	Data Management Specialist

## 2. PLANNING APPROACH FOR FUTURE SECTOR DEVELOPMENT

### 2.6 Planning Principles and Data Management

#### 2.6.2 Data Management

##### (1) Computer-based System

The data management system was established to support the Provincial Sector Planning Team (PSPT) in the preparation of the Provincial Water Supply, Sewerage and Sanitation Sector Plan (PW4SP). An essential task of data management is to organize various kind of data an effective and efficient information base.

A computer-based system was applied as a viable solution to process large amount of data and to minimize the human-error in calculation. For this particular project, a dynamic system is designed to allow the planner to adjust planning factors and update the information when further data becomes available.

It is viable and economical t choose the microcomputer with software suitable for the average skills of the common user. In this connection, of the two types of software package available, database and spreadsheet, the latter method was selected. Among the available spreadsheet-type software, EXCEL was used. Excel support file conversion (opening and saving), multiple file opening, graphic presentation of data, What-You-Sec-Is-What-You-Get (WYSIWYG) formatting, scaleable font and view, etc. The following are the advantage and disadvantages of the spreadsheet method with reference to database method.

Advantage	Disadvantage
1. Minimum programming skills	1. Repeated entry of same formula
2. Friendly environment to users	2. Sorting or indexing is done manually
3. Graphics presentation of data at user's option.	3. All data are loaded in memory, which require huge amount of memory.
4. Execution of data linkages at formula level entry	4. Limited to static data linkages
5. Guided formula creation using function wizard	

Data management task starts from the collection of data using the questionnaire forms. The existence and accuracy of data are major concern at this stage to prepare main information bases. Using the microcomputer provided with EXCEL spreadsheet, data in the questionnaire forms are transferred into the forms constructed in EXCEL. Applicable policy, criteria and assumption are entered into key parameter tables. These data are then processed and finally consolidated into target forms. These final provide a map of provincial profile, service coverage, future requirements, cost estimates for future sector development, and funding requirements.

Table 2.6.1 Key Parameter

No.	Description of Key Parameter		Unit	Values	
1.	Service Level	<i>Water Supply</i>			
		Number of household to be served by Level I Facility	HH/Source		
		Number of household to be served by Level II System	HH/Public Faucet		
		Water Consumption Rate for Level III System	Liter/capita/day		
		<i>Sanitation</i>			
		Std. number of student to be served by a unit of Sanitary toilet	Student/Toilet		
		Standard number of toilets for a public utility	Toilet/Public Facility		
2.	Provincial Sector Target	Medium Term Plan	<i>Water Supply</i>		
			Urban Water Supply	% of Population	
			Rural Water Supply	% of Population	
			<i>Sanitation</i>		
			Household Toilet		
			Urban Household Toilet	% of Household	
			Flush	% of Household	
			Pour Flush	% of Household	
			VIP Latrine	% of Household	
			Rural Household Toilet	% of Household	
			Flush	% of Household	
			Pour Flush	% of Household	
			VIP Latrine	% of Household	
			School Toilet	% of Public Student	
			Public Toilet	% of Public Utility	
		Solid Waste	% of Population		
		Long Term Plan	<i>Water Supply</i>		
			Urban Water Supply	% of Population	
			Rural Water Supply	% of Population	
			<i>Sanitation</i>		
			Household Toilet		
			Urban Household Toilet	% of Household	
			Flush	% of Household	
			Pour Flush	% of Household	
			VIP Latrine	% of Household	
			Rural Household Toilet	% of Household	
			Flush	% of Household	
Pour Flush	% of Household				
VIP Latrine	% of Household				
School Toilet	% of Public Student				
Public Toilet	% of Public Utility				
Urban Sewerage	% of Urban Population				
3.	Percentage of Level I Deep Wells to be Rehabilitated		%		
4.	Percentage of Sector Management Cost to Construction Cost				
	Feasibility and Detail Design		% of Construction Cost		
	Construction Supervision		% of Construction Cost		
5.	Community Development and Training Cost				
	Level III		% of Construction Cost		
	Level I, II and Public Toilet		% of Construction Cost		
6.	Recurrent Cost	Level III System (Operating Cost)	Pesos/HH/year		
		Level III System (Spare Parts/Equipment)	% of Construction Cost		
		Level II System (Spare Parts/Equipment)	Pesos/HH/year		
		Level I System (Spare Parts/Equipment)	Pesos/HH/year		
		Public School Toilet Maintenance Cost	Pesos/Toilet/year		
		Public Utility Toilet Maintenance Cost	Pesos/Toilet/year		
7.	Allocation factors/Percentages of IRA				
	From Provincial		%		
	From Municipality and Brgy.		%		
8.	Funding Levels/Percentages for Different Financing Scenarios				
	1st Scenario		% Funding Available		
	2nd Scenario		% Funding Available		
	3rd Scenario		% Funding Available		
	4th Scenario		% Funding Available		
	5th Scenario		% Funding Available		

Table 2.6.2 Composition of Well Sources and Specific Capacity

Name of Municipality	Type	Type Water Source	Proportion (%)	Standard Specification			
				Depth (m)	SWL (m)	Specific Capacity (liter/sec/m)	
	Urban	Shallow Well					
		Deep Well					
		Spring					
	Rural	Shallow Well					
		Deep Well					
		Spring					
		Urban	Shallow Well				
			Deep Well				
			Spring				
Rural		Shallow Well					
		Deep Well					
		Spring					
		Urban	Shallow Well				
			Deep Well				
			Spring				
	Rural	Shallow Well					
		Deep Well					
		Spring					
		Urban	Shallow Well				
			Deep Well				
			Spring				
Rural		Shallow Well					
		Deep Well					
		Spring					
		Urban	Shallow Well				
			Deep Well				
			Spring				
	Rural	Shallow Well					
		Deep Well					
		Spring					
		Urban	Shallow Well				
			Deep Well				
			Spring				
Rural		Shallow Well					
		Deep Well					
		Spring					
		Urban	Shallow Well				
			Deep Well				
			Spring				
	Rural	Shallow Well					
		Deep Well					
		Spring					

<b>Sub-Sector</b>	<b>Component</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>Total</b>
<b>Urban Water Supply</b>	<b>Level III System</b>						
	Feasibility Study and Detail Design						
	Construction & Supervision Community Development & Training						
<b>Rural Water Supply</b>	<b>Level I Facility</b>						
	Detail Design						
	Construction & Supervision						
	Community Development & Training						
	<b>Level II System</b>						
	Detail Design Construction & Supervision Community Development & Training						
<b>Sanitation</b>	Urban Household Toilet						
	Rural Household Toilet						
	Public School Toilet						
	Public Toilet						
	Disinfection of Level I Wells						
	Detail Design Construction & Supervision Community Development & Training						

**Table 2.6.4 Level I Safe & Unsafe Percentage**

<b>Name of Municipality</b>	<b>Safe (%)</b>	<b>Unsafe (%)</b>
<b>Provincial Total</b>		

Table 2.6.5 Unit Construction Cost of Different Facilities

Description	Unit Construction Cost (Pesos)	Service Coverage		Unit Cost	
		Served Population	Served Household	Pesos/ Person	Pesos/ Household
Water Supply					
<i>Level III - New System</i>					
For 5000 Population					
For 10000 Population					
For 15000 Population					
<i>Level III - Expansion</i>					
For 5000 Population					
For 10000 Population					
For 15000 Population					
<i>Level II</i>					
<i>Level I</i>					
Deep Well - 40 meter depth					
Deep Well - 80 meter depth					
Deep Well - 120 meter depth					
Shallow Well - 18 meter depth					
Spring Development					
<i>Rehabilitation Cost for Level I Deep Well</i>					
<i>Disinfection of Level I Wells</i>					
Sanitation					
Flush					
Pour Flush					
VIP / Dry					
School Toilet					
Public Toilet					
Urban Sewerage					

Table 2.6.6 Scoring Factor for Municipal Investment Ranking for Urban Water Supply

Score	Underserved and Unserved Population in Base Year	Underserved and Unserved Population in Phase I	Population Unserved by Level III Systems in Base Year
1.0	< %	< %	< %
0.8	< % < 40	< % <	< % <
0.6	< % < 30	< % <	< % <
0.4	< % < 20	< % <	< % <
0.2	% < 10	% <	% <
Weight Allocation Score (%)			

Table 2.6.7 Scoring Factor for Municipal Comprehensive Investment Ranking

Score	Urban Water Supply	Rural Water Supply	Urban Sanitation	Rural Sanitation
1.0	N.A.	< %	< %	< %
0.8	N.A.	< % <	< % <	< % <
0.6	N.A.	< % <	< % <	< % <
0.4	N.A.	< % <	< % <	< % <
0.2	N.A.	% <	% <	% <
Weight Allocation Score (%)				



### 3. PROVINCIAL PROFILE

#### 3.3 Socio-economic Conditions

##### 3.3.1 Economic Activities and Family Income

Table 3.3.1 Distribution of Families by Income Class

Income Class	Northern Samar				Region VIII	
	Total Number of Families		Annual Income		Total Number of Families	Annual Income Average (Pesos)
	Number	Share	Total (P '000.00)	Average (Pesos)		
Under 15,000	15,276	15	202,015	13,224	87,207	13,748
15,000 - 19,999	15,995	15	340,845	21,309	85,948	22,862
20,000 - 29,999	27,089	26	780,431	28,810	180,372	30,065
30,000 - 39,999	20,897	20	815,911	39,044	137,133	42,930
40,000 - 59,999	16,235	16	943,631	58,123	120,101	62,345
60,000 - 99,999	3,455	3	341,489	98,830	58,068	112,836
100,000 - 249,999	3,695	4	1,002,074	271,197	23,431	232,048
250,000 and over	562	1	267,913	476,629	1,418	473,960

Source: 1994 Family Income and Expenditures Survey by NSO

Notes:

- (1) Derived from Region VIII FIES
- (2) Based on NEDA and other agencies, poverty threshold in Region VIII was estimated at P-37,053 (P 6,444 annual per capita poverty threshold).
- (3) For purposes of the survey, a family is defined as a group of persons usually living together and composed of the head and other persons related by blood, marriage and adoption. A single person living alone is considered as a separate family. A household is composed of 1 or more families in the same housing unit and has a common arrangement of food preparation and consumption.

