

5. EXISTING SECTOR ARRANGEMENT AND INSTITUTIONAL CAPACITY
 5.5 Sector Agencies at the Local Level

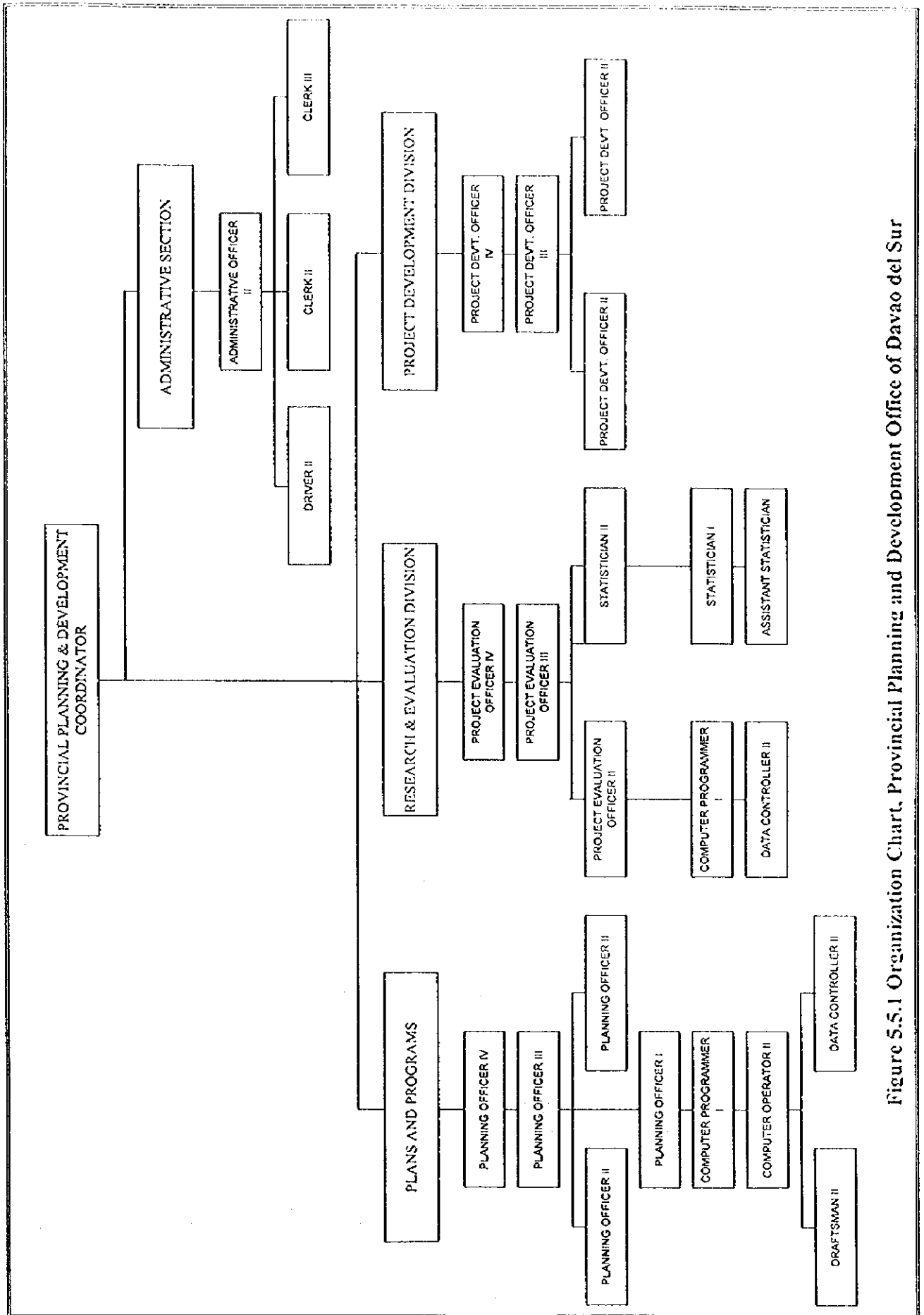


Figure 5.5.1 Organization Chart, Provincial Planning and Development Office of Davao del Sur

5.6 External Support Agencies in the Sector

Table 5.6.1
Priority Areas/Terms and Conditions, Programs and Projects by Donor

Donor	Priority Areas/Terms and Conditions	Programs and Projects in the Sector/Executing Agency
OECD	Providing project loans for <i>capital infrastructure (urban/rural), agricultural development, export promotion</i> . Can finance 75% of total project cost of total foreign exchange component, whichever is higher. Interest Rate: 2 to 3%; 30-year amortization with 10-year grace period. Environmental projects, interest free.	Water Supply and Sanitation Project-23rd Yen Package/DILG; Co-financing AWSOP with World Bank and ADB/MWSS.
ADB	Providing both capital and technical assistance; Project loans: <i>agriculture, agri-industry, energy, social infra., transport and communications</i> ; Program Loans: <i>sector loans (e.g., forestry, livestock, environment)</i> . Can finance 60% of total project cost or 100% of foreign exchange cost whichever is higher. Special cases can finance up to 80% of total project cost. Terms: Interest rate- pool-based variable; commitment charge of 0.75% per annum; 25 years amortization period including 5-year grace period.	Rural Water Supply and Sanitation Sector Project/DPWH; Small Towns Water Supply Sector Project/LWUA; Technical Assistance for Water Supply and Sanitation Sector Study/NEDA; Co-financing AWSOP with World Bank and OECF/MWSS.
AUSAID	Providing grant aid for <i>education, training, development planning, resource management, environmental management, health/population, infrastructure (e.g. water supply, coal energy development), social infrastructure, community development and agriculture</i> ; providing also supplies of commodities (steer cattle, drilling).	Water supply program in Central Visayas/RDCs and LGUs; Feasibility Study for Northern Mindanao Water and Sanitation Project.
DANIDA	Providing capital and technical assistance for <i>water supply and sanitation services and facilities, telecom ancillary equipment, small-scale power projects, environmental project, fishery and cold storage and post-harvest facilities</i> ; Can finance up to 100% of foreign exchange goods and services of Danish origin, 10% local cost on a case-to-case basis. Technical assistance can be negotiated for conduct of feasibility studies if implementation of the project will require Danish financing in the future.	Water supply projects for 10 towns/LWUA; Feasibility Study for control of pollution in the Pasig River-Metro Manila; Water Supply and Sanitation Data Bank.
Government of France	Grants for feasibility studies and detailed design for projects in priority areas, e.g., <i>power generation, telecommunication, research involving high technology, water supply, air navigational equipment, etc.</i> Can finance 100% of foreign exchange costs of goods and services of French origin.	Feasibility Study for water supply project in Rizal province.

Donor	Priority Areas/Terms and Conditions	Programs and Projects in the Sector/Executing Agency
German Agency for Technical Cooperation (GTZ)	Providing grants for technical assistance. Promotion of small and medium-scale industries, rural development, technical training, health/family planning, and environmental protection (forest management).	Water Supply for 20 Towns/LWUA; a national water supply and sanitation on-going program; special TA programs for cost recovery, monitoring and evaluation.
JICA	Providing a combination of capital assistance thru grant-aid and technical assistance thru Technical Cooperation for development survey and project type assistance which is a combination of experts, equipment and training. Technical assistance for conduct of feasibility studies/master plans, provision of training, limited provision of equipment. Capital assistance for provision of equipment/materials for construction of hospitals, schools, research, social welfare centers. Priority areas include basic infrastructure, e.g., construction of facilities and supply of equipment; project development for sectors dealing with basic services (agriculture, health public welfare, environment) and human resource development (education, research, training). Can finance 100% of foreign exchange costs of civil works, equipment, training (in Japan) and of all goods and services of Japanese origin.	Groundwater study in Manila; Feasibility Study for Balara Water Treatment Plant; Feasibility Study.
UNDP	Providing technical assistance for capacity building, human resource training, technology transfer, policy research, planning, technology development and pre-investment studies; Technical assistance are formulated within country program (CP) frameworks: 6th CP (1997-2001) -poverty and sustainable livelihood, protection and regeneration of the environment and sound governance, gender equality.	WATSAN Program for LGUs and selected BWSAs/DILG.
UNICEF	Providing grant aids for technical assistance. Priority area: social services, particularly for children.	Community-based water supply program in Palawan Province; Water supply and sanitation Study for Southern Mindanao.
USAID	Providing grant aid within its strategic objectives. Six strategic objectives and one special objectives are: Accelerate the economic transformation of Mindanao; Improve national systems for trade and investment; Reduce population growth and improve maternal and child health; Enhance management of renewable national resources; reduce emissions of greenhouse gas; broaden participation in public formulation/implementation (selected areas); prevent rapid increase of HIV/AIDS.	Barangay Water Program (BWP) for communities with populations of less than 10,000; TA for private sector participation in the sector.
World Bank	Providing capital assistance in the form of under IBRD and IDA. IBRD (Project/Program) Loans: Interest rate = less than 7%; 20 years amortization with 5 years grace period; IDA Loans: interest free with 30 to 40-year amortization period. Providing also technical assistance in the form of ESF, IDI, Poverty and Human Resource Development Project Preparation and Policy Notes. Can finance 100% of foreign exchange costs of the project. Priority areas: power and energy, roads and railways, telecommunications, ports, water supply and sanitation, agriculture and social services.	AWSOP co-financed with ADB and OECF/MWSS; TA for a Water Supply Sector Program Study/DILG; TA on private sector participation in the water supply and sanitation sector; Water Districts Development Project.

5.7 Project Management Arrangement, and Issues and Problems
 5.7.2 Institutional Aspect

Table 5.7.1 Office/Agencies involved in WATSAN project

Office/Agencies	Nature of Involvement
Provincial Engineering Office	Assists in the construction, operation and maintenance of the WATSAN facilities
Provincial Health Office	Conducts water quality examination Provides toilet facilities
DILG, Provincial Office	Assists in monitoring activities of the projects
Barangay/Municipal governments thru MPDO	Identifies projects Provides counterpart support during implementation
District Engineering Offices I & II, DPWH Water Districts	Provides pipes Implements central govt. funded projects Provides water supply coverage in urban areas
CIDA-PMO Regional Office	Provides technical and financial assistance through its Local Govt. Support Program
Provincial General Services Office	Responsible in procurement of materials
Provincial Accounting and Audit Office, Provincial Budget Office & Provincial Treasury Office	Responsible in financial releases
NGOs	Provides consultancy services especially in the bidding and monitoring activities
Sangguniang Panlalawigan	Appropriates funds

5.8 Community Development

5.8.1 General

(I) RESULT OF THE BARANGAY KEY INFORMANT SURVEY FOR DAVAO DEL SUR

I. BARANGAY

A. General

The barangay is the smallest political unit in the Philippines. It is headed by a barangay captain who is elected for a three-year term. Together with the barangay council, the barangay captain is responsible for running the affairs of the barangay. Water supply and sanitation sector projects are important to the barangay. Benefits are directly related to health and productivity, as well to improved economic activities in the community.

The key survey was conducted in five barangays representing three municipalities in Davao Sur. The key informants were either an official of the barangay council, an official of the BWSA, or a recognized community leader. The purpose of the survey was to find out the degree and type of government assistance on the sector that cascades from the national government down to the barangay level. The barangays surveyed were: Cogon, Colorado and Zone II in the capital town of Digos; San Isidro in the municipality of Padada; and, Balutakay in Hagonoy.

B. Community Organization

1. Manner of Participation in Sector Development

The need for water supply and sanitation facilities is discussed within and prioritized by the barangay development council (BDC). If the barangay is not able to finance the WATSAN project from its own funds, the BDC then endorses the project to the municipality. Again, the prioritization and funding of the endorsed project is discussed in the municipal development council (MDC). If the municipality can finance said project, then it does so, usually by providing technical and material support. The barangay is asked to contribute its share, which is usually in the form of free labor. If, however, the municipality cannot fund the barangay's request, the project is once again endorsed, but this time to the province. The project is then discussed/prioritized and provided funding

by the provincial development council. If implemented by the province, a counterpart is asked of the barangay and sector participation is in the form of free labor and/or donations in cash or in kind.

2. Existing Community Organization Serving /Acting as the Water Association

The BWSA is still the WATSAN organization that serves the community. None of the barangays was able to identify any community-based organization that could act as a water association, aside from the BWSA.

3. Role of the Barangay Council in O&M Assistance in the Form of Funds/ Manpower/Materials

Of the three BWSAs that have been organized, one depended on the barangay council for operation and maintenance assistance because its water users do not have training on O&M. The other two BWSAs had association members who have been trained to operate and maintain the facilities

II. COMMUNITY PARTICIPATION

A. General

Beneficiaries' participation is recognized as one of the determining factors in the success of the WATSAN sector plans on the community level. Participation by the barangay people is measured by their willingness to organize themselves into a water association and contribute their share towards its sustained operation. This may come in the form of free labor, donations in kind or in cash, or their active involvement in the management, operation and maintenance of the WATSAN facilities.

B. Socio-Economic Conditions

1. Average Monthly Income in the Rural Area

The average monthly income of the households in the barangays surveyed range from ₱2,000.00 to ₱4,000.00. The list of economic activities shows the following: livestock, farming, vegetable gardening, sari-sari-store, poultry raising and fishing. The list shows both genders equally involved in these economic activities.

2. Water Borne/Water Related Diseases

Incidences of water borne and water related diseases were reported in all the barangays surveyed. This could be traced to unsafe sources of supply, especially in the barangays where BWSAs are no longer in operation or in fringe areas not presently served by the BWSA facilities.

C. Willingness to Participate

1. Initiating the Organization of a WATSAN Association

Only one out of the five barangays surveyed does not have a committee on water and sanitation. In spite of this, all the respondents indicated the barangay council's willingness to participate in sector projects by initiating the formation of a water and sanitation association in their communities. A big majority also indicated that the barangay council is willing to pay for the training for the user-beneficiary volunteers on O&M. In the area of health and sanitation education, the majority also believed that the barangay council has the capability to implement information dissemination activities.

D. Status of BWSAs/NGOs/CBOs/POs

1. Number of Barangays with Functional BWSAs

Three out of five barangays surveyed have a BWSA organized in their communities. Of these, only two barangays have functional BWSAs.

2. Status of NGOs/CBOs/POs

Majority of the respondents reported having NGOs/CBOs that do work in their respective barangays. The areas of concern are in cooperative development, livelihood, peace and order, and agriculture. Those specifically related to sector needs are: (1) BASTEC Cooperative (headed by Mr. F. Ladores, Jr.) that specializes in livelihood and agriculture; (2) Rural Improvement Club (headed by Ms. Fe Ladores) which is active in community development; and (3) Cogon Women's Integrated Cooperative (headed by Mrs. Elsie Dagoy) also for livelihood.

E. O&M Practices by Beneficiaries

1. Facility Conditions

The barangays are supplied with water from a combination of sources: shallow wells and deep wells. A few residents of San Isidro (Padada) also depend on rainwater. All respondents, except three female respondents from San Isidro reported that there are water supply facilities constructed in the barangays. Most of these facilities are still functional but occasionally have problems. Most, however, believe that water is safe for drinking. The systems in San Isidro are not functional because of too much saltwater intrusion.

2. Common Difficulties and O&M Problems Encountered

Common problems cited by the respondents range from defective pumps, to no funds for maintenance work, lack of financial support, salt water intrusion, wells drying up and rusty, foul smelling water. The problems show that the users/beneficiaries still have the thinking that O&M is a task that belongs to others such as the barangay council or the municipality. Prevalent is also the dole-out mentality; where the people just wait for O&M funds rather than generating this through water fees.

F. Water Charges Adopted and Collection Efficiency

1. Sufficiency of Collected Charges for O&M

Majority of key informants believes that fees charged are sufficient to cover for the operation and maintenance of the WATSAN facilities. The users in five barangays were reported to be paying their water fee. Female respondents are could not determine whether water users pay water dues.

2. Current Practices with Affordability by Users and Manner of Fee Collection

The BWSA treasurer was responsible for collecting the fees in two barangays, the purok leader in one barangay and the water district in one of the barangays. No one was identified to collect the fees in one barangay surveyed. The cost of water as determined by most of the respondents varied as follows: Below P10.00, three respondents; between P10.00-20.00, three respondents; between P21.00-30.00, one respondent; between

P31.00-40.00, five respondents; between P41.00-50.00, two respondents; above P50.00, seven respondents. Three respondents could not determine the cost of water.

G. Requests by the Beneficiaries on O&M of the Facilities from LGUs and other Sources

1. Government Subsidies Requested by End Users

Four barangays were recipients of technical, institutional and financial assistance from the provincial government. The amounts of financial assistance ranged from P50,000.00 to P600,000.00 for the years 1996-1997. Technical assistance was in the form of pipes and pumps; while institutional was by BWSA formation and trainings. The biggest financial assistance came from CDF funds.

III. GENDER

A. General

The importance placed on gender is still something new in the province. The survey results point to growing responsiveness to sector projects, with an increasing awareness as to why there must be gender equality.

B. Gender in the Composition of the Barangay Council

In the five barangays surveyed, the total number of barangay council members is 40. Of this number, 29 were males and 11 females. The barangay councils are still male-dominated although in one barangay, the women outnumbered men in the composition of the council, 5-3, including the barangay captain.

C. Gender in the Composition of the BWSA

Only two barangays identified the composition of their BWSA board, which is also male-dominated. Of the 14 BWSA board members identified, 10 are male and 4 females. To the women members were reserved the traditional roles, such as that of secretary or treasurer of the board.

D. Gender in Participation in the O&M of the Water Facilities

The men believe that they participate more in the management and O&M of the water facilities. On the other hand, the women almost overwhelmingly indicated that they also participate in operating and maintaining the WATSAN facilities. The men stated their functions as: (1) officer of the BWSA, (2); managing the association; (3) billing and collection; and (4) maintaining the cleanliness of the facilities. The women stated their functions as: (1) maintaining the surroundings of the facilities; (2) monitoring if the facility is defective; and (3) information dissemination.

E. Gender in Knowledge or Awareness of Sector Related Information

There is no gender bias when it came to awareness of sector related information. Both women and men were knowledgeable as seen from the answers to questions such as assistance extended by LGUs, facility conditions, O&M practices, and the status of BWSA.

(2) RESULT OF GROUP INTERVIEW (DAVAO DEL SUR)

1.1 General

A group interview was conducted in two selected barangays representing two municipalities in the province of Davao del Sur. The objectives of the group survey/interviews were to identify potential service population and service level desired by the community, to assess the degree of involvement of both men and women in planning, managing, operating and maintaining WATSAN projects, and the willingness and capacity to pay of potential users.

The Project Team conducted the interviews on two sets of interviewees: an all female group and an all male group, each consisting of a minimum of 10 and a maximum of 20 participants. None of the respondents belonged to the same household. Answers to interview questionnaires were made by raising of hands. The group interviews were conducted in Barangay Balutakay (Hagonoy) and San Isidro (Padada).

1.2 Demographic Profile

(1) Population

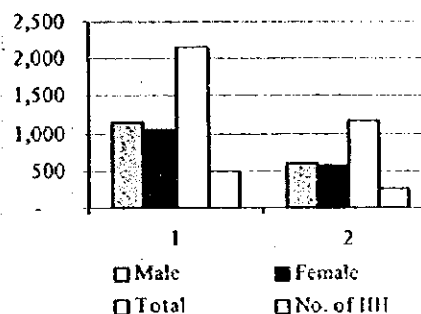
The aggregate population in two barangays totaled 3,342, breakdown of which follows: Balutakay, 2,169 (1,134 males, 1,035 females); and San Isidro, 1,173 (590 males, 510 females). Males outnumbered females, comprising 51.60 percent (1,724) of the total population.

(2) Households

As indicated by the respondents, there were 744 households in the two barangays. Breakdown per barangay follows: Balutakay, 491; and San Isidro, 253. Considering the total population, the figure represents an average of 4.5 members per household.

TABLE 1: TOTAL POPULATION OF BARANGAYS AND NUMBER OF HOUSEHOLDS

BARANGAY (MUNICIPALITY)	M	F	T	NO. OF HH
1. Balutakay (Hagonoy)	1,134	1,035	2,169	491
2. San Isidro (Padada)	590	583	1,173	253
TOTAL	1,724	1,618	3,342	744



(3) Composition of Barangay Councils

As stated by the respondents, total number of members of the barangay councils in two barangays was 19. Of the barangay council members, nine were males and 10 were females. All barangay captains were males.

