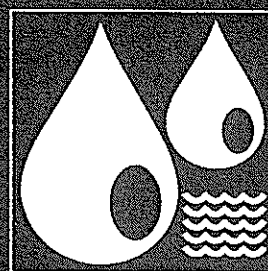


Comprehensive Basic Study of the Autonomous Region in Muslim Mindanao in the Republic of the Philippines

Final Report



WATER SUPPLY AND
SANITATION SECTOR

PROVINCE OF MAGUINDANAO

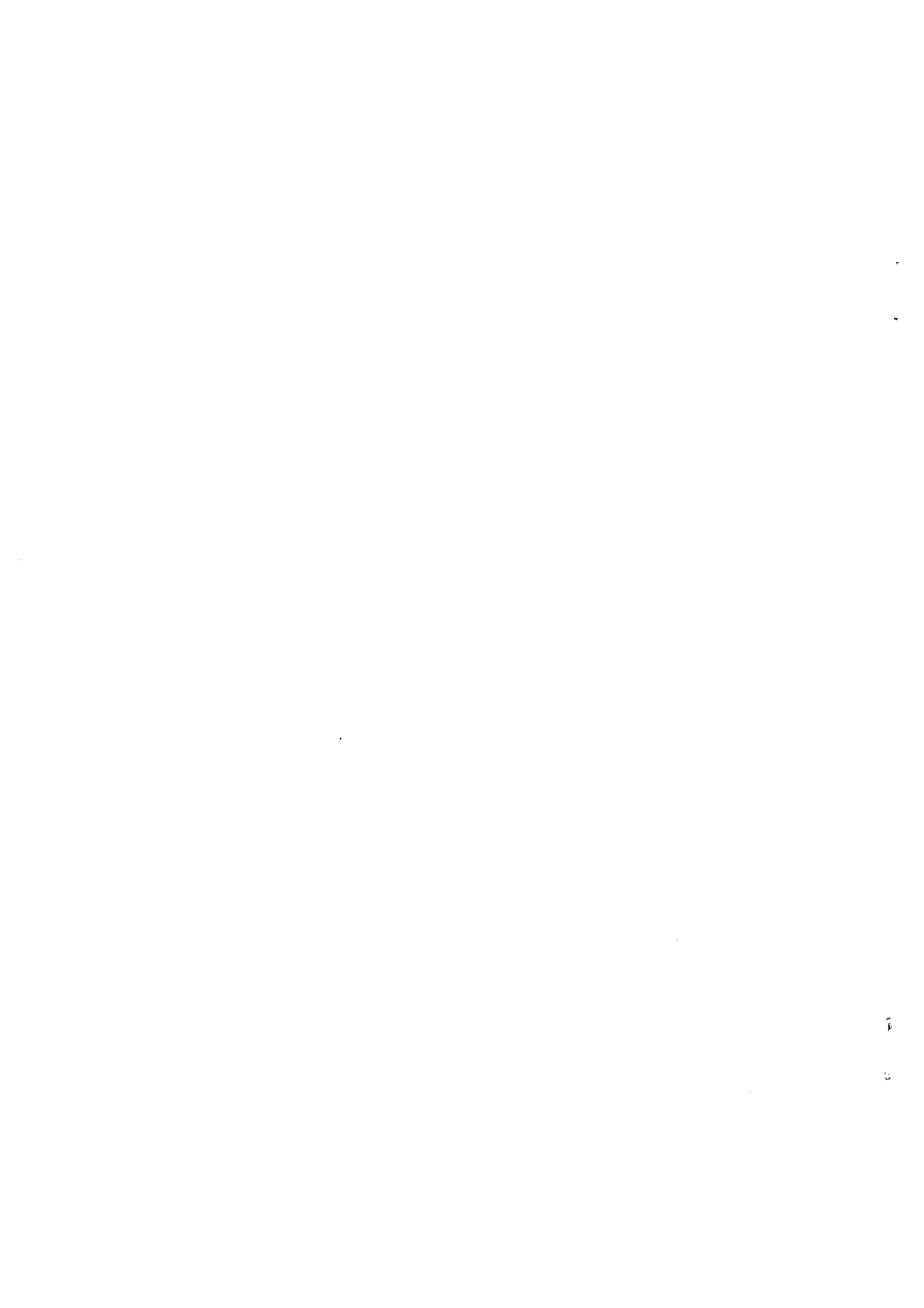
December 2003

PKII ENGINEERS
ENGINEERING CONSULTANT

IN ASSOCIATION WITH



ORIENT INTEGRATED DEVELOPMENT CONSULTANTS INC.



**COMPREHENSIVE BASIC SURVEY
OF THE AUTONOMOUS REGION
IN MUSLIM MINDANAO**

WATER SUPPLY AND SANITATION SECTOR

PROVINCE OF MAGUINDANAO

FINAL REPORT

DECEMBER 2003

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LIST OF ABBREVIATIONS

ADB	-	Asian Development Bank
AFMA	-	Agriculture and Fisheries Modernization Act
AIP	-	Annual Investment Plan
ARG	-	Autonomous Regional Committee
ARMM	-	Autonomous Region in Muslim Mindanao
CBOS	-	Community-based Organization
COA	-	Commission on Audit
CPSO	-	Central Project Support Office
CSC	-	Civil Service Commission
DBM	-	Department of Budget and Management
DILG	-	Department of Interior and Local Government
DOF	-	Department of Finance
DOH	-	Department of Health
DPWH	-	Department of Public Works and Highways
IEC	-	Information Education Campaign
IMR	-	Infant Mortality Rate
IRA	-	Internal Revenue Allotment
JICA	-	Japan International Cooperation Agency
KFI	-	Kasanyangan Foundation, Inc.
LCE	-	Local Chief Executive
LGU	-	Local Government Unit
LWUA	-	Local Water Utilities Administration
MBUSSP	-	Mindanao Basic Urban Services Sector Project
MGB	-	Mines and Geoscience Bureau
MNLF	-	Moro National Liberation Front
MPDO	-	Municipal Planning and Development Office
NAMRIA	-	National Mapping and Resources Information Administration
NAPOLCOM	-	National Police Commission
NEDA	-	National Economic Development Authority
NSCB	-	National Statistics and Coordination Board
NSDW	-	National Standards for Drinking Water
NSO	-	National Statistics Office
NWRB	-	National Water Resources Board
ORG	-	Office of the Regional Director
PDC	-	Provincial Development Council
PDDO	-	Provincial Planning and Development Office
PHO	-	Provincial Health Officer
POs	-	Peoples Organizations
PST	-	Provincial Sector Team
PWSO	-	Provincial Water and Sanitation Office
QV	-	Quaternary Volcanics
QVP	-	Pliocene to Recent Pyroclastic
REDBP	-	Regional Development and Planning Board
RLA	-	Regional Legislative Assembly
RLEDAC	-	Regional Legislative and Executive Development Advisory Committee

ROAC	-	Regional Development Administration Committee
RPDO	-	Regional Planning and Development Office
RPMEC	-	Regional Project Monitoring and Evaluation Committee
RRUC	-	Regional Reconciliation and Unification Council
SPOA	-	Southern Philippines Development Authority
TMS	-	Technical Management Services
TOR	-	Terms of Reference
WATSAN	-	Water Supply and Sanitation
WD	-	Water District

FOREWORD

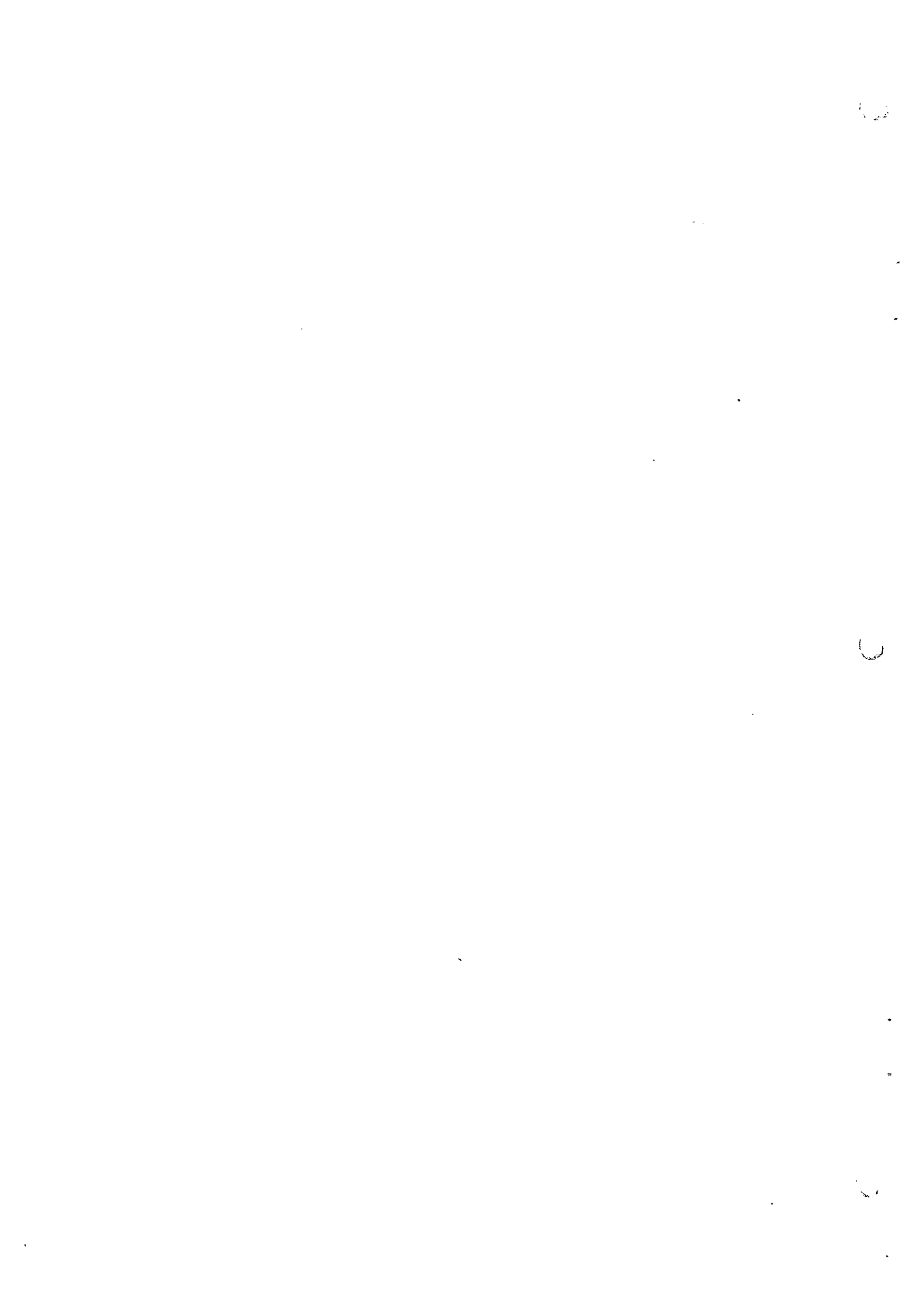
The "Comprehensive Basic Survey of the Autonomous Region In Muslim Mindanao (ARMM)" in the Republic of the Philippines, hereinafter referred to as the "Survey", was funded by the Japan International Cooperation Agency (JICA) of the Government of Japan. The Survey had commenced on August 4, 2003 and was for three (3) month duration. The sectors included in the Survey were:

- (1) Agriculture and Fisheries
- (2) Health and Medical Care
- (3) Education
- (4) Basic Infrastructure
- (5) Governance
- (6) Water Supply and Sanitation

All the information/data used in the survey was generated during the aforementioned survey period with the objective of gathering as much as possible the latest statistics available to provide an up-to-date picture of the current situation in the ARMM. What is therefore provided in these reports are the latest available data, though in some cases these already seemed outdated.

The difference between time period (year) reflected by the statistics and the period (year) of the conduct of this Survey shows the inadequacy in the availability of updated information. In instances wherein the desired information/data were not available, the Survey had to generate the necessary information itself through field surveys.

EXECUTIVE SUMMARY



1. Overview of the Water Supply and Sanitation Sector

The provision of safe and potable water is a pressing need in the ARMM, where most of the communities are forced to utilize any form and means of water sources to sustain for domestic needs. Many of these communities have utilized brackish and saline groundwater, collected and stored rainwater, and bulk-hauled untreated water transported by barge or other sea transport from mainland Mindanao.

Based on data furnished by ARMM, in 1992 the Region had a total population of 2.02 million corresponding to about 295,242 households and had grown to 2.808 million in the year 2000. During this said year, the ARMM Socio-Economic Report indicates that accessibility to potable water is estimated at 38% of the regional population, which corresponds to 456,263 households. The figure below shows the access to water supply by province.

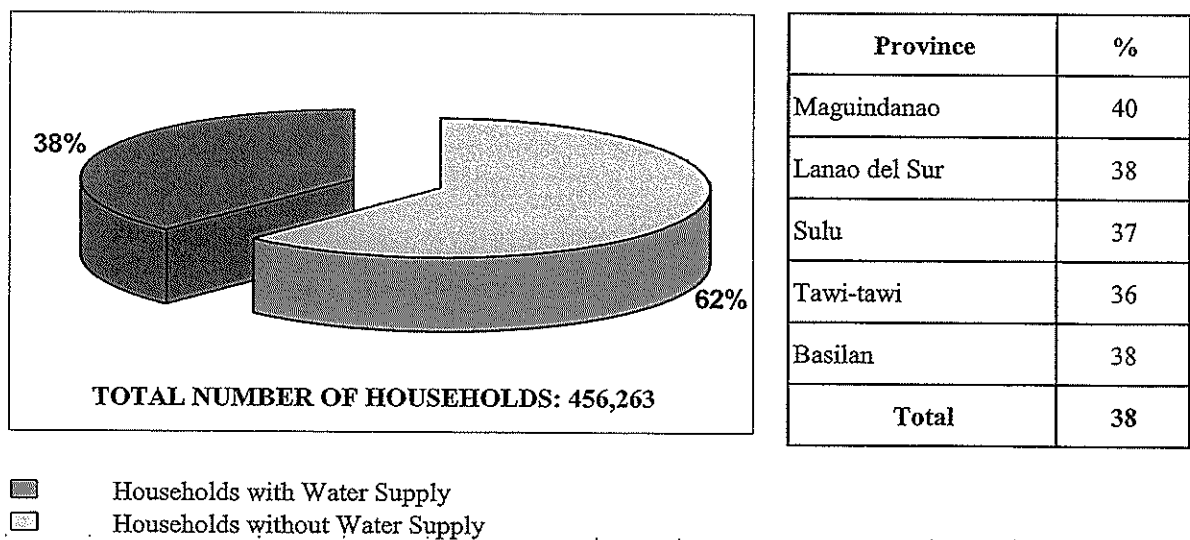


Figure ES-1 Households in ARMM with Access to Water Supply, as of 2000

At present, the percentage to access to potable water has a marginal increase which could be traced to assistance from various institution. Based on the data of present existing water supply facilities, analysis showed that about 40% of ARMM projected 2003 population have access to water supply. These data, however, is still far from acceptable level of providing safe and potable water within the community, thus the need to further impart technical and financial assistance to the Region in terms of water supply development.