Table 3.3.2 Employment by Major Industry Group and Class of Worker, 1994

Major Industry Group	Household Population 15 years and Over Who Worked	Class of Worker							Not Reported
		Worked for Private Household (Domestic Services)	Worked for Private Business/ Enterprise/ Farm	Worked for Government/ Government Corporation	Self-employed Without Any Paid Employee	Employer In Own Farm or Business	Work With Pay In Own Family Operated Farm or Business	Work Without Pay in Own Family Operated Farm or Business	
Agriculture, Hunting and Forestry	81,271	252	14,003	228	39,343	5,185	561	21,382	317
Fishing	9,979	127	516	7	8,315	245	6	649	114
Mining and Quarrying	206	0	116	0	58	4	0	26	2
Manufacturing	2,662	53	691	6	1,699	63	16	127	7
Electricity, Gas and Water	160	1	112	6	37	1	0	2	1
Construction	3,964	704	2,701	48	466	15	0	21	9
Trade	9,486	37	1,273	13	6,363	559	43	1,173	25
Services	29,431	6,469	4,966	13,928	3,488	230	21	265	44
Not Stated	259	29	96	10	45	3	0	20	56
<b>Provincial Total</b>	<b>137,418</b>	<b>7,672</b>	<b>24,494</b>	<b>14,246</b>	<b>59,814</b>	<b>6,305</b>	<b>647</b>	<b>23,665</b>	<b>575</b>

Source: 1995 NSO Socioeconomic and Demographic Characteristics

### 3.3.3 Education

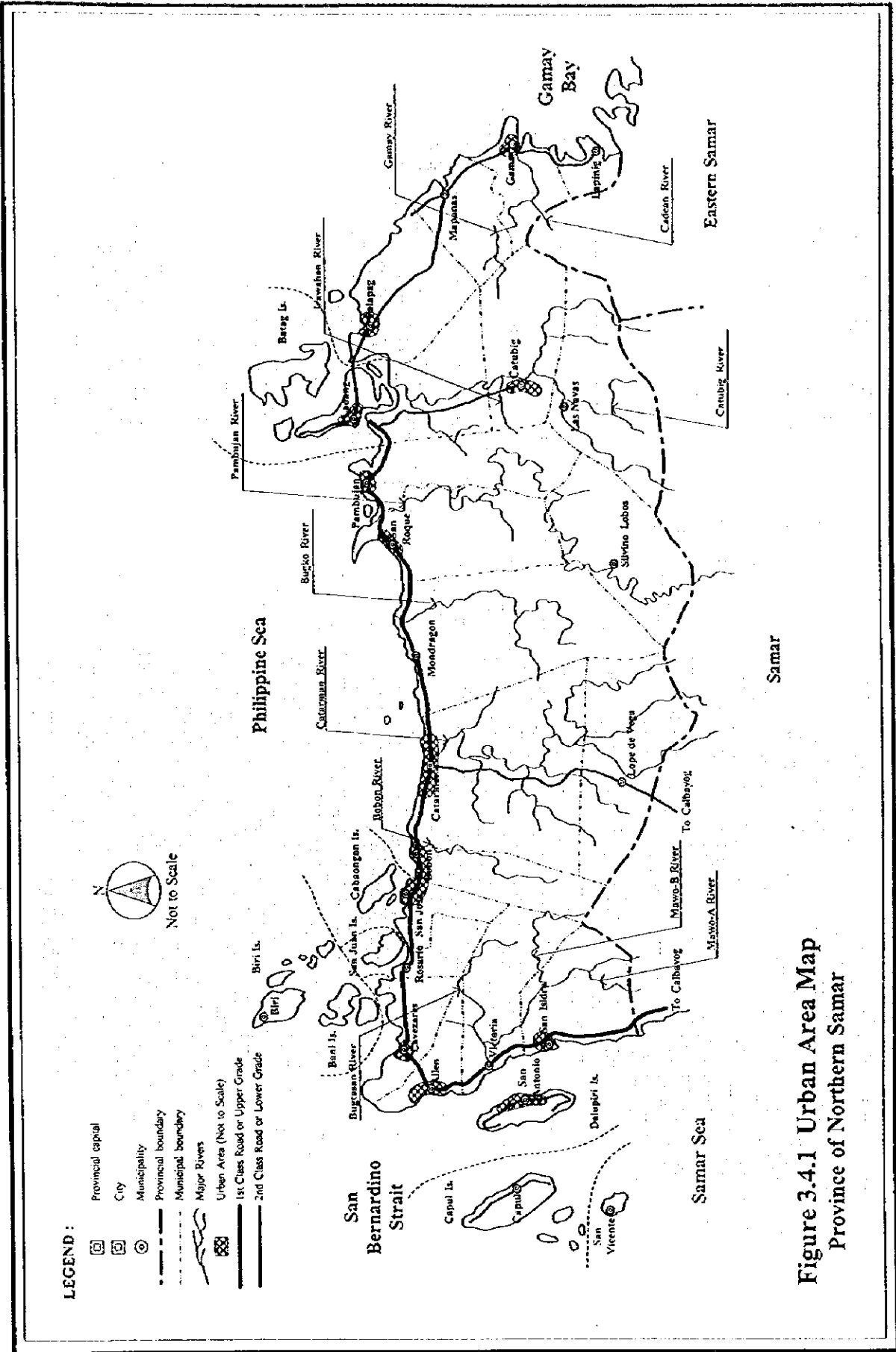
**Table 3.3.3 Household Population by Highest Educational Attainment**

Highest Educational Attainment	Household Population 5 years Old and Over	Age Group				
		Below 20	20 - 24	25 - 29	30 - 34	35 and Over
No Grade Completed	34,248	24,771	1,024	877	668	6,908
Pre-school	12,757	12,048	65	64	54	526
Elementary						
1st - 4th Grade	123,435	69,123	6,999	6,493	5,715	35,105
5th - 7th Grade	97,456	28,252	9,590	9,395	8,449	41,770
High School						
Undergraduate	48,356	23,710	6,373	4,589	3,520	10,164
Graduate	24,726	4,345	5,007	4,322	3,350	7,702
Post Secondary						
Undergraduate	321	62	96	69	44	50
Graduate	1,698	124	461	392	268	453
College Undergraduate	16,385	3,796	4,953	2,291	1,581	3,764
Academic Degree Holder	14,742	91	2,116	2,763	2,537	7,235
Post-Baccalaureate	663	2	37	63	63	498
Not Stated	4,764	3,354	234	191	165	820
<b>Total</b>	<b>379,551</b>	<b>169,678</b>	<b>36,955</b>	<b>31,509</b>	<b>26,414</b>	<b>114,995</b>

Source: 1995 NSO Socioeconomic and Demographic Characteristics

### 3.4 Population

#### 3.4.1 Classification of Urban and Rural Area



**Figure 3.4.1 Urban Area Map  
Province of Northern Samar**

### 3.5 Health Status

**Table 3.5.1 Number and Ratio of Population to Health Facilities and/or Medical Practitioners**

Health Facilities and Practitioners	Northern Samar		Philippines	
	Number	Ratio	Number	Ratio
<b>Health Facilities</b>				
Hospital	8	1/59,660	1,700	1/40,206
Rural Health Units	24	1/19,887	2,335	1/29,272
Barangay Health Station	112	1/4,261	11,646	1/5,869
<b>Practitioners</b>				
Doctors	15	1/31,819	6,913	1/9,887
Nurses	23	1/20,751	8,849	1/7,724
Midwives	91	1/5,245	10,831	1/6,311
Dentists	11	1/43,389	1,895	1/36,068

Source: PSPT and 1997 Philippine Statistical Yearbook.

### 3.6 Environmental Conditions

#### 3.6.2 Water Pollution

**Table 3.6.1 Types of Drainage Facilities**

Type	Length (km)
Drainage Main	27
Open Channel (with Concrete & rubble masonry)	25
Open Ditches & Unlined Laterals	86
Reinforced Concrete Circular Pipes	6
Street Gutters	20
Outfalls to rivers from drainage mains	12

**Table 3.6.2 DENR Water Quality Criteria/Water Usage and Classification for Fresh Water**

Parameter	Unit	Class AA	Class A	Class B	Class C	Class D
Color	PCU	15	50	(C)	(C)	(C)
Temperature (max. rise in deg. Celsius)	°C rise	--	3	3	3	3
pH (range)		6.5-8.5	6.5-8.5	6.5-8.5	6.5-8.5	6.0-9.0
Dissolve Oxygen (Minimum)	%satn	70	70	70	60	40
	mg/L	5.0	5.0	5.0	5.0	3.0
5-Day 20°C BOD	mg/L	1	5	5	7(10)	10(15)
Total Suspended Solids	mg/L	25	50			
Total Dissolved Solids	mg/L	500	1,000	--	--	1,000
Surfactants (MBAS)	mg/L	nil	0.2(0.5)	0.3(0.5)	0.5	--
Oil/Grease (Petroleum Ether Extract)	mg/L	nil	1	1	2	5
Nitrate as Nitrogen	mg/L	1	10	NR	10	--
Phosphate as Phosphorous	mg/L	nil	0.1	0.2	0.4	--
Phenolic Substances as Phenols	mg/L	nil	0.002	0.005	0.02	--
Total Coliforms	MPN/100mL	50	1,000	1,000	5,000	--
or Fecal Coliforms	MPN/100mL	20	100	200	--	--
Chloride as Cl	mg/l	250	250	--	350	--
Copper	mg/L	1	1	--	0.05	--

**Notes:**

Class AA - Public Water Supply Class I. Intended for waters having watersheds that are uninhabited and otherwise protected and which require only approved disinfection in order to meet the national standards for drinking water.