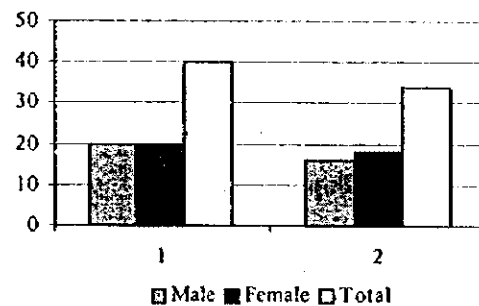
1.3 Respondents' Profile

(1) Number and Gender of Respondents

There were 74 respondents that participated in the group interviews. Of these, 36 or 48.65 percent are males and 38, or 51.35 percent are females.

TABLE 2: NUMBER OF RESPONDENTS

BARANGAY (MUNICIPALITY)	M	F	T
1. Balutakay (Hagonoy)	20	20	40
2. San Isidro (Padada)	16	18	34
TOTAL	36 (48.65%)	38 (51.35%)	74

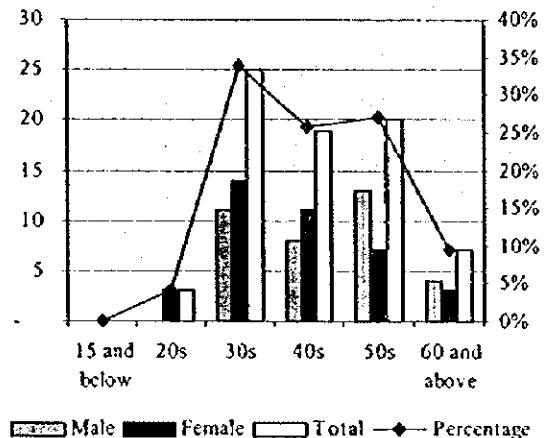


(2) Age Bracket

The majority, or 25 respondents, belonged to 30s age bracket, with females outnumbering males, 14 to 11. A total of 20, or 13 males and 7 females were under the 50s age bracket, while 19 respondents, or 8 males and 11 females belonged to 40s age bracket. Four males and three females, or a total of seven respondents belonged to the 60 and above age bracket.

TABLE 3: AGES OF THE RESPONDENTS

AGE BRACKET	M	F	T	%
15 and below	-	-	-	-
20s	-	3	3	4.05
30s	11	14	25	33.80
40s	8	11	19	25.70
50s	13	7	20	27.00
60 and above	4	3	7	9.45
TOTAL	36	38	74	100.00

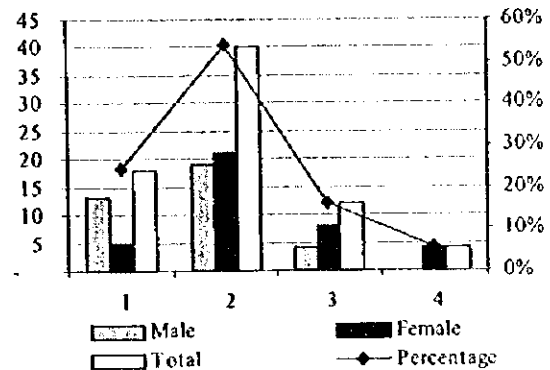


(3) Level of Education

Most of the respondents, or 40 of them completed high school level of education. Eighteen were elementary graduates. A total of 12 attended college education. Only four respondents took and completed vocational course.

TABLE 4: RESPONDENTS' LEVEL OF EDUCATION

EDUCATIONAL LEVEL	M	F	T	%
1. Elementary	13	5	18	24.32
2. High School	19	21	40	54.05
3. College	4	8	12	16.22
4. Vocational	-	4	4	5.41
TOTAL.	36	38	74	100.00

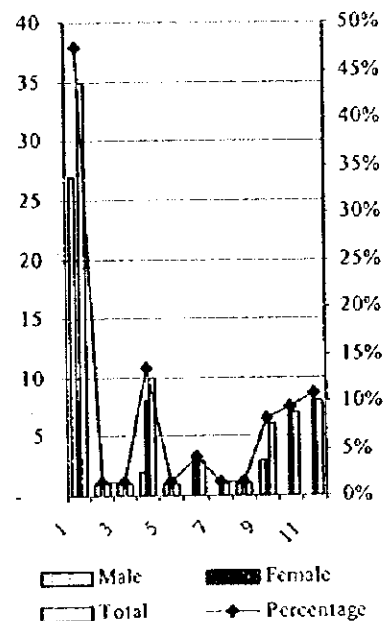


(4) Occupation

The majority of the respondents, or 35 of them were engaged in either farming or fishing. The males outnumbered the females in this work category, 27 to 8. Other occupations of the respondents included: vendors/carpenters/dressmakers (3 males, 3 females); business (2 males, 8 females), professional, 3 females; laborer, office worker, technician, equipment operator, and service worker.

TABLE 5: OCCUPATION OF RESPONDENTS

OCCUPATION	M	F	T	%
1. Farmer/Fisherfolk	27	8	35	47.30
2. Laborer	1	-	1	1.35
3. Service Worker	1	-	1	1.35
4. Businessman/woman	2	8	10	13.50
5. Technician	1	-	1	1.35
6. Professional	-	3	3	4.05
7. Office Workers	-	1	1	1.35
8. Equipment Operator	1	-	1	1.35
9. Vendor/Carpenter/Dressmakers	3	3	6	8.10
10. Others	-	7	7	9.50
11. No Response	-	8	8	10.80
TOTAL.	36	38	74	100.00



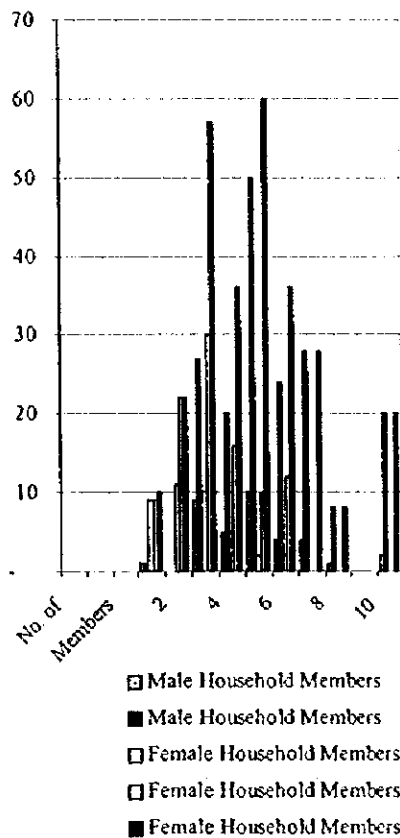
1.4 Socio Economic Profile

(1) Number of Household Members

As indicated by the respondents, total household members were 277. Males outnumber females in the respondents' households. There were 178 or 64.25% males while there are 99 or 35.75% females. The figures represent an average of four members per household.

TABLE 6: NUMBER OF HOUSEHOLD MEMBERS

NO. OF HH MEMBERS	MALE HOUSEHOLD MEMBERS		FEMALE HOUSEHOLD MEMBERS		TOTAL HOUSEHOLD MEMBERS
	NO. OF RESPONDENTS	TOTAL MALE HH MEMBERS	NO. OF RESPONDENTS	TOTAL FEMALE HH MEMBERS	
1	1	1	9	9	10
2	-	-	11	22	22
3	9	27	10	30	57
4	5	20	4	16	36
5	10	50	2	10	60
6	4	24	2	12	36
7	4	28	-	-	28
8	1	8	-	-	8
9	-	-	-	-	-
10	2	20	-	-	20
TOTAL	36	178 (64.25%)	38	99 (35.75%)	277 (100%)

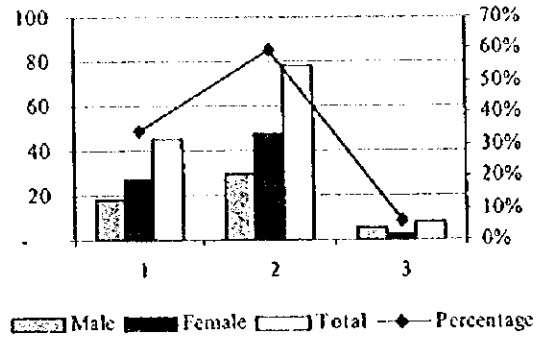


(2) Ages of Household Members

As pointed out by most respondents, majority of the household members belonged to the 15-60 age bracket. Female household members outnumber male members in this age bracket. The 15 and below age level was the second largest age group with while the 60 and above age group has the least number in it.

TABLE 7: AGES OF HH MEMBERS

AGES	M	F	T	%
15 and below	18	27	45	34.35
15-60	30	48	78	59.55
60 and above	5	3	8	6.10
TOTAL	53	78	131	100.00

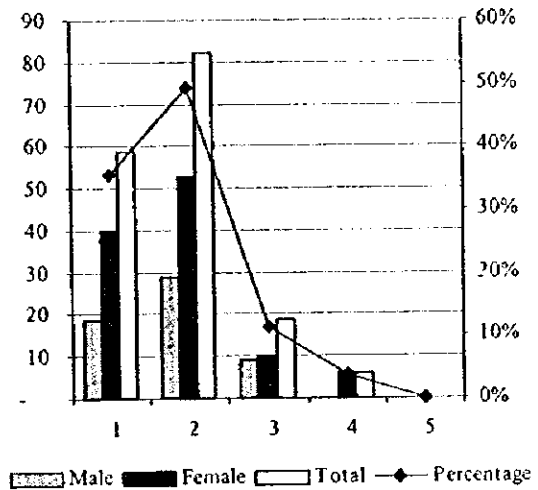


(3) Level of Education of Household Members

Out of the total household members, the respondents listed 166 members as having attained different levels of education. Just like the respondents themselves, the majority of their household members have reached high school education. On the other hand, a total of 59 members attained elementary education. Nineteen studied in college while six attended vocational training. Nobody pursued postgraduate education.

TABLE 8: LEVEL OF EDUCATION OF HH MEMBERS

EDUCATIONAL LEVEL	EDUCATED HOUSEHOLD MEMBERS			
	M	F	T	%
1. Elementary	19	40	59	35.55
2. High School	29	53	82	49.40
3. College	9	10	19	11.45
4. Vocational	-	6	6	3.60
5. Post Graduate	-	-	-	-
TOTAL	57	109	166	100.00

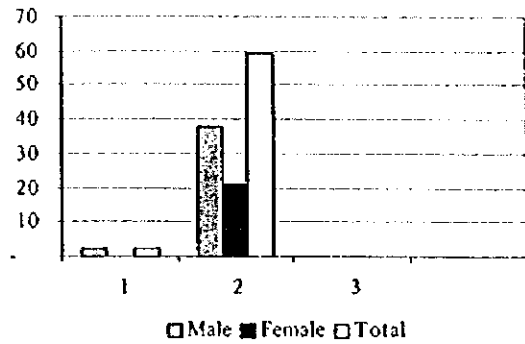


(4) Employed Household Members

There are only 61 among the respondents' household members who were gainfully employed or had a regular source of income. Employed men outnumbered working women, 40 to 21. The majority of these productive people belonged to the 15 to 60 age bracket with 38 males and 21 females, for a total of 59. On the other hand, only two males under the 15 and below age bracket had some form of employment

TABLE 9: EMPLOYED IHI MEMBERS

AGE BRACKET	M	F	T
15 and below	2	-	2
15-60	38	21	59
60 and above	-	-	-
TOTAL	40	21	61



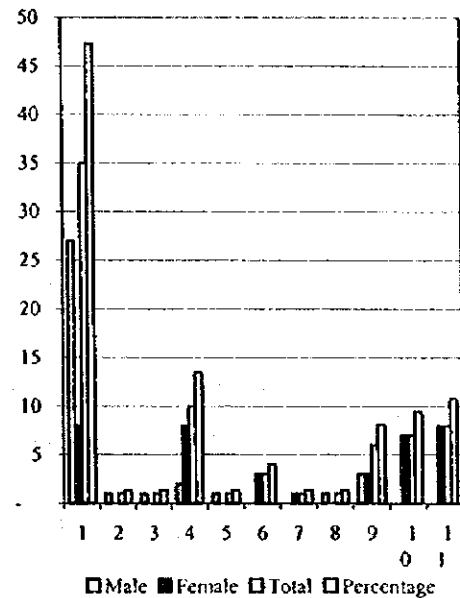
(5) Occupation of Household Heads and Other Members

The majority of the household heads and members (47.30%) were engaged in either farming or fishing where they derived income. The male household members constituted the majority of workers in this field. Those who were engaged in business were mostly females. Other household heads and members were either laborers, vendors, carpenters, dressmakers, technician, service workers and equipment operators or office workers.

Almost all of those who were gainfully employed earned an average monthly income of ₱5,000.00 and below. Eleven workers earned more than ₱5,000.00.

TABLE 10: OCCUPATION OF IHI MEMBERS

OCCUPATION	M	F	T	%
1. Farmer/Fisherfolk	27	8	35	47.30
2. Laborer	1	-	1	1.35
3. Service Worker	1	-	1	1.35
4. Businessman/woman	2	8	10	13.50
5. Technician	1	-	1	1.35
6. Professional	-	3	3	4.05
7. Office Worker	-	1	1	1.35
8. Equipment Operator/Welder	1	-	1	1.35
9. Vendor/Carpenter/Dressmaker	3	3	6	8.10
10. Others	-	7	7	9.50
11. No Response	-	8	8	10.80
TOTAL	36	38	74	100.00



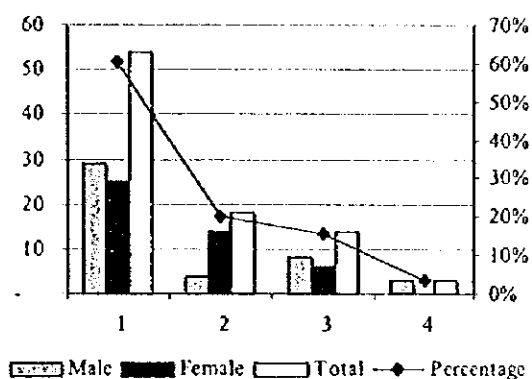
(6) Economic Activities

Aside from their regular source of income, household members engaged in other economic activities to augment their monthly income. The respondents listed three major livelihood projects that their family members were engaged with. These are

livestock/poultry raising, vegetable gardening and sari-sari store operation. As indicated by most of the respondents or 54, livestock/poultry raising was the main livelihood project of the people. According to the respondents, the men were more involved in economic activities than women. Vegetable gardening was the second most popular livelihood projects followed by sari-sari store operation. From these economic activities, almost all of the household members earned from ₱500.00 to ₱4,999.00. Fourteen members earned below ₱5,000.00 while four generated an income of between ₱5,000.00 to ₱9,999.99.

TABLE 11: ECONOMIC ACTIVITIES OF HH MEMBERS

ECONOMIC ACTIVITY	M	F	T	%
1. Livestock/Poultry	29	25	54	60.70
2. Vegetable/Gardening	4	14	18	20.20
3. Sari-Sari Store	8	6	14	15.70
4. No Response	3	-	3	3.40
TOTAL	44	45	89	100.00

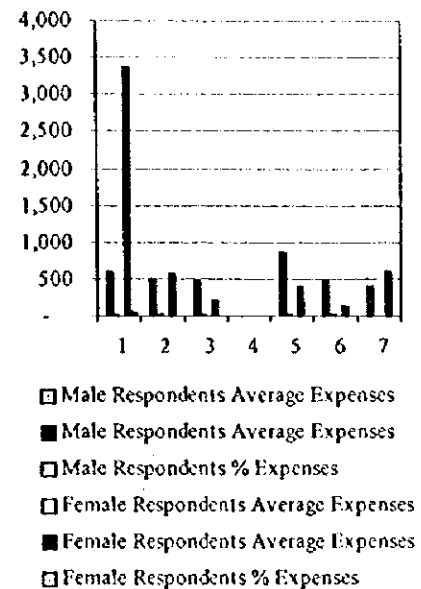


(7) Average Expenditures of Household

As indicated by the respondents, the average monthly expenditure of a family was ₱4,298.75. The female respondents indicated higher monthly expenditures at ₱5,286.50 as compared with the male respondents who placed it at ₱3,311.00. The men and women differed in priority expenditures. For female respondents, the biggest expenditure was allotted to food at ₱3,380.00, which is 63.95% of the total monthly expenditures. For men, it was education that was important, getting 26.40% or ₱875.00 of the total household expenditures. Food was only second priority for men. Both male and female respondents ranked water third in their monthly expenses, although the males water expenditures spent higher with 15.10% of the monthly expenses as compared to the females who only spent about 10.85% of their monthly budget. Both male and female interviewees did not spend for house rentals during the year. Expenses for clothing was not also included in the respondents' list of expenditures.

TABLE 12: AVERAGE EXPENDITURES OF III MEMBERS

EXPENDITURES	MALE RESPONDENTS		FEMALE RESPONDENTS	
	EXPEN-SES	%	EXPEN-SES	%
1. Food	P 612.50	18.50	P3,380.00	63.95
2. Water	500.00	15.10	573.00	10.85
3. Electricity/Fuel	472.50	14.30	203.50	3.85
4. House Rental	-	-	-	-
5. Education	875.00	26.40	404.00	7.65
6. Recreation	458.50	13.85	126.00	2.40
7. Others	392.50	11.85	600.00	11.35
TOTAL	P3,311.00	100.00	P5,286.50	100.00

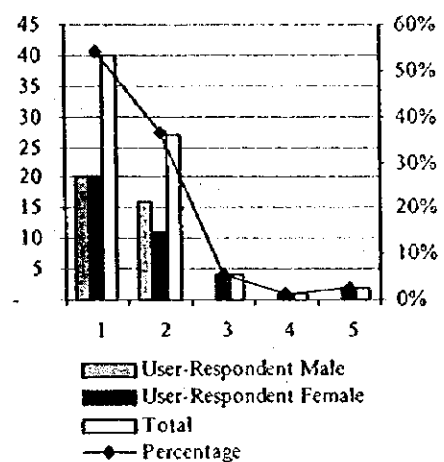


(8) Practices

Source of Drinking Water. The majority of the male and female respondents (40) indicated that the people get drinking water from communal free flowing wells. Other sources mentioned by the respondents as their sources of drinking water were: communal deepwell (27 respondents), level III system (4); rainwater catchment (1) and other sources (2).

TABLE 13: SOURCES OF DRINKING WATER

SOURCE	USER-RESPONDENT			
	M	F	T	%
1. Communal Free Flow Well	20	20	40	54.05
2. Communal Deepwell	16	11	27	36.50
3. Piped Water System	-	4	4	5.40
4. Rain Catchment	-	1	1	1.35
5. Others	-	2	2	2.70
TOTAL	36	38	74	100.00

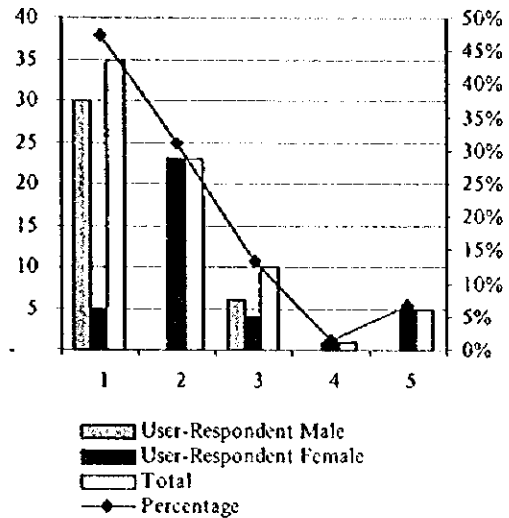


Responsible for Fetching Water. The majority of the male respondents, or 30 of them, said that the husband is still the one responsible for hauling drinking water for family use. However, the female respondents disagreed with them because for most of them, or 23, the wife is responsible for fetching water. Ten respondents, six males and four females, said

that male children handle this chore. As many as five female respondents were uncertain on this issue.