2. Introduction

Background and Objectives

The preparation of the master plan for the Water Supply and Sanitation Sector Plan was undertaken by the Consultant thru the assistance of Japan International Cooperation Agency (JICA). Past reports such as the PW4SP was made as reference and basis to come-up with the sector development plan for possible financing thru sector loan(s) by foreign donors, LGU's counterpart including internal revenue allotment from the National Government and private sector investments.

This Study covers a Medium-Term Investment Plan (2005-2010) as well as a Long-Term Development Plan (2010-2015) to attain the provincial targets of water supply and sanitation sector. The plan includes development cost to cover the construction of water supply and sanitation improvement in the ARMM covered provinces. The Study likewise includes institutional strengthening to assure that community based operational framework and capability could be sustained in the future.

As part of the initial move to familiarize the different LGUs and evaluate their respective sector management capability, the Study undertook workshops and consultation with local officials and planning managers.

Coverage of Study Area

Based on the Terms and Reference provided to the Consultant, the sector evaluation and analyses shall cover the ARMM which is composed of the following provinces and city:

- ◆ Maguindanao
- ◆ Lanao del Sur
- ◆ Basilan
- ◆ Sulu
- ◆ Tawi Tawi
- ◆ Marawi City

The Provinces of Maguindanao, Lanao del Sur and Marawi City are found in mainland Mindanao while the Provinces of Basilan, Sulu and Tawi Tawi are island provinces.

Approach and Methodology

The primary bases of this Study are the sector policies and strategies, as well as existing legislations and regulations pertaining to water supply and sanitation development, and guidelines for setting the provincial sector targets. In conjunction to these policies, reference was likewise made in the current sector policies and strategies to ensure:

- ◆ self-reliance and local community management services
- ◆ integrated approach to water, sanitation and hygiene education
- ◆ financial arrangement and, operation and maintenance
- ◆ participation of private sector and NGOs
- ◆ integrated water resources strategy

The methodology and work approach in undertaking the Study is also patterned in accordance to the previous water supply and sanitation studies prepared for JICA, like the PW4SP Feasibility Study reports.

All other technical criteria and standards are based on other sector agencies such as Local Water Utilities Administration (LWUA), National Water Resources Board (NWRB), Department of Public Works and Highways (DPWH), Sanitary Code of the Philippines and the Philippine National Standards for Drinking Water (NSDW).

Report Composition

Five (5) study reports were prepared covering the respective provinces as previously mentioned (Marawi City is included in the Lanao del Sur report). The analyses, evaluation and relevant information form part of the individual report consisting of 10 chapters.

3. Provincial Profile

The Province of Maguindanao is located in central Mindanao. It is bounded on the north by Lanao del Sur, on the east by North Cotabato, on the west by the Moro Gulf and on the south by Sultan Kudarat.

Maguindanao is accessible by plane through Awang airport in Datu Odin Sinsuat municipality. An international port located at Polloc, Parang and a sub-port located across the Polloc Port, also makes access by sea possible. The province has a total road network of 1,943 km long that links Maguindanao to its neighboring provinces of Sultan Kudarat, South Cotabato, and Cotabato. The province of Maguindanao is the site of the Regional Industrial Center for the ARMM and is strategically located at the center of two growth areas in Mindanao, the Cagayan-Iligan Industrial Corridor and the South Cotabato-Sarangani - Sultan Kudarat- General Santos City Project.

The Census of Population and Housing in year 2000 showed that Maguindanao registered a total population of 808,102 persons, higher by 139,754 persons over the 1995 Census of Population results. This figure recorded a 4.16 percent annual population growth rate, higher by 3.25 percentage points than the annual population growth rate during the 1990 to 1995 period. A corresponding increase on the number of households was also recorded at 143,669 households, higher by 14,802 households over the 1995 figure. This resulted to an average household size of 5.57 persons, slightly higher than the average household size (5.13 persons) recorded in 1995 and the national average of five persons.

Physical Features

Maguindanao is one of the provinces carved out of old Cotabato. The National Statistics and Coordination Board (NSCB) reports that Maguindanao has a land area 5,047.6 km². The Department of Budget and Management (DBM), in its 2003 Internal Revenue Allotment, reports a total land area of 7,447.75 km². As of 2003, there are two congressional districts, 26 municipalities and 472 barangays in the province of Maguindanao.

Maguindanao has a generally flat terrain and scattered hills with fertile valleys and isolated mountain ranges. Maguindanao can be divided into two physiographic units: the southwest mountain clusters and the Maguindanao lowlands.

The southwest mountain clusters include the two big groups of mountain elevations - Binaca and Blik. These are separated by the valleys of Mateber River, which flows northwest into the Moro Gulf and Lawasig River, which flows southward into the Mindanao Sea. The Maguindanao lowlands include the north extremity of Cotabato Basin, northeast of the province's highlands. The area is gently sloping from the foothills to relatively flat as it approaches the sea and the Liguasan Marsh. Thick accumulation of detrital materials derived from the weathering and erosion of the adjacent emergent landmass compose the area.

The biggest river in Maguindanao is the Pulangi River. It is at the same time the northeast boundary of the province and as such the western banks are within the province's jurisdiction. The river meanders with flood plains developed at places together with extensive delta, which make its immediate vicinity marshy. It drains westward into the Mindanao Sea. Several smaller streams and creeks dissect the area.

The province has a Type IV climate (classified from Modified Corona's Classification System. This type of climate is characterized by more or less evenly distributed rainfall throughout the year. The province enjoys a tropical rainy climate with May to December showing an excess of rainfall. The main moisture carriers are the northeast monsoons during October to May and the southwest winds from June to September. The local superficial winds are generally influenced by the monsoons and by physiographic differences.

Socio-economic Aspects

Traditionally, the Maguindanaos are rice farmers who live in the valley. Those near the coasts have become fishermen and traders. They also produce fine handicrafts such as brassware, hand-woven malongs, mats and baskets.

The business opportunities in Maguindanao are enhanced by the rich agricultural lands, the strategic location of the province and the plans of the local government unit to industrialize its agricultural based economy. The present set of investment options include yellow corn production for industrial use, development of inland fishing, processing of agricultural products into industrial raw materials like feeds, and consumer products like snack foods.

4. Existing Facilities and Service Coverage

The existing service coverage for each sub-sector was identified up to the barangay level of each municipality. For the water supply, the coverage was classified per water service level. For the sanitation, the facilities were classified as sanitary and unsanitary toilets. Table below shows the existing water and sanitation facilities.

SUB-SECTOR	BASE YEAR COVERAGE	
Provincial Population 2003	852,270	
No. of HH	152,778	
1.1.1 Water	<i>Served Population</i>	<i>% Served</i>
Level III	46,817	5.47 %
Level II	3,408	.40 %
Level I	322,128	37.65 %
Total	372,353	43.52 %
1.1.2 Sanitation	<i>No. of Units</i>	<i>%</i>
Households	73,486	48 %
School Toilet	465	79 %
Public Utilities	33	97%

Water Supply

In the province of Maguindanao, there are three (3) towns having level III water systems. The towns of Sultan Kudarat and Datu Odin Sinsuat are being served by Cotabato City Water District (CCWD) while the water system of the town of Parang is being managed by its LGU and the other system of the town is managed by a barangay cooperative. The province has two municipalities with level II water supply system. These are the two adjacent towns, Upi and South Upi. The rest of the municipalities of Maguindanao has level I water supply system. Most of the towns in the province get water from wells. In the case of Parang, Upi and South Upi, they use spring since there are available sources, which are accessible to their respective areas. Provincial wide, about 5% is being served by level III, 1% by level II and 38% by level I.

Sanitation

There are about 48 % of the present households in the province have sanitary toilets. This low figure is mainly cause by the lack of water supply in the area. There are about 465 schools in the province and about 79% have toilets. Almost all towns in the province have toilets in their public utilities except for the Town of Talitay.

5. Existing Sector Arrangements and Institutional Capacity

The ARMM Local Government Units (LGUs) have the distinct advantage over non-ARMM. LGUs on that certain basic services have been retained by the Regional Government and continue to be provided by them, i.e. health, social services, agriculture. This results in more financial resources being available for other basic services that could be provided by the LGU, such as water supply for instance.

In general, the ARMM Regional Government also undertakes water supply related projects but this does not seem to be a priority. Only a minimal amount of the ARMM infrastructure budget has been allocated to water supply.

The ARMM offices involved in water supply include the Department of Public Works and Highways, Department of Health, Department of the Interior and Local Government and all LGU's.

6. Past Financial Performance in Water Supply and Sanitation

Given the limited financial resources of the ARMM Regional Government, the LGUs have taken greater responsibility in the provision of basic infrastructures. With their Internal Revenue Allotment (IRA) increasing over time, the available 20% Development Fund has also increased. This means that LGUs have more financial resources that could be parlayed into funding water supply projects. However, based on the amount allocated to various infrastructures, local roads/bridges enjoy a higher priority.

Most LGUs have repeated surpluses in their financial operations.

7. Water Source Development

The hydrogeologic make-up of the province of Maguidanao mainly consist of uplifted igneous and sedimentary rocks 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 are well cemented, compacted sedimentary rocks can be considered as dependable sources of sustainable groundwater. Only the Pleistocene to Recent deposits can be considered as potential sources of significant quantity of groundwater reserve.

Groundwater Availability in the Province

- **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 (N₃S) and Late Miocene to Pliocene Clastic Rocks (N₂S).
- **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, N₃S, and N₂S wherein the first two are more productive. Where sandstone and conglomerate are low-yielding well can also be drilled in the N₁S. High yielding deep wells are common in the QVP.

- **Difficult areas.** These areas are not suitable for well development. In the province, the areas under this category are the Ultramafic Complex (UC), Cretaceous to Paleogene sediments and volcanics (Kpg), Diorite and Other Intrusive Rocks (NI), Early to Middle Miocene Volcanics (N_1V), Late Miocene Volcanics (N_2V), Quaternary Volcanics (QV) and Early to Middle Miocene Rocks (N_1S). 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.

Surface Water

The Mindanao River, which is the receiving body of the Pulangui and Gatisan Alah Rivers, is the biggest and longest river in Mindanao. Several perennial rivers and creeks with significant flows are draining the province. For the Cotabato City area the Dimapatoy and Simuay Rivers are potential sources of water supply.

The northern portion of the province is drained by the south-flowing Nituan, Ambat, and Simuay Rivers and their tributaries. The southwestern portion of the province is drained by the west-flowing Mataba and Tabuan rivers and by the southwest-flowing Lawanig River and its tributaries. The southern portion is being drained by the northeast-flowing Talayan River and its tributaries and several perennial creeks which discharge into Gatisan Alah River.

Tapping these surface water sources will necessitate the construction of intake structures and other facilities needed for complete treatment. Considering the facilities needed for surface water source, the initial investments involved would entail huge expenses. Hence, it is recommended that a more detailed and extensive study should be conducted, prior to considering surface water as probable water source.

8. Future Requirements in Water Supply and Sanitation Improvement

Physical Targets and Service Coverage

The future requirements for water supply and sanitation were evaluated and it was envisioned to be implemented in two phases. Phase I will cater to the needs of the province from year 2005 to year 2010 while Phase II from year 2010 to year 2015. The succeeding Table shows the summary of the water and sanitation future requirements.

Sub sector	Phase I (2005-2010)		Phase II (2010-2015)	
<i>Water</i>	<i>Served Population</i>		<i>Served Population</i>	
	<i>Additional</i>	<i>Total</i>	<i>Additional</i>	<i>Total</i>
Level III	48,923	102,100	21,279	151,289
Level II	55,970	55,970	19,853	70,800
Level I	103,988	405,703	106,743	501,661
Total	208,881	563,773	147,875	723,750
<i>Sanitation</i>	<i>Number of Units</i>		<i>Number of Units</i>	
	<i>Additional</i>	<i>Total</i>	<i>Additional</i>	<i>Total</i>
Households				
Flush	4,142	22,349	5,543	27,257
Pour Flush	17,405	77,625	24,004	97,255
Total	21,547	94,974	29,547	24,512
School toilets	159	527	49	576
Public Utilities	26	58	26	84

9. Institutional Strengthening for Medium-Term Plan

The failure of barangay/rural water service associations have resulted in the discontinuation of potable water supply availability. This might be due to the failure to properly train the community in the management, operation and sustenance of their systems. Unfortunately, the diversity of cultures in the area have resulted in the inability to organize working/effective associations to oversee water supply service operations. In addition, the deteriorating security, peace and order situation and frequent clan wars have further resulted in the dismantling of these associations. In any institutional-strengthening and capability-building activities for water supply projects, cultural diversity must be of paramount consideration in sustaining these projects.

10. Cost Estimates for Future Sector Development

The total investment cost required for the two phased implementation as identified in Chapters 7 and 8 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

Executive Summary

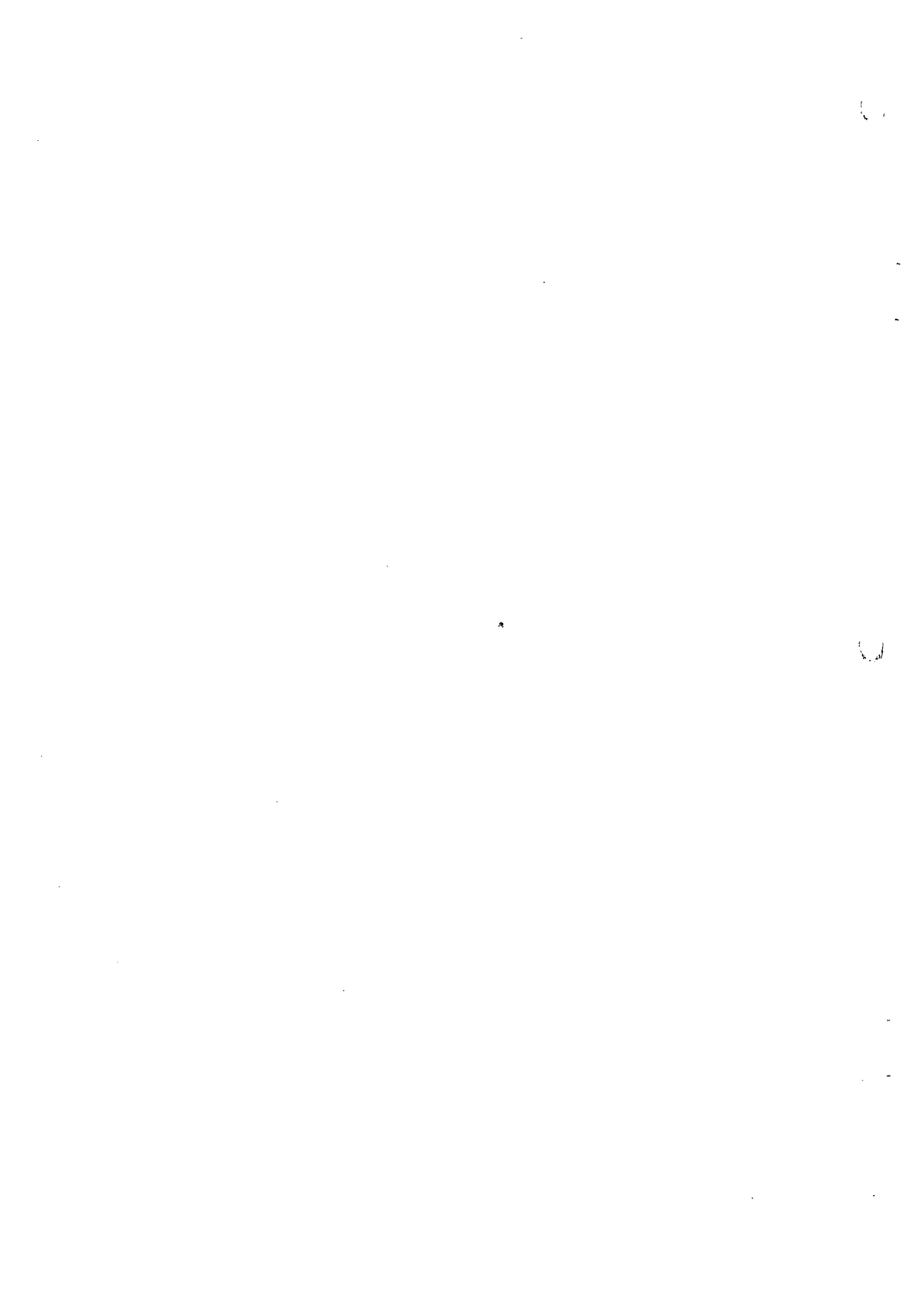
coordination with concerned provincial and municipal LGUs and to current standards of relevant sector agencies like the Department of Interior and Local Government (DILG), Local Water Utilities Administration (LWUA), Department of Health (DOH) and Department of Public Works and Highways (DPWH).