Class A - Public Water Supply Class II. Sources of water supply that will require complete treatment (coagulation, sedimentation, filtration and disinfection) in order to meet drinking water standards.

Class B - Recreational Water Class I. For primary contact recreation such as bathing, swimming skin diving, etc. (particularly for tourism purposes).

Class C - Fishery Water for the propagation and growth of fish and other aquatic resources; recreational (for boating, etc.); industrial water supply class I for manufacturing processes after treatment.

Class D - For agriculture, irrigation, livestock watering, etc.; for industrial water supply class II (cooling, etc.); other inland waters by their quality, belong to this specification.



#### 4. EXISTING FACILITIES AND SERVICE COVERAGE

##### 4.1 Water Supply

##### 4.1.3 Level III Systems

Table 4.1.1 Details on Existing Level III Systems

Sheet 1 of 4

Name of Municipality	Name of Operating Body	Level III Service								
		Number of Barangays Served			Number of Households Served			Number of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Catarman (Capital)	Catarman WD	15	3	18	388	97	485	2,128	532	2,660
	Costa Real Const.	1		1	80		80	439		439
	<b>Municipal Total</b>	16	3	19	468	97	565	2,567	532	3,099
San Isidro	San Isidro WD	2	1	3	166	30	196	908	164	1,072
<b>Provincial Total</b>		18	4	22	634	127	761	3,475	696	4,171

Table 4.1.1 Details on Existing Level III Systems

Sheet 2 of 4

Name of Municipality	Name of Operating Body	Level II Service								
		Number of Public Faucets			Number of Households Served			Number of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Catarman (Capital)	Catarman WD	7		7	35		35	192		192
	Costa Real Const.									
	<b>Municipal Total</b>	7		7	35		35	192		192
San Isidro	San Isidro WD	3		3	15		15	82		82
<b>Provincial Total</b>		10		10	50		50	274		274

Table 4.1.1 Details on Existing Level III Systems

Sheet 3 of 4

Name of Municipality	Name of Operating Body	Water Sources			Consumption			
		Type <sup>1</sup>	Number	Production (cu.m/day)	Domestic	Institutional	Commercial	Industrial
		(cu.m/day)						
Catarman	Catarman WD	DW	2	690	17		29	
	Costa Real Const.	SW	1	173				
	<b>Municipal Total</b>		3	863	17		29	
San Isidro	San Isidro WD	SP	1	173				
<b>Provincial Total</b>			7	1,898	34		58	

Note: 1. Type of Water Source; DW - Deep Well, DgW - Dug Well, Surf - Surface Water (River), SP - Spring, and IG - Infiltration Gallery

Table 4.1.1 Details on Existing Level III Systems

Sheet 4 of 4

Name of Municipality	Name of Operating Body	Consumers													
		Domestic House Connections			Domestic Public Faucets			Institutional Consumers		Commercial Consumers		Industrial Consumers			
		Connection		Consumption (m <sup>3</sup> /day)	Connection		Consumption (m <sup>3</sup> /day)	Connection		Consumption (m <sup>3</sup> /day)	Connection		Consumption (m <sup>3</sup> /day)		
		Metered	Unmetered		Metered	Unmetered	Metered	Unmetered	Metered	Unmetered	Metered	Unmetered			
Catarman	Catarman WD	485		16.00	7		1.20	24		29.00	89		29.00		
	Costa Real Const.	80													
	<b>Municipal Total</b>	565		16.00	7		1.20	24		29.00	89		29.00		
San Isidro	San Isidro WD	5			3					29					
<b>Provincial Total</b>		570		16	10		1.20	27		29.00	118		29.00		

#### 4.1.4 Level II Systems

Table 4.1.2 Details on Existing Level II Systems  
Sheet 1 of 6

Name of Municipality	Name of Operating Body	Water Source			Existing Facilities				
		Type	Number	Discharge (m <sup>3</sup> /day)	Length of Transmission Line (meter)	Reservoir		Length of Distribution Line (meter)	Number of Public Faucets
						Number	Volume (m <sup>3</sup> )		
Capul	Brgy. 1-5	SP	1	237.6	40	1	11.7	314	6
	Oson	SP	1	172.8	800	1	60		22
	Sawang	SP	1	259.2	1,000	3	50.26	800	10
	<b>Municipal Total</b>	SP	3	669.6	1,840	5	121.96	1114	38
Catubig	Brgy. Nagocan	Surf	1		1,500	1		600	7
	Brgy. San Jose BWSA	SP	1		2,000	2		800	11
	Brgy. San Vicente	SP	1		600	1		500	5
	<b>Municipal Total</b>	SP/Surf	2/1		4,100	4		1,900	23
Lapinig	Can Omania	SP	1		375	1	12.0	75	3
	Pio del Pilar	SP	1		400	1	15.0	100	3
	<b>Municipal Total</b>	SP	2		775	2	27.0	175	6
Las Navas	Dagdap WS	SP	1	172.8	3,500	1	27.0	100	5
	Las Navas WS	SP	1	72.0	3,200	1	400.0	4,000	25
	San Miguel WS	SP	1	28.8	842	1	60.0	600	11
	<b>Municipal Total</b>	SP	3	273.6	7,542	3	487.0	4,700	41
Lavezares	Bali Cuatro	SP	1		500			200	4
	Libas	SP	1	38.2	3,000	1	8.0	200	10
	Villa	SP	1	259.2	3,000	1	36.0	300	16
	<b>Municipal Total</b>	SP	3	297.4	6,500	2	44.0	700	30
Lope De Vega	Bonifacio BWSA	SP	1		1,000	1	8.0	300	6
	Getigo	SP	1	86.4	2,500	3	16.0	2,000	10
	Osmeha	SP	1	86.4	2,000	1	9.0	1,000	12
	Poblacion	SP	1		1,000	2	3.5	2,000	12
	<b>Municipal Total</b>		4	172.8	6,500	7	36.5	5,300	40
Pambujan	Ginulgan WS	SP	1		1,300	1	15.6	400	5
	Igot WS	SP	1		400	1	16.0	200	3
	Tula WS	SP	1		1,600	1	15.6	300	5
	Ynaguigayan WS	SP	1		1,000	1	15.6	100	4
	<b>Municipal Total</b>	SP	4		4,300	4	62.8	1,000	17
San Antonio	Rizal WS	SP	1	250.0	350	1	10.0	200	10
San Isidro	BAS Water Sys.	SP	1	512.0	500	1	64.0	1,028	51
	Cagtanipao	SP	1	87.5	1,000	1	21.0	720	10
	Mabuhay	SP	1	1.2	1,600	1	88.0	254	11
	Palanit	SP	1	305.0	1,000	1	6.5	370	12
	San Juan	SP	1	66.4	960	1	22.5	1,000	15
	Veriato	SP	1	332.0	160	1	13.9	600	14
	<b>Municipal Total</b>	SP	6	1,304.1	5,220	6	215.9	3,972	113
San Jose	Aguadahan	SP	1						4
	Bonglas	SP	1		3,000	1	8.0	200	3
	<b>Municipal Total</b>	SP	2		3,000	1	8.0	200	7
San Roque	Coroconog	SP	1	129.6	2,000	1	8.0	300	3
	Malobago	SP	1	129.6	1,000	1	4.0	75	3
	Zone 3	SW	1	60.5	318	1	8.0	90	3
	<b>Municipal Total</b>	SP/SW	2/1	319.7	3,318	3	20.0	465	9
Silvino Lobos	Deit de Turag	SP	1	98.0	1,300	1	8.0		4
	Poblacion 1-3	SP	1	121.0					22
	<b>Municipal Total</b>	SP	2	219.0	1,300	1	8.0		26
Victoria	Acedillo	SP	1	43.2	240	2	5.0	175	6
	Buenos Aires	SP	1	172.8	380	1	1.7	230	4
	Erenas	SP	1	51.8	1,200	2	16.5	475	18
	Lungib	SP	1	103.7	250	1	3.5	180	5
	Pasabuena	SP	1	43.2	860	1	3.4	250	3
	Pop. 1, 2 and 3	SP	1	50.4	1,600	2	14.0	1,200	30
	<b>Municipal Total</b>		6	465.1	4,530	9	44.1	2,510	66
<b>Provincial Total</b>			39	3,301.7	47,435	43	963.3	21,122	388

Note: 1. Type of Water Source: DW - Deep Well, DgW - Dug Well, Surf - Surface Water (River), SP - Spring, and IG - Infiltration Gallery