TABLE 14: RESPONSIBLE FOR FETCHING DRINKING WATER

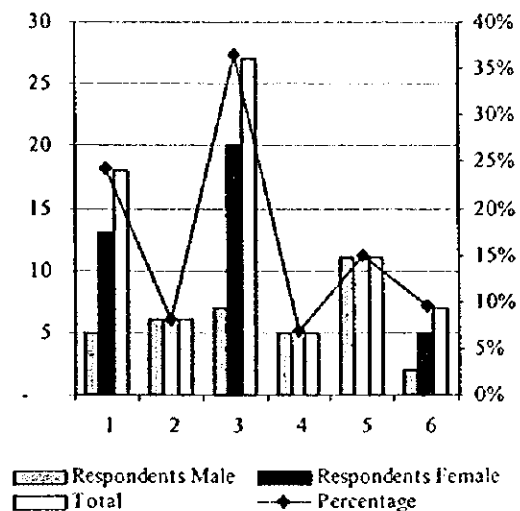
FAMILY MEMBER	USER-RESPONDENT		T	%
	M	F		
1. Husband	30	5	35	47.30
2. Wife	-	23	23	31.10
3. Male Children	6	4	10	13.50
4. Female Children	-	1	1	1.35
5. Uncertain	-	5	5	6.75
TOTAL	36	38	74	100.00



Frequency of Fetching Water. The majority of male respondents, or 11 indicated that families fetch drinking water more than four times a day. Most of the female respondents, or 20, however said that they haul water three times a day. Another 13 female and five male interviewees thought that it only takes once a day for the family to fetch drinking water. Seven respondents, two males and five females, did not reply on this topic.

TABLE 15: FREQUENCY OF FETCHING DRINKING WATER

FREQUENCY	RESPONDENTS		T	%
	M	F		
1. Once a Day	5	13	18	24.30
2. Twice a Day	6	-	6	8.10
3. 3x a Day	7	20	27	36.50
4. 4x a Day	5	-	5	6.75
5. More than 4x	11	-	11	14.85
6. No Response	2	5	7	9.50
TOTAL	36	38	74	100.00

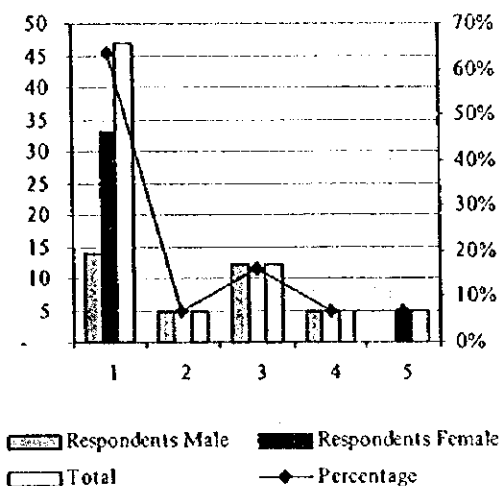


Duration of Fetching Water. For most of the respondents, 14 males and 33 females, it takes only about 10 minutes to fetch water from the source to their house. Twelve male

respondents indicated 30 minutes; while 5 male interviewees said 20 minutes and another five thought it takes more than 30 minutes. As many as five female participants did not respond to this question.

TABLE 16: DURATION FOR FETCHING DRINKING WATER

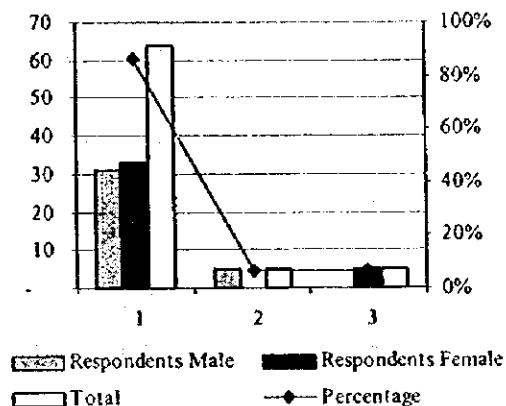
DURATION	RESPONDENTS		T	%
	M	F		
1. About 10 minutes	14	33	47	63.55
2. About 20 minutes	5	-	5	6.75
3. About 30 minutes	12	-	12	16.20
4. Over 30 minutes	5	-	5	6.75
5. No Response	-	5	5	6.75
TOTAL	36	38	74	100.00



Problems with Source. The majority (64) of the respondents, or 31 males and 33 females, admitted that they have problems with the current water source. Only five male interviewees said there is no problem. Five females respondents were uncertain on the issue.

TABLE 17: PROBLEMS WITH SOURCE OF WATER

RESPONSE	RESPONDENTS		T	%
	M	F		
1. There are Problems	31	33	64	86.50
2. No Problem	5	-	5	6.75
3. Uncertain	-	5	5	6.75
TOTAL	36	38	74	100.00



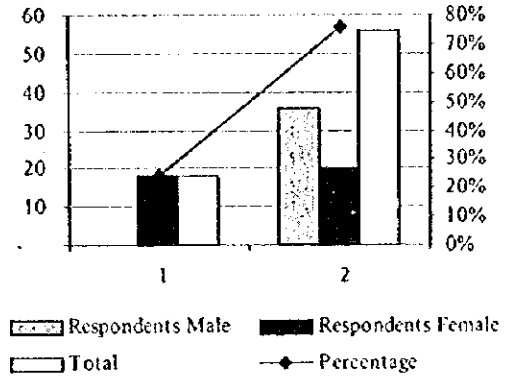
1.5 Institutional

(1) Presence of BWSA

All the male respondents and 20 female interviewees, said there was no BWSA in their barangay. On the other hand, the other 18 female respondents indicated that there is a BWSA in their communities.

TABLE 18: KNOWLEDGE OF THE EXISTENCE OF BWSA

RESPONSE	RESPONDENTS		T	%
	M	F		
1. Yes	-	18	18	24.30
2. No	36	20	56	75.70
TOTAL	36	38	74	100.00

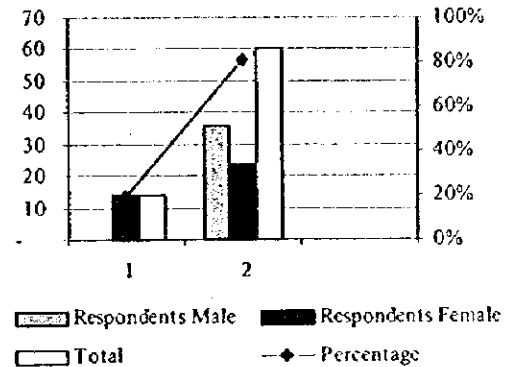


All the male respondents, as well as 24 female interviewees, indicated that they are not an officer or a member of the BWSA. Some 14 female respondents however said they are members of the BWSA.

All the respondents said they are not actively involved in the BWSA affairs.

TABLE 19: MEMBERSHIP TO THE BWSA

RESPONSE	RESPONDENTS			
	M	F	T	%
1. Yes	-	14	14	18.90
2. No	36	24	60	81.10
TOTAL	36	38	74	100.00

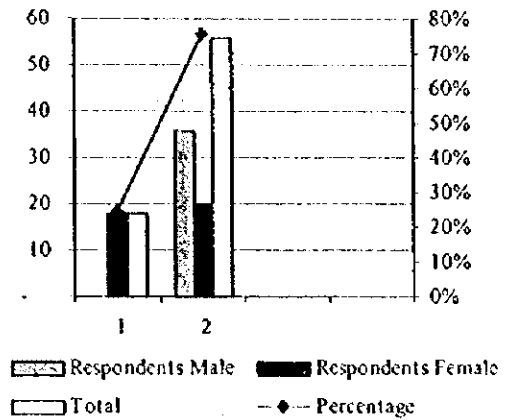


(2) Who maintains the facilities of the BWSA?

Some 18 female respondents indicated that someone in the barangay could be maintaining the facilities, if any, of the BWSA. All other respondents could not determine the people responsible for maintaining the facilities.

TABLE 20: RESPONSIBLE FOR MAINTAINING WATSAN FACILITIES

RESPONSE	RESPONDENTS		T	%
	M	F		
1. Someone in the Barangay	-	18	18	24.30
2. Don't Know	36	20	56	75.70
TOTAL	36	38	74	100.00

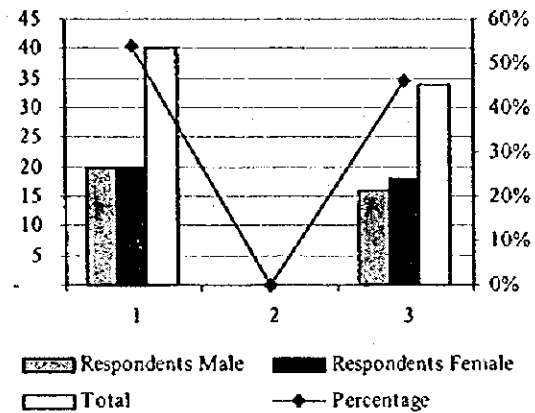


(3) Interested to be a member of BWSA

Significantly, the majority of the respondents (40 or 54.05%) indicated interest in becoming a member of BWSA once it is formed and/or activated in their respective barangays. The rest of the 34 interviewees, (16 males and 18 females) did not respond.

TABLE 21: INTEREST OF RESPONDENTS TO JOIN BWSA

RESPONSE	RESPONDENTS		T	%
	M	F		
1. Interested	20	20	40	54.05
2. Not Interested	-	-	-	-
3. No Response	16	18	34	45.95
TOTAL	36	38	74	100.00

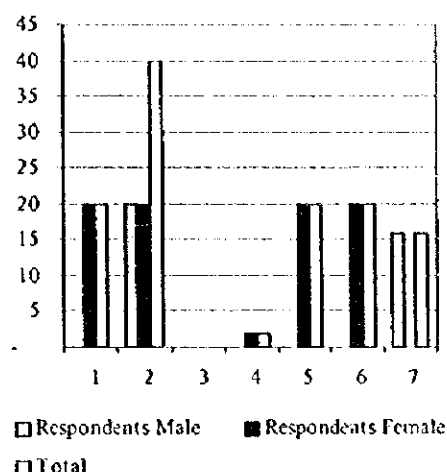


(4) How can respondents become actively involve in BWSA affairs?

A total of 20 male respondents are willing to contribute free labor as a manifestation of their active involvement with the BWSA. The rest of the male interviewees (16) had no response. On the other hand, the female respondents will either contribute cash or free labor and can assist in the collection of fees. They are also willing to be the officer or just members of the BWSA.

TABLE 22: HOW RESPONDENTS CAN BECOME ACTIVELY INVOLVED IN WATSAN PROJECTS

RESPONSE	RESPONDENTS		
	M	F	T
1. Contribute Cash	-	20	20
2. Contribute Labor	20	20	40
3. Do Repair/Maintenance	-	-	-
4. Collection of Fees	-	2	2
5. Be Officer	-	20	20
6. Just Member	-	20	20
7. No Response	16	-	16

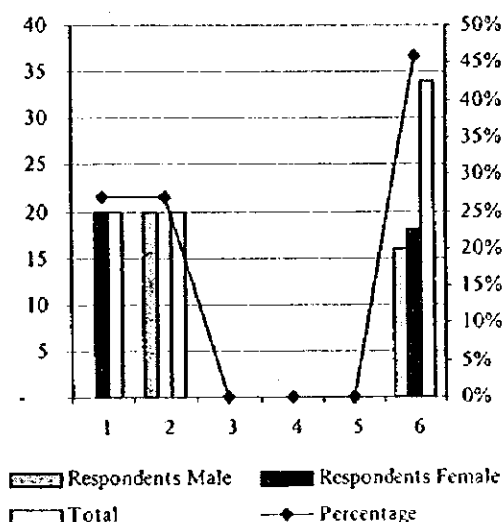


(5) If not interested, where to get source of water

In the event that they will not be members of the BWSA, majority of the male respondents (20) said that they will be obliged to fetch water from communal well. All the other male interviewees were uncertain on this issue. For the majority of female respondents, they will either get their water source from private wells. The other female interviewees were uncertain on this question.

TABLE 23: SOURCES OF DRINKING WATER OF NON-BWSA MEMBERS

SOURCE OF WATER	RESPONDENTS		T	%
	M	F		
1. Private Well	-	20	20	27.00
2. Communal Well	20	-	20	27.00
3. Spring Source	-	-	-	-
4. Vendor	-	-	-	-
5. Others	-	-	-	-
6. Uncertain	16	18	34	46.00
TOTAL	36	38	74	100.00

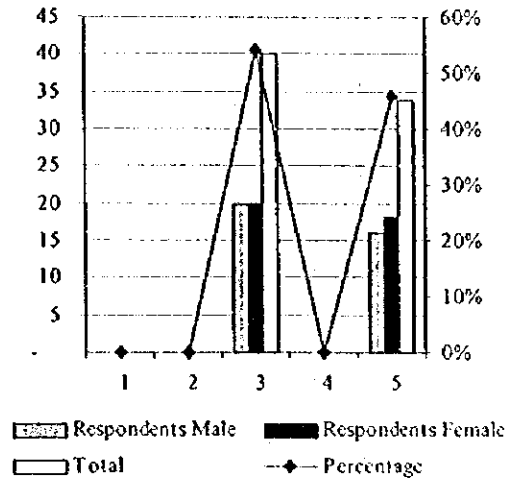


(6) Responsible for minor repairs of water facilities

Somebody in the barangay, according to the majority of male (20) and female (20) respondents, are responsible for doing minor repairs of the family's water supply facility. The rest, 16 male and 18 female interviewees were uncertain on this matter.

TABLE 24: RESPONSIBLE FOR MINOR REPAIRS

SOURCE OF WATER	RESPONDENTS		T	%
	M	F		
1. Female Member	-	-	-	-
2. Male Member	-	-	-	-
3. Somebody in the Barangay	20	20	40	54.05
4. Professional Caretaker	-	-	-	-
5. Uncertain	16	18	34	49.95
TOTAL	36	38	74	100.00



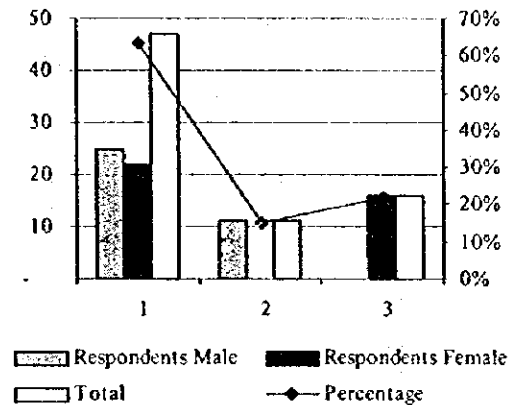
1.6 Training Activities

(1) Training Program attended in 1997

The majority of the respondents, or 25 males and 22 females, said they have attended training program during the calendar year 1997. Eleven male interviewees, however, said they did not attend. Some 16 female participants did not respond to the question.

TABLE 25: TRAININGS ATTENDED BY RESPONDENTS IN 1997

RESPONSE	RESPONDENTS			
	M	F	T	%
1. Yes	25	22	47	63.50
2. No	11	-	11	14.85
3. No Response	-	16	16	21.65
TOTAL	36	38	74	100.00



(2) Kinds of Training Program

The respondents attended various training programs in 1997. Table 26 summarizes the training programs/seminars attended by the respondents during the year.

TABLE 26: TRAINING COURSES ATTENDED BY RESPONDENTS IN 1997

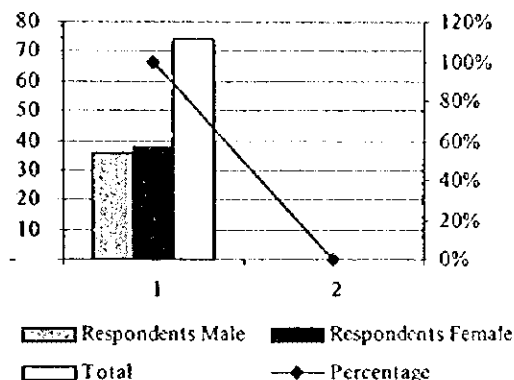
BARANGAY	MALE	FEMALE
Barangay Balutakay (Ilagonoy)	<ol style="list-style-type: none"> 1. Aquaculture 2. Agriculture 3. Cooperative 4. Hog Raising 5. Peace and Order 	<ol style="list-style-type: none"> 1. Community Development 2. Hog Raising 3. Health and Nutrition 4. Farmers Field School
San Isidro (Padada)	<ol style="list-style-type: none"> 1. Livestock/Poultry Raising 2. Cooperative 3. Sport Training 	<ol style="list-style-type: none"> 1. Community Development 2. Health and Sanitation 3. Bgy. Administrative System

(3) On BWSA Training

All the respondents were not aware of any training program for BWSA members. However, all the respondents indicated willingness to attend in any BWSA training program for the barangay.

TABLE 27: WILLINGNESS TO ATTEND BWSA-RELATED TRAINING PROGRAMS

RESPONSE	RESPONDENTS		T	%
	M	F		
1. Yes	36	38	74	100.00
2. No	-	-	-	-
TOTAL	36	38	74	100.00

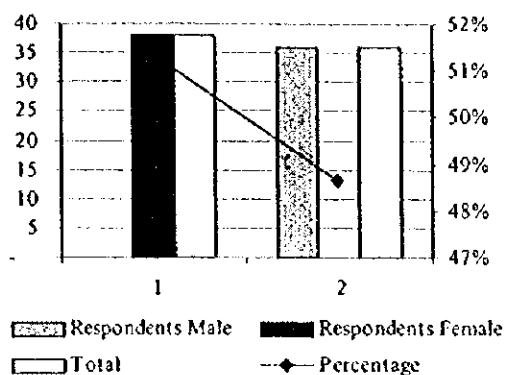


(4) Training on Health Education

All the female respondents have attended health education training program. On the contrary, all male participants said they have not attended any health education training program.

TABLE 28: PARTICIPATION IN HEALTH EDUCATION AND TRAINING

RESPONSE	RESPONDENT		T	%
	M	F		
1. Yes	-	38	38	51.35
2. No	36	-	36	46.65
TOTAL	36	38	74	100.00



(5) Type of Training Respondents Wish to attend

If given a chance, both the male and female respondents wanted to train on the operation and maintenance of waterworks facilities as well as on livelihood. Other training programs the interviewees were interested in are included in the following table:

TABLE 29: TYPES OF TRAINING RESPONDENTS WISH TO ATTEND

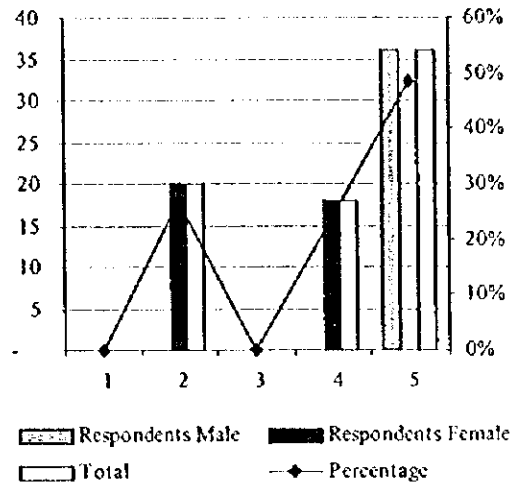
BARANGAY	MALE	FEMALE
Barangay Balutakay (Hagonoy)	<ol style="list-style-type: none"> Livelihood BWSA Operation Peace and Order Anti-Drug Campaign Skills Training 	<ol style="list-style-type: none"> Operation and Maintenance of Water Supply Facilities
San Isidro (Padada)	<ol style="list-style-type: none"> Water and Sanitation Livelihood 	<ol style="list-style-type: none"> Waterworks Operation Livelihood

(6) Desirable Training Period

In relation to this, all male respondents wanted to attend training programs that would be conducted for more than three days. On the other hand, the majority of the female interviewees (20) desired for a one-day training period and another 18 respondents wanted three days.