The total project cost was estimated using the unit price established based on the PW4SP study unit analysis model for each component. The unit price of the items of work for each component was computed on current prices.. Unit construction costs includes mobilization/demobilization, material and labor, contingencies, profit and taxes. The total project cost includes; total construction cost, feasibility study, detailed engineering design, construction supervision, and community development and training. Table below shows the total project cost for each sector of the province.

Total Project Cost Estimate (P x 1,000)

Sub sector	Phase I	Phase II
1. Water	1,949,785	1,714,737
2. Sanitation	129,195	99,944
	2,078,980	1,814,681

CHAPTER 1
INTRODUCTION



1. INTRODUCTION

1.1 Background of the Project

Being an archipelago, the Philippines has to cope with ethnic cultural differences such as dialects and customs to the more sensitive are like religion. Although touted as the only predominantly Christian country in Southeast Asia, Philippine Muslims were once a dominant group in the country. Presently concentrated between the western portion of Mindanao and the Sulu Archipelago, Philippine Muslims have 500 years of political history behind them; the longest political experience compared to other groups in the Philippines.

Philippine history had witnessed the Muslims steadfastness; unwilling to succumb to foreign hegemony since the time of the Spanish colonization. They have thrived and preserved their unique culture and identity through 11 ethnic tribes: Maranao, Maguindanao, Iranun, Tausug, Yakan, Sama, Sangil, Kaangan, Kolibugan, Palawan or Panimusan, and Molbog.

The inaccessibility and neglect that was born out of a confluence of political, ideological, geological and cultural differences has stirred unrest with Philippine Muslims. For more than two decades, the political unrest in the region has given a devastating blow to the already delicate economy of Mindanao.

To quell this unrest, the Philippine government has conducted a number of negotiations and concluded agreements with the Muslim separatist groups. This culminated with the creation of the Autonomous Region in Muslim Mindanao (ARMM). Still, distrust in the government's efforts for lasting peace has continued, not due only to cultural differences but also because of a high level of dissatisfaction on the government among Philippine Muslims. Such distrust then can only be outweighed by a sincere effort to uplift the socio-economic conditions of Philippine Muslims and only then could lasting peace and development be achieved in the ARMM.

Towards this end, the Japan International Cooperation Agency (JICA) intends to contribute its share to the development and growth of the ARMM. The conduct of the "Comprehensive Basic Survey of Autonomous Region in Muslim Mindanao" would be the initial stage of its involvement in turning Mindanao from a "Land of Promise" to a "Land of Realized Dreams". Through the basic survey, a comprehensive look into the current reality within the ARMM region in terms of socio-economic conditions, delivery of basic services, resources and

infrastructure would be made. This will help identify gaps in the programs and local policies inherent to the approaches currently being applied. The collection and analysis of primary data on sectors directly affecting the ARMM residents is indispensable if one is to come up with a responsive and sustainable developmental approach for the ARMM. Needless to say, the developmental approach will take into account the ARMM Development Framework Plan for 2003-2004 which prescribes the direction towards which the ARMM government has set its sights in the promotion of peace and security, social development, economic development, infrastructure development, and development of administration and finance. Eventually the analyzed data will aid in identifying the various issues and problems for the sectors reviewed leading towards the identification of appropriate intervention (policies, programs or projects) for both the short and long term.

Overall, the surveys should help in creating a complete and accurate picture of the ARMM as determined from the stakeholders themselves. This democratizes the process of development by creating a participatory atmosphere.

1.2 Survey Objectives

To reiterate, the basic study for the ARMM was conducted to achieve the following objectives:

1. Study and analyze the existing conditions in the region, e.g. socio-economic, policy/program, institutions, donors trend etc.;
2. Analyze the existing conditions, problems and needs of the sectors on health and medical care, education, water supply, infrastructure, agriculture and fisheries, and governance; and
3. Formulate the programs/projects that JICA can promote, considering both aid strategy and viable approaches specifically tailor-fit for the ARMM.

The objectives defined the sectors that need to be addressed if the ARMM is to succeed in its quest for self-determination and envisioning a peaceful and progressive society through social justice, human equity, responsive governance while preserving its unique identity in establishing international amity in enjoying the freedom to chart its own destiny.

1.3 Approach and Methodology

1.3.1 Approach to the Survey

The Scope of Work defined in straightforward fashion the required activities to produce a reliable database of basic data, a profile of administrative systems and identification of issues or problems and list of recommendations for JICA's possible assistance.

The stated objectives are immediate and more appropriately understood as purposes as they describe the activities that were conducted and what shall be produced in physical terms, which included:

Activities	Output
Collection of basic data covering six (6) major sectors: health and medical care, education, agriculture and fishery, basic infrastructure (roads and bridges), governance and water supply	Additional new field data and/or data that confirmed or validated existing documented data; prepare the findings of the sector survey and official data in a consolidated database report
Review of the administration systems of concerned ARMM regional line agencies (i.e., DOH, DepEd, DA, DPWH/DILG, ARMM Government);	Consolidated report
Identification and analysis of issues and problems	Consolidated report
Identification of potential programs and projects for JICA's possible cooperation	Consolidated report

Multi-Sectoral Participatory Approach. One of the most critical components of the plan were the inputs of the stakeholders in the plan which provided their insights, visions and aspirations, future directions and purpose. These stakeholders consisted of the Provincial and Municipal government officials, line agencies, non-government organizations, women organizations, people's organization, and the private sector, which had the opportunity³ to actively participate in the process.

Computerized Information System. A systematic handling and management of voluminous sets of information is a requisite for any data collection exercise. It was expected that the process will generate masses of information from both primary and secondary sources. The

multi-sectoral approach combining the aspects of social, economic, cultural, environment, physical and market generated complex sets of data, which need to be integrated and correlated.

This process expedited data compilation and analysis allowing more effective and efficient use of project time for the Consultant as well as better basis for drawing up analysis and strategies.

Utilization of Mindanao-based Support Staff. The associated firms sourced the required support staff from two Mindanao-based Non-Government Organizations with which we have partnered in past engagements. This set-up facilitated data gathering but data collection at the field level was still problematic. These firms are the following:

- ◆ *Kasanyangan Foundation, Inc. (KFI)* is a non-stock, non-profit organization based in Zamboanga City. A social development agency for a period of twelve years, KFI staff has the necessary expertise in Community and Institution Organizing and Building, Enterprise Development and Management, Agricultural Services, Policy Research and Advocacy, and Local Governance Capacity Building.
- ◆ *MinPhil International Consultants* is a service institution, which provides technical assistance to private firms, government owned and controlled corporations, non-government organizations, national government agencies, local government units and development agencies. Its services include training, policy analysis and research, feasibility and market studies, and project design, implementation and evaluation. MinPhil is based in Davao City.

1.3.2 Methodology

An Overall Study Framework for the Conduct of the Survey was developed and served as the road map that guided the Survey Team in the conduct and completion of the Survey consistent with JICA's objectives for the Survey and the quality of Survey outputs.

The Framework is given as Figure 1-1.

The Project Organization is given as Figure 1-2.

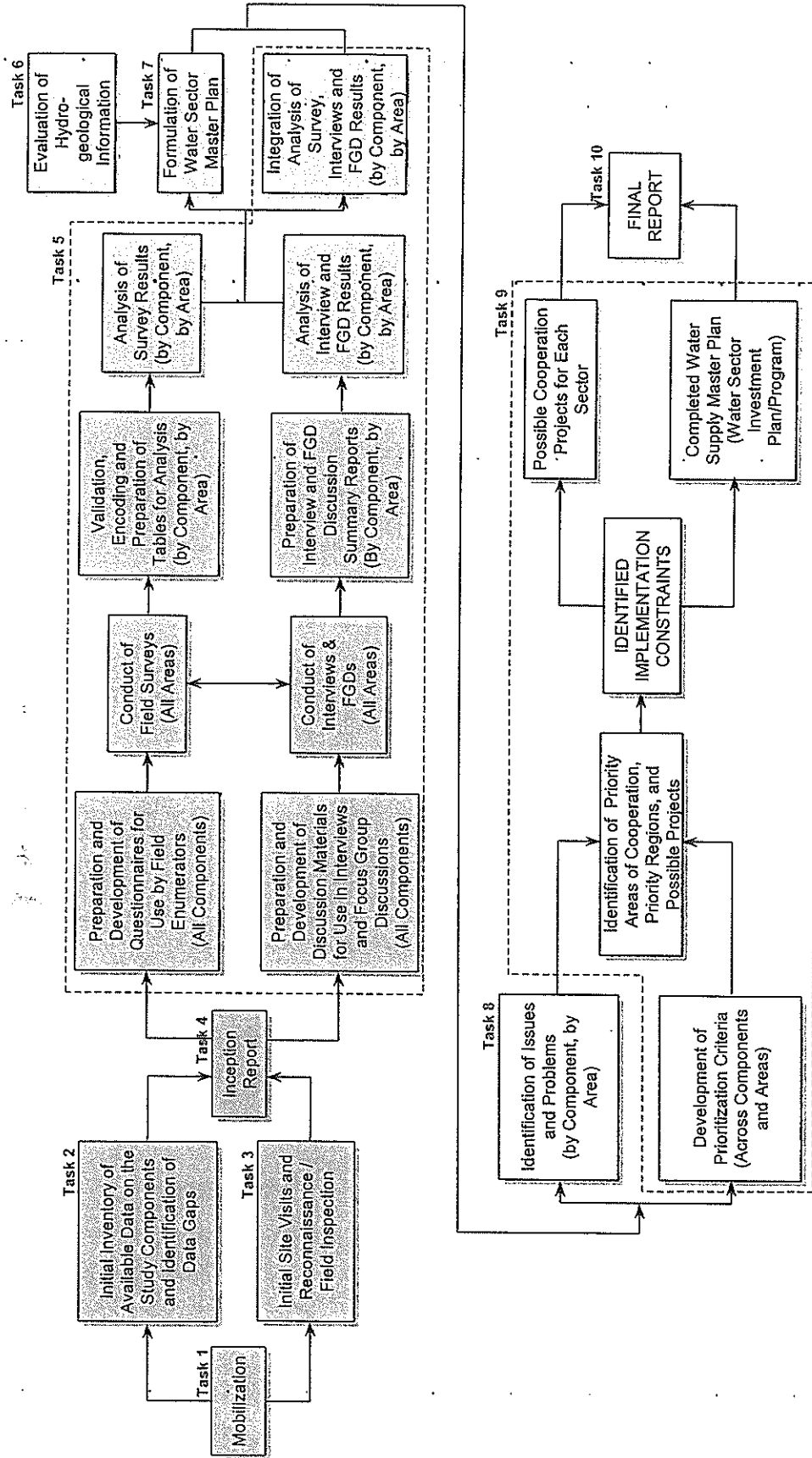


Figure 1-1 Overall Study Framework for the Comprehensive Basic Survey of ARMIM



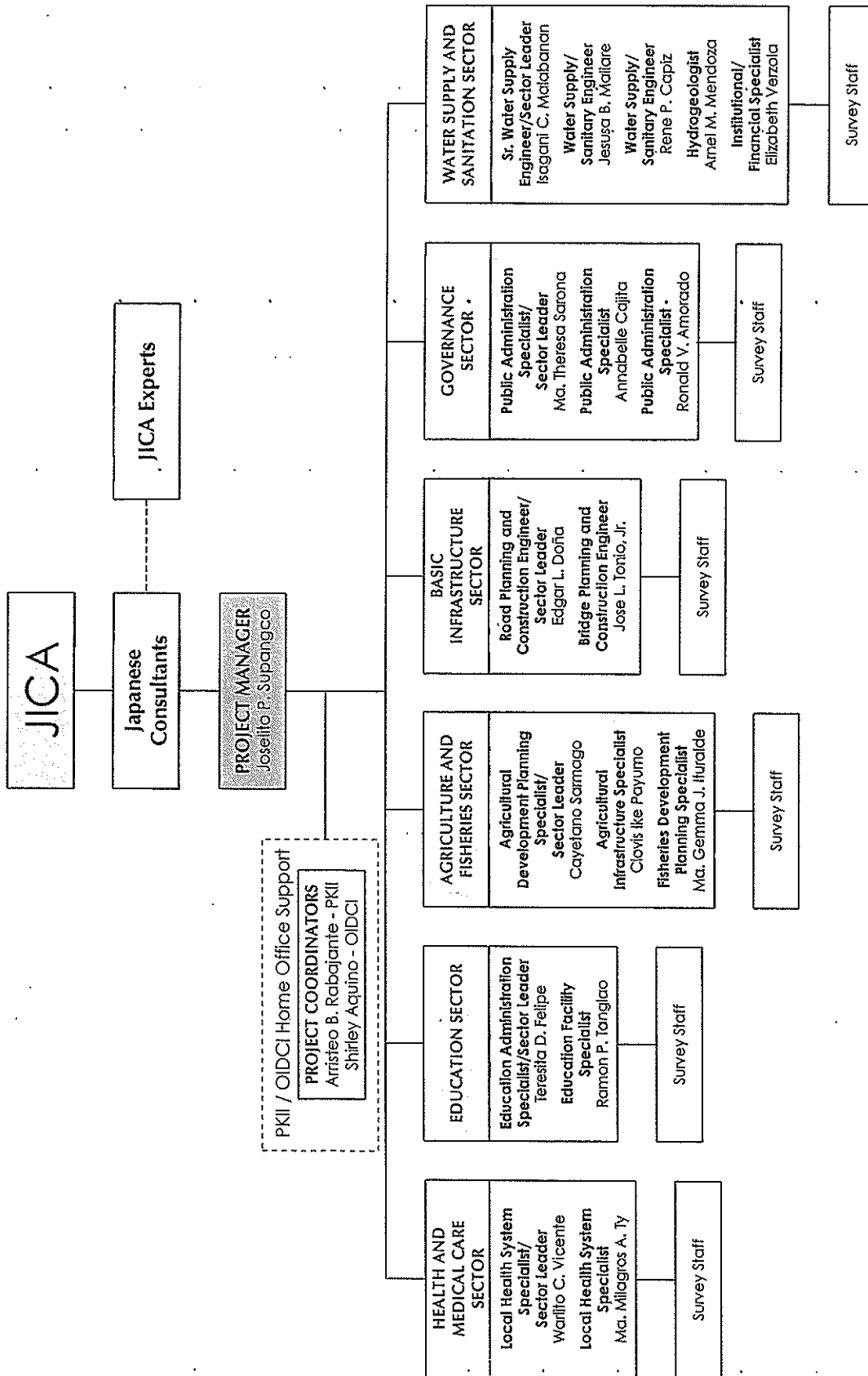


Figure 1-2 Project Organizational Chart

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1.3.3 Conduct of Workshops, Meetings, Focus Group Discussions and Other Participatory Activities