Table 4.1.2 Details on Existing Level II Systems  
Sheet 2 of 6

Name of Municipality	Name of Operating Body	Number of Barangay Served			Number of Households Served			Number of Population Served		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Capul	Brgy. 1-5	5		5	110		110	563		563
	Oson		1	1		30	30		156	156
	Sawang		1	1		50	50		260	260
	<b>Municipal Total</b>	<b>5</b>	<b>2</b>	<b>7</b>	<b>110</b>	<b>80</b>	<b>190</b>	<b>563</b>	<b>416</b>	<b>979</b>
Catubig	Brgy. Nagoocan		1	1		35	35		180	180
	Brgy. San Jose BWS		1	1		55	55		283	283
	Brgy. San Vicente		1	1		25	25		129	129
	<b>Municipal Total</b>		<b>3</b>	<b>3</b>		<b>115</b>	<b>115</b>		<b>592</b>	<b>592</b>
Lapinig	Can Omani		1	1		15	15		86	86
	Pio del Pilar		1	1		15	15		86	86
	<b>Municipal Total</b>		<b>2</b>	<b>2</b>		<b>30</b>	<b>30</b>		<b>172</b>	<b>172</b>
Las Navas	Dapdap WS		1	1		25	25		124	124
	Las Navas WS	2	2	4	75	50	125	373	249	622
	San Miguel WS		1	1		55	55		274	274
	<b>Municipal Total</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>75</b>	<b>130</b>	<b>205</b>	<b>373</b>	<b>647</b>	<b>1,020</b>
Lavezares	Bali Cuatro		1	1		20	20		100	100
	Libas		1	1		50	50		250	250
	Villa		1	1		80	80		400	400
	<b>Municipal Total</b>		<b>3</b>	<b>3</b>		<b>150</b>	<b>150</b>		<b>750</b>	<b>750</b>
Lope De Vega	Bonifacio BWSA		1	1		30	30		182	182
	Getigo		1	1		50	50		304	304
	Osmeña		1	1		60	60		365	365
	Poblacion	1		1	60		60	346		346
	<b>Municipal Total</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>346</b>	<b>851</b>	<b>1,197</b>
Pambujan	Ginulgan WS		1	1		25	25		142	142
	Igot WS		1	1		15	15		85	85
	Tula WS		1	1		25	25		142	142
	Ynaguingayan WS		1	1		20	20		114	114
	<b>Municipal Total</b>		<b>4</b>	<b>4</b>		<b>85</b>	<b>85</b>		<b>483</b>	<b>483</b>
San Antonio	Rizal WS		1	1		10	10		49	49
San Isidro	BAS Water Sys.		3	3		255	255		1,400	1,400
	Caglanipao		1	1		50	50		275	275
	Mabuhay		1	1		55	55		302	302
	Palanit		1	1		60	60		329	329
	San Juan		1	1		75	75		412	412
	Veriato		1	1		70	70		384	384
	<b>Municipal Total</b>		<b>8</b>	<b>8</b>		<b>565</b>	<b>565</b>		<b>3,102</b>	<b>3,102</b>
	San Jose	Agudahan		1	1		20	20		103
Bonglas			1	1		15	15		78	78
<b>Municipal Total</b>			<b>2</b>	<b>2</b>		<b>35</b>	<b>35</b>		<b>181</b>	<b>181</b>
San Roque	Coroconog		1	1		15	15		91	91
	Malobago		1	1		15	15		91	91
	Zone 3	1		1	15		15	91		91
	<b>Municipal Total</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>15</b>	<b>30</b>	<b>45</b>	<b>91</b>	<b>182</b>	<b>273</b>
Silvino Lobos	Deit de Turag		1	1			20		120	120
	Poblacion 1-3	3		3	111		111	668		668
	<b>Municipal Total</b>	<b>3</b>	<b>1</b>	<b>4</b>	<b>111</b>	<b>20</b>	<b>131</b>	<b>668</b>	<b>120</b>	<b>788</b>
Victoria	Acedillo		1	1		30	30		146	146
	Buenos Aires		1	1		20	20		97	97
	Erenas		1	1		90	90		437	437
	Lungib		1	1		25	25		121	121
	Pasabuena		1	1		15	15		73	73
	Pob. 1, 2 and 3	3		3	150		150	729		729
<b>Municipal Total</b>	<b>3</b>	<b>5</b>	<b>8</b>	<b>150</b>	<b>180</b>	<b>330</b>	<b>729</b>	<b>874</b>	<b>1,603</b>	
<b>Provincial Total</b>		<b>10</b>	<b>38</b>	<b>54</b>	<b>411</b>	<b>1,490</b>	<b>2,036</b>	<b>2,207</b>	<b>8,003</b>	<b>10,935</b>

Table 4.1.2 Details on Existing Level II Systems  
Sheet 3 of 6

Name of Municipality	Name of Operating Body	Supply (Hrs/day)	Dirty Water <sup>1</sup>	Taste or Smell <sup>2</sup>	Service Conditions During Dry Season					Supply Water Pressure (% of total)
					Power Failure	Pump Breakdown	Pipe Burst	Others	Adequate	
Capul	Brgy. 1-5	6								
	Oson									
Cantibig	Sawang	24								
	Brgy. Nagcoan									
Lapinig	Brgy. San Jose BWSA									
	Brgy. San Vicente									
Las Navas	San Omani	24								
	Pio del Pilar	24								
Lavezares	Dapdap WS									
	Las Navas WS									
Lope De Vega	San Miguel WS									
	Bali Cuatro									
Pambujan	Libas									
	Villa									
San Antonio	Bonifacio BWSA	24								
	Getgo	24								
San Isidro	Omeña	24								
	Poblacion	8								
San Jose	Gimujan WS									
	Jgot WS									
San Roque	Tala WS									
	Ynangngayan WS									
Sibvino Lobos	Rizal WS	24								
	BAS Water Sys.	24								
Victoria	Caglanpac	24								
	Mabohay	24								
Zone 3	Palanit	24								
	San Juan	24								
Bonglas	Vernato	24								
	Aguadahan									
Malabago	Bonglas									
	Coroconog									
Accedillo	Malabago									
	Zone 3									
Buenos Aires	Deit de Turay	24								
	Poblacion 1-3	24								
Ereñas	Accedillo	24								
	Buenos Aires	24								
Pasabena	Ereñas	24								
	Lungib	24								
Prob. 1, 2 and 3	Pasabena	24								
	Prob. 1, 2 and 3	24								

Note: 1. Dirty Water: E - Everyday, OW - Once a week, OM - Once a month, O - Occasional.  
2. Taste or Smell: C - Good taste, S - Salty, W - Wood taste, M - Metallic taste, O - Others.

Table 4.1.2 Details on Existing Level II Systems  
Sheet 4 of 6

Name of Municipality	Name of Operating Body	Number of Staff					Repair Work			
		Technical Staff	Administrative Staff	Collector	Total Number of Staff	Local Tradesman	MEO/CEO	DEO	Others	
Capul	Brgy. 1-5	1								
	Oson					✓				
	Sawang					✓				
Cantubig	Brgy. Nagocan									
	Brgy. San Jose BWSA									
Lapinig	Brgy. San Vicente		10		10	✓				
	Can Ornanio		10		10	✓				
Las Navas	Po del Pilar									
	Dapdap WS									
Lavezares	Las Navas WS									
	San Miguel WS									
	Bali Cuatro									
	Libas									
Lope De Vega	Villa									
	Bonifacio BWSA					✓				
	Gengo					✓				
	Osmeha					✓				
Pambujan	Problacion									
	Ginulagan WS									
	Igot WS									
	Fula WS									
San Antonio	Ynagungayon WS									
	Ruzal WS									
San Isidro	BIAS Water Sys.									
	Caglanipao					✓				
	Mabuhay					✓				
	Palanit					✓				
San Jose	San Juan			2		✓				
	Venatio				2	✓				
San Roque	Aguadianan									
	Bonglas									
Silvino Lobos	Coroconog									
	Malobago									
Victoria	Zone 3									
	Deit de Turag									
Victoria	Poplacion 1-3									
	Accedillo					✓				
	Buenos Aires					✓				
	Erenas					✓				
Pasabuena	Lungob					✓				
	Pasabuena					✓				
Pop. 1, 2 and 3	Pop. 1, 2 and 3					✓				

Table 4.1.2 Details on Existing Level II Systems  
Sheet 5 of 6

Name of Municipality	Name of Operating Body	Expenditures						Tariff				Average Collection Efficiency (%)	
		Annual	Wages	Fuel, Chem.	Transport	Repairs	Loan Repayment	Other	Consumer Payment (Year)	Cost per Pail	Cost per Cu. Meter (Pesos)		Cost per HH
		(P 000.00 / year)											
Capul	Brgy. 1-5											20	20
	Oson												
	Sawang												
Catubig	Brgy. Nagoocan												
	Brgy. San Jose BWSA												
	Brgy. San Vicente												
Lapinig	Can Omani	500											
	Pio del Pilar	500											
Las Navas	Dapdap WS												
	Las Navas WS												
Lavezares	San Miguel WS												
	Bali Cuatro												
	Libas												
	Villa												
Lope De Vega	Bonifacio BWSA											5	5
	Cebigo											5	5
	Osmeña												
	Poblacion												
Pambujan	Gimuligan WS												
	Igoi WS												
	Tula WS												
	Ynaguinsayan WS												
San Antonio	Rizal WS											5	20
San Isidro	BAS Water Sys.											5	5
	Caglanjato												
	Mabuhay												
	Palamit												
	San Juan												2
	Veriato												
San Jose	Aguadahan												
	Bonglas												
San Roque	Coroconog												
	Malobago												
	Zone 3												
Silvino Lobos	Deit de Turag												
	Poblacion 1-3												
Victoria	Acedito												
	Buenos Aires												
	Erenas												
	Lumgib												
	Pastbuena												
	Pop. 1, 2 and 3											10	