TABLE 30: DESIRABLE TRAINING PERIOD

RESPONSE	RESPONDENTS		T	%
	M	F		
1. Less than 1 Day	-	-	-	-
2. One Day	-	20	20	27.05
3. Two Days	-	-	-	-
4. Three Days	-	18	18	24.30
5. More than 3 Days	36	-	36	46.65
TOTAL	36	38	74	100.00



1.7 Community Development

(1) CBOs and contact persons

As pointed out by the respondents, some community-based organizations have been doing different development works in the barangays. Table 31 lists down these NGOs/CBOs and their contact persons:

TABLE 31: NGOS/CBOS IN THE BARANGAYS

BARANGAY	CONTACT PERSON
A. Barangay Balutakay (Hagonoy) 1. Religious Group 2. NAMANKA/Farm Sea 3. Rural Improvement Club	Mrs. Panganiban Clara Rufiros
B. Barangay San Isidro (Padada) 1. Malalag Venture Plantation, Inc. 2. Rural Improvement Club 3. BWSA	Mr. Raul Tuazon Joventura Quirente Leonisa Ignit

(2) Were the respondents consulted on their respective roles and responsibilities?

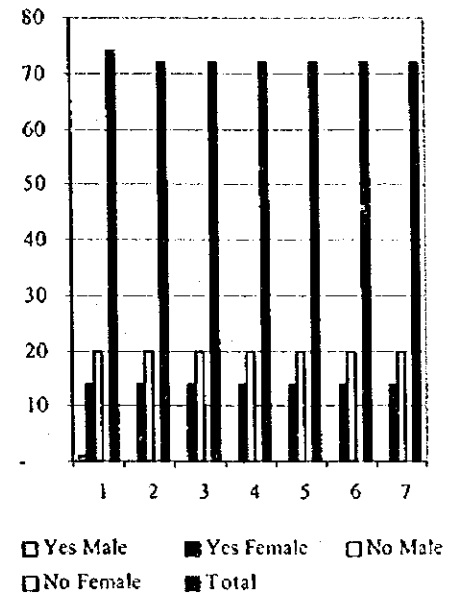
The majority of the respondents indicated that they were never consulted and/or briefed about their respective roles and responsibilities on the planning, design and construction of their water supply facilities. This is also true for the operation and maintenance and financing aspects of the system where the same number of respondents claimed they were

not consulted. On the other hand, a total of 14 female respondents said they were consulted and briefed on their responsibilities in the aforementioned activities.

In the same manner, the majority of the respondents were never consulted when the BWSA was formed in their respective barangays as well as when the level/type of services and water fees were agreed upon. This is also true during the construction of the water facilities.

TABLE 32: RESPONDENTS CONSULTED/INVOLVED IN PAST WATSAN PROJECTS

BWSA ACTIVITIES	YES		NO		NO RES- PONSE	T
	M	F	M	F		
1. Planning and Design	1	14	20	-	39	74
2. O&M of the System	-	14	20	-	40	74
3. Financing of the System	-	14	20	-	40	74
4. BWSA Formation	-	14	20	-	40	74
5. Water Fee Decision	-	14	20	-	40	74
6. Level of Service Decided	-	14	20	-	40	74
7. Construction of Facilities	-	14	20	-	40	74

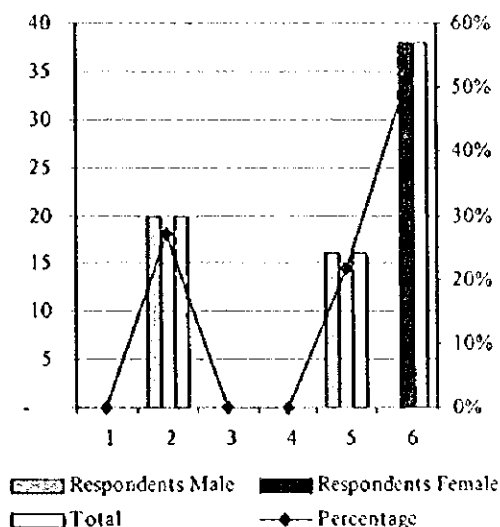


(3) How did the respondents participate in past construction projects?

Only the male respondents participated in the construction of previous WATSAN facilities. Most, or 20 of them, donated the site for the water system. Nobody contributed cash for the construction. All the female interviewees did not respond on this question.

TABLE 33: PARTICIPATION IN PAST CONSTRUCTION PROJECTS

TYPE OF PARTICIPATION	RESPONDENTS		T	%
	M	F		
1. Provided Cash	-	-	-	-
2. Donated Site	20	-	20	27.00
3. Provided Labor	-	-	-	-
4. Provided Materials	-	-	-	-
5. Others	16	-	16	21.65
6. No Response	-	38	38	51.35
TOTAL	36	38	74	100.00

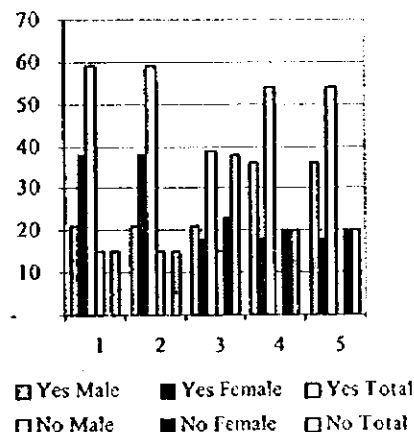


(4) Will the respondents participate in future projects?

For future projects, however, the majority of the respondents indicated that they would participate and/or contribute for the success of the projects. A total of 59 respondents, or 21 males and 38 females, said they would actively be involved in the formation of the BWSA formulation of water rates and in the selection of sites and level of service. About the same number of male and female respondents, or 36 males and 18 females, would also participate in the construction of the facilities and in the operation and maintenance of the completed facilities. The rest of the respondents, 15 males and 20 female interviewees are not prepared to participate in future projects.

TABLE 34: WILLINGNESS/TYPE OF PARTICIPATION IN FUTURE PROJECTS

PROJECT ACTIVITY	YES			NO		
	M	F	T	M	F	T
1. Formation of BWSA	21	38	59	15	-	15
2. Water rates Formulation	21	38	59	15	-	15
3. Selection of Sites and Level of Service	21	18	59	15	23	38
4. Construction of Facilities	36	18	54	-	20	20
5. Operation & Maintenance	36	18	54	-	20	20



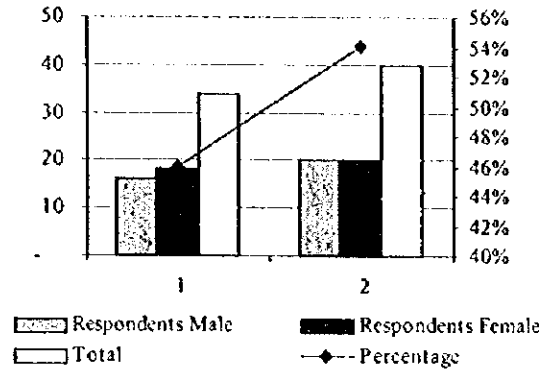
1.8 Financial Aspects

(1) Are respondents presently paying for their water supply?

The majority (54.05%) of the respondents, or 20 males and 20 females indicated that they are not presently paying for their water supply. Only about 45% of the respondents are presently paying

TABLE 35: NUMBER OF RESPONDENTS PRESENTLY PAYING WATER FEE

RESPONSE	RESPONDENTS		T	%
	M	F		
1. Yes	16	18	34	45.95
2. No	20	20	40	54.05
TOTAL	36	38	74	100.00

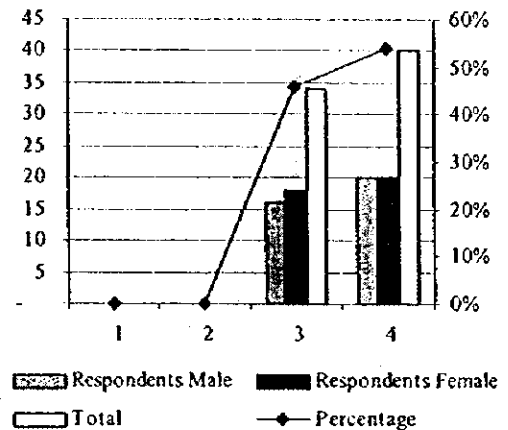


(2) If so, how much per household?

The majority of the respondents who are presently paying said they pay more than ₱50.00 per month. The rest of the interviewees did not respond to this question.

TABLE 36: PRESENT WATER FEES PAID

WATER FEES	RESPONDENTS		T	%
	M	F		
1. ₱1.00 - ₱10.00	-	-	-	-
2. ₱11.00 - ₱50.00	-	-	-	-
3. Above ₱50.00	16	18	34	45.95
4. No Response	20	20	40	54.05
TOTAL	36	38	74	100.00

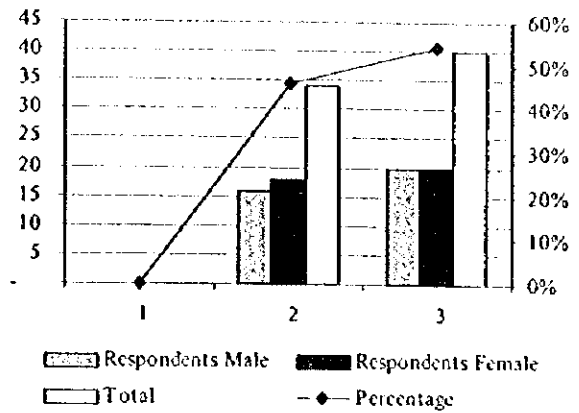


(3) Is the water fee enough for O&M?

For respondents who were paying water fees, all agreed that the fees being collected were not enough to operate and maintain the facilities. Since the majority of the respondents did not pay water fees, they could not determine if the fees were enough or not.

TABLE 37: ADEQUACY OF WATER FEE FOR O&M

RESPONSE	RESPONDENTS			
	M	F	T	%
1. Yes	-	-	-	-
2. No	16	18	34	45.95
3. No Response	20	20	40	51.05
TOTAL	36	38	146	100.00

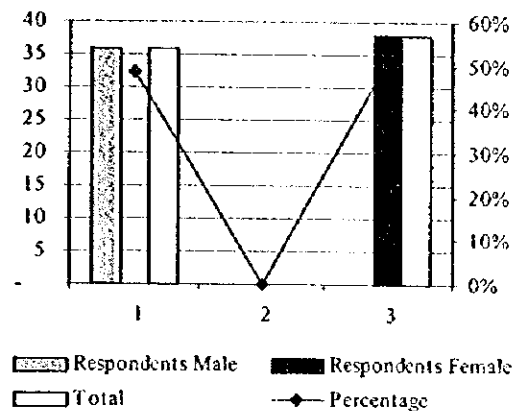


(4) Who shoulders the O&M of Facilities?

In areas where water fees were not being collected, all male respondents claimed it was the barangay council which shouldered the operation and maintenance costs of the facilities. On the other hand, all the female interviewees said it was the owner of the well who maintained the system.

TABLE 38: RESPONSIBILITY FOR SHOULDERING THE O&M COSTS

PERSON	RESPONDENTS		T	%
	M	F		
1. Barangay Council	36	-	36	48.65
2. Municipal Government	-	-	-	-
3. Owner of the Well	-	38	38	51.35
TOTAL	36	38	74	100.00

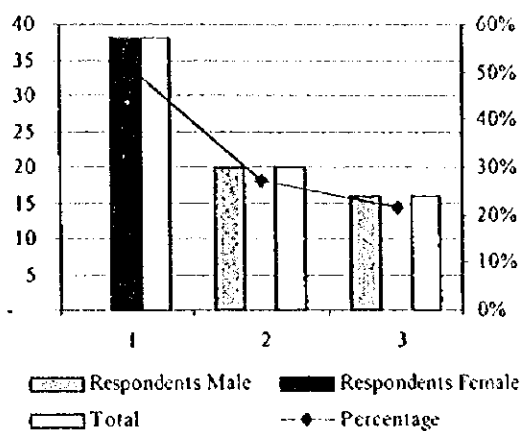


(5) Are the people willing to pay for O&M of future facilities?

All the female respondents expressed willingness to pay/contribute for the operation and maintenance of future facilities. On the other hand, the majority of the male participants said they are not willing to pay for the O&M of future facilities. The rest of the male interviewees were uncertain whether to pay or not.

TABLE 39: RESPONDENTS' WILLINGNESS TO PAY FOR FUTURE FACILITIES

RESPONSE	RESPONDENTS		T	%
	M	F		
1. Yes	-	38	38	51.35
2. No	20	-	20	27.00
3. Uncertain	16	-	16	21.65
TOTAL	36	38	74	100.00

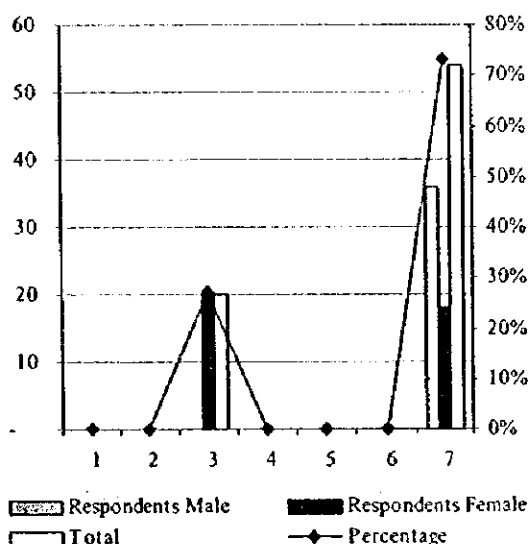


(6) How much are respondents willing to pay?

Of those who are willing to pay, only 20 female respondents said they can pay from ₱11.00 to ₱20.00. The rest of the interviewees are not willing to shoulder water fees since, according to most of them, they could not afford the water fee.

TABLE 40: HOW MUCH RESPONDENTS ARE WILLING TO PAY

RESPONSE	RESPONDENTS			
	M	F	T	%
1. ₱2.00 - ₱5.00	-	-	-	-
2. ₱6.00 - ₱10.00	-	-	-	-
3. ₱11.00 - ₱20.00	-	20	20	27.00
4. ₱21.00 - ₱30.00	-	-	-	-
5. ₱31.00 - ₱40.00	-	-	-	-
6. ₱41.00 - ₱50.00	-	-	-	-
7. No Response	36	18	54	73.00
TOTAL	36	38	74	100.00

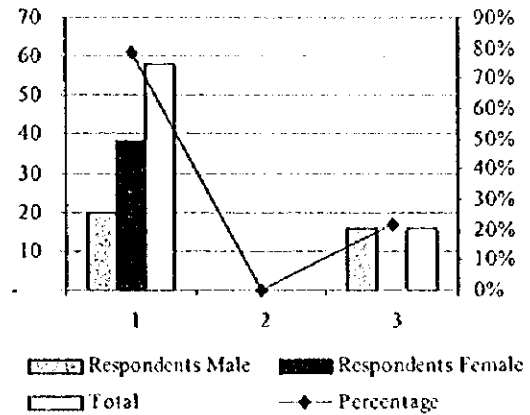


(7) Are you willing to contribute for future projects?

Significantly, the majority of the respondents or 20 males and 38 females indicated their willingness to contribute in cash or kind for the construction of WATSAN facilities in their respective barangays. Sixteen male interviewees did not respond.

TABLE 41: WILLINGNESS OF RESPONDENTS TO CONTRIBUTE FOR FUTURE FACILITIES

RESPONSE	RESPONDENTS			
	M	F	T	%
1. Yes	20	38	58	78.35
2. No	-	-	-	-
3. No Response	16	-	16	21.65
TOTAL	36	38	74	100.00

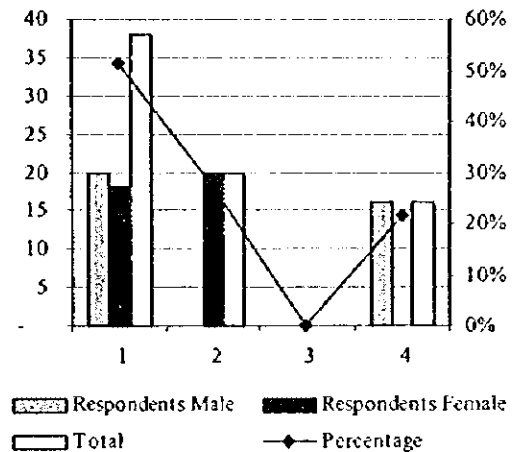


(8) If so, what kind?

Of those willing to share, 38 respondents or 20 males and 18 females, preferred to contribute free labor during the construction. Twenty female respondents were prepared to contribute cash, which varies from ₱10.00 to ₱20.00. Some 16 interviewees remained uncertain whether to contribute or not.

TABLE 42: TYPES OF CONTRIBUTION

RESPONSE	RESPONDENTS		T	%
	M	F		
1. Labor	20	18	38	51.35
2. Cash	-	20	20	27.00
3. Materials	-	-	-	-
4. Uncertain	16	-	16	21.65
TOTAL	36	38	74	100.00



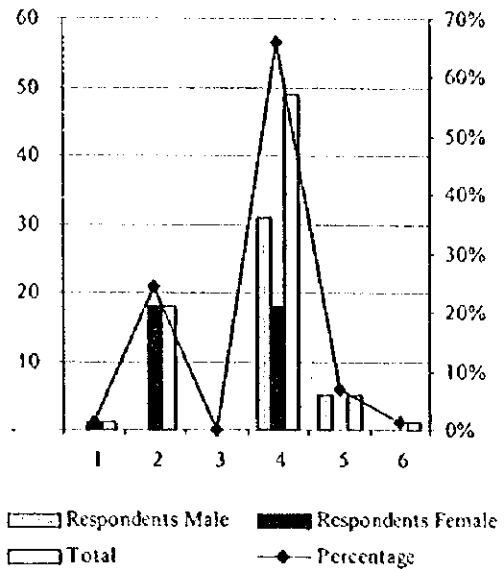
1.9 Health and Sanitation

(1) Type of toilet

The majority of the respondents, or 31 males and 18 females, indicated that water seal pour flush is widely used. Another 18 female interviewees used private household pit latrine. Five male participants utilized outdoor open pit as toilet. Only one female respondent used private household toilet flushed to septic tank on the site.

TABLE 43: TYPE OF TOILETS RESPONDENTS USE

RESPONSE	RESPONDENTS			
	M	F	T	%
1. Private III Toilet Flushed to Septic Tank on the Site	-	1	1	1.35
2. Private III Pit Latrine	-	18	18	24.30
3. Shared Toilet Pit Latrine	-	-	-	-
4. Water Seal (Pour Flush)	31	18	51	68.90
5. Outdoor Open Pit	5	-	5	6.75
6. Uncertain	-	1	1	1.35
TOTAL	36	38	74	100.00



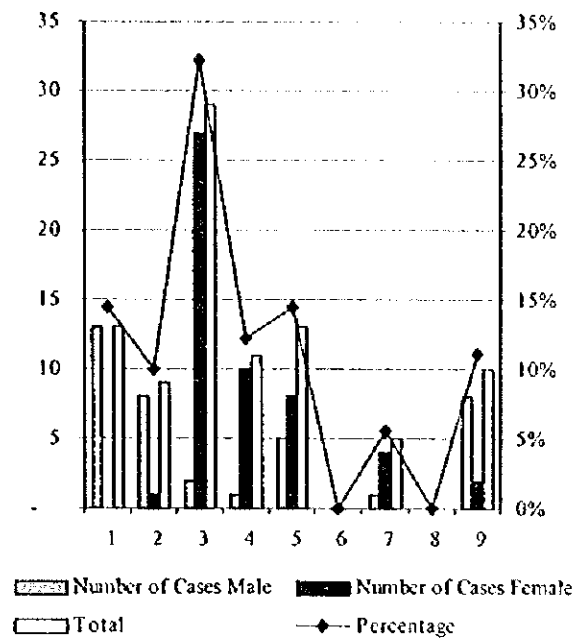
(2) Who got sick during the past year? What sickness?

The respondents indicated that during the calendar year 1997, some 90 persons related to them were afflicted with various water-related diseases. The leading cause of illnesses was gastroenteritis, which afflicted 29 persons. The second leading illnesses were stomach pain and kidney trouble, which both afflicted 13 persons. Diarrhea came in third with 11 cases; typhoid fever, 10 cases; skin disease, nine cases; and intestinal flu, 5 cases. There were no reported cases of schistosomiasis and malaria.

The women were most afflicted with these water-related diseases during the year. A total of 52 women were afflicted with various illnesses; 27 cases of gastroenteritis; diarrhea, 10 cases; and kidney trouble, 8. Daughters were not so susceptible as only six of them got sick during the year. Thirty-eight men, mostly the husbands/fathers also suffered from these diseases, with stomach pain at 13 cases and skin diseases and typhoid fever accounting for eight cases each. Another 12 sons also suffered, mostly from typhoid and kidney troubles.