Provincial Workshops. An important component of the Survey was the conduct of the Provincial Workshops which were intended to facilitate the collection of information from the various stakeholders and to allow the participants to vent issues and problems related to their specific sectors. The preparatory activities for the conduct of the Workshops were facilitated by the Provincial Government through the Offices of the Provincial Administrator and the Provincial Planning and Development Coordinator. The conduct of the Workshops were still delayed as it required a significant amount of time to invite the targeted participants. While attendance was significant, some of the major stakeholders did not attend for various reasons. The structure of the workshops were simplified due to time constraint, as the Study Team members still had to meet the various key informants in their offices to collect whatever data was required by the Survey.

Thus, the Provincial Workshops started with the usual traditional program followed by the introduction of the participants and the introduction of the Survey and its objectives. The participants were then divided into the six sector groupings of the Study for the conduct of the Focus Group Discussions facilitated by the Specialists concerned. The focus questions were:

- a) What operational and statistical data are available in the various offices of the participants? (This included the method of data collection, forms used, data validation, frequency of data collection and problems the agency faced in data collection)
- b) What are the various issues and concerns faced by the sector in the area? (This also included what the suggested solutions are and how these solutions should be implemented.)

The problems usually encountered in the conduct of the workshops were as follows:

- a) *Communication and Scheduling the Workshops.* In spite of advances in communication technology, there was great difficulty in contacting the appropriate persons responsible for inviting the targeted participants, arrangement of the venue and the scheduling of the workshops itself. The provinces usually had a lot of intervening activities such as trainings, meetings, and other activities that usually involved the

targeted participants. This had caused difficulty in scheduling the date of the workshops.

- b) *Attendance of Participants.* While the provincial government, through the office of the governor, expedited the identification of the participants and the distribution of the invitations, a significant number of the identified key informants were still unable to attend due to other activities within and outside the province.
- c) *Level of Participants.* Sometimes, when the invitees are unable to attend, representatives were sent. Oftentimes, the representatives were not well versed in the operations of their offices or the type of information that was being generated by their offices. Thus, they could not effectively participate in the discussions during the workshops.
- d) *Distance of the Venue.* While the venues of the workshops were usually in the provincial capitol, some of the participants, especially those from the LGUs had to travel long distances just to attend the workshop. This also meant that they had to leave early in order to catch the last trips to their LGUs, which were usually early in the afternoon.

The Provincial Workshops did serve the purpose intended in terms of: (a) expediting the gathering of information from the participants' offices; (b) generating key informants and stakeholders' viewpoints on issues and problems in their sector; and (c) assisting the specialists in the site investigations that usually followed the conduct of the workshops.

The date, location and number of participants in these workshops are summarized below.

Table 1-1 Venue, Date and Number of Participants in Provincial Workshops

Province	Venue	Date	Number of Participants
Tawi-Tawi	Rachel Halipa Hotel and Restaurant, Bongao, Tawi-Tawi	8 Sept. 2003	39
Basilan	Provincial Livelihood Center, Isabela, Basilan	10 Sept. 2003	37
Sulu	Honeybee Foods and Apartelle, Jolo, Sulu	11 Sept. 2003	29
Lanao del Sur/ Marawi City	Cafe Hermoso, Iligan City, Lanao del Norte	17 Sept. 2003	46
Maguindanao	Estosan Hotel, Cotabato City, Maguindanao	24 Sept. 2003	24

Special Consultation Workshops for the Office of the Regional Governor. In agreement with the Regional Planning and Development Office (RPDO) and the Technical Management Services (TMS) of the Office of the Regional Governor (ORG), two sets of consultation workshops were conducted. The objectives of these two additional workshops were:

- a) To identify the emerging trends since the implementation of the Organic Act as amended in the following areas;
 - i. Development Directions for ARMM
 - ii. Budget and Funds Flow
 - iii. Resource Mobilization
 - iv. Devolution
 - v. Operating Systems and Procedures
 - vi. Delivery of Basic Services
 - vii. Intergovernmental and Non-Governmental Relations
 - viii. Legislation
- b) To identify the constraints in the implementation of the Organic Act; and
- c) To identify the strategic interventions in governance and development administration.

The consultation workshop used a combination of small group discussions and the technology of participation (TOP) approach. The participants were divided into small groups where greater participation was maximized.

At the end of each session, it was expected that there would be agreements reached in terms of emerging trends, constraints and strategic interventions on governance.

The first set of workshop was for the offices within the Office of the Regional Governor (ORG), which was preliminary activity before the final consultation workshop. There was an expressed interest from these offices to be involved since they felt that the ultimate beneficiaries need to be consulted.

The second and final consultation workshop was attended by the members and additional agencies of the Regional Development Administration Committee (RDAC), the Planning

Committee tasked to coordinate Development Administration, including governance matters for the ARMM.

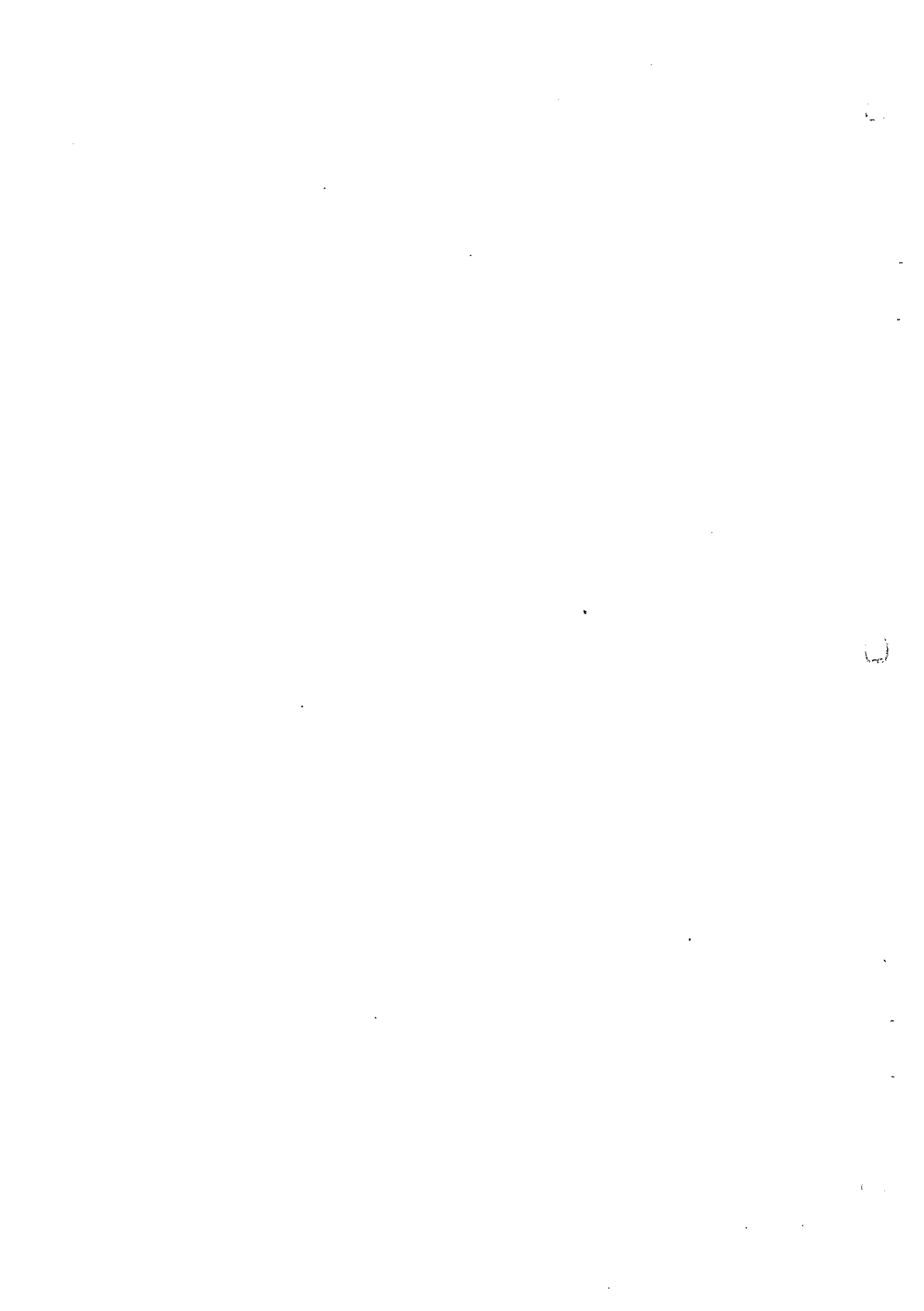
The Preliminary Consultation Workshop was attended by the Division Chiefs of the different offices and services in the Office of the Regional Governor. The final Consultation Workshop was attended by the members of the Regional Development Administration Committee (RDAC) and additional participants.

One-on-One Meetings. For the actual data collection at site, the different specialists were fielded in the ARMM. They met, whenever available, the different key informants and officials at the municipal, provincial, local officials of national agencies, regional government and officials of different funding institutions involved in the ARMM. The detailed fieldwork was quite extensive, although the data that was actually collected from these were less than targeted. In the end, there were still substantial data gaps that prevailed across sectors and therefore could not be filled. This became a major constraint of the Survey.

1.4 Organization of Report

The sector plan will discuss existing situation of the water supply and sanitation sector in the Province of Maguindanao in terms of facilities and coverage, sector arrangements and institutional capacity, past financial performance and water source development. Based on the analysis of the existing situation and conditions of the province, future requirements in water supply and sanitation improvement will be projected. Costs for future sector development will be estimated, a sector management plan will also be drawn up including financial arrangements and monitoring and evaluation for the sector and the project. Selection criteria to identify priority projects/ area will also be established.

CHAPTER 2
PROVINCIAL PROFILE



2. PROVINCIAL PROFILE

2.1 Brief History

Maguindanao means “people of the flooded plains.” Mindanao itself was derived from the word *danao*, meaning “inundation of a river, lake, or sea”. Shariff Mohammed Kabungsuwan of Johore introduced Islam in the area at the end of the 15th century. He subsequently married a local princess and established the sultanate of Maguindanao. The Cotabato Valley formed the sultanate’s heartland but its influence extended from the Zamboanga peninsula to Sarangani Bay and Davao.

Muslim traders from the nearby Malay states traded with the Maguindanaos and influenced the culture of the region. It is believed that Islam first came to the region in 1460, with the arrival of Sharif Awliya, who married a Maguindanao. The introduction of Islam and its institutions has been credited to Sharif Mohammed Kabungsuwan, a Johore Muslim who established the Sultanate of Maguindanao sometime in 1515. Over the years, several sultanates were established to rule over the region, the most significant of which are the sultanates of Cotabato, Buayan, and Kabuntalan.

The Spaniards tried to conquer Maguindanao as early as 1596 but were thwarted by the stiff resistance of the Maguindanaos. From 1600-1650, the Sultan of Maguindanao, Sultan Muhammad Dipatuan Kudarat, expanded the realm subject to the Maguindanao Sultanate and at its height of power, it held sway over the regions from the Gulf of Davao all the way to Dapitan.

Upon his death, however, the sultanate was fragmented into several rival sultanates and towards the middle of the 19th Century, Maguindanao power had waned considerably.

In 1851, Spanish forces attacked and seized Polloc. A naval base was established in the town and in 1854, a separate politico-military district was created. In 1861, following more expeditions by the Spaniards, the Sultan of Maguindanao recognized Spanish sovereignty. Resistance continued in the upper Pulangi directed by Datu Ugto but superior Spanish arms allowed the Spaniards to remain in Maguindanao until 1899. In that year, following the evacuation of Spanish forces from the region, Upper Pulangi datus attacked and occupied Cotabato until the Americans arrived.

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The district of Cotabato was created in 1860 following the reorganization of Spanish government in Mindanao. In 1903, following the establishment of the Moro Province, Cotabato became one of its districts. Maguindanao continued to be a part of the province of Cotabato until November 1973 when the province was divided into the three provinces of Maguindanao, North Cotabato and Sultan Kudarat by virtue of Presidential Decree No. 341.

Maguindanao was the scene of clashes between government forces and Bangsa Moro secessionists during the height of the armed struggle to create a Moro homeland forcing thousands to seek refuge in more secure settlements. Maguindanao remains a stronghold of the Moro Islamic Liberation Front. In 1979, the province became part of an autonomous regional government for Central Mindanao. Ten years later, the people of Maguindanao voted to be included in the ARMM.

2.2 Location and Accessibility

Maguindanao is located in central Mindanao. It is bounded on the north by Lanao del Sur, on the east by North Cotabato, on the west by the Moro Gulf and on the south by Sultan Kudarat.

Maguindanao is accessible by plane through the Awang airport in Datu Odin, Sinsuat municipality. An international port located at Polloc, Parang and a sub-port located across the Polloc Port, also makes access by sea possible. The province has a total road network of 1,943 km long that links Maguindanao to its neighboring provinces of Sultan Kudarat, South Cotabato, and Cotabato. The province of Maguindanao is the site of the Regional Industrial Center for the ARMM and is strategically located at the center of two growth areas in Mindanao, the Cagayan-Iligan Industrial Corridor and the South Cotabato - Sarangani - Sultan Kudarat - General Santos City Project.