Table 4.1.2 Details on Existing Level II Systems  
Sheet 6 of 6

Name of Municipality	Name of Operating Body	Billings				Revenues						
		Annual Billing (Number)	Public Faucet Consumers	House Connection Consumers	Expected Subsidies	Others	Annual Income (P 000.00 / year)	Payment by Public Faucet Consumers	Payment by House Connection	Subsidies	Other	
Capul	Brgy. 1-5 Oson Sawang											
Catubig	Brgy. Nagoocan Brgy. San Jose BWSA											
Laping	Brgy. San Vicente Can Ornamio											
Las Navas	Pio del Pilar Dapdap WS Las Navas WS											
Lavezares	San Miguel WS Bali Cuatro Libas Villa											
Lope De Vega	Bonifacio BWSA Gebigo Osmeña											
Pambujan	Publacion Gimulgan WS Igot WS Tula WS											
San Antonio San Isidro	Ynaguingsyan WS Rozal WS BAS Water Sys.											
San Jose	Caglanpao Maubuhay Palanit San Juan Veriate											
San Roque	Agudahan Bonglas Coroconog Malibago											
Silvino Lobos	Zone 3 Derr de Turag Poblacion 1-3											
Vistona	Acedillo Buenos Aires Erenas Lungib Pasaburena Pop. 1, 2 and 3											

#### 4.1.5 Level I Facilities

##### Safe and Unsafe Classification of Level I Facilities

According to the definition of DOH, the protected deep well, protected shallow well, covered/improved dug well and developed spring are classified as safe sources, while unprotected shallow well, open dug well, undeveloped spring and rainwater collector are classified as unsafe sources.

In the 1990 population census data, "Households by Main Source of Drinking Water and City /Municipality", it was shown that 54% of the households depended on shallow well, dug well, undeveloped spring, lake, river and rain water collector. This figure was arrived as the percentage of underserved/unserved sources, if all shallow wells were regarded as doubtful.

The PHO has conducted water quality analysis on samples collected at public and private Level I wells, however, the results by municipality/city are available for only five (5) out of 24 municipalities at present as shown in Table 4.1.3. The unsafe percentage ranges from 7% to 50%.

Under this situation, the following conditions may be considered to assume safe/unsafe percentage for this planning purpose.

- The number of samples examined was very limited compared with the number of existing shallow wells (4,696) and water sampling by PHO is usually conducted where problems on water quality and/or incidence of water related diseases have experienced.
- There might be some cases that examination at the same Level I sources/facilities was conducted until the safety of the water was confirmed.
- Sources such as dug wells, which are defined as unsafe sources may have been included in the above examination results.

Considering the above conditions on the manner of sampling, an average unsafe percentage (20%) of shallow wells derived from Table 4.1.3 will not be used.

While, as reference information, the experiences in 1<sup>st</sup> and 2<sup>nd</sup> batch provinces in Mindanao in the preparation of PW4SP show the unsafe percentage of 20-50% as summarized below.

Surigao del Norte	Agusan del Norte	Agusan del Sur	Bukidnon	Misamis Oriental	Davao Oriental	Davao del Norte	Davao del Sur	Sarangani	South Cotabato
20%	50%	23%	50%	50%	40%	20%	46%	30%	50%

**Table 4.1.3 Results of Water Quality Examination of Shallow Wells**

Municipality	No. of Existing Shallow Well	Results of Water Quality Examination				Total No. of Sample
		Safe Source		Unsafe Source		
		Number	Percentage	Number	Percentage	
Allen	334	3	50%	3	50%	6
Biri	163	13	93%	1	7%	14
Bobon	607	ND	-	ND	-	0
Capul	29	ND	-	ND	-	0
Catarman	2,322	ND	-	ND	-	0
Catubig	5	ND	-	ND	-	0
Gamay	146	ND	-	ND	-	0
Laoang	81	ND	-	ND	-	0
Lapinig	35	ND	-	ND	-	0
Las Navas	3	ND	-	ND	-	0
Lavezares	111	ND	-	ND	-	0
Lope De Vega	0	ND	-	ND	-	0
Mapanas	33	ND	-	ND	-	0
Mondragon	44	ND	-	ND	-	0
Palapag	100	ND	-	ND	-	0
Pambujan	65	ND	-	ND	-	0
Rosario	11	ND	-	ND	-	0
San Antonio	35	2	67%	1	33%	3
San Isidro	22	ND	-	ND	-	0
San Jose	170	3	100%	0	0%	3
San Roque	326	7	78%	2	22%	9
San Vicente	14	ND	-	ND	-	0
Silvino Lobos	4	ND	-	ND	-	0
Victoria	36	ND	-	ND	-	0
<b>Province</b>	<b>4,696</b>	<b>28</b>	<b>80%</b>	<b>7</b>	<b>20%</b>	<b>35</b>

(Source) PHO, 1998

(Note) ND: No data available

Compared with these experiences, the percentage of 40% as an average experienced in the 1<sup>st</sup> and 2<sup>nd</sup> batch study (10 provinces) may be adopted as the unsafe percentage to all municipalities both in urban and rural area in the classification of shallow wells. While, those sources other than shallow wells are processed as classified in the questionnaire. Table 4.1.4 (a) presents the numbers of Level I facilities by safe and unsafe classification.

#### **Public and Private Level I Facilities for Rural Water Supply**

Table 4.1.4 (b) presents the number and proportion of Level I facilities by public and private sources for rural water supply in the province. Public and private facilities share 44% and 56% of the total number of Level I facility, respectively. Developed springs occupy 20% of the total number of public facilities.

Table 4.1.4(p) Number of Level 1 Facilities by Safe and Unsafe Classification

Name of Municipality	Area	Safe Sources										Unsafe Source						Grand Total
		Public					Private					Public			Private			
		Deep Well	Shallow Well	Covered/Improved Dug Well	Developed Spring	Sub-total	Deep Well	Shallow Well	Covered/Improved Dug Well	Total	Shallow Well	Open Dug Well	Undeveloped Spring	Rain Water Collection	Sub-total	Open Dug Well	Rain Water Collector	
Allen	Urban	2	4	4	5	4	27	77	82	3	52			3	52		52	54
	Rural	2	5	13	3	113	113	126	4	4	75			4	75		75	79
	Total	4	9	17	8	190	190	207	7	7	127			7	127		127	134
Bin	Urban	2	21	5	2	17	1	18	43	14	11			14	11		15	26
	Rural	2	21	10	31	39	56	39	70	14	28			14	28		28	42
	Total	4	42	12	36	56	56	57	113	28	7			28	37		40	88
Bobon	Urban	11	11	11	11	100	233	244	7	7	155			7	155		155	162
	Rural	21	32	32	32	332	364	21	14	66	201			14	66		66	80
	Total	32	43	43	43	332	364	21	25	73	201			21	73		73	92
Capul	Urban	1	4	2	5	10	2	2	2	11	2			2	11		11	15
	Rural	3	10	4	6	14	2	2	2	16	6			6	16		16	24
	Total	4	14	6	11	24	4	4	4	27	9			9	27		27	39
Caaman (Capital)	Urban	2	99	101	1	1,260	1,260	66	66	66	66			66	66		66	906
	Rural	12	16	5	1	19	24	32	10	10	12			10	12		12	23
	Total	14	115	106	2	1,279	1,284	76	76	76	76			76	78		78	929
Caubig	Urban			3	3	3	3	3	3	3	2			2	2		2	2
	Rural			21	24	27	27	27	27	27	2			2	2		2	29
	Total			24	27	30	30	30	30	30	4			4	4		4	17
Camay	Urban	1	5	2	8	20	20	20	4	4	13			4	13		13	17
	Rural	3	18	7	31	44	44	44	12	12	30			12	30		30	42
	Total	4	23	9	39	64	64	64	16	16	43			16	43		43	59
Laouang	Urban	10	7	17	4	4	4	4	21	5	2			5	2		7	26
	Rural	28	16	4	4	48	22	22	30	11	14			11	14		14	25
	Total	38	23	21	8	52	26	26	51	16	25			16	25		25	51
Laoping	Urban	2	6	2	5	17	2	2	2	4	4			4	4		4	5
	Rural	1	11	5	17	2	2	2	19	8	8			8	8		8	15
	Total	3	17	7	22	19	4	4	21	12	12			12	12		12	20
Las Navos	Urban	1	1	1	1	1	1	1	1	1	1			1	1		1	1
	Rural	1	2	11	14	14	14	14	14	1	1			1	1		1	15
	Total	2	3	12	15	15	15	15	15	2	2			2	2		2	16
Laveares	Urban	1	9	12	22	29	29	29	51	6	6			6	6		6	26
	Rural	11	13	12	36	16	16	16	51	8	8			8	8		8	19
	Total	12	22	24	58	45	45	45	102	14	14			14	14		14	44
Lope De Vega	Urban	1	1	1	1	1	1	1	1	1	1			1	1		1	1
	Rural	1	1	1	1	1	1	1	1	1	1			1	1		1	1
	Total	2	2	2	2	2	2	2	2	2	2			2	2		2	2



Table 4.1.4(a) Number of Level I Facilities by Safe and Unsafe Classification (Cont'd.)