TABLE 44: WATER-RELATED ILLNESSES

DISEASE	NUMBER OF CASES		T	%
	M	F		
1. Stomach Pain	13	-	13	14.40
2. Skin Diseases	8	1	9	10.00
3. Gastroenteritis	2	27	29	32.20
4. Diarrhea	1	10	11	12.20
5. Kidney Trouble	5	8	13	14.45
6. Schistosomiasis	-	-	-	-
7. Intestinal Flu	1	4	5	5.55
8. Malaria	-	-	-	-
9. Typhoid Fever	8	2	10	11.10
TOTAL	38	52	90	100.00

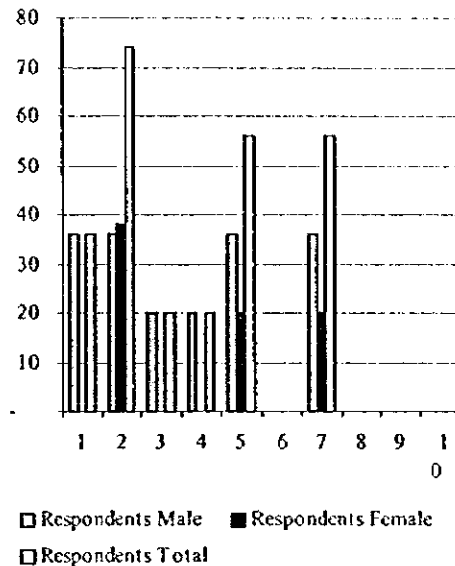


(3) Health and hygiene practices

Most respondents recognized the importance of good health and hygiene practices. As indicated by them, the respondents learned about health and sanitation matters mostly from six major sources. These were: Health Workers/Inspectors; Health Aid Stations, Clinics; Schools; Family and Friends; Radio; and, Television.

TABLE 45: WHERE PEOPLE LEARNED HEALTH AND HYGIENE EDUCATION

RESPONSE	RESPONDENTS		
	M	F	T
1. Relatives and Friends	36	-	36
2. Health Workers/Inspectors	36	38	74
3. Radio	20	-	20
4. Television	20	-	20
5. School	36	20	56
6. Newspaper	-	-	-
7. Health Clinics	36	20	56
8. Hospitals	-	-	-
9. NGOs	-	-	-
10. Others	-	-	-



5.8.5 Utilization of NGOs

LIST OF NGOs / CBOs IN DAVAO DEL SUR

NAME OF NGOs / CBOs	CONTRACT PERSON	ADDRESS / TEL. #
1. Davao del Sur Labor and Jamboleros Association Incorporated	Felipe Requizo	Trining's Store, Digos Central Public Market, Digos Davao del Sur
2. Davao del Sur Market Fish Vendor Labor	Jimmy O. Boloron	Public Market, Digos, Davao del Sur
3. Agrarian Reform Beneficiaries Association	Mansueto G. Danole	ARBA, Digos, Davao del Sur
4. Friends of the Farmers-Davao del Sur	Atty. Jose Jimmy Sagarino	Digos, Davao del Sur
5. Council of Integrated Farmer of Davao del Sur	Eustaquio Pasalo, Jr.	--
6. Tri-Media Association of Davao del Sur	Elmer Abragan	c/o DXDS 116 KHZ, Digos, Davao del Sur
7. Tambayayong Batok Sa Kawad-on Davao del Sur, Inc.	Simplicia Delada	Digos, Davao del Sur
8. Mt. Apo React (Philippines), Incorporated	Dr. Manuel K. Gonzales	2/F Derequito Bldg., Rizal Ave., Digos, Davao del Sur
9. Institute for Small Farms and Industries	Carlos G. Domiguez	Atenco de Davao University Jacinto St., Davao City
10. Darong Multi-Purpose Cooperative	Heracleo Somoza	Darong Sta. Cruz, Davao del Sur
11. Citizens Alliance Unified for Sectoral Empowerment-- Davao del Sur	Atty. Jose Jimmy Sagarino	Digos, Davao del Sur
12. Rotary Club of Digos	Edgardo C. Elera	Digos, Davao del Sur
13. International Coordinating and Advisory Group, Inc.	Jaime B. Marces	Bliss Multi-Purpose Bldg., National Road, Poblacion, Carmen, Davao del Norte
14. People's Economic Council - Davao del Sur	Ramon Teodolfo Barido	Digos, Davao del Sur
15. Integrated Sectoral League and Alliance of Muslim of Davao del Sur	Samson M. Boat	C/o Office on Muslim Affairs Davao del Sur Sub-Office, 2/F Derequito Bldg., Rizal Ave., Digos
16. Pag-amoma Children's Development Foundation, Inc.	Ma. Lourdes A. Bodilles	Rm. M. Valgosons Bldg., C.M. Recto St., Davao City
17. Regional Emergency Communication Operation Network Association, Inc.	Wymen Lee	Digos, Davao del Sur
18. Girl Scout of the Philippines Davao del Sur Chapter	Atty. Josefina Brandarez	Girl Scout of the Philippines Davao del Sur Council, Digos
19. Institute of Primary Health Care	Sony J. Chin	Circumferential Road, Bajeda, Davao City
20. Kiblawan Rural Development Foundation, Inc.	Zenaida T. Pantujan	2257 Padillo Compound, Digos, Davao del Sur
21. Farmer's Organizing Outreach for Development Services, Association, Inc.	Eustaquio Pasalo	Digos, Davao del Sur
22. Nagkahiusang Mag-uuma sa Davao del Sur	Juanito Solitarino	NAMADDS, Davao del Sur
23. Lakas ng Kabataan sa Davao del Sur	Joseph S. Kennosisima	Digos, Davao del Sur
24. Davao del Sur Medical Society	Dr. Gil G. Mantilla	Digos, Davao del Sur
25. Malita Multi-Purpose Cooperative, Inc.	Rizalino Ciriaco	Malita, Davao del Sur
26. Consortium for the Development of Southeastern Mindanao Cooperatives, Inc.	Fr. Fred M. Epiz	Door 2, Flr. I, De Mazenod Center Quezon Blvd., Kidapawan, Cotabato
27. Organic Farming Field Experimental Resource Station	Martin P. Alinen	Kisante, Makilala, North Cotabato
28. Malita Economic Recovery Association, Inc.	Serino M. Sara	Malita, Davao del Sur

NAME OF NGOs / CBOs	CONTRACT PERSON	ADDRESS / TEL. #
29. Manga Multi Purpose Cooperative	Teresita Lonzaga	Manga, Matanao, Davao del Sur
30. Digos Livestock Multi-Purpose Cooperative	Tomas C. Catalan	Catalan Residence, San Jose Digos, Davao del Sur
31. San Jose Arrastre, Stevedoring and Allied Services Company	Tomas Catalan	San Jose, Digos, Davao del Sur
32. Oblates of the Divine Mother 01230-6-4 Missionary of Mindanao, Philippines, Inc.	Serino M. Sara	Malita, Davao Del Sur
33. United Women's Multi-Purpose Cooperative	Fidela L. Alvarado	McArthur Highway, Digos, Davao del Sur
34. Task Force Detainees of the Philippines	Luisito Bilbao	Digos, Davao del Sur
35. Technical Assistance Center for the Development of Rural and Urban Poor	Rex Cipriano M. Pinili	Sinawlan, Matanao, Davao del Sur
36. Countryside development Foundation, Inc.	Angel S. Regidor	4061 rizal Ave., Digos, Davao del Sur
37. Tienda Better Living Multi-Purpose Corporation	Reynaldo Bajura	Tienda Aplaya, Digos, Davao del Sur
38. Disaster Response Center Incorporated	Rhey Duhaylungsod	P.O. Box 855, Koronadel, South Cotabato
39. Children Rehabilitation Center		
40. Kiwanis Club of Central Digos		Digos, Davao del Sur
41. Magsaysay Farmers Multi-Purpose Cooperative, Inc.		Magsaysay, Davao del Sur
42. Binhi Agricultural Resource Foundation, Inc.	Martin Atienza, Jr.	Davao City

5.8.6 Existing Community Development Process

Detailed Typical CD Process in Agusan del Sur

- 1) **Make courtesy calls.** Courtesy calls are made to barangay/sitio officials prior to the conduct of meetings with the community. Then, a series of meetings and community assemblies are done where the WATSAN program is introduced, its significance and impact taken up and the importance of organizing promoted. This is followed by a more detailed presentation/orientation of the project -- its concept, features, history, stakeholders, and the CO process utilized. Depending on the level of community awareness regarding the program/project, two or three meetings/assemblies are needed before doing the baseline survey.
- 2) **Preparation of profile (secondary information) and survey forms.**
 - (a) **General information.** Distance from barangay to poblacion, mode of travel, time and fare; no. of sitio/purok; dominant ethnic groups, common occupation of residents; demographic data (no. of household, male and female population) by sitio/purok, no. of dwelling structures, school buildings, other buildings, availability of electricity by sitio/purok.
 - (b) **Barangay WATSAN status.** Existing water supply systems, by sitio/purok, by type and service level, no. of facilities (functioning), potability, no. of HH served, who installed, who operates, user charges, if any; HHs toilet facilities, by sitio/purok, no. of HHs with private toilets by type, no. of HH using shared toilets by type, no. of HH without toilets; no. of community waste disposal systems by sitio/purok, by method and wastewater system; no. of reported morbidity and mortality cases of water-borne/contact/vector-borne diseases of barangay residents.
 - (c) **WATSAN related programs and projects in the barangay.** Existing WATSAN programs/project by type of activity, implementing organization/agency, sponsoring funding agency, specify years when operated in barangay, name of community association organized, if any; past WATSAN programs/projects by type of activity, implementing organization/agency, sponsoring funding agency, specify years when operated, name of community association organized, if any; Community organizations in the barangay, watsan related groups/organization and other community organizations, its name of group/organization, sitios where members are, sponsoring agencies, year organized and status; other barangay facilities.

(d) Resources for barangay water supply and toilet facilities fabrication. Brief description of water sources-undeveloped springs, streams and other water sources which can be tapped and developed, sources which can be improved including estimated distance to center of HHs to be served, availability of water, estimated flows during dry and wet seasons; water and well depths by sitio/purok, by season; availability of construction materials for water supply and toilet if available for free at barangay or at hardware/other stores, its sources, name and address of store, materials available, distance from barangay and means of transport for materials; sources of pumps and spare parts for pumps – name and address of dealer/store, types of pumps/parts available and distance from barangay; barangay residents with skills in water supply system construction and maintenance, type of skill, no. of persons and remarks; well drillers and water supply contractors who can be tapped for barangay works, their name address, services rendered and charging rates; local fabricators of toilet bowls, their name, location, type/description of toilet bowl.

3. **Identify of community volunteers.** As an initial step in community organizing, a core group of about 7 persons consisting of community leaders is formed. This is the formation of an informal community organization that will assist the CD worker in the preparation of CO strategies, community profiling, identification of project sites, and other work.
4. **Conduct baseline survey.** In the conduct of this survey, focus group discussion was applied and the results validated during barangay spot mapping. The barangay spot map reflects the location of structures (scaled) and different facilities/infrastructure. This serves as a planning tool in the development of WATSAN program for the area.
5. **Inspect/identify project sites and validate projects.** An assembly is called again to present the results of the survey, its profile, assessment and needs. The CD team situates the community, i.e., *where they are now in the sector*. A member of the CD team will then facilitate the surfacing of thoughts from the group in terms of identifying the needs for WATSAN facilities, how project will be implemented in their area, how the facility will be designed and constructed, and how the community perceives their role in the project. In some cases, the community request technical assistance from the Center on site selection of identified areas.
6. **Conduct technical and community consultative meetings of members and officers together with barangay officials.** By this time, the core group has already specific

projects to be implemented. Together with these interim officers, meetings with barangay officials are undertaken to determine local counterpart funding support to the program/project.

7. **Facilitate project implementation.** After funding has been assured, the CD team facilitates the implementation of the project through supervision and monitoring progress of construction. Contribution from the community comes in the form of free labor (*pahina*).
8. **Consolidate BWSA Organization.** The core group formulates the by-laws and policies of the organization and have these ratified by the members. The election of BWSA officers follows. A barangay resolution is passed endorsing the association and submitted to the Municipal Development Council/Sangguniang Bayan for registration/accreditation. Parallel to this activity is the completion of the facility and in most cases, the turn-over of the facility to the newly-organized BWSA, which can coincide with the swearing-in of BWSA officials.
9. **Conduct training on skills and management to BWSA officials** by the Center. The module includes topics on: human resource development (self and group awareness, communication skills, group facilitation and conducting meeting, effective community work, leadership skills and roles of officers and members, and conflict management); technical (hydrogeology and site selection, well construction and identification of handpump parts, equipment plumbing tools and materials for construction and repairs, hand pump principles of operation, maintenance and approach in trouble shooting, spring development, types of spring, their characteristics and method of developing, operation and maintenance of tank, spring box and distribution line, excreta, liquid and solid disposal system, water related diseases-prevention/control and water quality surveillance); financial management; project planning management; and action planning.
10. **Undertake follow-up activities.** The CD team after the construction of the WATSAN facilities undertakes follow-up activities such as monitoring and evaluation and the provision of recommendations/adjustments on the O&M of the facilities, where needed.

Source:

DIUG/WATSAN UNDP-PIII as modified by Province of Agusan del Sur

6. PAST FINANCIAL PERFORMANCE IN WATER SUPPLY AND SANITATION

6.2 Past Public Investment

6.2.1 Sources of Local Fund

Table 6.2.1 Income and Expenditures of Davao del Sur, 1994-1998

Municipality	1994	1995	1996	1997	1998 I
1. Bansalan					
Income					
Internal Revenue Allotment	13,343,876.00	14,854,832.00	16,068,725.00	20,797,705.00	21,367,499.00
Various Local Taxes	1,472,730.10	1,388,007.91	1,726,865.21	2,213,154.93	
Other Fees, Cesses, etc.	11,565,511.74	7,951,723.20	3,649,233.88	1,082,001.48	
Expenditures					
Recurrent Expenditures	15,361,870.34	19,402,309.38	21,070,923.37	26,034,826.53	
Capital Expenditures	9,651,500.00	5,247,619.00	529,450.16	960,037.19	
2. Digos					
Income					
Internal Revenue Allotment	22,613,057.00	25,321,976.00	27,474,264.00	35,790,767.00	36,456,638.00
Various Local Taxes	8,751,670.29	9,196,782.96	10,502,632.38	12,839,974.99	
Other Fees, Cesses, etc.	13,480,722.10	17,571,329.68	21,213,584.91	22,297,253.92	
Expenditures					
Recurrent Expenditures	37,902,868.26	46,968,717.96	54,671,500.45	63,558,160.02	
Capital Expenditures	3,134,446.60	4,471,172.62	7,131,539.58	6,497,724.76	
3. Don Marcelino					
Income					
Internal Revenue Allotment	14,176,986.00	15,579,006.00	16,671,201.00	20,911,104.00	21,989,296.00
Various Local Taxes	360,994.25	461,997.51	414,280.00	395,300.25	
Other Fees, Cesses, etc.	1,105,232.38	1,329,172.12	845,625.88	3,135,973.29	
Expenditures					
Recurrent Expenditures	13,796,872.61	14,858.00	17,904,534.90	24,183,690.40	
Capital Expenditures	2,270,197.57	2,655,851.35	147,997.90	266,332.47	
4. Hagayan					
Income					
Internal Revenue Allotment	10,980,891.00	12,240,536.00	13,261,188.00	16,938,564.00	17,283,838.00
Various Local Taxes	3,095,478.44	2,923,113.51	3,381,563.85	4,960,316.14	
Other Fees, Cesses, etc.	2,971,438.84	5,291,746.40	3,641,600.03	2,105,660.34	
Expenditures					
Recurrent Expenditures	12,375,018.15	17,699,222.23	21,295,336.76	23,718,656.21	
Capital Expenditures	1,528,594.91	4,880,529.63	973,434.92	225,680.50	
5. Jose Abad Santos					
Income					
Internal Revenue Allotment	20,242,107.00	22,277,122.00	23,851,460.00	29,511,630.00	30,028,756.00
Various Local Taxes	816,849.31	593,874.69	694,279.26	999,153.03	
Other Fees, Cesses, etc.	294,904.29	199,472.32	624,942.38	6,975,510.30	
Expenditures					
Recurrent Expenditures	14,801,247.26	19,614,646.00	23,361,476.74	28,246,382.82	
Capital Expenditures	6,797,015.43	1,994,011.72	2,330,824.17	9,357,999.60	
6. Kiblawan					
Income					
Internal Revenue Allotment	9,300,431.00	10,399,283.00	11,244,182.00	14,865,721.00	15,175,328.00
Various Local Taxes	658,942.93	344,471.26	562,842.83	583,536.67	
Other Fees, Cesses, etc.	781,425.22	1,453,934.30	1,270,488.07	983,102.93	
Expenditures					
Recurrent Expenditures	10,269,101.21	11,347,077.51	12,207,316.57	15,780,149.85	
Capital Expenditures	392,110.50	163,062.45	223,018.36	126,363.12	
7. Matsayasay					
Income					
Internal Revenue Allotment	11,254,206.00	12,534,414.00	13,568,303.00	20,091,934.00	20,760,749.00
Various Local Taxes	892,086.49	972,999.49	1,136,150.45	1,264,927.19	
Other Fees, Cesses, etc.	1,311,123.80	1,494,338.05	5,155,008.37	2,568,958.84	
Expenditures					
Recurrent Expenditures	12,072,925.20	14,143,161.03	15,574,986.13	22,099,795.34	
Capital Expenditures	645,715.00	1,158,229.90	4,993,924.88	1,875,418.38	

Table 6.2.1 Income and Expenditures of Davao del Sur, 1994-1998

Municipality	1994		1995		1996		1997		1998	
	Income	Expenditures	Income	Expenditures	Income	Expenditures	Income	Expenditures	Income	Expenditures
8. Malalag										
Income	13,148,011.00		14,532,728.00		15,569,618.00		21,197,678.00		22,166,202.00	
Internal Revenue Allotment	873,770.43		985,089.14		1,309,381.54		1,124,339.55		1,124,339.55	
Various Local Taxes	1,284,822.13		3,022,443.40		5,835,936.71		4,572,483.29		4,572,483.29	
Other Fees, Cesses, etc.										
Expenditures	13,179,791.17		17,322,028.45		10,468,938.70		27,703,950.17		27,703,950.17	
Recurrent Expenditures	7,493,458.16		11,558,746.29		2,291,137.88		1,724,240.42		1,724,240.42	
Capital Expenditures										
9. Matiaya										
Income	31,443,038.00		34,688,261.00		37,196,076.00		45,469,221.00		47,804,145.00	
Internal Revenue Allotment	2,187,227.11		1,617,930.31		2,140,525.60		3,033,559.72		3,033,559.72	
Various Local Taxes	1,762,317.48		4,502,783.81		6,383,685.85		11,386,623.64		11,386,623.64	
Other Fees, Cesses, etc.										
Expenditures	36,327,931.84		40,647,854.85		40,597,728.15		39,233,633.11		39,233,633.11	
Recurrent Expenditures	4,296,480.13		4,177,492.85		6,578,518.02		13,179,609.43		13,179,609.43	
Capital Expenditures										
10. Matnago										
Income	11,880,735.00		13,191,962.00		14,253,859.00		19,405,643.00		18,654,393.00	
Internal Revenue Allotment	761,451.56		778,074.71		1,033,184.19		1,013,062.84		1,013,062.84	
Various Local Taxes	748,357.85		3,563,015.97		2,435,737.30		3,576,417.22		3,576,417.22	
Other Fees, Cesses, etc.										
Expenditures	10,321,926.00		14,252,641.24		16,114,333.84		19,179,764.71		19,179,764.71	
Recurrent Expenditures	681,039.75		3,857,566.86		1,074,017.88		2,432,500.39		2,432,500.39	
Capital Expenditures										
11. Pataza										
Income	7,656,442.00		8,497,923.00		9,186,708.00		11,765,974.00		12,010,921.00	
Internal Revenue Allotment	1,140,358.57		1,239,472.52		1,712,012.66		1,914,369.61		1,914,369.61	
Various Local Taxes	2,656,458.57		5,555,819.20		4,973,906.32		4,140,006.57		4,140,006.57	
Other Fees, Cesses, etc.										
Expenditures	9,724,565.17		12,163,171.34		14,574,613.67		16,890,938.18		16,890,938.18	
Recurrent Expenditures	743,796.31		3,857,566.86		1,074,017.88		2,432,500.39		2,432,500.39	
Capital Expenditures										
12. Sarangani										
Income	6,710,449.00		7,343,284.00		8,025,199.00		10,428,798.94		10,719,095.00	
Internal Revenue Allotment	408,760.77		401,350.89		291,585.97		421,397.66		421,397.66	
Various Local Taxes	208,566.96		153,174.51		1,125,776.20		178,908.50		178,908.50	
Other Fees, Cesses, etc.										
Expenditures	7,124,420.91		7,322,146.22		7,089,883.79		10,510,408.85		10,510,408.85	
Recurrent Expenditures	34,035.13		698,930.94							
Capital Expenditures										
13. Sta. Cruz										
Income	16,346,998.00		18,185,781.00		19,649,933.00		25,199,901.00		26,055,513.00	
Internal Revenue Allotment	1,696,309.63		1,699,174.12		3,559,975.93		3,117,654.21		3,117,654.21	
Various Local Taxes	4,841,589.21		7,159,335.70		8,387,649.30		5,558,594.65		5,558,594.65	
Other Fees, Cesses, etc.										
Expenditures	15,641,535.60		27,746,307.64		25,662,803.35		33,457,668.48		33,457,668.48	
Recurrent Expenditures	3,670,897.30		1,216,230.24		3,506,044.58		1,448,345.52		1,448,345.52	
Capital Expenditures										
14. Sta. Maria										
Income	12,192,861.00		13,567,457.00		14,670,709.00		18,315,223.00		18,352,237.00	
Internal Revenue Allotment	693,067.75		689,716.97		909,846.64		1,421,710.02		1,421,710.02	
Various Local Taxes	787,947.41		706,309.35		939,557.55		1,272,866.10		1,272,866.10	
Other Fees, Cesses, etc.										
Expenditures	12,407,566.46		14,309,484.39		14,758,766.00		20,576,920.04		20,576,920.04	
Recurrent Expenditures	1,282,788.45		593,099.00		1,185,650.00		302,826.96		302,826.96	
Capital Expenditures										
15. Subop										
Income	8,460,575.00		9,189,669.00		10,145,946.00		13,292,711.00		13,629,409.00	
Internal Revenue Allotment	610,945.50		421,639.41		527,771.99		747,582.71		747,582.71	
Various Local Taxes	754,121.36		883,783.22		1,172,698.85		1,336,820.06		1,336,820.06	
Other Fees, Cesses, etc.										
Expenditures	9,337,303.11		10,300,879.40		11,157,276.47		14,809,942.05		14,809,942.05	
Recurrent Expenditures	451,672.50		367,599.37		742,472.06		590,652.46		590,652.46	
Capital Expenditures										

Source: Municipalities and PPDC.
Note: If 1998 has no breakdown for income and expenditures.