2.3 The Land

Maguindanao is one of the provinces carved out of old Cotabato. The National Statistics and Coordination Board (NSCB) reports that Maguindanao has a land area 5,047.6 km². The Department of Budget and Management (DBM), in its 2003 Internal Revenue Allotment, reports a total land area of 7,447.75 km². As of 2003, there are two congressional districts, 26 municipalities and 472 barangays in the province of Maguindanao.

2.3.1 Topography and Drainage

Maguindanao has a generally flat terrain and scattered hills with fertile valleys and isolated mountain ranges. Maguindanao can be divided into two physiographic units: the southwest mountain clusters and the Maguindanao lowlands.

The southwest mountain clusters include the two big groups of mountain elevations - Binaca and Blik. These are separated by the valleys of Mateber River, which flows northwest into the Moro Gulf and Lawasig River, which flows southward into the Mindanao Sea.

The Maguindanao lowlands include the north extremity of Cotabato Basin, northeast of the province's highlands. The area is gently sloping from the foothills to relatively flat as it approaches the sea and the Liguasan Marsh. Thick accumulation of detrital materials derived from the weathering and erosion of the adjacent emergent landmass compose the area.

The biggest river in Maguindanao is the Pulangi River. It is at the same time the northeast boundary of the province and as such the western banks are within the province's jurisdiction. The river meanders with flood plains developed at places together with extensive delta, which make its immediate vicinity marshy. It drains westward into the Mindanao Sea. Several smaller streams and creeks dissect the area.





2.3.2 Climate

The province enjoys a tropical rainy climate with May to December showing an excess of rainfall. The main moisture carriers are the northeast monsoons during October to May and the southwest winds from June to September. The local surficial winds are generally influenced by the monsoons and by physiographic differences.

The climate is characterized by more or less even distribution of rainfall throughout the year. Compared to the other provinces of the country, Maguindanao has the lowest frequency of cloudy or overcast days.

While the climate of the entire Philippines may be classified into four types following the Modified Corona's Classification System, only three types are observed in Mindanao and only two of these are observed in the ARMM area. Figure 2-1 presents the classification of climate within the entire island of Mindanao and within the coverage of ARMM.

LEGEND:

-  TYPE I Two pronounced seasons, dry from December to May and wet from June to November. Maximum rain period is from June to September.
-  TYPE II No dry season with a very pronounced maximum rain period in winter. Maximum rainfall generally occur in Dec. and January, although there is not a single dry month.
-  TYPE III No very pronounced maximum rain period, with a short dry season lasting only from 1 to 3 months.
-  TYPE IV Rainfall is more or less evenly distributed throughout the year.

SOURCE: PAG-ASA

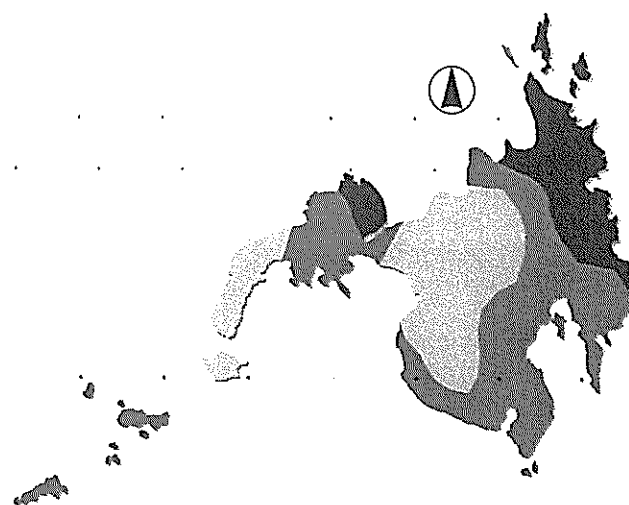


Figure 2-1 Climate Map of Mindanao

The monthly and rainfall data recorded at weather stations located in the ARMM and its vicinity are summarized in Figure 2-2. As can be inferred from the map, northern Maguindanao receives more rain annually than western Maguindanao. Its southeastern portion is relatively drier than the rest of the province.

2.3.3 Land Classification

As of December 2000, lands in the province were classified as follows:

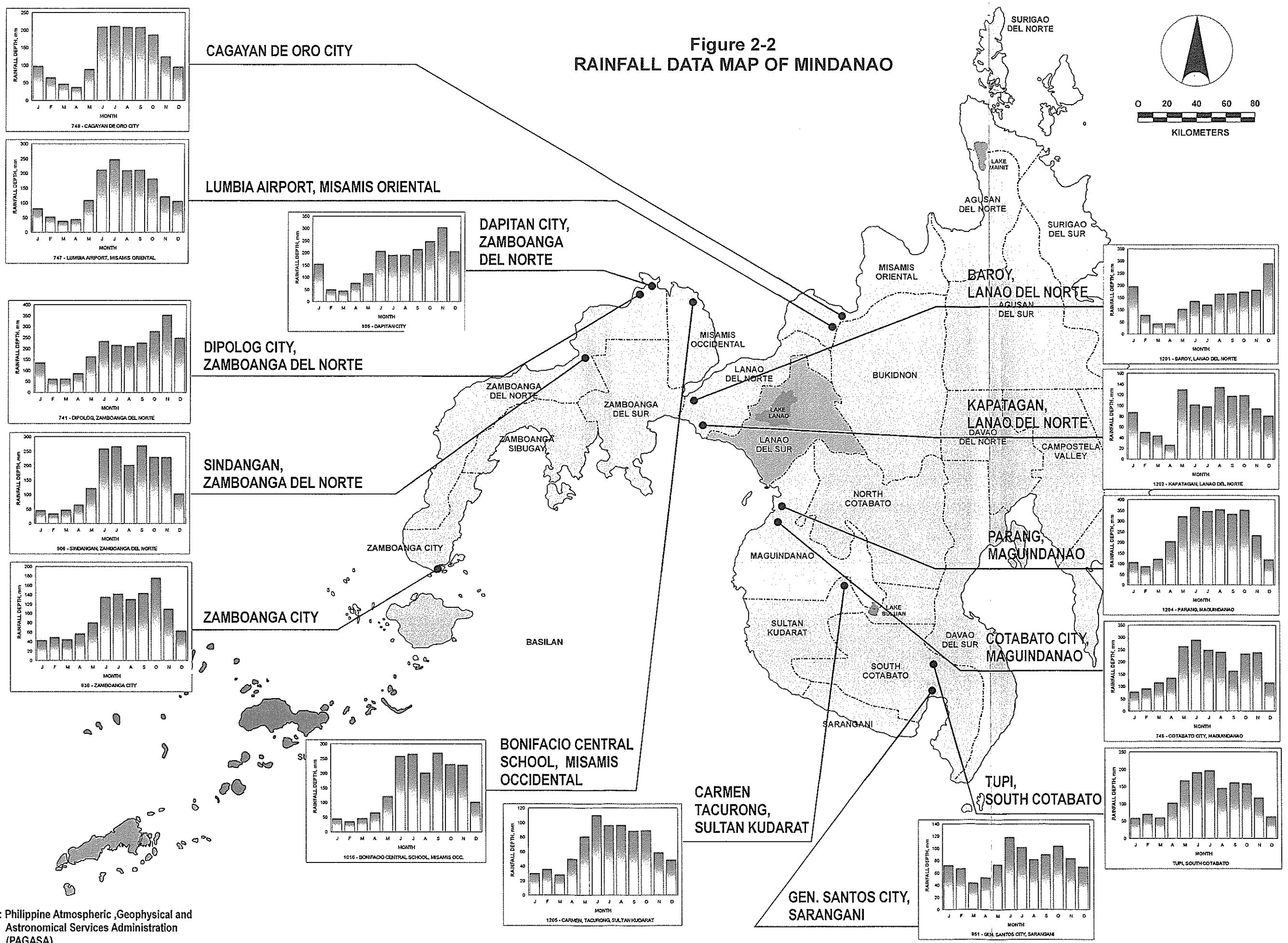
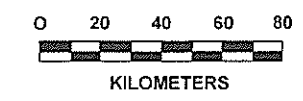
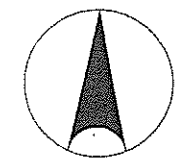
Table 2-1 Land Classification as of December 2000

CLASSIFICATION	Area, km ²	Percent of Province	Percent of ARMM
Total Land Area	5,047.60	100.00	39.02
Alienable and Disposable	3,066.22	60.75	48.79
Total Forest Area	1,981.38	39.25	29.79
Unclassified Forest Land	35.25	0.70	3.50
Total Classified Public Forest	1,946.13	38.56	34.47
<i>Forest Reserves</i>	125.15	2.48	51.03
<i>Established Timber Land</i>	1,520.50	30.12	30.44
<i>National Park (GRBS/WA)</i>	300.48	5.95	91.66
<i>Area for Fishpond Development</i>	0.00	0.00	0.00

Source: Bureau of Census and Statistics, Statistical Yearbook 2002



**Figure 2-2
RAINFALL DATA MAP OF MINDANAO**



SOURCE: Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

2.4 Socio-Demographic Profile

Total Population. As shown in Table 2-2, the 2000 Census of Population and Housing results showed that Maguindanao registered a total population of 808,102 persons, higher by 139,754 persons over the 1995 Census of Population results. This figure recorded a 4.16 percent annual population growth rate, higher by 3.25 percentage points than the annual population growth rate during the 1990 to 1995 period. A corresponding increase on the number of households was also recorded at 143,669 households, higher by 14,802 households over the 1995 figure. This resulted to an average household size of 5.57 persons, slightly higher than the average household size (5.13 persons) recorded in 1995 and the national average of five persons.

Table 2-2 Population Distribution: Maguindanao, 2000

MUNICIPALITY / CITY	Total Population	Percent
1. Ampatuan	32,907	4.07
2. Barira	18,296	2.26
3. Buldon	26,903	3.33
4. Buluan	51,098	6.32
5. Datu Odin Sinsuat (Dinaig)	71,569	8.85
6. Datu Paglas	20,014	2.47
7. Datu Piang	67,303	8.32
8. Gen. S. K. Pendatun	28,374	3.51
9. Guindulungan	16,894	2.09
10. Kabuntalan (Tumbao)	23,137	2.86
11. Mamasapano	20,059	2.48
12. Matanog	19,006	2.35
13. Pagagawan	27,010	3.34
14. Pagalungan	25,908	3.20
15. Paglat	5,832	0.72
16. Parang	60,935	7.53
17. Shariff Aguak (Maganoy)	49,531	6.12
18. South Upi	28,186	3.48
19. Sultan Kudarat (Nuling)	78,951	9.76
20. Sultan Mastura	15,910	1.97
21. Sultan Sa Barongis (Lambayong)	34,709	4.29
22. Talayan	18,235	2.25
23. Talitay	17,026	2.10
24. Upi	51,141	6.32
TOTAL	808,934	100.00

Source: NSO, 2000 Census of Population and Housing

The population of Maguindanao will increase by 33,326 persons annually and expected to reach one million in year 2006 and to double by year 2017 if the population growth rate (4.16 percent) will not change with in the said period.

Of the 26 municipalities in Maguindanao, Sultan Kudarat was the largest in terms of population size, comprising 9.76 percent of the total population of the province. The least populous was the municipality of Talitay (2.10 percent). Shariff Aguak, the capital town of the province, formerly known as Maganoy, comprised 6.12 percent of the total population of the province.

Population Distribution. As shown below, Maguindanao had a median age of 19 years, slightly higher than the 1995 median age of 18 years.

Table 2-3 Total Population by Age Group, Sex and Sex Ratio: Maguindanao, 2000

Age Group	Total Population	Male	Female	Sex Ratio
Maguindanao	801,102	401,049	400,053	100.2
Under 1	12,094	5,848	6,246	93.6
1 to 4	86,259	41,938	44,321	94.6
5 to 9	119,473	60,820	58,653	103.7
10 to 14	108,220	54,250	53,970	100.5
15 to 19	105,047	52,396	52,651	99.5
20 to 24	73,299	36,269	37,030	97.9
25 to 29	58,831	27,441	31,390	87.4
30 to 34	48,450	23,374	25,076	93.2
35 to 39	53,495	26,035	27,460	94.8
40 to 44	40,066	20,845	19,221	108.4
45 to 49	32,048	16,675	15,373	108.5
50 to 54	22,569	12,087	10,482	115.3
55 to 59	16,212	8,916	7,296	122.2
60 to 64	11,423	6,473	4,950	130.8
65 to 69	6,579	3,639	2,940	123.8
70 to 74	3,734	2,190	1,544	141.8
75 to 79	1,580	937	643	145.7
80 and over	1,723	916	807	113.5

Source: NSO, 2000 Census of Population and Housing

In 2000, the age-sex structure of the population of Maguindanao deviated from the usual pyramid shape. The age group 5-9 years old occupied the largest proportion of the total population (15 percent). Children under 5 years old made up 12.3 percent of the total population of the province, lower than the percentage for the age group 5 to 9 years old.

There were 401,049 males and 400,053 females in Maguindanao. This gave a sex ratio of 100.25 males for every 100 females. There were more males in almost all age groups except in the 15-39 age group.

Women in childbearing or reproductive age group (15 to 49 years) comprised 52 percent of the total female population.

There were 414,097 persons or 52 percent of the total population belonging to the voting age population (18 years and over). Among them, the proportion of males was higher (50.14 percent) than that of the females (49.86 percent).

Over 57 percent of the total population was economically active (aged 15 to 64 years). About 41 percent were young dependents (aged 0 to 14 years) while two percent were old dependents (aged 65 years and above). The overall dependency ratio in 2000 was 74, dropped by 5 percentage points from the 1995 ratio of 79. This meant that for every 100 persons aged 15 to 64 years, there were about 74 dependents, i.e., 71 young dependents and three old dependents.

Housing. As shown in Table 2-4, majority of the housing units were single houses (94 percent). Over seven out of ten housing units needed no repair or if needed one, with minor repair only. Two out of five housing units were built from 1996 to 2000.

Three out of five housing units had floor area of less than 20 square meters (59.15 percent). Only 1.5 percent of the occupied housing units had a floor area of 120 and over square meters.

The households in Maguindanao preferred native or locally made materials for their houses. About 53 percent used cogon/nipa/anhaw for their roof, while 31 percent used galvanized iron/aluminum. As to construction materials of the outer walls, 44 percent used bamboo/sawali/cogon/nipa/anhaw and 35.4 percent, wood.