Name of Municipality	Area	Safe Sources										Unsafe Sources						Grand Total							
		Public					Private					Public			Private										
		Deep Well	Shallow Well	Covered/Improved Dug Well	Developed Spring	Sub-total	Deep Well	Shallow Well	Covered/Improved Dug Well	Sub-total	Total	Shallow Well	Open Dug Well	Undeveloped Spring	Rain Water Collection	Sub-total	Shallow Well		Open Dug Well	Rain Water Collector	Sub-total	Total			
Mapana	Urban	1	3	2		4																			
	Rural		7	8		8																			
	Total	2	10	10		12																			
Mondragon	Urban	1	2	3		3																			
	Rural	16	13	5		32																			
	Total	17	16	8		36																			
Palapog	Urban	1	5	6		6																			
	Rural	1	26	8		29																			
	Total	2	31	14		33																			
Pambujan	Urban	5	8	34		41																			
	Rural	6	1	4		11																			
	Total	11	9	38		52																			
Retene	Urban	1	1	1		3																			
	Rural	1	1	6		8																			
	Total	2	2	7		11																			
San Antonio	Urban	2	2	5		7																			
	Rural	10	10	3		23																			
	Total	12	12	8		31																			
San Isidro	Urban	3	6	9		18																			
	Rural	3	7	6		16																			
	Total	6	13	15		34																			
San Jose	Urban	22	22	32		76																			
	Rural	25	25	75		125																			
	Total	47	47	151		201																			
San Roque	Urban	2	5	165		172																			
	Rural	4	6	19		29																			
	Total	6	11	184		201																			
San Viceme	Urban	4	2	1		7																			
	Rural	4	4	5		13																			
	Total	8	6	6		20																			
Silvino Lobos	Urban			2		2																			
	Rural		6	2		8																			
	Total		6	2		8																			
Victoria	Urban	7	10	10		27																			
	Rural	7	10	8		25																			
	Total	14	20	18		52																			
Provincial Total	Urban	16	205	28		249																			
	Rural	110	210	468		788																			
	Total	126	415	496		1031																			

Table 4.1.4 (b) Public and Private Level I Facilities for Rural Water Supply

Facility	Public Source		Private Source		Total
	Number	%	Number	%	
Deep Well	110	94%	7	6%	117
Shallow Well	383	33%	788	67%	1,171
Spring Development	126	100%			126
Others			2	100%	2
<b>Total</b>	<b>619</b>	<b>44%</b>	<b>797</b>	<b>56%</b>	<b>1,416</b>

#### 4.1.6 Water Supply Service Coverage

##### Estimation of Service Coverage in Terms of Safe, Unsafe and Unserved Classification

Through review of the number of water supply systems/facilities and the number of households that were derived from the questionnaire, it was found that a great number of unserved population would be accounted as a balance between the total population and the population with any levels of services (including unsafe facilities) in application of the service level standard for Level I facility. To come up with more realistic service coverage, the unserved population in 1998 was referred to using the profile in the 1990 population census data, "Households by Main Source of Drinking Water and City/Municipality" prepared by NSO. The rest of the population, those who are not served by Level III and/or II systems, were considered to be covered by shared or own use of Level I facilities. The calculation procedure is as follows:

- Service percentage/population of Level III and Level II systems was estimated based on the questionnaire survey results.
- Percentage of unserved population (using undeveloped spring, lake water, river water, peddler, etc.) of respective municipality by urban and rural area, which were studied in the 1990 population census.
- Population covered by Level I facilities was calculated as the balance between the total population and the population served by Level III & II systems and the unserved population.
- Level I population coverage was estimated with the assumption that 50% of the private facilities were shared by neighbors.

Unserved population and the population covered by Level I facilities are presented in Table 4.1.5. Table 4.1.6 (a) and (b) present the overall population covered by Level I facilities and the number of households.

Table 4.1.5 Estimation of Unserved Population by Municipality

Name of Municipality	Area	Population and Household (1998)		Served Population			Unserved Population			Population Covered by Level I Facilities
		Number	HH Size	Level III	Level II	Total	Unserved Percentage (1995)		Unserved Population 1998	
							Total No. of HHs	No. of Unserved		
Allen	Urban	8,476	5.03				80	5	447	8,029
	Rural	10,336	4.85				398	19	1,932	8,404
	Total	18,812	4.93				478	13	2,379	16,433
Biri	Urban	2,596	5.77				25	5	133	2,463
	Rural	6,728	5.83				116	11	725	6,003
	Total	9,324	5.81				139	9	858	8,466
Bobon	Urban	5,041	5.23				15	2	87	4,954
	Rural	11,451	5.11				73	3	380	11,071
	Total	16,492	5.14				88	3	467	16,025
Capul	Urban	4,286	5.12		563	563	818	5	26	3,697
	Rural	5,827	5.19		416	416	1,112	24	126	5,285
	Total	10,113	5.16		979	979	1,930	29	152	8,982
Catarman (Capital)	Urban	31,015	5.82	2,567	192	2,759	5,212	235	1,398	26,858
	Rural	34,205	5.26	532		532	5,965	1,166	6,686	26,987
	Total	65,220	5.52	3,099	192	3,291	11,177	1,401	8,085	53,844
Catubig	Urban	4,649	5.26				869	438	2,343	2,306
	Rural	21,566	5.13		592	592	4,022	2,176	11,668	9,306
	Total	26,215	5.15		592	592	4,891	2,614	14,011	11,612
Gamay	Urban	2,753	5.16				522	116	612	2,141
	Rural	17,913	5.12				3,271	574	3,143	14,770
	Total	20,666	5.13				3,793	690	3,755	16,911
Laoang	Urban	11,104	5.47				2,029	75	410	10,694
	Rural	38,098	5.20				6,991	373	2,033	36,065
	Total	49,202	5.26				9,020	448	2,443	46,759
Lapinig	Urban	3,701	6.01				572	28	181	3,520
	Rural	6,629	5.75		172	172	1,109	139	831	5,626
	Total	10,330	5.84		172	172	1,681	167	1,012	9,146

Table 4.1.5 Estimation of Unserved Population by Municipality (Cont'd.)

Name of Municipality	Area	Population and Household (1998)		Served Population			Unserved Population			Population Covered by Level I Facilities	
		Number	HH Size	Level III	Level II	Total	Total No. of HHs	Unserved Percentage (1995)			Unserved Population 1998
								No. of Unserved	%		
Las Navas	Urban	6,254	5.33		373	373	1,001	498	50	3,111	2,770
	Rural	19,763	4.89		647	647	4,030	2,474	61	12,132	6,984
	Total	26,017	4.98		1,020	1,020	5,031	2,972	59	15,244	9,753
Lavezares	Urban	3,433	5.25				654	67	10	352	3,081
	Rural	17,528	4.95		750	750	3,446	332	10	1,689	15,089
	Total	20,961	5.00		750	750	4,100	399	10	2,040	18,171
Lope De Vega	Urban	2,514	5.77		346	346	395	243	62	1,547	621
	Rural	10,314	6.08		851	851	1,590	1,208	76	7,836	1,627
	Total	12,828	6.02		1,197	1,197	1,985	1,451	73	9,383	2,248
Mapanas	Urban	2,161	5.40				352	52	15	319	1,842
	Rural	7,813	5.64				1,326	257	19	1,514	6,299
	Total	9,974	5.59				1,678	309	18	1,834	8,140
Mondragon	Urban	5,491	5.37				927	16	2	95	5,396
	Rural	21,357	5.20				3,943	79	2	428	20,929
	Total	26,848	5.24				4,870	95	2	523	26,325
Palapag	Urban	6,243	4.85				1,222	176	14	899	5,344
	Rural	20,286	5.12				3,717	874	24	4,770	15,516
	Total	26,529	5.05				4,939	1,050	21	5,669	20,860
Pambujan	Urban	9,970	5.82				1,577	145	9	917	9,053
	Rural	13,414	5.62		483	483	2,311	722	31	4,191	8,740
	Total	23,384	5.70		483	483	3,888	867	22	5,107	17,794
Rosario	Urban	2,412	6.64				363	2	1	13	2,399
	Rural	6,845	5.66				1,098	12	1	75	6,770
	Total	9,257	5.90				1,461	14	1	88	9,169

Table 4.1.5 Estimation of Unserved Population by Municipality (Cont'd.)

Name of Municipality	Area	Population and Household (1998)		Served Population			Unserved Population			Population Covered by Level I Facilities	
		Number	HH Size	Level III	Level II	Total	Total No. of HHs	Unserved Percentage (1995)			
								No. of Unserved	%		
San Antonio	Urban	839	4.99				168	15	9	75	764
	Rural	7,413	4.87		49	49	1,467	73	5	369	6,995
	Total	8,252	4.88		49	49	1,635	88	5	444	7,759
San Isidro	Urban	2,834	5.33	908	82	990	507	34	7	190	1,654
	Rural	21,675	5.49	164	3,102	3,266	3,695	167	5	980	17,429
	Total	24,509	5.47	1,072	3,184	4,256	4,202	201	5	1,170	19,083
San Jose	Urban	3,088	5.33				570	15	3	81	3,007
	Rural	10,052	5.17		181	181	1,841	77	4	420	9,451
	Total	13,140	5.21		181	181	2,411	92	4	502	12,457
San Roque	Urban	8,378	6.26		91	91	1,274	8	1	53	8,234
	Rural	11,103	5.90		182	182	1,714	37	2	240	10,681
	Total	19,481	6.06		273	273	2,988	45	2	292	18,916
San Vicente	Urban	1,610	4.72				341	1	0	5	1,605
	Rural	4,423	4.63				941	4	0	19	4,404
	Total	6,033	4.66				1,282	5	0	24	6,009
Silvino Lobos	Urban	2,615	6.47		668	668	351	194	55	1,445	502
	Rural	9,053	5.91		120	120	1,481	964	65	5,893	3,040
	Total	11,668	6.02		788	788	1,832	1,158	63	7,338	3,542
Victoria	Urban	2,700	4.86		729	729	555	44	8	214	1,757
	Rural	9,327	4.85		874	874	1,770	221	12	1,165	7,288
	Total	12,027	4.86		1,603	1,603	2,325	265	11	1,379	9,045
Provincial Total	Urban	134,163	5.52	3,475	3,044	6,519	23,117	2,525	11	14,953	112,691
	Rural	343,119	5.25	696	8,419	9,115	62,247	12,540	20	69,243	264,761
	Total	477,282	5.32	4,171	11,463	15,634	85,364	15,065	18	84,197	377,451