Table 6.2.2 Past Internal Revenue Allotment to Municipalities from Central Government

	1994	1995	1996	1997	1998
1. IRA to all municipalities (National total)	16,325,288,074	18,768,952,000	19,607,715,553	24,849,000,000	28,245,815,434
2. IRA to municipalities in Davao del Sur					
<i>Total</i>	201,374,091	223,278,947	240,691,359	309,213,390	318,999,610
Bansalan	13,343,870	14,854,836	16,068,722	20,797,703	21,362,499
Digos (Capital)	22,633,058	25,321,876	27,474,262	35,290,763	36,156,638
Don Marcelino	14,176,987	15,579,005	16,671,200	20,956,540	21,989,296
Hagonoy	10,980,891	12,240,534	13,261,185	16,938,558	17,283,838
Jose Abad Santos (Trinidad)	20,242,107	22,277,122	23,851,456	29,511,630	30,028,756
Kiblawan	9,300,433	10,371,767	11,244,147	14,865,727	15,175,328
Magsaysay	11,254,206	12,534,411	13,568,299	20,091,933	20,760,749
Malibago	13,212,028	14,532,724	15,509,615	21,197,680	22,166,202
Malita	31,443,031	34,688,261	37,196,070	45,469,220	47,804,145
Matanao	11,880,735	13,191,964	14,253,861	18,403,651	18,654,392
Padada	7,656,443	8,498,923	9,186,705	11,762,966	12,010,921
Santa Cruz	16,347,002	18,185,780	19,649,930	25,199,901	26,055,513
Santa Maria	12,192,852	13,567,460	14,670,708	18,298,323	18,832,237
Sarangani	6,710,448	7,434,284	8,025,199	10,428,795	10,719,095
Sulop	8,460,575	9,389,669	10,145,943	13,337,954	13,629,409
3. Share (%) in national total by municipality					
<i>Total</i>	1.2853	1.2396	1.2793	1.2980	1.1776
Bansalan	0.0817	0.0791	0.0820	0.0837	0.0756
Digos (Capital)	0.1386	0.1349	0.1401	0.1420	0.1280
Don Marcelino	0.0868	0.0830	0.0850	0.0843	0.0778
Hagonoy	0.0673	0.0652	0.0676	0.0682	0.0612
Jose Abad Santos (Trinidad)	0.1240	0.1187	0.1216	0.1188	0.1063
Kiblawan	0.0570	0.0553	0.0573	0.0598	0.0537
Magsaysay	0.0809	0.0668	0.0692	0.0809	0.0735
Malibago	0.0809	0.0774	0.0794	0.0853	0.0785
Malita	0.1926	0.1848	0.1897	0.1830	0.1692
Matanao	0.0728	0.0703	0.0727	0.0741	0.0660
Padada	0.0469	0.0453	0.0469	0.0473	0.0425
Santa Cruz	0.1001	0.0969	0.1002	0.1014	0.0922
Santa Maria	0.0747	0.0723	0.0748	0.0736	0.0667
Sarangani	0.0411	0.0396	0.0409	0.0420	0.0379
Sulop	0.0518	0.0500	0.0517	0.0537	0.0483

Sources: (1) Department of Budget and Management; and (2) Bureau of Local Government Finance.



7. WATER SOURCE DEVELOPMENT

7.3 Groundwater Sources

7.3.2 Groundwater Availability in the Province

(1) Major Information and References

The Groundwater Availability Map was prepared using the following information and reference (detailed list of reference is presented in Table 7.3.1, Data Report):

- Administrative and Topographical Maps of the Province published by NAMRIA with scale of 1:150,000 and 1:50,000, respectively.
- Geological Map of the Philippines published by BMGS with a scale of 1:1,000,000.
- Water Resource Investigation conducted by NWRB, 1986.
- Well Inventory Database prepared by NWRB, LWUA, and DPWH.
- Well Inventory Database in the province.
- General information on groundwater condition by DPWH-DEO and PPDO.
- Well Log Data by DPWH-DEO.
- Water source information by Water Districts.

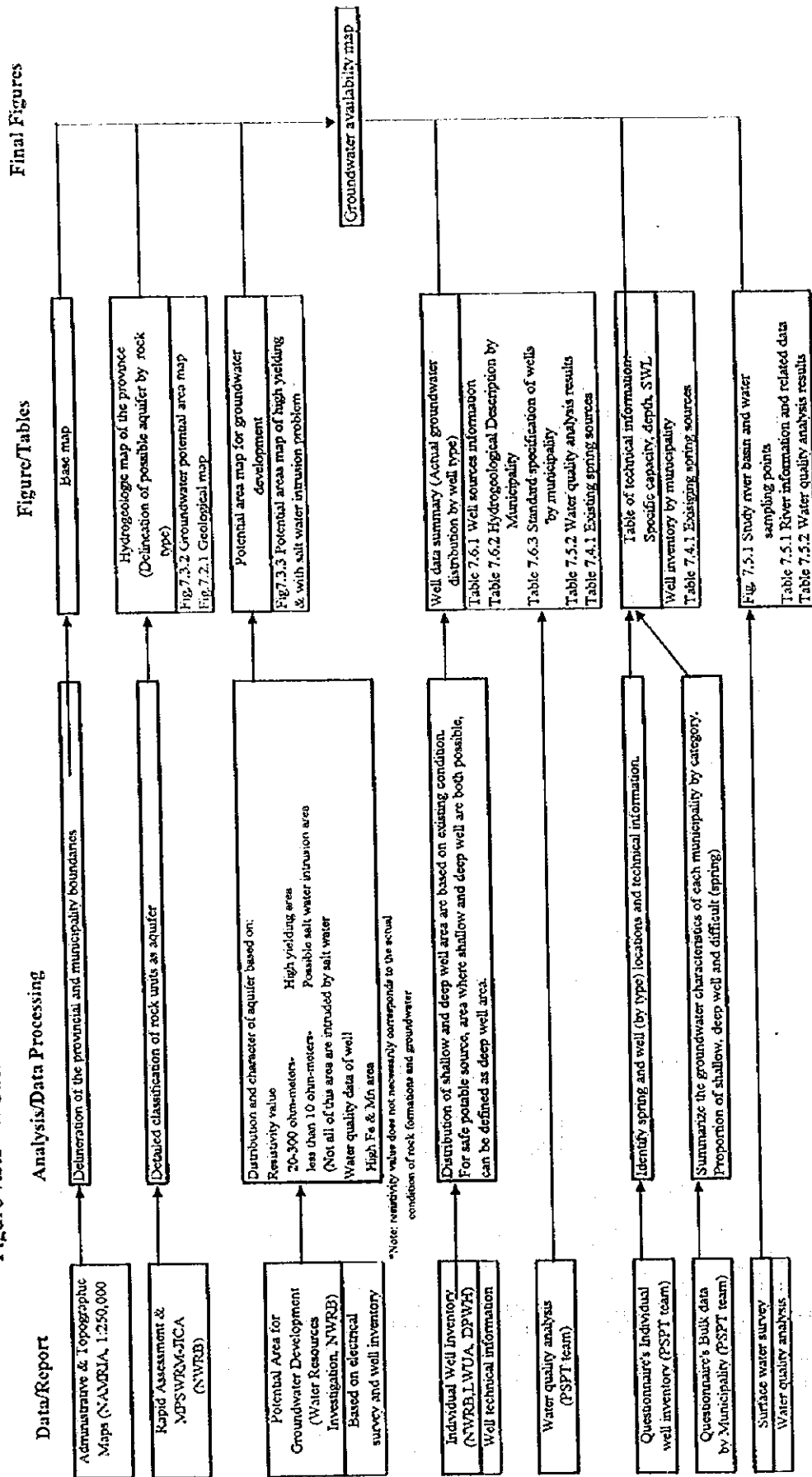
(2) Approach and Methodology

The procedure in preparing the Groundwater Availability Map is explained below with work flow depicted in Figure 7.3.1.

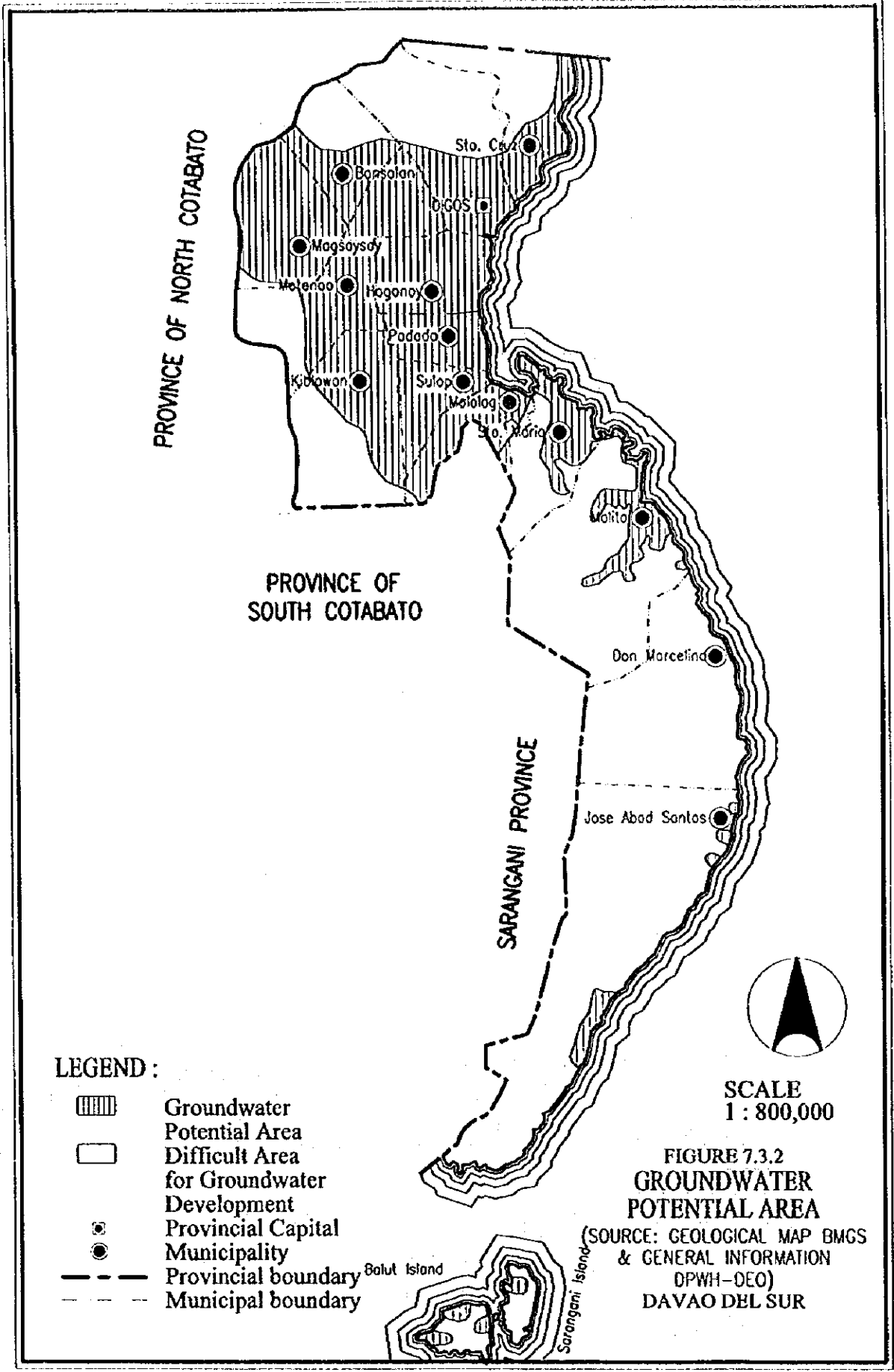
- 1) Prepare a base map with a scale of 1:250,000. The topographical map of NAMRIA (1:250,000) was used as a reference map. Basic information including rivers and provincial and municipal boundaries are indicated in the prepared base map.
- 2) The groundwater potential areas, based on the geology of the province, are delineated on the base map. The Recent alluvial and/or beach deposits, Pliocene-Quaternary sedimentary formation (clay, silt, sand and gravel) and Pliocene-Quaternary volcanic rock units (pyroclastics, debris flow, and tuff) are regarded as possible aquifers considering their high porosity and permeability.

Boundaries between groundwater development potential areas and difficult areas were defined and delineated as presented in Figure 7.3.2.

Figure 7.3.1 WORK FLOW OF GROUNDWATER AVAILABILITY MAP



DISK NAME : DAVAO-DELSUR(DISK1)
 FILENAME : DAVAO-DELSUR(GPA)

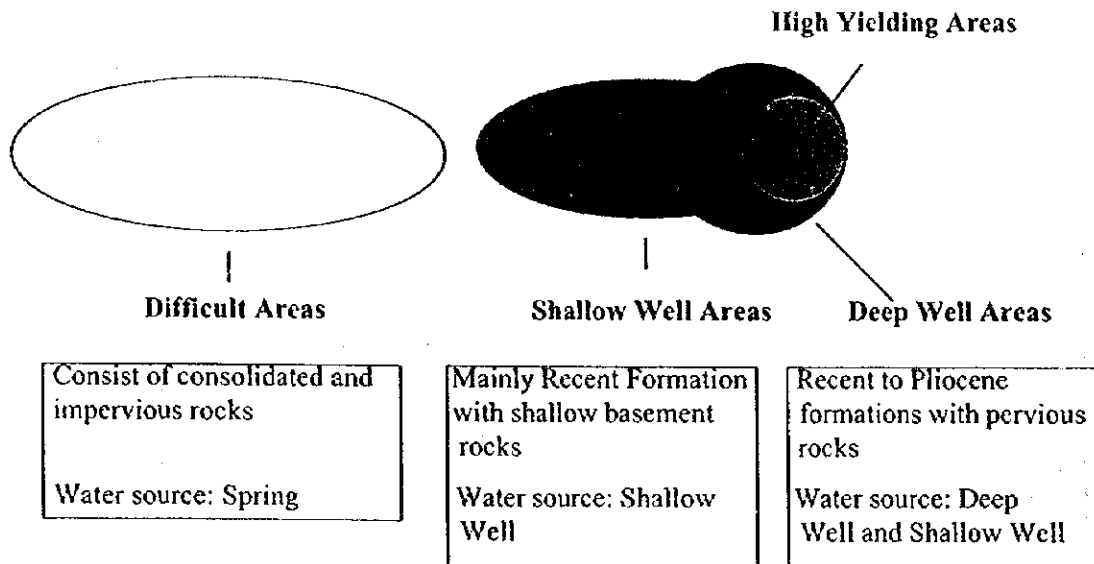


- 3) Areas with potential high yielding aquifer in the Water Resources Investigation of NWRB, are reflected in the defined groundwater potential areas.

Based on the results of electric resistivity survey of the above investigation, resistivity values from 20 to 210 ohm-meter indicate a potential high yielding formation. Values less than 10 ohm-meter suggest clayey layer. Figure 7.3.3 shows the boundaries of areas with high and low yielding aquifers.

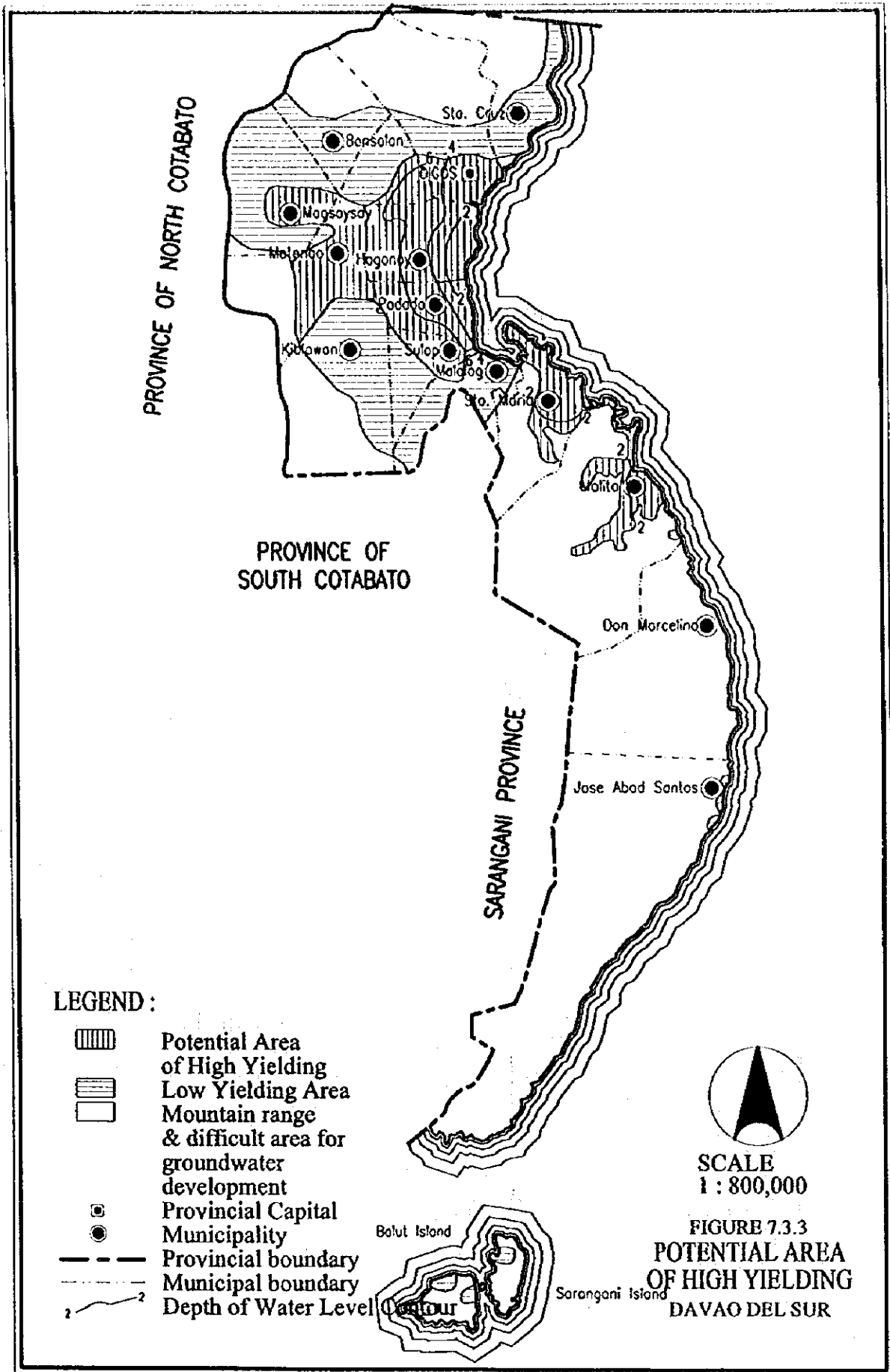
- 4) Delineate shallow and deep well areas based on well database of NWRB and DPWH-central office, well inventory of DPWH-DEO (refer to Table 7.3.1, Data Report) and rock distribution. Figure 7.3.4 presents the categorization in terms of groundwater utilization.