Table 2-4 Occupied Housing Units by Construction Materials of Outer Walls and Roof: Maguindanao, 2000

CONSTRUCTION MATERIALS OF THE OUTER WALLS	Total Occupied Housing Units	CONSTRUCTION MATERIALS OF THE ROOF						
		GI/ Aluminum	Tile/ Concrete/ Clay Tile	Half GI and Half Concrete	Wood	Cogon/ Nipa/ Anahaw	Makeshift/ Salvaged/ Improvised Materials	Asbestos/ Others/ Not Reported
Maguindanao	140,815	43,429	740	5,154	10,486	74,690	135	6,181
Concrete/Brick/ Stone	7,401	6,572	312	212	90	206	4	5
Wood	49,846	23,644	196	1,187	8,074	16,665	16	64
Half Concrete/Brick Stone and Half Wood	11,834	7,814	103	3,033	271	598	5	10
Galvanized Iron/ Aluminum	921	444	32	183	138	120	3	1
Bamboo/Sawali/ Nipa	62,690	4,540	-	450	1,762	55,868	44	26
Asbestos	70	25	12	12	10	-	-	11
Glass	32	12	7	4	5	-	-	4
Makeshift/ Salvaged/ Improvised Materials	481	26	-	5	12	393	41	4
Others/Not Reported	7,346	300	72	67	101	765	11	6,030
No walls	194	52	6	1	23	75	11	26

Source: NSO, 2000 Census of Population and Housing

2.5 Commerce and Industry

Traditionally, the Maguindanaos are rice farmers who live in the valley. Those near the coasts have become fishermen and traders. They also produce fine handicrafts such as brassware, hand-woven malongs, mats and baskets.

Maguindanao is predominantly an agricultural economy that produces palay, corn, coconuts, bananas and cassava. Areas suited for inland fishing are also present in the province.

The business opportunities in Maguindanao are enhanced by the rich agricultural lands, the strategic location of the province and the plans of the local government unit to industrialize its agricultural based economy. The present set of investment options include yellow corn production for industrial use, development of inland fishing, processing of agricultural products into industrial raw materials like feeds, and consumer products like snack foods.

CHAPTER 3
EXISTING FACILITIES AND SERVICE COVERAGE

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3. EXISTING FACILITIES AND SERVICE COVERAGE

3.1 Water Supply

3.1.1 General

The present water supply system for each municipality was surveyed to assess the condition and the need of the people in the locality. Water supply system parameters such as service areas, served population, water service level, water sources, present distribution system (for Level II and III) were evaluated to define the necessary measures to be planned for the improvement of the water supply system of each municipality. The existing condition described below refers to the existing water supply facilities, on-going water supply projects and planned water supply system development, which are scheduled to be completed by year 2005. There are about 20 out of 26 towns of Maguindanao visited during the field investigation. The towns of Upi, South Upi, Kabuntalan, Paglat, Matanog and Buldon were not accessible during fieldwork, nevertheless the PPDO of Maguindanao provided the general information for these towns.

3.1.2 Types of Facilities, Definition of Service Level Standard, and classification of urban and rural barangays

Composition of Water Supply System and Facility. The service level and system components of water supply system and facilities are shown below.

Table 3-1 Composition of Water Supply System and Facility

Facility	Level I	Level II	Level III
1. Water Source	Drilled shallow well Drilled deep well Spring Dug well Rain Collector	Drilled shallow well Drilled deep well Spring Infiltration gallery	Drilled shallow well Spring Infiltration gallery Surface water intake
2. Water Treatment	Generally none. Disinfection of well is conducted periodically by local health authorities	Disinfection facility is sometimes not provided.	Disinfection facility is provided. Systems with surface water source have series of treatment facilities.
3. Distribution	None	Pipe system provided with reservoir	Pipe system provided with reservoir
4. Delivery and Service level	Generally none.	Communal faucet shared by houses within 25 m radius	Household connection
5. Consumption Rate	At least 20 lpcd	At least 60 lpcd	At least 100 lpcd

Safe and Unsafe Classification of Water Sources. Generally, all water sources cannot be assumed to be safe for drinking unless chemical and bacteriological tests are conducted. However, the sources can be classified initially as either safe or unsafe considering the physical condition and accessibility of source to contamination.

Safe Sources

Protected deep well
Protected shallow well
Improved/covered dug well
Developed spring

Unsafe Sources

Unprotected deep well
Unprotected shallow well
Open dug well
Unprotected Rain Collector

Service Level Standard. The water supply system has three service levels. Normally, the number of households served for each level is sometimes beyond the standard set. The ideal service level standards are shown below.

Level I	15 households per point source 1 household per private well
Level II	4 to 6 households per communal faucet
Level III	1 household per connection

Urban and Rural Barangays Classification. The municipal barangay classification of urban and rural areas used in this report was based on the National Statistics Office (NSO) classification. The following are the NSO definition for urban area.

1. Poblaciones or central districts of municipalities and cities which have a population density of at least 500 persons per square kilometer;
2. Poblaciones of central districts, not included in item 1 above, regardless of population size which have the following characteristics:
 - a) Street pattern, that is network of streets in either parallel or right angle orientation;
 - b) At least six establishments, either commercial, manufacturing, recreational and/or personal services; and
 - c) At least three of the following:
 - A town hall, church or chapel with religious service at least once a month;
 - A public place, park or cemetery;
 - A market place or building like school, hospital, puriculture or health center or library;
3. Barrios having at least 1,000 inhabitants that meet the conditions set forth in item 2 above, and in which the occupation of the inhabitants is predominantly non-farming/ fishing.

3.1.3 Level III Water Supply System

The Level III water system is usually operated by the water district or by the municipal waterworks. In the province of Maguindanao, the municipalities Sultan Kudarat, Parang, and Datu Odin Sinsuat have Level III water supply system. Sultan Kudarat and Datu Odin Sinsuat are being served by the Cotabato City Water District (CCWD) while the main water supply system of Parang is under the management of Parang Municipal Waterworks System. The improvement of the water supply system is presently being constructed under the financial assistance of the Asian Development Bank (ADB). There is another remote barangay (Bgy. Sarmiento) in Parang, about eight kilometers from the Poblacion, wherein the water system is being operated by a barangay cooperative. The level of water service is Level III and mixed with Level II. There are no details provided as to what extent is the service coverage of Level III in the barangay. But information given to us by one of the staff of the cooperative that very minimal are being served by Level II. In Datu Odin Sinsuat, Bgy Dalican Poblacion is proposed to be constructed by a level III water supply system. The proposed plan was presented to us by the assistant of the MPDC. However, there was no clear figure on the target number of connections but the 50% service population coverage was assumed. Table 3-2 shows the available details of the water supply system for each municipality.

Table 3-2 Existing Level III Water System of Maguindanao

Municipality	Water Service Provider	Service Area			Total No. of connections	Water source	Estimated unit water cons. (lpcd)
		Barangay	Class	2003 Served Population			
Datu Odin Sinsuat	Cotabato City Water District	1. Awang	Rural	4,814	165	Spring	130*
		2. Tamontaka	Rural	2,955	112		
		3. Tanuel	Rural	889	201		
		4. Tambak	Rural	602	892		
5. Capiton		Rural	1,086	548			
6. Semba		Rural	2,199	408			
		Total		12,545	2,326		
	LGU Management	1. Dalican Poblacion	Urban	***4,755	***882	Deep well	No data provided
		Total	Urban	4,755	2,326		Total
			Rural	12,545	882		
			Total	17,300	3,208		
Parang	Parang Waterworks	1. Poblacion I	Urban	3,579	670	Spring and River	on-going construction (120 lpcd estimated)
		2. Poblacion II	Urban	4,827	903		
		3. Magsaysay	Rural	2,309	432		
		4. Making	Rural	2,905	544		
		5. Nituan	Rural	1,406	263		
		6. Macasandag	Rural	1,007	188		

Municipality	Water Service Provider	Service Area			Total No. of connections	Water source	Estimated unit water cons. (lpcd)	
		Barangay	Class	2003 Served Population				
	Sarmineto Rural Waterworks and Sanitation Association	1. Sarmineto **	Rural	2,031	380	Deep well	No data provided	
		Total		Urban Rural Total	8,406 9,658 18,064			1,573 1,807 3,380
Sultan Kudarat	Cotabato City Water District	1. Bulalo	Rural	1,397	250	Deep well	No data provided	
		2. Dalumangcob	Urban	1,298	232			
		3. Gang	Rural	949	170			
		4. Kalsada	Rural	1,272	228			
		5. Katuli	Rural	1,353	243			
6. Limbo		Rural	1,385	248				
7. Macaguiling		Rural	627	112				
8. Pinarang		Rural	643	115				
9. Rebukén		Rural	617	111				
10. Salimbao		Urban	1,243	223				
	Barangay Waterworks	1. Crossing Simuay	Rural	670	Approx. 120	Deep well	No data provided	
		Total		Urban Rural Total	2,541 8,913 11,454			455 1,477 1,932
Province	Total			Urban Rural Total	15,702 31,116 46,818	4,354 4,166 8,520		

Notes: No breakdown of service connections was provided for each bgy. The breakdown shown above were computed by pro rating the total connections to the ratio of brgy and mun. pop for the purpose of having a picture on the rural and urban pop served.

* Average consumption (lpcd) of CCWD consumers

** Sarmiento water system is mixed wit Level III and II. No data was provided

*** LGU-Datu Odin Sinsuat Existing plan but no clear information on the target number of connection but a 50% is assumed

3.1.4 Level II Water Supply System

The Level II water systems, defined as communal faucets, are designed to serve barangays at specified service area. The systems are usually operated by the Barangay Waterworks System Association (BWSA). In Maguindanao, the municipalities of North Upi and South Upi have Level II water systems. Since there is no data generated from North Upi regarding the number of communal faucets or number of served population, 50% of the barangay population with Level II system was assumed served. The details are shown in Table 3-3.

Table 3-3 Existing Level II Water System of Maguindanao

Municipality	Water Service Provider	Barangay Served		Estimated Population Served	No. of Communal faucets	Water Source	Estimated unit water consumption (lpcd)
		Served	Class				
North Upi	No data provided	Poblacion	Urban	2,797	No data provided	Spring/ deep well	No data provided
South Upi	Timanan Water System	Timanan Poblacion	Urban	611	8 operational 2 non-operational	Spring	90 *
Total		Urban		3,408			

* based on projected 2003 barangay population and average spring yield

3.1.5 Level I Water Supply System

Level I water systems are usually used in the rural areas of the municipality. The common sources, like shallow wells, are equipped with hand pumps and for those who can afford they use motorized pump to get water. There are also areas where springs are used as point source by connecting polyethylene pipes directly to the households. Other households get water from the river nearest to their area for domestic use and rainwater for drinking. Since there was no data provided during the investigation on how many households (served by Level I) uses the shallow wells, deep wells and developed spring as their present sources for each municipality, 40% of municipal population which are not served by level III and level II water systems was used to estimate the level I users having shallow wells, deepwells, and developed spring in each municipality. The 40% figure was taken from the ARMM Regional Socio Economic Profile, indicating that in the year 2000, about 40% of the province of Maguindanao are being served by the water supply system facilities. Since very few households are using the spring source for Level I, 40% of Level I served population are assumed to have shallow and deep wells facilities in each municipality. The total shallow or deep well facilities for each town were calculated considering 15 households are sharing per point source. Table 3-4 shows the existing served population with facilities of shallow and deep well sources.

Table 3-4 Existing Level I Water System of Maguindanao

Municipality	Type	Year 2003		No. of Facilities
		Mun. Population	Served Population	
1 Ampatuan	Urban	5,882	2,353	31
	Rural	29,000	11,600	152
	Total	34,882	13,953	182
2 Barira	Urban	1,595	2,006	24
	Rural	0	5,738	70
	Total	1,595	7,744	94
3 Buldon	Urban	5,287	2,115	25
	Rural	23,802	9,521	113
	Total	29,089	11,636	138
4 Buluan	Urban	13,255	5,302	66
	Rural	38,276	15,310	190
	Total	51,531	20,612	256
5 Datu Odin Sinsuat	Urban	12,902	3,259	40
	Rural	64,589	20,818	257
	Total	77,491	24,076	298
6 Datu Paglas	Urban	2,472	989	12
	Rural	18,980	7,592	93
	Total	21,451	8,581	105
7 Datu Piang	Urban	10,613	4,245	45
	Rural	30,448	12,179	130
	Total	41,060	16,424	176
8 Datu Saudi	Urban	0	0	0
	Rural	28,692	11,477	123
	Total	28,692	11,477	123
9 Datu Unsay	Urban	0	0	0
	Rural	13,486	5,394	59
	Total	13,486	5,394	59
10 Gen. S. K. Pendatun	Urban	6,188	2,475	26
	Rural	23,783	9,513	101
	Total	29,971	11,988	127
11 Guindulungan	Urban	0	0	0
	Rural	16,902	6,761	76
	Total	16,902	6,761	76
12 Kabuntalan	Urban	4,166	1,666	20
	Rural	20,838	8,335	101
	Total	25,004	10,002	122

Table 3-4 Existing Level I Water System of Maguindanao (Cont.)

Municipality	Type	Year 2003		No. of Facilities
		Mun. Population	Served Population	
13 Mamasapano	Urban	872	349	3
	Rural	19,919	7,968	78
	Total	20,791	8,316	82
14 Matanog	Urban	2,889	1,156	13
	Rural	17,354	6,942	76
	Total	20,243	8,097	89
15 Pagagawan	Urban	0	0	0
	Rural	29,689	11,876	160
	Total	29,689	11,876	160
16 Pagalungan	Urban	6,816	2,727	33
	Rural	21,677	8,671	105
	Total	28,494	11,398	138
17 Paglat	Urban	0	0	0
	Rural	6,183	2,473	28
	Total	6,183	2,473	28
18 Parang	Urban	34,782	8,576	107
	Rural	27,998	9,310	116
	Total	62,780	17,887	223
19 Shariff Aguak	Urban	8,979	3,591	39
	Rural	28,872	11,549	125
	Total	37,851	15,140	165
20 South Upi	Urban	9,889	3,711	49
	Rural	20,529	8,212	107
	Total	30,418	11,923	156
21 Sultan Kudarat	Urban	8,153	2,245	27
	Rural	76,072	26,864	321
	Total	84,225	29,109	348
22 Sultan Mastura	Urban	0	0	0
	Rural	16,826	6,730	80
	Total	16,826	6,730	80
23 Sultan Sa Barongis	Urban	6,320	2,528	31
	Rural	29,677	11,871	147
	Total	35,997	14,399	178
24 Talayan	Urban	3,478	1,391	16
	Rural	16,973	6,789	76
	Total	20,451	8,180	92
25 Talitay	Urban	0	0	0
	Rural	19,198	7,679	84
	Total	19,198	7,679	84
26 Upi	Urban	5,594	1,119	15
	Rural	47,886	19,154	249
	Total	53,480	20,273	264
Provincial Total	Urban	150,131	51,802	626
	Rural	687,647	270,325	3,223
	Total	837,778	322,128	3,849

3.1.6 Water Supply Service Coverage

In Maguindanao, there are three municipalities with Level III system, but not all barangays are being served. Likewise, there are municipalities with Level II water systems, which cater only to the Poblacion. All other municipalities have Level I systems. Table 3-5 shows the distribution of water system level per municipality. Figure 3-1 shows the existing water supply facilities coverage.