Table 4.1.6 (a) Estimation of Population Covered by Safe and Unsafe Source by Municipality

Name of Municipality	Area	Pop. Covered by Level I Facilities	Number of Facilities						Coverage of Own Use					
			Public Facilities			Private Facilities			Number of Private Facilities			(1) Population Covered		
			Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total
Allen	Urban	8,029	4	3	7	77	52	129	26	39	65	195	130	324
	Rural	8,404	13	4	17	113	75	188	38	56	94	284	189	473
	Total	16,433	17	7	24	190	127	317	63	95	159	478	319	797
Bini	Urban	2,463	25	14	39	18	12	30	9	6	15	51	35	87
	Rural	6,003	31	14	45	39	28	67	20	14	34	113	81	193
	Total	8,466	56	28	84	57	40	97	28	28	56	164	116	280
Bobon	Urban	4,954	11	7	18	233	155	388	78	116	194	609	406	1,015
	Rural	11,071	21	14	35	100	66	166	33	50	83	260	174	434
	Total	16,025	32	21	53	332	222	554	111	166	277	869	579	1,449
Capul	Urban	3,697	10	2	12	2	1	3	1	1	2	5	3	8
	Rural	5,285	14	6	20	2	2	4	1	1	2	6	4	10
	Total	8,982	23	9	32	4	3	7	2	2	4	11	7	18
Catanman (Capital)	Urban	26,858	101	66	167	1,260	840	2,100	420	630	1,050	3,667	2,444	6,111
	Rural	26,987	29	10	39	24	12	36	12	12	24	69	36	105
	Total	53,844	130	76	206	1,284	852	2,136	426	642	1,068	3,735	2,480	6,216
Catubig	Urban	2,306	3	2	5	3	2	5	1	1	2	5	3	8
	Rural	9,306	24	2	26	2	2	4	1	1	2	6	4	10
	Total	11,612	27	4	31	5	4	9	2	2	4	11	7	18
Gamay	Urban	2,141	8	4	12	20	13	33	10	10	20	51	34	85
	Rural	14,770	28	12	40	44	30	74	22	22	44	115	76	191
	Total	16,911	36	16	52	64	43	107	32	32	64	166	110	276
Laoang	Urban	10,694	17	5	22	4	2	6	2	2	4	10	7	16
	Rural	36,065	48	11	59	22	14	36	11	7	18	59	39	98
	Total	46,759	65	16	81	25	17	42	13	8	21	69	46	115
Lapinig	Urban	3,520	8	4	12	2	1	3	1	1	2	5	4	9
	Rural	5,626	17	8	25	2	1	3	1	1	2	5	4	9
	Total	9,146	25	12	37	4	2	6	2	2	4	10	8	18
Las Navas	Urban	2,770	1	1	2	1	1	2	1	1	2	3	2	5
	Rural	6,984	14	1	15	1	1	2	1	1	2	3	2	5
	Total	9,753	15	2	17	2	2	4	2	2	4	6	4	10
Lavezares	Urban	3,081	22	6	28	20	20	49	15	15	30	77	51	129
	Rural	15,089	36	8	44	16	10	26	8	5	13	41	27	68
	Total	18,171	58	14	72	45	30	75	23	23	46	118	79	197
Lope De Vega	Urban	621	2	2	4	2	2	4	1	1	2	3	2	5
	Rural	1,627	9	1	10	1	1	2	1	1	2	3	2	5
	Total	2,248	11	3	14	3	3	6	2	2	4	6	4	10
Mapanas	Urban	1,842	4	2	6	2	1	3	1	1	2	5	3	8
	Rural	6,299	8	5	13	8	5	13	4	3	7	21	14	35
	Total	8,140	12	7	19	10	6	16	5	5	10	26	17	43

Table 4.1.6 (a) Estimation of Population Covered by Safe and Unsafe Source by Municipality (Cont'd.)

Name of Municipality	Area	Pop. Covered by Level I Facilities	Number of Facilities						Coverage of Own Use					
			Public Facilities			Private Facilities			Number of Private Facilities			(1) Population Covered		
			Safe		Total	Safe		Total	Safe		Total	Safe		Total
			Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total
Mondragon	Urban	5,396	3	2	5	6	4	10	3	2	5	16	11	27
	Rural	20,929	32	9	41	5	3	8	2	2	4	13	9	21
	Total	26,325	36	10	46	11	7	18	5	4	9	29	19	48
Palapag	Urban	5,344	6	3	9	14	9	23	7	5	12	33	22	56
	Rural	15,516	29	14	43	20	14	34	10	7	17	49	33	82
	Total	20,860	35	17	52	34	23	57	17	11	29	83	55	138
Pambujan	Urban	9,053	13	5	18	28	18	46	14	9	23	81	52	134
	Rural	8,740	12	0	12	4	2	6	2	1	3	10	7	17
	Total	17,794	24	6	30	32	20	52	16	10	26	92	59	151
Rosario	Urban	2,399	1	0	1	1	1	2	0	0	0	0	0	0
	Rural	6,770	4	0	4	6	4	10	3	2	5	20	13	33
	Total	9,169	5	0	5	6	4	10	3	2	5	20	13	33
San Antonio	Urban	764	4	1	5	5	4	9	3	2	5	13	9	22
	Rural	6,995	23	7	30	4	2	6	2	1	3	9	6	15
	Total	7,759	27	8	35	9	6	15	5	3	8	22	15	37
San Isidro	Urban	1,654	9	4	13	13	8	21	4	2	6	21	11	32
	Rural	17,429	5	1	6	8	4	12	4	2	6	21	11	32
	Total	19,083	14	5	19	21	12	34	8	4	12	42	22	64
San Jose	Urban	3,007	5	4	9	43	28	71	21	14	36	114	76	189
	Rural	9,451	22	14	36	32	22	54	16	11	27	86	58	144
	Total	12,457	27	18	45	75	50	125	38	25	63	200	133	333
San Roque	Urban	8,234	7	4	11	165	110	275	83	55	138	516	344	861
	Rural	10,681	11	4	15	19	13	32	10	6	16	60	40	100
	Total	18,916	18	8	26	184	123	307	92	61	154	577	384	961
San Vicente	Urban	1,605	2	1	3	4	3	7	2	1	4	10	7	17
	Rural	4,404	7	1	8	1	0	1	0	0	1	1	1	2
	Total	6,009	9	2	11	5	3	8	2	2	4	11	8	19
Silvino Lobos	Urban	502	1	0	1	1	1	2	0	0	0	0	0	0
	Rural	3,040	5	0	5	2	2	4	1	1	2	8	5	13
	Total	3,542	6	0	6	2	2	4	1	1	2	8	5	13
Victoria	Urban	1,757	2	0	2	1	1	2	0	0	0	1	1	2
	Rural	7,288	25	7	32	10	7	17	5	3	9	25	17	41
	Total	9,045	27	7	34	11	7	18	5	4	9	26	17	44
Provincial Total	Urban	112,691	269	137	406	1,912	1,274	3,186	956	637	1,593	5,460	3,639	9,099
	Rural	264,761	466	153	619	480	317	797	240	159	399	1,276	843	2,119
	Total	377,451	735	290	1,025	2,392	1,591	3,983	1,196	796	1,992	6,736	4,482	11,219

Table 4.1.6 (b) Estimation of Population Covered by Safe and Unsafe Source by Municipality