Figure 7.3.4 Area Category in Groundwater Utilization



Shallow well areas are defined on the following basis:

- Predominance of serviceable shallow wells and presence of deep wells with water quality problem and/or low yielding aquifers.
 - Occurrence of impervious rocks beneath the Recent formation at shallow depth.
- 5) Based on the information provided by NWRB's well inventory and the data obtained through the questionnaires, well specifications for each municipality are established as shown in the map. These specifications are used as references in



DISK NAME : DAVAO-DELSUR(DISK1)
 FILENAME : DAVAO-DELSUR(PARTY)

evaluating the groundwater availability in each locality. Individual well locations with technical information are presented in Figure 7.6.1, Data Report.

(3) Future updating and utilization of the map

For future updating of the map, the following procedure shall be employed.

- 1) Referring to the results of any supplementary water sources investigation by various agencies, re-define the potential area for groundwater development by applying the aforementioned procedures.
- 2) Update the provincial database using the questionnaire made for the study to make necessary revision of the delineated boundaries of groundwater categories.

7.4 Spring Sources

The numbers and discharge of developed and untapped springs by municipality are shown in Table 7.4.1. The data are derived from the information obtained through the questionnaires and Table 7.1.1 Water Source Information, Data Report.

Table 7.4.1 Existing Spring Sources

Municipality	Developed Spring		Untapped Spring		
	Number	Discharge (l/sec)	Number	Discharge (l/sec)	
				Ave.	Range
Sta. Cruz	37	<2.8	1	15.8	15.8
	1	>2.8			
Digos	31	<2.8			
Bansalan	11	<2.8	4	32.9	1.6 - 94.6
Magsaysay	23	<2.8			
	1	>2.8			
Matanao	10	<2.8	7	N.A.	N.A.
Sulop	1	<2.8			
Malalag	10	<2.8	4	N.A.	N.A.
Kiblawan	6	<2.8	4	N.A.	N.A.
Sta. Maria	33	<2.8	2	1.0	0.9 - 1.1
Malita	154	<2.8			
Don Marcelino	100	<2.8	2	0.8	0.3 - 1.4
Jose Abad Santos	5	<2.8	2	1.3	0.6 - 1.9
Sarangani	13	<2.8	2	0.5	0.3 - 0.6

7.5 Surface Water Sources

The major rivers in the province were selected to evaluate their potential as water supply source to meet the future water needs of the province. The following criteria were adopted in for their selection:

- rivers currently utilized for domestic water supply,
- rivers which have gauging stations, and
- rivers with watersheds of 100 sq.km or more.

Based on the above criteria, the selected major rivers were the Sibulan River, the Digos River, the Hagonoy River and the Padada River. The Digos and Padada Rivers have several stream systems, which are the Stream-A for the Digos River and the Marber-Mantanao stream, the Stream-C and -D for the Padada River as shown in Table 7.5.1. The Padada River main system originates from North Cotabato, and the Stream-C and -D systems originate from South Cotabato.

The three gauging stations in the province are located at the Sibulan River and the Padada River, which are shown in Figure 7.5.1. The runoff records are obtained from the "Philippine Water Resources Summary Data" prepared by NWRC in 1980. Data from gauging station including surface water use in watershed as water rights registrations are summarized in Table 7.5.1.

(1) Surface Water Utilization/Water Rights

As seen in Table 7.5.1, the present surface water uses from the major rivers total 27.96 cu.m/sec. Of this total use, the water rights of 16.10 cu.m/sec are registered in the province's major rivers. While, 11.86 cu.m/sec are used in the adjoining provinces and 4.08 cu.m/sec from other rivers are utilized in the province. The ratio of surface water use for domestic water supply purpose in the major river basins is only 1.4%, including future utilization of the Davao City WD' BOT project.

(2) River Flow Analysis

The flow duration curves, derived from available runoff records, are shown in Figure 7.5.2. The stream flow, maintenance flow, diversion flow and return flow are usually used to estimate the exploitable surface water potential. In this study, the stream flow was considered as flow potential for domestic use and the diversion flow value was

Table 7.5.1 Gauging Station & River Water Use by Major River Basins

Major River	River Basin		Information from Gauging Station				Surface Water Use (Water Rights) in Watershed					
	Stream & Main Systems	Drainage ¹ sq. km	Location No. in Figure 7.5.1	Peak Q _p	Max. Q _{sr}	Min. Q _{sr}	Data Period	Municipality in watershed	Domestic cum/sec	Industrial cum/sec	Irrigation cum/sec	Others ³ cum/sec
Sibulan				39.41	25.39	4.96	1955-'70	Digos	0.00	0.00	0.33	0.00
Digos		128.0 (1); near Santa Cruz						Santa Cruz	0.00	0.00	0.11	0.00
	Stream-A	No Existing Gauging Station						Digos	0.00	0.00	0.28	0.00
	Digos Main	No Existing Gauging Station						Matanao	0.00	0.00	0.30	0.00
		No Existing Gauging Station						Hagonoy	0.00	0.00	0.03	0.00
		No Existing Gauging Station						Digos	0.00	0.00	0.03	0.00
		No Existing Gauging Station						Hagonoy	0.00	0.00	0.81	0.00
		No Existing Gauging Station						Digos	0.00	0.00	0.05	0.00
		No Existing Gauging Station						Bansalan	0.00	0.00	0.45	0.00
		No Existing Gauging Station						Matanao	0.00	0.00	0.53	0.00
		No Existing Gauging Station						Hagonoy	0.00	0.00	2.26	0.01
		No Existing Gauging Station						Digos	0.00	0.00	0.15	0.00
		No Existing Gauging Station						Bansalan	0.00	0.00	3.67	0.00
		No Existing Gauging Station						Magsaysay	0.00	0.00	3.95	0.08
		No Existing Gauging Station						Matanao	0.00	0.00	1.00	0.00
		No Existing Gauging Station						Padada	0.00	0.00	0.00	0.00
		No Existing Gauging Station						(South Cotabato) ⁵	0.00	0.00	1.92	0.00
		No Existing Gauging Station						Kiblawan	0.00	0.00	0.17	0.00
		No Existing Gauging Station						Padada	0.00	0.00	0.00	0.00
		No Existing Gauging Station						(South Cotabato) ⁵	0.00	0.00	0.61	0.00
		No Existing Gauging Station						Kiblawan	0.00	0.00	0.22	0.00
		No Existing Gauging Station						Padada	0.00	0.00	0.00	0.00
		No Existing Gauging Station						(North Cotabato) ⁵	0.00	0.00	9.33	0.00
		No Existing Gauging Station						(Sultan Kudarat) ⁵	0.00	0.00	0.13	0.00
		No Existing Gauging Station						Matanao	0.00	0.00	1.50	0.00
		No Existing Gauging Station						Padada	0.00	0.00	0.00	0.04

Source: Philippine Water Resources Summary Data, established January 1980 by NWRG

Notes: Drainage¹ : Watershed Area at Gauging Station

NA² : Record is lacking.

Q_p : Peak Discharge of Daily Maximum Discharge

Q_{max} : Maximum Daily Discharge of Weighted Daily Discharge

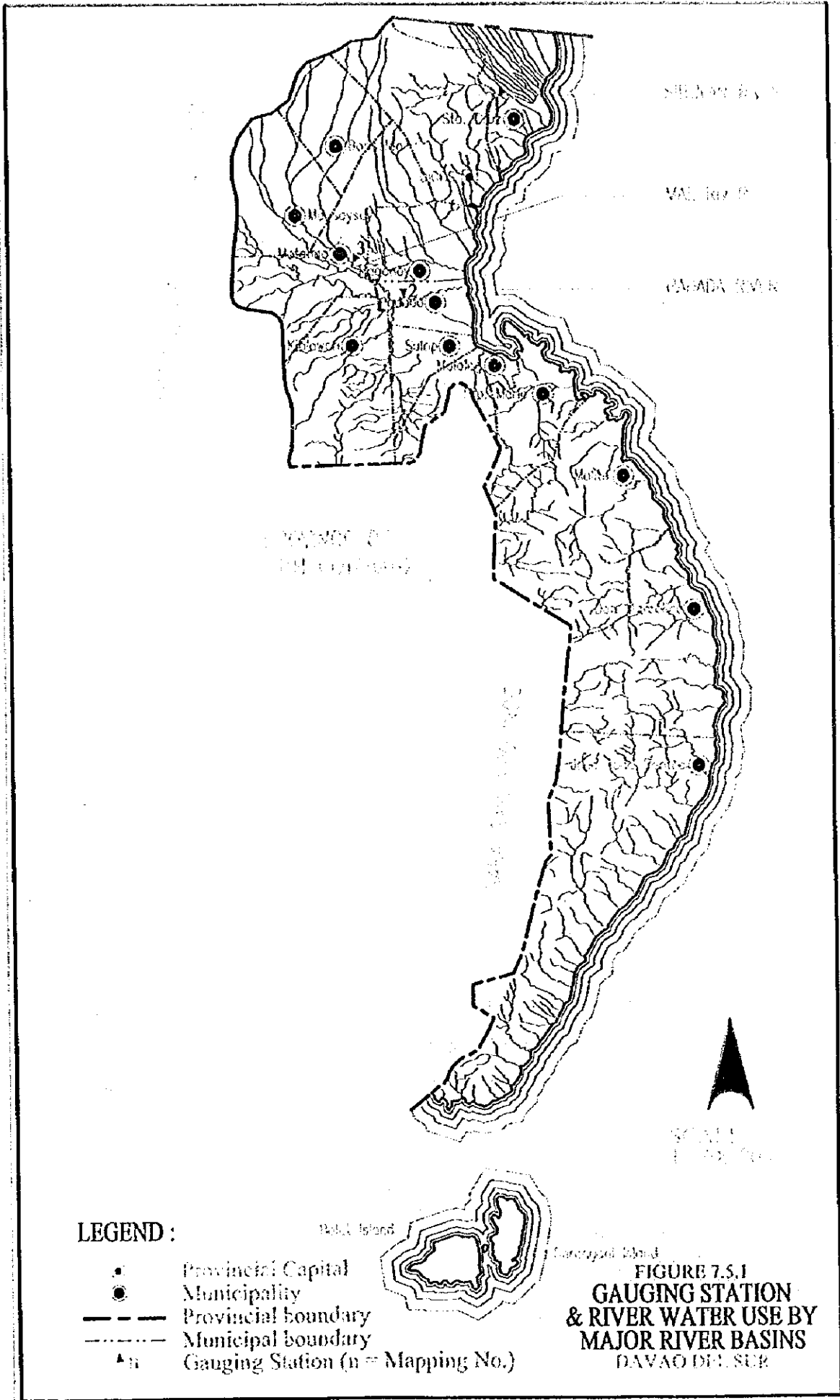
Q_{min} : Minimum Daily Discharge of Weighted Daily Discharge

Others³ : Including Livestock, Recreation & Fisheries

NR⁴ : Surface water utilization was not registered in NWRB Database, as of March 1997.

(Province)⁵ : Out of Applicable Area

DISK NAME : DAVAO DEL SUR(DISK1)
FILENAME : DAVAO-DEL-SUR(A4)



LEGEND :

- Provincial Capital
- Municipality
- Provincial boundary
- Municipal boundary
- ▲n Gauging Station (n = Mapping No.)

FIGURE 7.5.1
GAUGING STATION
& RIVER WATER USE BY
MAJOR RIVER BASINS
DAVAO DEL SUR

treated as the equivalent to the discharge of water rights registration in surface water use. Detailed study on the return flow has not been performed due to the difficulties in investigating relating hydrological parameters within the whole watersheds in the province. Therefore, the return flow was not considered for the estimation of exploitable potential.

It is generally accepted that to secure the required volume for water supply, each water use sector adopts the different return periods. Usually, the dependability of domestic water supply is taken to be 90% (10-year return-period) of the whole hydrological period.

In determining the river maintenance flow, such factors as navigation, fishing, picturesque scenery, salt water intrusion, clogging of river mouth, riparian structures, ground water table, flora and fauna, and river water quality shall be considered to maintain the normal function of the river. In the Philippines, 10% of the dependable flow of the river is at least required as minimum maintenance flow. Therefore, the maintenance flow was calculated as the dependable flow for irrigation, which equals to 80% (5-year return-period) of the whole hydrologic period.

Finally, the exploitable potential of surface water in the province was studied in case of inflow to and outflow from the respective municipalities. The results are summarized in Table 7.5.2.

3) Surface Water Quality

The result of water quality analysis for surface water is summarized in Table 7.5.1, Data Report. The sampling locations were basically selected at the upstream boundary of each (stream in the respective municipalities. In the said table, the class AA and A of the "DENR Water Quality Criteria for Fresh Water" are used as reference for raw water evaluation. The PNSDW-1994 is also used to evaluate water quality with reference to turbidity and trace element. Table 7.5.1, Data Report indicates the results of the water quality analysis of the selected streams that meet the Class A water quality criteria.

7.6 Future Development Potential of Water Sources

7.6.1 Groundwater

A well inventory covering all the municipalities show that there are 4,023 existing wells

Percent of Time (%) (No. in Figure 7.5.1)	Specific Discharge (cum/sec/100sq km)		
	Sibulan 1	Padada 2	Marber 3
10%	7.17	3.57	6.03
20%	6.04	2.92	4.84
30%	5.59	2.53	3.74
40%	5.22	2.28	3.02
50%	4.84	1.96	2.38
60%	4.46	1.66	2.09
70%	3.89	1.46	1.79
80%	3.61	1.13	1.36
90%	3.18	0.84	1.17
100%	2.05	0.20	0.71
Period of Data Used	1955-'70	1949-'70	1956-'70

Source: Philippine Water Resources Summary Data, as of Jan. 1980 by NWRC

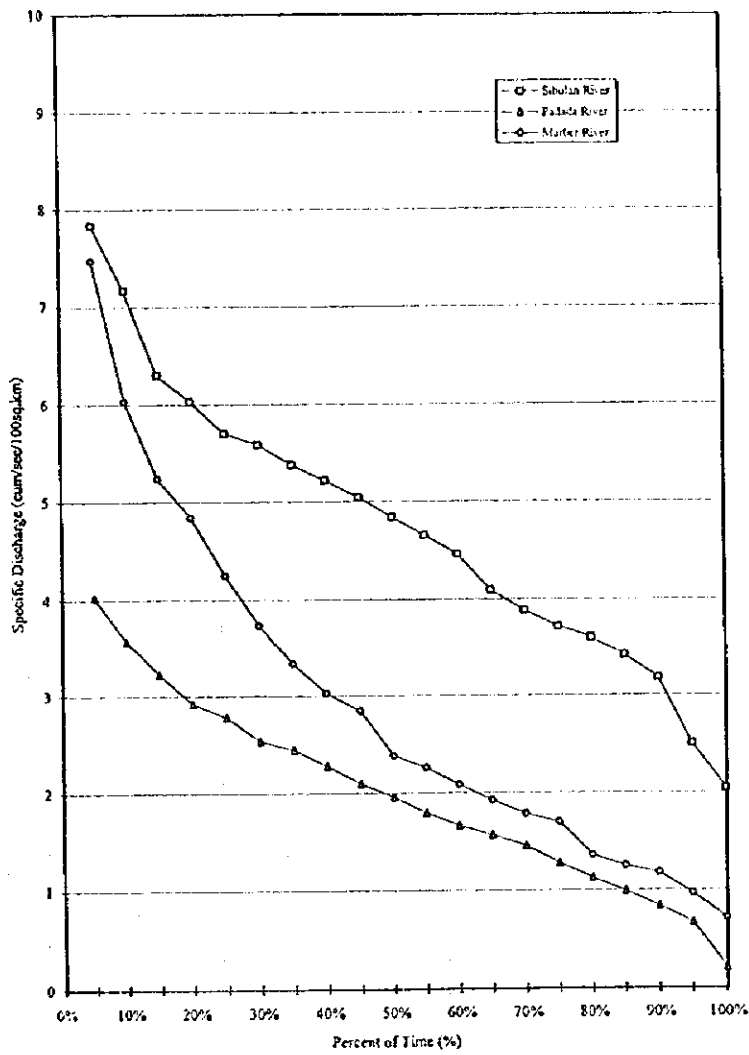


Figure 7.5.2 River Flow Duration Curve

Table 7.5.2 Probability of Surface Water

Surface Water Sources		Related Data					Probability of Surface Water (10-year return-period)								
Major Surface Water	Stream & Main Systems	Location Municipality & other Province upstream to down	River Connection outlet or inlet	Watershed Area in		Sp. D (return-period)		Inflow to Municipality			Outflow from Municipality				
				Location (1)	Upstream (2)	10-year (3)	5-year (4)	S/Flow (5) (2)x(3) _{min}	M/Flow (6) (2)x(4) _{min}	Use (7) (3)x(6) _{min}	Potential (8) (5)-(6)-(7)	S/Flow (9) (5)-(1)x(3) _{min}	M/Flow (10) (6)-(1)x(4) _{min}	Use (11) Potential (12) (9)-(10)-(11)	
		sq. km	sq. km	Q	Q	cu. m/sec	cu. m/sec	cu. m/sec	cu. m/sec	cu. m/sec	cu. m/sec	cu. m/sec	cu. m/sec	cu. m/sec	cu. m/sec
Sibulan		Digos	55.80	0.00	3.18	3.61	0.00	0.00	0.00	0.00	0.00	1.77	0.20	0.33	1.24
		Santa Cruz	36.35	55.80	3.18	3.61	1.77	0.20	0.33	1.24	2.93	0.33	0.44	2.16	
Digos	Stream-A	Digos	48.10	0.00	3.18	3.61	0.00	0.00	0.00	0.00	0.00	1.53	0.17	0.28	1.07
		Matanao	7.18	48.10	3.18	3.61	1.53	0.17	0.28	1.07	1.76	0.20	0.58	0.97	
Digos Main		Hagonoy	0.80	55.28	3.18	3.61	1.76	0.20	0.58	0.97	1.78	0.20	0.62	0.96	
		Digos	5.77	0.00	3.18	3.61	0.00	0.00	0.00	0.00	0.18	0.02	0.03	0.13	
Hagonoy		Hagonoy	19.15	5.77	3.18	3.61	0.18	0.02	0.03	0.13	2.57	0.29	1.46	0.82	
		Digos	7.70	0.00	1.01	1.24	0.00	0.00	0.00	0.00	0.08	0.01	0.05	0.02	
Padada	Stream-B	Bansalan	17.45	7.70	1.01	1.24	0.08	0.01	0.05	0.02	0.25	0.03	0.50	(0.28)	
		Magsaysay	12.77	25.14	1.01	1.24	0.25	0.03	0.50	(0.28)	0.38	0.05	1.03	(0.70)	
Padada	Stream-C	Hagonoy	53.47	37.91	1.01	1.24	0.38	0.05	1.03	(0.70)	0.92	0.11	3.30	(2.50)	
		Digos	25.01	0.00	1.17	1.36	0.00	0.00	0.00	0.00	0.29	0.03	0.15	0.11	
Padada	Stream-D	Bansalan	141.15	25.01	1.17	1.36	0.29	0.03	0.15	0.11	1.95	0.23	3.82	(2.10)	
		Magsaysay	112.50	166.17	1.17	1.36	1.95	0.23	3.82	(2.10)	3.27	0.38	7.85	(4.96)	
Padada	Stream-E	Matanao	23.94	278.67	1.17	1.36	3.27	0.38	7.85	(4.96)	3.55	0.41	8.85	(5.71)	
		Padada	4.36	302.61	1.17	1.36	3.55	0.41	8.85	(5.71)	3.60	0.42	8.85	(5.67)	
Padada	Stream-F	South Cotabato	284.38	0.00	1.17	1.36	0.00	0.00	0.00	0.00	3.34	0.39	1.92	1.03	
		Kiblawan	24.77	284.38	1.17	1.36	3.34	0.39	1.92	1.11	3.63	0.42	2.10	1.15	
Padada	Stream-G	Padada	3.64	309.15	1.17	1.36	3.63	0.42	2.10	1.15	3.67	0.42	2.10	1.15	
		South Cotabato	89.80	0.00	0.84	1.13	0.00	0.00	0.00	0.00	0.75	0.10	0.61	0.04	
Padada	Stream-H	Kiblawan	31.53	89.80	0.84	1.13	0.75	0.10	0.61	0.04	1.01	0.14	0.83	0.05	
		Padada	3.64	121.33	0.84	1.13	1.01	0.14	0.83	0.05	1.05	0.14	0.83	0.08	
Padada Main		North Cotabato	915.75	0.00	1.17	1.36	0.00	0.00	0.00	0.00	10.75	1.24	9.33	0.18	
		Sultan Kudarat	795.93	915.75	1.17	1.36	10.75	1.24	9.33	0.18	20.08	2.33	9.45	8.31	
Padada		Matanao	35.91	1,711.68	1.17	1.36	20.08	2.33	9.45	8.31	20.51	2.37	10.95	7.18	
		Padada	61.07	1,747.59	1.17	1.36	20.51	2.37	10.95	7.18	29.54	3.44	22.76	3.34	