Table 3-5 Water System Level Coverage of Maguindanao

Municipality	Type	Population (2003)	Population Served by 2003 Facilities				
			Level III	Level II	Level I	Total	% Coverage
1 Ampatuan	Urban	5,882	0	0	2,353	2,353	17%
	Rural	29,000	0	0	11,600	11,600	33%
	Total	34,882	0	0	13,953	13,953	50%
2 Barira	Urban	5,015	0	0	2,006	2,006	26%
	Rural	14,345	0	0	5,738	5,738	30%
	Total	19,360	0	0	7,744	7,744	56%
3 Buldon	Urban	5,287	0	0	2,115	2,115	18%
	Rural	23,802	0	0	9,521	9,521	33%
	Total	29,089	0	0	11,636	11,636	51%
4 Buluan	Urban	13,255	0	0	5,302	5,302	26%
	Rural	38,276	0	0	15,310	15,310	30%
	Total	51,531	0	0	20,612	20,612	55%
5 Datu Odin Sinsuat	Urban	12,902	4,755	0	3,259	8,014	17%
	Rural	64,589	12,545	0	20,818	33,362	43%
	Total	77,491	17,300	0	24,076	41,376	60%
6 Datu Paglas	Urban	2,472	0	0	989	989	12%
	Rural	18,980	0	0	7,592	7,592	35%
	Total	21,451	0	0	8,581	8,581	47%
7 Datu Piang	Urban	10,613	0	0	4,245	4,245	26%
	Rural	30,448	0	0	12,179	12,179	30%
	Total	41,060	0	0	16,424	16,424	56%
8 Datu Saudi	Urban	0	0	0	0	0	0%
	Rural	28,692	0	0	11,477	11,477	40%
	Total	28,692	0	0	11,477	11,477	40%
9 Datu Unsay	Urban	0	0	0	0	0	0%
	Rural	13,486	0	0	5,394	5,394	40%
	Total	13,486	0	0	5,394	5,394	40%
10 Gen. S. K. Pendatun	Urban	6,188	0	0	2,475	2,475	21%
	Rural	23,783	0	0	9,513	9,513	32%
	Total	29,971	0	0	11,988	11,988	52%
11 Guindulungan	Urban	0	0	0	0	0	0%
	Rural	16,902	0	0	6,761	6,761	40%
	Total	16,902	0	0	6,761	6,761	40%
12 Kabuntalan	Urban	4,166	0	0	1,666	1,666	17%
	Rural	20,838	0	0	8,335	8,335	33%
	Total	25,004	0	0	10,002	10,002	50%

Table 3-5 Water System Level Coverage of Maguindanao (Cont.)

Municipality	Type	Population (2003)	Population Served by 2003 Facilities				
			Level III	Level II	Level I	Total	% Coverage
13 Mamasapano	Urban	872	0	0	349	349	4%
	Rural	19,919	0	0	7,968	7,968	38%
	Total	20,791	0	0	8,316	8,316	43%
14 Matanog	Urban	2,889	0	0	1,156	1,156	14%
	Rural	17,354	0	0	6,942	6,942	34%
	Total	20,243	0	0	8,097	8,097	49%
15 Pagagawan	Urban	0	0	0	0	0	0%
	Rural	29,689	0	0	11,876	11,876	40%
	Total	29,689	0	0	11,876	11,876	40%
16 Pagalungan	Urban	6,816	0	0	2,727	2,727	24%
	Rural	21,677	0	0	8,671	8,671	30%
	Total	28,494	0	0	11,398	11,398	54%
17 Paglat	Urban	0	0	0	0	0	0%
	Rural	6,183	0	0	2,473	2,473	40%
	Total	6,183	0	0	2,473	2,473	40%
18 Parang	Urban	34,782	13,342	0	8,576	21,918	55%
	Rural	27,998	4,722	0	9,310	14,032	22%
	Total	62,780	18,064	0	17,887	35,950	78%
19 Shariff Aguak (Maganoy)	Urban	8,979	0	0	3,591	3,591	24%
	Rural	28,872	0	0	11,549	11,549	31%
	Total	37,851	0	0	15,140	15,140	54%
20 South Upi	Urban	9,889	0	611	3,711	4,322	33%
	Rural	20,529	0	0	8,212	8,212	27%
	Total	30,418	0	611	11,923	12,534	60%
21 Sultan Kudarat	Urban	8,153	2,541	0	2,245	4,786	10%
	Rural	76,072	8,912	0	26,864	35,776	42%
	Total	84,225	11,453	0	29,109	40,562	52%
22 Sultan Mastura	Urban	0	0	0	0	0	0%
	Rural	16,826	0	0	6,730	6,730	40%
	Total	16,826	0	0	6,730	6,730	40%
23 Sultan Sa Barongis	Urban	6,320	0	0	2,528	2,528	18%
	Rural	29,677	0	0	11,871	11,871	33%
	Total	35,997	0	0	14,399	14,399	51%
24 Talayan	Urban	3,478	0	0	1,391	1,391	17%
	Rural	16,973	0	0	6,789	6,789	33%
	Total	20,451	0	0	8,180	8,180	50%
25 Talitay	Urban	0	0	0	0	0	0%
	Rural	19,198	0	0	7,679	7,679	40%
	Total	19,198	0	0	7,679	7,679	40%
26 Upi	Urban	5,594	0	2,797	1,119	3,916	10%
	Rural	47,886	0	0	19,154	19,154	36%
	Total	53,480	0	2,797	20,273	23,070	46%
Provincial Total	Urban	153,551	20,638	3,408	51,802	75,848	18%
	Rural	701,992	26,179	0	270,325	296,504	35%
	Total	855,544	46,817	3,408	322,128	372,352	53%

The present provincial coverage for ARMM was compared to the national and other regional data in the country. Table below shows the comparison between ARMM with other regions, which demonstrates very low coverage within the sector.

From the table it could be observed that access to Level III & II water system is lowest in ARMM. Likewise remedial means to obtain potable water from rain collector, private vendor and other sources, which shows highest values for ARMM indicates the lack of adequate standard water source.

Number of Families Main Source of Water Supply (2002)

Region	Total Families	Main Source of Water Supply											
		Level III		Level II		Level I		Rain Collector		Private Vendor		Others	
		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
PHILIPPINES	15,925,454	5,194,864	33	2,626,307	16	7,393,385	46	61,513	0.4	573,598	4.0	75,787	0.5
ARMM	388,437	22,549	6	26,657	7	299,895	77	12,456	3.0	24,172	6.0	2,708	1.00
Ilocos Region	849,081	164,955	19	82,758	10	597,765	70	0	0.0	3,440	0.4	163	0.02
Eastern Visayas	774,958	172,869	22	282,421	36	308,072	40	1,011	0.1	9,177	1.0	1,408	0.18
Western Mindanao	637,944	165,860	26	161,173	25	299,617	47	0	0.0	7,091	1.0	4,203	0.65
Central Mindanao	694,91	136,540	20	65,586	9	475,113	68	566	0.08	10,550	2.0	6,557	0.94

Source: National Statistics Office, 2002 Annual Poverty Indicators Survey (APIS)

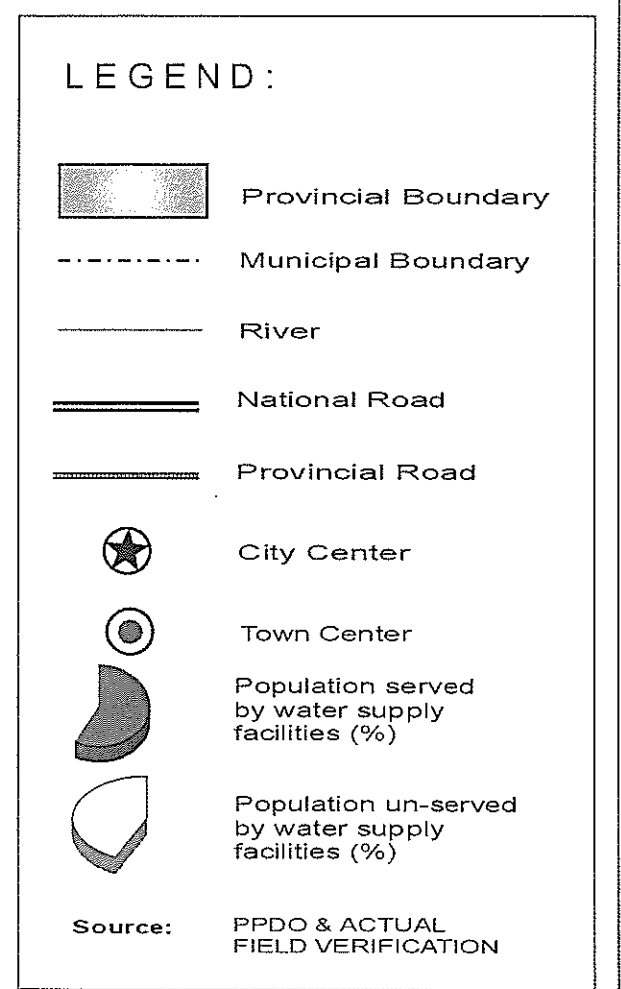
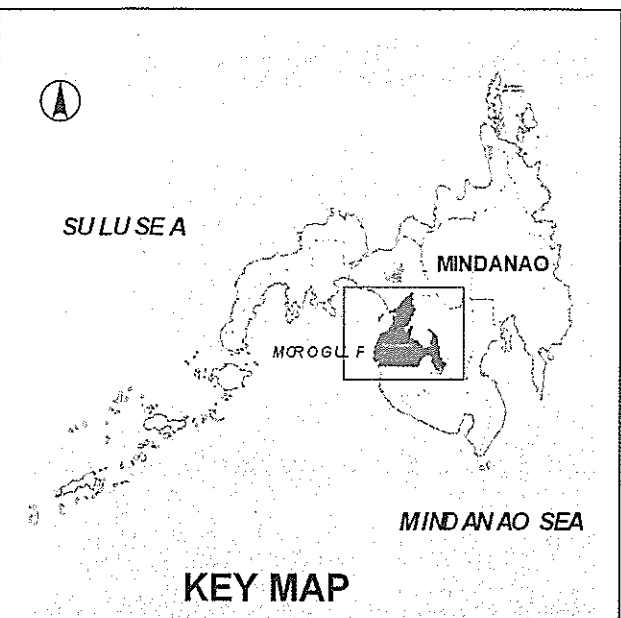
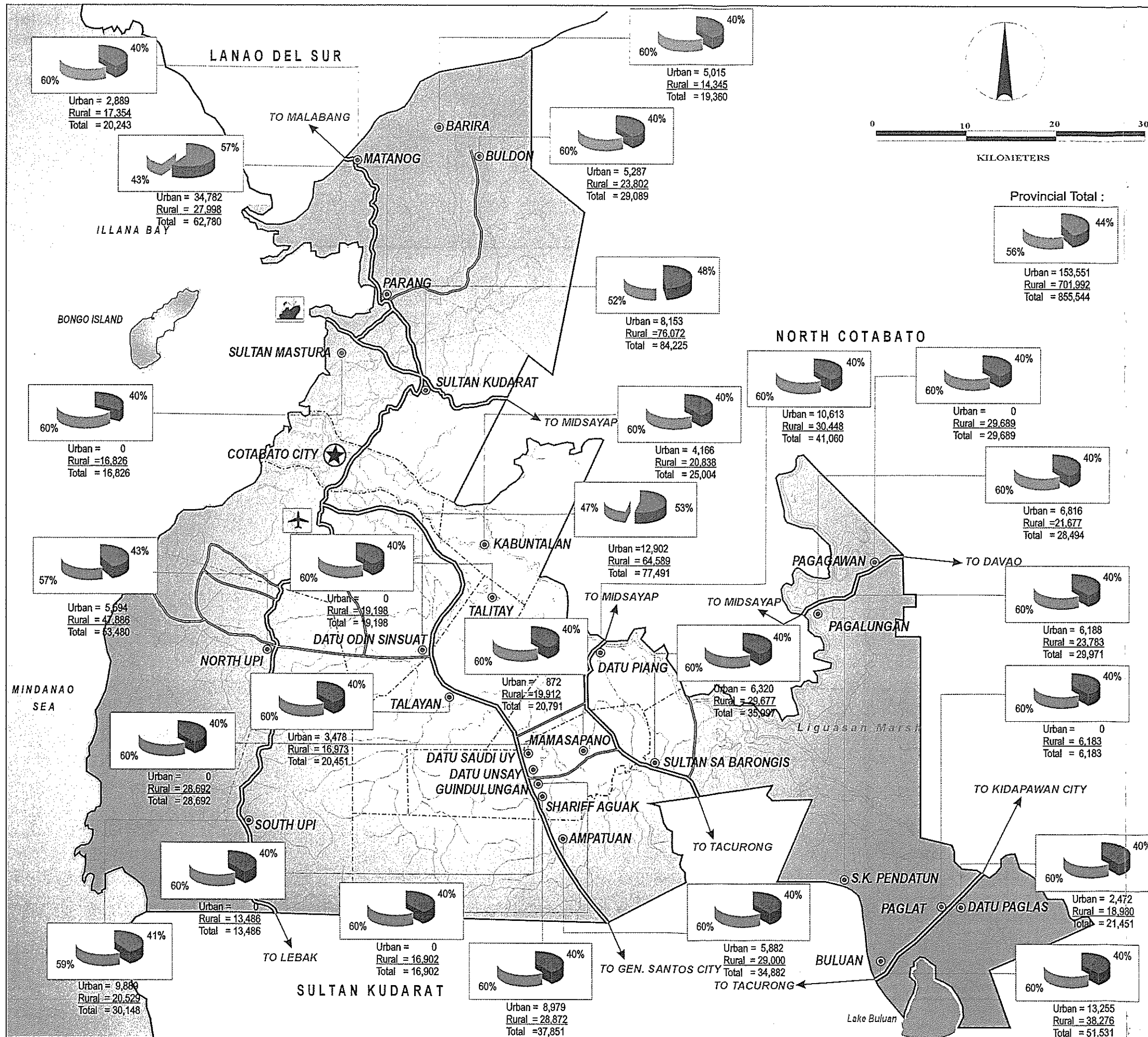


Figure 3-1
WATER SUPPLY FACILITIES
BASE YEAR (2003) COVERAGE
MAGUINDANAO

3.2 Sanitation

3.2.1 General

The present sanitation conditions of the municipalities were also assessed to determine the present need and to integrate measures with the water supply. The key to sanitation is water. That is why in the areas visited, the common problem to sanitation is lack of potable water. One gateway to progress of the municipality basically rely on the cleanliness of the community.

3.2.2 Types of Facilities and Definition of Service Level Standard

The household toilets are categorized into two types: sanitary and unsanitary toilets. Sanitary toilets are defined as approved, water sealed toilets that can be flush type or pour-flush type with receiving pit or septic tanks, or septic vault, with ventilation. The unsanitary toilets include the types of facilities used for disposing human waste, which do not fall under the category of the approved type.