Name of Municipality	Area	Coverage of Shared Well										Level I Coverage (1) + (2)							
		(2) Population Covered by Private and Public					Number of Households					No. of HHs per Shared Facility		Safe		Unsafe		Total	
		Safe	Unsafe	Total	Safe	Unsafe	Total	Safe	Unsafe	Total	No. of HHs per Shared Facility	%	Pop.	%	Pop.	%	Pop.	%	
Allen	Urban	4,818	2,887	7,705	958	574	1,532	21	5,012	59	3,017	36	8,029	95					
	Rural	5,254	2,677	7,931	1,953	552	1,635	15	5,538	54	2,866	28	8,404	81					
	Total	10,072	5,564	15,636	2,041	1,126	3,167	17	10,550	56	5,883	31	16,433	87					
Biri	Urban	1,546	830	2,377	268	144	412	8	1,598	62	866	33	2,463	95					
	Rural	3,862	1,948	5,809	662	334	996	13	3,974	59	2,029	30	6,003	89					
	Total	5,408	2,778	8,186	930	478	1,408	11	5,572	60	2,894	31	8,466	91					
Bobon	Urban	2,972	967	3,939	568	185	753	4	3,581	71	1,373	27	4,954	98					
	Rural	6,643	3,994	10,637	1,300	782	2,082	18	6,903	60	4,168	36	11,071	97					
	Total	9,615	4,961	14,577	1,868	967	2,835	9	10,485	64	5,541	34	16,025	97					
Capul	Urban	2,875	814	3,689	562	159	721	53	2,880	67	817	19	3,697	86					
	Rural	3,556	1,719	5,275	685	331	1,016	46	3,562	61	1,724	30	5,285	91					
	Total	6,431	2,533	8,964	1,247	490	1,737	49	6,442	64	2,540	25	8,982	89					
Catarman (Capital)	Urban	16,132	4,614	20,747	2,772	793	3,565	3	19,799	64	7,059	23	26,858	87					
	Rural	19,128	7,755	26,882	3,636	1,474	5,111	90	19,196	56	7,791	23	26,987	79					
	Total	35,260	12,369	47,629	6,408	2,267	8,675	7	38,995	60	14,849	23	53,844	83					
Caubig	Urban	2,306		2,306	438		438	146	2,306	50			2,306	50					
	Rural	8,590	716	9,306	1,675	140	1,814	70	8,590	40	716	3	9,306	43					
	Total	10,896	716	11,612	2,113	140	2,252	78	10,896	42	716	3	11,612	44					
Gamay	Urban	1,375	681	2,056	266	132	398	14	1,426	52	715	26	2,141	78					
	Rural	9,629	4,950	14,579	1,881	967	2,847	37	9,744	54	5,026	28	14,770	82					
	Total	11,004	5,631	16,635	2,147	1,099	3,246	31	11,170	54	5,741	28	16,911	82					
Laolang	Urban	8,127	2,550	10,677	1,486	466	1,952	78	8,137	73	2,557	23	10,694	96					
	Rural	27,634	8,332	35,967	5,314	1,602	6,917	90	27,694	73	8,372	22	36,065	95					
	Total	35,762	10,882	46,644	6,800	2,069	8,869	87	35,830	73	10,928	22	46,759	95					
Lapinig	Urban	2,320	1,190	3,511	386	198	584	43	2,326	63	1,194	32	3,520	95					
	Rural	3,885	1,732	5,617	676	301	977	37	3,891	59	1,736	26	5,626	85					
	Total	6,206	2,922	9,128	1,062	499	1,561	39	6,217	60	2,929	28	9,146	89					
Las Navas	Urban	2,770		2,770	520		520	520	2,770	44			2,770	44					
	Rural	6,425	559	6,984	1,314	114	1,428	95	6,425	33	559	3	6,984	35					
	Total	9,195	559	9,753	1,834	114	1,948	122	9,195	35	559	2	9,753	37					



Table 4.1.6 (b) Estimation of Population Covered by Safe and Unsafe Source by Municipality (Cont'd.)

Name of Municipality	Area	Coverage of Shared Well										Level I Coverage (1) + (2)														
		Population Covered by Private and Public					Number of Households					Safe			Unsafe			Total								
		Unsafe		Safe		Total	Unsafe		Safe		Total	No. of HHs per Shared Facility		Pop.		%		Pop.		%		Pop.		%		
		Unsafe	Safe	Unsafe	Safe	Total	Unsafe	Safe	Unsafe	Safe	Total	Unsafe	Safe	Unsafe	Safe	Unsafe	Safe	Unsafe	Safe	Unsafe	Safe	Unsafe	Safe	Unsafe	Safe	
Lavezares	Urban	2,154	799	2,953	410	152	562	11					2,231	65	850	25	3,081	90								
	Rural	11,489	3,532	15,021	2,321	714	3,035	53					11,530	66	3,559	20	15,089	86								
	Total	13,643	4,331	17,974	2,731	866	3,597	33					13,761	66	4,409	21	18,171	87								
Lope De Vega	Urban	621		621	108		108	54					621	25			621	25								
	Rural	1,627		1,627	268		268	30					1,627	16			1,627	16								
	Total	2,248		2,248	375		375	34					2,248	18			2,248	18								
Mapanas	Urban	1,203	630	1,834	223	117	340	45					1,208	56	634	29	1,842	85								
	Rural	3,908	2,355	6,264	693	418	1,111	57					3,929	50	2,369	30	6,299	81								
	Total	5,112	2,986	8,097	916	534	1,450	54					5,138	52	3,003	30	8,140	82								
Mondragon	Urban	3,454	1,916	5,369	643	357	1,000	100					3,470	63	1,927	35	5,396	98								
	Rural	16,092	4,815	20,908	3,095	926	4,021	89					16,105	75	4,824	23	20,929	98								
	Total	19,546	6,731	26,277	3,738	1,283	5,021	91					19,575	73	6,751	25	26,325	98								
Palapag	Urban	3,311	1,977	5,288	683	408	1,090	53					3,344	54	2,000	32	5,344	86								
	Rural	10,137	5,296	15,434	1,980	1,034	3,014	50					10,187	50	5,329	26	15,516	76								
	Total	13,448	7,274	20,722	2,663	1,442	4,105	51					13,531	51	7,329	28	20,860	79								
Pambujan	Urban	5,918	3,002	8,919	1,017	516	1,533	37					5,999	60	3,054	31	9,053	91								
	Rural	7,808	915	8,723	1,389	163	1,552	103					7,818	58	922	7	8,740	65								
	Total	13,726	3,916	17,642	2,406	679	3,085	55					13,818	59	3,976	17	17,794	76								
Rosario	Urban	2,399		2,399	361		361	361					2,399	99			2,399	99								
	Rural	4,965	1,772	6,737	877	313	1,190	132					4,955	73	1,785	26	6,770	99								
	Total	7,364	1,772	9,136	1,238	313	1,552	155					7,383	80	1,785	19	9,169	99								
San Antonio	Urban	523	219	742	105	44	149	16					536	64	228	27	764	91								
	Rural	5,299	1,681	6,980	1,088	345	1,433	43					5,308	72	1,687	23	6,995	94								
	Total	5,822	1,900	7,722	1,193	389	1,582	37					5,845	71	1,915	23	7,759	94								
San Isidro	Urban	1,145	509	1,654	215	95	310	24					1,145	40	509	18	1,654	58								
	Rural	13,363	4,035	17,397	2,434	755	3,169	264					13,384	62	4,046	19	17,429	80								
	Total	14,508	4,544	19,051	2,649	830	3,479	139					14,529	59	4,554	19	19,083	78								
San Jose	Urban	1,804	1,013	2,818	338	190	529	12					1,918	62	1,089	35	3,007	97								
	Rural	5,670	3,636	9,307	1,097	703	1,800	29					5,757	57	3,694	37	9,451	94								
	Total	7,474	4,650	12,124	1,435	893	2,329	22					7,674	58	4,783	36	12,457	95								

Table 4.1.6 (b) Estimation of Population Covered by Safe and Unsafe Source by Municipality (Cont'd.)

Name of Municipality	Area	Coverage of Shared Well										Level I Coverage (1) + (2)					
		(2) Population Covered by Private and Public			Number of Households			No. of HHs per Shared Facility	Safe			Unsafe			Total		
		Safe	Unsafe	Total	Safe	Unsafe	Total		Pop.	%	Pop.	%	Pop.	%			
San Roque	Urban	4,985	2,389	7,374	796	382	1,178	8	5,501	66	2,733	33	8,234	98			
	Rural	7,098	3,483	10,581	1,203	590	1,793	58	7,158	64	3,523	32	10,681	96			
	Total	12,083	5,872	17,955	1,999	972	2,971	17	12,659	65	6,256	32	18,916	97			
San Vicente	Urban	963	626	1,589	204	133	337	52	973	60	632	39	1,605	100			
	Rural	3,679	723	4,402	795	156	951	112	3,680	83	724	16	4,404	100			
	Total	4,642	1,349	5,991	999	289	1,287	86	4,653	77	1,356	22	6,009	100			
Silvino Lobos	Urban	502		502	78		78	78	502	19			502	19			
	Rural	2,693	335	3,027	456	57	512	73	2,701	30	340	4	3,040	34			
	Total	3,195	335	3,529	533	57	590	74	3,202	27	340	3	3,542	30			
Victoria	Urban	1,335	419	1,755	275	86	361	144	1,337	50	420	16	1,757	65			
	Rural	5,453	1,794	7,247	1,124	370	1,494	37	5,478	59	1,811	19	7,288	78			
	Total	6,788	2,214	9,002	1,399	456	1,855	43	6,814	57	2,251	19	9,045	75			
Provincial Total	Urban	75,558	28,033	103,591	13,679	5,130	18,809	9	81,018	60	31,672	24	112,691	84			
	Rural	193,887	68,755	262,641	37,045	13,121	50,167	49	195,163	57	69,598	20	264,761	77			
	Total	269,445	96,788	366,233	50,725	18,251	68,976	23	276,181	58	101,270	21	377,451	79			

The number of households per shared public/private facility is estimated at 23 households as provincial averages. Compared with the service level standard of Level I public facility (15 households/facility), this figure is considered within an acceptable range. However, those figures in the municipalities of Catarman, Catubig, Laoang, Las Navas, Mondragon, Pambujan, Rosario, San Isidro, San Vicente and Silvino Lobos are considered quite large. This reason seems to arise from a considerable number of non-reported/unidentified private wells.

#### **Percentage of Population Covered by Level I Public Facility for Rural Water Supply**

Grasping the current percentage of population covered by public facilities would be a useful information in considering to what extent the additional population to be covered by public facilities in the future plan. This takes into account that the major facilities would be Level I especially for rural water supply in the future.

Population covered by public facilities is calculated as a balance between total population served by Level I facilities and population covered by private facilities. Thus, it is estimated that 191,400 persons or 98% of the total population served covered by Level I facilities are served by public facilities as shown in Tables 4.1.6 (a) and 4.1.6 (b).