Notes: Sp. D (Specific Discharge) was analyzed by monthly mean flow records from gauging station.
 S/Flow (Stream Flow) was estimated specific discharge (10-year return-period) multiplied by upstream area.
 M/Flow (Maintenance Flow) was estimated 10% of river flow in case of 5-year return-period.
 Sp.D (10-year or 5-year return-period) without gauging station was adopted by the other analysis result from near gauging station.
 Inlet & outlet "User" (Water Rights) are summed up by NWRB Database, as of March 1997.
 Unit Q for Specific Discharge is cu.m/sec/100 sq.km.
 S/Flow, M/Flow & Use in final outlet flow of each stream system was added to respective inlet flows of main system.

in the province, while 201 wells are recorded in the inventory made by NWRB (See Table 7.1.1 and 7.3.1, Data Report). Despite the smaller number of wells included in NWRB data, they were used in the analysis since they provided technical information. Of the total 201 wells, 184 have complete information: depth, static water level and specific capacity. Data are summarized in Table 7.6.1 Existing Well Sources.

Considering the well information, the most productive wells are those having depth ranging from 4 m to 20 m and from 20 m to 113 m. The good yielding wells have static water level varying from about 3 m to 38 mbgl and specific capacity of about 0.52 l/sec/m to 2.5 l/sec/m of drawdown.

Based on the hydraulic characteristics and distribution of wells in Davao del Sur, good aquifers are distributed in a wide alluvial plain in the northern area of the province, including Digos, Padad, Hagonoy, and Sulop and in mountain slope of Bansalan, Kiblawan, and Sta. Cruz. Considering the depth of the existing deep wells, the alluvial formations have thicknesses of 106 m or more. Other alluvial plains are also distributed on a smaller scale in places of Malita, and Jose Abad Santos. In the southern areas of Digos and Hagonoy, deep wells with depths of about 54 m are free flowing. In portions of Malalag, Sta. Maria, and Malita, wells with depths from 36 m to 48 m are also in the same condition.

As indicated in Figure 7.3.2 Main Report, salt water intrusion occurs in deep wells drilled in the alluvial plain along the shorelines of Sta. Cruz and Padada. Free flowing wells in Malalag also have saline water. In Sulop area, shallow and deep groundwater is salty. In the southern municipalities of Sta. Maria, Malita, and Jose Abad Santos, the small alluvial plains have salt water intrusion in the shallow and deep wells. Balut Island located in the southern most part of the province has salt water intrusion in shallow and deep groundwater.

Groundwater in the alluvial plain in Magsaysay, north of Hagonoy, east of Sulop, Kiblawan, and east of Malalag contains high iron concentration. Moreover, in the small alluvial plains distributed in Sta. Maria and Malita, shallow and deep groundwater has high iron content. Balut Island also has high iron content in deep groundwater.

Table 7.6.1 Existing Well Sources

Municipality	Type	Number	Depth (m)		SWL (m)		Sp. Cap. (l/sec/m)	
			Ave.	Range	Ave.	Range	Ave.	Range
Dansalan	SW	16	10.06	6.70 - 18.29	4.68	1.22 - 15.24	1.24	0.20 - 2.20
	DW	20	52.95	20.01 - 113.4	37.36	12.20 - 88.42	1.06	0.069 - 3.13
	Total	36	33.89		22.84		1.14	
Davao City	SW	19	11.41	4.87 - 18.30	3.16	0.91 - 6.40	1.16	0.03 - 3.16
	DW	160	53.38	20.73 - 225.00	22.89	0.30 - 121.95	0.92	0.02 - 6.21
	Total	179	48.93		20.80		0.95	
Digos	SW	9	10.85	8.23 - 13.72	2.99	244 - 3.96	0.52	0.41 - 0.91
	DW	14	57.06	24.39 - 106.40	35.14	2.44 - 94.51	0.83	0.23 - 1.04
	Total	23	38.98		22.56		0.71	
Don Marcelino	SW							
	DW	14	43.55	33.55 - 46.78	***			
	Total	14	43.55					
Hagonoy	SW	14	14.03	9.75 - 18.60	6.07	1.22 - 15.24	1.35	0.41 - 3.13
	DW	8	38.12	24.39 - 50.30	16.16	4.26 - 32.32	1.99	0.20 - 4.20
	Total	22	22.79		9.74		1.58	
Jose Abad Santos	SW	16	11.49	9.15 - 15.24	4.57	2.13 - 6.40	1.18	0.14 - 2.53
	DW	9	45.23	32.01 - 54.88	28.45	27.44 - 28.96	0.35	0.16 - 0.72
	Total	25	23.64		13.17		0.88	
Kiblawan	SW	13	18.29	18.29 - 18.29				
	DW	7	50.52	48.78 - 54.87	***			
	Total	20	29.57					
Magsaysay	SW							
	DW	5	35.56	21.34 - 48.78	***			
	Total	5	35.56					
Malalag	SW	29	12.03	4.26 - 19.82	2.97	0.91 - 9.15	0.89	0.13 - 2.93
	DW	30	27.62	20.05 - 80.79	10.21	0.50 - 24.39	0.69	0.04 - 2.07
	Total	59	19.96		6.65		0.79	
Malita	SW	45	12.03	6.71 - 19.82	5.36	0.61 - 14.63	1.05	0.21 - 2.48
	DW	42	26.03	20.73 - 67.99	13.26	3.96 - 34.14	0.6	0.06 - 1.67
	Total	87	18.79		9.17		0.83	
Matanao	SW	4	17.84	17.40 - 18.29	9.98	6.40 - 13.57	2.5	2.10 - 2.90
	DW	11	43.78	20.73 - 107.90	29.04	5.49 - 96.03	0.64	0.143 - 2.10
	Total	15	36.86		23.96		1.14	
Padada	SW	13	14.09	4.57 - 19.81	3.29	1.06 - 7.31	2.14	0.42 - 5.60
	DW	9	50.56	20.43 - 107.32	4.17	1.52 - 6.10	1.81	0.18 - 5.52
	Total	22	29.01		3.65		2.01	
Sta. Cruz	SW	9	14.88	7.01 - 19.82	4.69	1.21 - 17.38	1.73	1.05 - 2.93
	DW	11	39.75	25.61 - 51.22	16.34	0.30 - 39.63	0.93	0.04 - 3.10
	Total	20	28.56		11.10		1.29	
Sta. Maria	SW	6	18.39	18.39 - 18.39				
	DW	8	41.15	33.53 - 48.78	***			
	Total	14	31.40					
Sulop	SW	40	15.75	13.32 - 18.29	3.35	0.61 - 6.40	0.95	0.24 - 1.66
	DW	24	34.86	25.30 - 48.78	17.27	1.52 - 23.48	0.67	0.28 - 1.45
	Total	64	22.92		8.57		0.85	
Provincial	SW	233	13.14	4.26 - 19.82	4.81	0.61 - 17.38	1.34	0.03 - 5.60
	DW	372	42.67	20.01 - 225.00	20.94	0.30 - 121.95	0.95	0.02 - 6.21
	Total	605	31.30		14.73		1.10	

Source: NWRB Well Inventory Database

Notes:

- Based on the data from Feasibility Study of WDs, LWUA and DPWH (Questionable data were disregarded)
- ** Estimated figures from hydrogeological continuity of the aquifer.
- *** No related technical information available.

Legend: SWL = Static Water Level SP. Cap = Specific Capacity Ave. = Average
 SW = Shallow Well DW = Deep Well

As alternative water sources, the untapped springs can be developed for future use. These are the most reliable sources of water supply in the province because groundwater quality has a serious problem of salt water intrusion and high iron content. Existing spring sources (436) originating from mountainous areas in the northern and southern parts of the province are utilized for water supply. To meet future demand, 29 untapped springs in the areas of Sta. Cruz, Digos, Bansalan, Magsaysay, Hagonoy, Matanao, Padada, Sulop, Malalag, and Kiblawan municipalities are recommended.

The detailed hydrogeological characteristics of each municipality are summarized in Table 7.6.2, while individual well locations with technical information are shown in Figure 7.6.1 Individual Well Location and Specification Map, Data Report.

Table 7.6.2 Hydrogeological Description by Municipality

MUNICIPALITY	TOPOGRAPHY	EXISTING CONDITIONS											DATA INTERPRETATION							
		GEOLOGIC UNITS (%)			WELL INFORMATION				SPRINGS		GROUND WATER AVAILABILITY (%)			AQUIFER FOR-MATION	ESTIMATED AQUIFER DEPTH RANGE (m/bp)	OTHERS				
		R	N3	N2	N1	0	DEPTH (m)	SWL (m/bp)	AVE. SWL (m/bp)	MAX. (AVE)	SP. CAP. (1/ft/m)	NO.	AVE. Q (l/s)				TAPPED	UNTAPPED	SW	DW
Barasain	hilly to mountainous	0	0	30	0	70	6-18	20-113	4.68	37.36	0.20-2.20 (1.24)	0.07-3.13 (1.06)	8	<2.3	0	60	40	60	6-60	Expected aquifer at low relief hills but produce low yield. Spring and surface water sources can be developed to supplement groundwater source.
Digos	flat to hilly	25	20	0	0	55	8-14	24-106	2.99	35.14	0.41-0.91 (0.52)	0.23-1.00 (0.83)	30	<2.3	0	40	60	40	3-80	Potential aquifer expected in the alluvial and low relief hills. Abstraction of groundwater shall be monitored to prevent salt-water intrusion.
Don Marcelino	hilly to mountainous	0	0	40	20	40							30	<2.3	0	5	95	3-40	Aquifer expected in the alluvial deposit near the shoreline. Spring development is recommended to supplement the groundwater source.	
Hagonoy	flat to hilly	100	0	0	0	0	9-18	24-50	6.07	16.16	0.41-3.13 (1.35)	0.20-4.20 (1.99)	-	-	0	100	0	100	6-60	Potential aquifer expected in the alluvial deposits. Wells shall be located away from the shoreline to prevent saltwater intrusion.
Jose Abad Santos	hilly to mountainous	0	0	70	30	0	9-15	32-55	4.57	28.45	0.14-2.53 (1.18)	0.16-0.72 (0.35)	5	<2.3	0	5	95	6-60	6-60	Aquifer expected along the coastal area. Spring sources should be developed to supplement groundwater source.
Kiblawan	mountainous	10	85	5	0	0							5	<2.3	0	50	50	6-60	6-60	Aquifer expected at deepwell areas but may produce low yield. Spring development is recommended. High iron content reported in the area.
Magsaysay	hilly to mountainous	25	0	70	0	5	9-15	32-54					9	<2.3	0	90	10	10-80	10-80	Aquifer expected at deepwell areas. Spring development is recommended. High iron in groundwater reported.
Malalag	flat to hilly	90	0	10	0	0	4-19	20-80	2.97	10.21	0.13-2.93 (0.89)	0.04-2.07 (0.69)	9	<2.3	0	95	5	95	2-60	Potential aquifer expected in the alluvial and low relief hills.
Malita	flat to mountainous	5	30	5	30	30	6-19	20-67	5.36	13.26	0.21-2.48 (1.05)	0.06-1.67 (0.6)	22	<2.3	0	70	30	5-60	5-60	Potential aquifer expected in the alluvial and low relief hills. Wells shall be located inland to prevent salt water intrusion.

MUNICIPALITY	TOPOGRAPHY	EXISTING CONDITIONS														DATA INTERPRETATION					
		GEOLOGIC UNITS (%)						WELL INFORMATION				SPRINGS				GROUND WATER AVAILABILITY (%)	AQUIFER FORMATION	ESTIMATED AQUIFER DEPTH RANGE (m/ft)	OTHERS		
		R	N ₁	N ₂	N ₃	N ₄	O	DEPTH (m)		AVE. (m/ft)		MAX. (AVE.) SP. CAP. (L/M)		TAPPED NO.	TAPPED AVE. (L/S)					UNTAPPED NO.	UNTAPPED AVE. (L/S)
								SW	DW	SW	DW	SW	DW			SW	DW				
Matanao	hilly to mountainous	35	65	0	0	0	0	17-20	18-107	9.98	29.04	2.10-2.90	0.143-2.1	8	<2.3	0	70	30	Aluvium/ Plio-Pleistocene rocks	6-60	Potential aquifer expected in the alluvial and low relief hills.
Padada	flat	100	0	0	0	0	4-19	20-107	3.29	4.17	0.42-5.6	0.18-5.52	-	-	0	100	0	Aluvium deposits	3-60	Potential aquifer expected in the alluvial plains and low relief hills. Salt water intrusion shall be monitored along the coastal area. Methane gas reported in the area.	
Sta. Cruz	flat to mountainous	5	0	25	0	70	7-19	25-51	4.69	16.34	1.05-2.93	0.04-3.1	30	<2.3	0	30	70	Miocene and older rocks	4-60	Potential aquifer expected in the alluvial along the coast. Spring development is recommended.	
Sta. Maria	flat to hilly	20	5	0	60	15							32	<2.3	0	95	5	Aluvium/ Plio-Pleistocene rocks	3-60	Potential aquifer expected in the alluvial and low relief hills. Groundwater sources should be located inland and away from the shoreline to prevent saltwater intrusion. High Iron content reported in the area.	
Suop	flat to hilly	15	35	10	20	20	13-18	25-48	3.35	17.27	0.24-1.66	0.28-1.45	1	<2.3	0	100	0	Aluvium/ Plio-Pleistocene rocks	3-60	Potential aquifer expected in the alluvial plains and low relief hills.	
Sarangani	hilly to mountainous												12	<2.3						36	

7.6.2 Springs

Untapped spring source identification data are shown in Table 7.6.3. These data were collected and tabulated by questionnaire sheets-untapped spring information format, Data Report, including the parameters of barangay name, owner, discharge, transmission line length, and elevation difference.

7.6.3 Untapped Spring Source Identification

Municipality	Barangay Name	Number	Untapped Spring			
			Owner	Discharge (m ³ /hr)	T.L.L. (km)	Ele. Different (m)
Sta. Cruz	Ragabrab	1	N.A.	56.8	5.0	N.A.
Bansalan	Balagonan, Managa	1	N.A.	90.8	15.0	N.A.
	Gagpang, Alegre	1	N.A.	36.3	18.0	N.A.
	Tacub, Alegre	1	N.A.	5.8	18.0	N.A.
	Poblacion	1	N.A.	340.7	N.A.	N.A.
Matanao	Cabasagan	1	Private	N.A.	N.A.	N.A.
	Towak	1	Private	N.A.	N.A.	N.A.
	San Jose	1	Private	N.A.	N.A.	N.A.
	New Latipunan	1	Private	N.A.	N.A.	N.A.
	Kauswagan	1	Private	N.A.	N.A.	N.A.
	Kapoc	1	Private	N.A.	N.A.	N.A.
	Buri	1	Private	N.A.	N.A.	N.A.
Malalag	Dongan Pekong	1	N.A.	N.A.	20.0	N.A.
	Pitu	1	N.A.	N.A.	10.5	N.A.
	Ibo	1	N.A.	N.A.	10.0	N.A.
	Bolton	1	N.A.	N.A.	8.0	N.A.
Kiblawan	Poblacion	1	N.A.	N.A.	0.5	N.A.
	Bunot	1	N.A.	N.A.	N.A.	N.A.
	San Jose	1	N.A.	N.A.	N.A.	N.A.
	Tacul	1	N.A.	N.A.	N.A.	N.A.
Sta. Maria	Abnate	1	N.A.	N.A.	N.A.	N.A.
	Pongpong	1	N.A.	3.8	9	N.A.
Don Marcelino	San Isidro	1	N.A.	3.4	7	N.A.
	Lumbia	1	N.A.	1.0	N.A.	N.A.
Jose Abad Santos	Agoo	1	N.A.	5.0	N.A.	N.A.
	Caburan Small	1	N.A.	6.8	5	N.A.
Sarangani	Caburan Big	1	N.A.	2.3	N.A.	N.A.
	Tucal	1	N.A.	2.3	5.0	N.A.
	Kaile	1	N.A.	1.1	2.5	N.A.

Note: T.L.L. Transmission line length
N.A. Data not available

7.7 Water Source Development for Medium-Term Development Plan

7.7.1 Spacing Allocation for Level II and III Wells

The pumping rates required for Level I systems are fairly lower than that for Level II and III systems. The well interference in Level I systems need not to be studied in terms of spacing of wells and production rate, since most formations in shallow and deep well areas generally have enough groundwater development potential. As Level II and III wells are usually expected to produce larger discharge to meet the water demand, the spacing of wells to avoid the well interference has to be considered. Spacing allocation for Level II and III wells was examined considering specific capacity, pumping rate, and assumed drawdown of 1 cm at interference radius for a pumping duration of 16 hours.

(1) Specific Capacity

According to the existing well source information, specific capacity was considered with ranges from 0.5 l/s/m to 6.5 l/s/m. To simplify the calculation, an average value in each range is adopted in the calculation of interference radius.

(2) Pumping Rate

The pumping rate was estimated by assuming a drawdown of 10 m with the average value of specific capacity and 16 operation hours/day of pumps. The formula used to determine proper well spacing is the Jacob modified equation. Drawdown at the interference boundary is assumed to be 1 cm after a pumping duration of 16 hours.

Table 7.7.1 presents the estimated spacing requirements and number of wells to be constructed per sq. Km. The spacing interval between adjacent wells to avoid the well interference is planned to be more than twice distances of the calculated interference radius.

Table 7.7.1 Spacing Arrangements for Planned Wells

Range of Specific Capacity (l/s/m)	Estimated Pumping Rate (m ³ /day)	Estimated Interference Radius (m)	Estimated Number of wells/km ²
0.5 - 1.5	500	80	45
1.5 - 3.0	1,000	120	20
3.0 - 4.5	2,000	160	11
4.5 - 6.0	2,500	200	7
> 6.0	> 2,500	> 200	> 7