3.2.3 Sanitation Facilities and Service Coverage

From our field investigation, there are 15 out of 26 municipalities who have provided data on the present sanitation condition of the households of their towns. From the data of the 15 towns, the computed average households with sanitary toilets are about 48% of the present households. For the towns with no data provided such as: Barira, Buldon, Buluan, Datu Paglas, Guindulungan, Kabuntalan, Mamasapano, Matanog, Paglat, Talayan, and Upi, the average figure computed from the towns with data was used in calculating their present households sanitation condition. This figure clearly demonstrates that the province needs to improve the sanitation facilities of the locality. It can be seen in the table below that other towns have a higher percentage of coverage in sanitary toilets but with lower percentage coverage in the water supply facilities. This is possible in this province because they have a type 4 climate where rainfall is more or less evenly distributed through out the year. Households with no water facilities may depend on the rainwater for domestic use.

The data on the present sanitation facilities of public schools of each municipality were taken from the Provincial Economic Profile book where the number of public schools and its sanitation facilities were presented.

0

0

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From the data gathered from each town and interviews with the residents in the province, almost all public utilities have toilets in their market area except for the town of Talitay, which has none. Table 3-6 shows the number of existing sanitation facilities of households, public schools and public toilets. Figure 3-2 shows the 2003 base year coverage of sanitation facilities.

Table 3-6 Existing Sanitation Facilities of Maguindanao

Municipality	Type	2003		Served Pop	Households with Sanitary Toilet		Public School Toilets (2003)			Public Utilities (2003)		
		Population	Ho. of HH		No. of HH	Cove- rage	Total Public Schools	No with toilets	Cove- rage	Total Public Utilities	No. with toilets	Cove- rage
1 Ampatuan	Urban	5,882	1,154	4,304	844	12%	21	21	100%	2	2	100%
	Rural	29,000	5,687	21,221	4,161	61%						
	Total	34,882	6,840	25,525	5,005	73%						
2 Barira	Urban	5,015	912	2,412	439	12%	19	1	5%	1	1	100%
	Rural	14,345	2,608	6,900	1,254	36%						
	Total	19,360	3,519	9,312	1,693	48%						
3 Buldon	Urban	5,287	944	2,543	454	9%	24	24	100%	1	1	100%
	Rural	23,802	4,248	11,448	2,043	39%						
	Total	29,089	5,192	13,992	2,497	48%						
4 Buluan	Urban	13,255	2,465	6,375	1,185	12%	17	3	18%	1	1	100%
	Rural	38,276	7,117	18,411	3,423	36%						
	Total	51,531	9,581	24,786	4,609	48%						
5 Datu Odin Sinsuat	Urban	12,902	2,392	9,031	1,675	12%	40	40	100%	4	4	100%
	Rural	64,589	11,976	45,212	8,383	58%						
	Total	77,491	14,368	54,243	10,058	70%						
6 Datu Paglas	Urban	2,472	454	1,189	218	6%	16	16	100%	3	3	100%
	Rural	18,980	3,483	9,129	1,675	43%						
	Total	21,451	3,937	10,318	1,894	48%						
7 Datu Piang	Urban	10,613	1,702	7,323	1,174	18%	13	13	100%	2	2	100%
	Rural	30,448	4,883	21,009	3,369	51%						
	Total	41,060	6,585	28,332	4,543	69%						
8 Datu Saudi	Urban	0	0	0	0	0%	12	12	100%	1	1	100%
	Rural	28,880	4,631	19,927	3,196	69%						
	Total	28,880	4,631	19,927	3,196	69%						
9 Datu Unsay	Urban	0	0	0	0	0%	3	3	100%	1	1	100%
	Rural	13,486	2,198	2,967	484	22%						
	Total	13,486	2,198	2,967	484	22%						
10 Gen. S. K. Pendatun	Urban	6,188	985	1,609	256	5%	15	15	100%	1	1	100%
	Rural	23,783	3,785	6,184	984	21%						
	Total	29,971	4,769	7,793	1,240	26%						
11 Guindulungan	Urban	0	0	0	0	0%	5	2	40%	1	1	100%
	Rural	13,440	2,261	6,465	1,087	48%						
	Total	13,440	2,261	6,465	1,087	48%						
12 Kabuntalan	Urban	4,166	760	2,004	366	8%	20	14	70%	1	1	100%
	Rural	20,838	3,803	10,023	1,829	40%						
	Total	25,004	4,564	12,027	2,195	48%						

Table 3-6 Existing Sanitation Facilities of Maguindanao (Cont.)

Municipality	Type	2003		Served Pop	Households with Sanitary Toilet		Public School Toilets (2003)			Public Utilities (2003)		
		Population	Ho. of HH		No. of HH	Cove- rage	Total Public Schools	No with toilets	Cove- rage	Total Public Utilities	No. with toilets	Cove- rage
13 Mamasapano	Urban	872	129	419	62	2%	9	7	78%	1	1	100%
	Rural	19,919	2,943	9,581	1,416	46%						
	Total	20,791	3,072	10,000	1,478	48%						
14 Matanog	Urban	2,889	475	1,390	228	7%	21	11	52%	1	1	100%
	Rural	17,354	2,853	8,347	1,372	41%						
	Total	20,243	3,328	9,737	1,601	48%						
15 Pagagawan	Urban	0	0	0	0	0%	13	13	100%	1	1	100%
	Rural	29,689	6,008	14,251	2,884	48%						
	Total	29,689	6,008	14,251	2,884	48%						
16 Pagalungan	Urban	6,816	1,241	682	124	2%	12	12	100%	1	1	100%
	Rural	21,677	3,945	2,168	395	8%						
	Total	28,494	5,186	2,849	519	10%						
17 Paglat	Urban	0	0	0	0	0%	0	0	0%	1	1	100%
	Rural	6,183	1,064	2,974	512	48%						
	Total	6,183	1,064	2,974	512	48%						
18 Parang	Urban	34,782	6,508	30,608	5,727	49%	31	31	100%	1	1	100%
	Rural	27,998	5,239	24,638	4,610	39%						
	Total	62,780	11,747	55,246	10,338	88%						
19 Shariff Aguak	Urban	8,979	1,463	1,975	322	5%	13	13	100%	1	1	100%
	Rural	28,872	4,706	6,352	1,035	17%						
	Total	37,851	6,169	8,327	1,357	22%						
20 South Upi	Urban	9,889	1,941	4,153	815	14%	32	5	16%	1	1	100%
	Rural	20,529	4,030	8,622	1,693	28%						
	Total	30,418	5,971	12,776	2,508	42%						
21 Sultan Kudarat	Urban	8,153	1,461	2,446	438	3%	31	31	100%	1	1	100%
	Rural	76,072	13,630	22,822	4,089	27%						
	Total	84,225	15,090	25,268	4,527	30%						
22 Sultan Mastura	Urban	0	0	0	0	0%	9	9	100%	1	1	100%
	Rural	16,826	3,015	5,048	904	30%						
	Total	16,826	3,015	5,048	904	30%						
23 Sultan Sa Barongis	Urban	6,320	1,170	316	59	1%	20	15	75%	1	1	100%
	Rural	29,677	5,494	1,484	275	4%						
	Total	35,997	6,664	1,800	333	5%						
24 Talayan	Urban	3,478	585	1,673	281	8%	5	3	60%	1	1	100%
	Rural	16,973	2,855	8,164	1,373	40%						
	Total	20,451	3,440	9,837	1,655	48%						
25 Talitay	Urban	0	0	0	0	0%	11	1	9%	1	0	0%
	Rural	19,198	3,145	8,255	1,352	43%						
	Total	19,198	3,145	8,255	1,352	43%						
26 Upi	Urban	5,594	1,091	2,691	525	5%	53	53	100%	1	1	100%
	Rural	47,886	9,340	23,033	4,493	43%						
	Total	53,480	10,431	25,724	5,017	48%						
Provincial Total	Urban	153,551	27,831	83,144	15,193	10%	465	368	79%	33	32	97%
	Rural	698,718	124,947	324,633	58,293	38%						
	Total	852,270	152,778	407,777	73,486	48%						

* The data provided for the existing school and public utilities are total number of units. To where barangays these facilities are located was not stated.

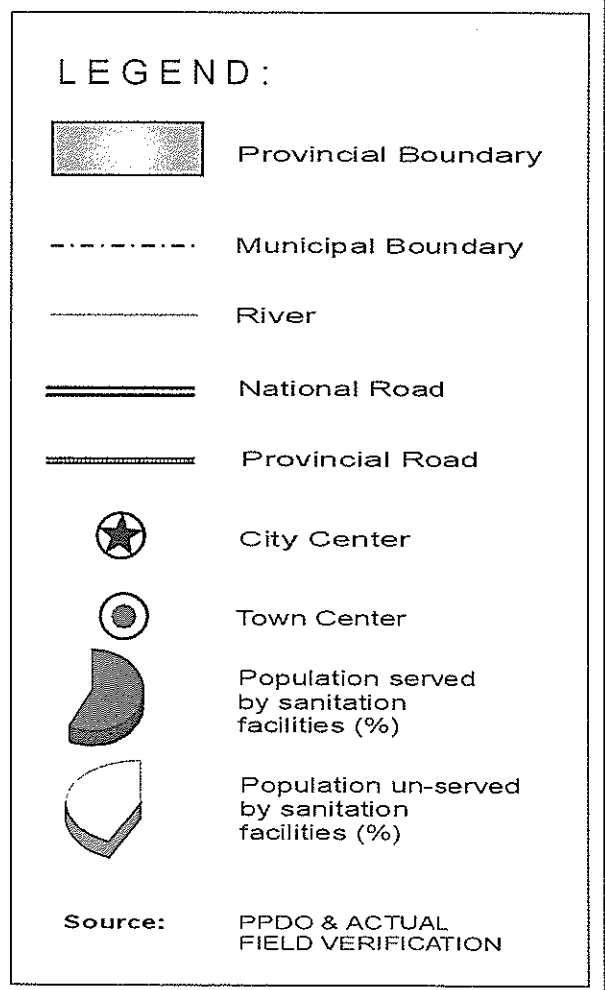
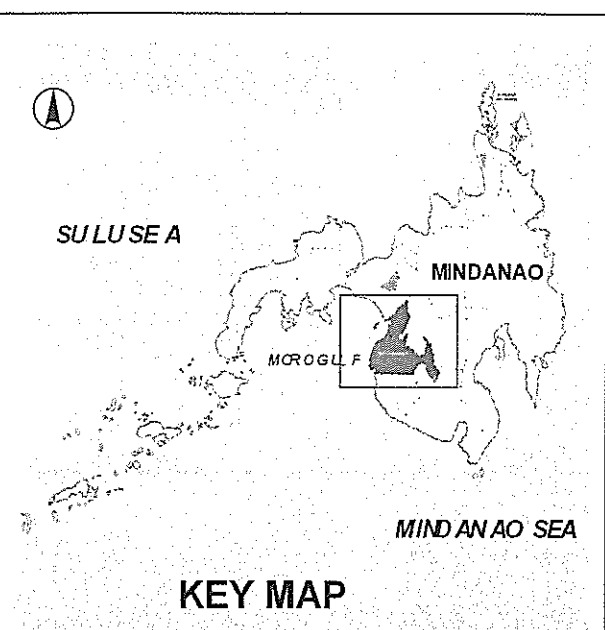
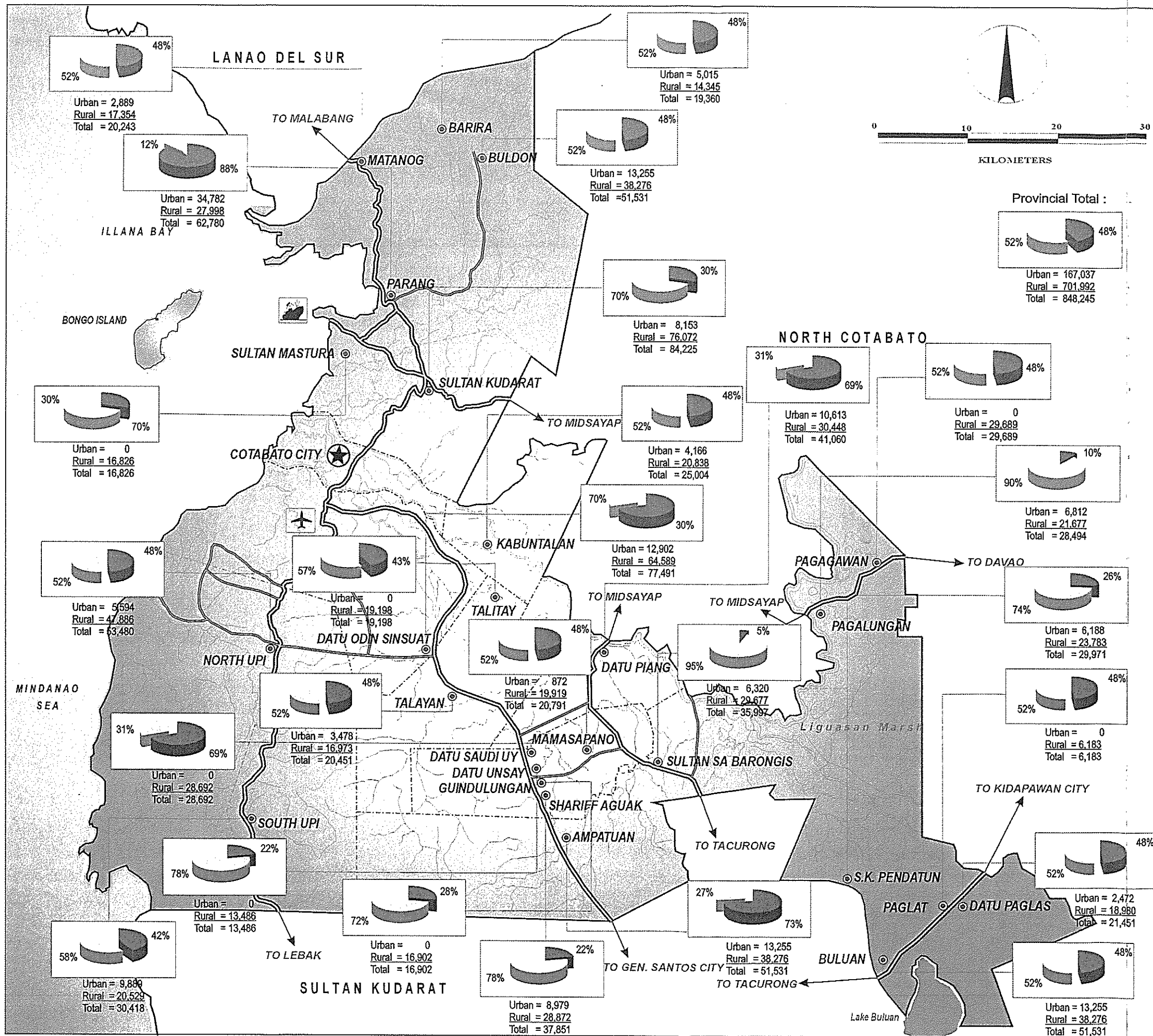


Figure 3-2
SANITATION FACILITIES
BASE YEAR (2003)
COVERAGE
MAGUINDANAO