HYDROGEOLOGICAL/GROUNDWATER ASSESSMENT OF RURAL WATER RESOURCES OF MISAMIS OCCIDENTAL:

A Capability-Building Project for Local Government Staff of Misamis Occidental

Introduction

The proposal to undertake a hydrogeological study for Misamis Occidental dates back to year 2000 when the Mines and Geosciences Bureau Regional Office No. 10 (MGB-10) submitted a proposal to the Provincial Government of Misamis Occidental through its Provincial Planning and Development Office (PPDO). The preparation of the proposal was in response to the recommendation of the NEDA Regional Office-10 (NEDA-10) which viewed the activity as an important input in ensuring the sustainability of water supply facilities proposed to be constructed under Philippine-Australia Local Sustainability (PALS) Program funded by the Australian Agency for International Development with the said Provincial Government of Misamis Occidental as executing agency.

The province-specific proposal, however, was superceded by the approval of a similar but geographically wider study. In 2001, the Philippines-Australia Governance Facility (PAGF) approved a Groundwater Assessment Study for the whole of Region-10 including Misamis Occidental. But this has not materialized, and the MGB-10 is presently not keen on pursuing the regional study in view of constraints in counterpart resources. Moreover, said proposal is put on hold status by the PAGF for quite sometime now. Given this development, the MGB-10 has presented a revised proposal, which has been favorably endorsed by the Hon. Loreto S. Ocampos, Provincial Governor of Misamis Occidental, to the PDF Panel of PALS Program last March 2003. This proposal has been considered for implementation by the PALS management team, headed by Mr.Lindsay Chan and his deputy, Mr. Isagani Salazar, and the same presented in an Activity Design. Compared with other hydrogeological activities done in the past in Southern Philippines, which were limited in purpose and scope of work, the province-wide activity encompasses the goals not covered by the former and is in fact considered as unique considering the incorporation of capability building concept in its concerns.

The Project Goal and Objectives

Project Goal

To promote good governance in the water supply sector of the Province of Misamis Occidental and encourage sustainable resource use and development of water as a vital commodity.

Objectives

To promote the rational utilization of the vital resource in order to sustain the projected economic growth of the concerned LGUs through the provision of geoscientific information regarding its groundwater resource potential and possibly subsurface conditions that could serve as a major input in its decision-making for its future developmental plans and implementation of piped community water supply schemes within its jurisdictions; and

To avoid wastage in terms of time, resources and efforts relative to water supply development by verifying and ascertaining the reliability of existing and potential potable water sources in the study area.

Output Indicators

Fourteen municipalities of the province shall be covered, with priority to the six PALS Municipalities (Bonifacio, Clarin, Don Victoriano, Jimenez, Lopez Jaena and Tudela). A total of fourteen (14) hydrogeological assessment reports, at one per town, will be prepared;

An estimated 112 springs and 210 wells shall be covered by the water point inventory, based on a rough ratio of 8 springs and 15 wells per town. A list showing the inventoried groundwater resources for each municipality will be presented in each report to be prepared;

A total of 168 VES points will be completed, at an average of 12 vertical electrical sounding (VES) points to be placed in each municipality, the specific sites of which are determined according to the locations of proposed community water systems to be installed;

A total of 210 water quality tests shall be conducted, at an average of 15 water samples to be collected or sampling sites to be tested per municipality; and

Conduct of hands-on, field trainings on the use of the new equipments for technical personnel of the PWSDP Project Team and municipal staff assigned to handle tasks relative to specific concerns or aspects of the assessment.

Key Activities

The key activities to be undertaken in the study area include geological mapping with on site lectures, and hands-on training on water point/spring sources inventory, geo-resistivity survey and water quality testing and determination. Participants for the hands-on capability building to be administered by the MGB-10 Project Staff will include technical members of the Provincial Water Supply Development Project (PWSDP) Team.

Geological Mapping with On-Site Lectures – this will involve the conduct of rapid reconnaissance to follow-up semi-detailed geological mapping of the project site giving emphasis to areas with geohydrological concerns (e.g. potential groundwater-bearing rocks or horizons) as identified from the interpretations of available aerial photographs, LandSat imageries and/or other remotely sensed data will be undertaken. Actual mapping will be centered on creeks, rivers and even road cuts. Likewise, on-site or field lectures will be conducted to prospective participants, which will be attended by representatives from the concerned LGUs.

Water Point/Spring Sources Inventory with Training - this activity centers on spring sources and well inventory, which are key elements in the groundwater resource assessment to be undertaken within the project area. The inventory aspect involves measurement of the water level in wells, spring yield, either developed or undeveloped, its location, elevation, well depth, water level or depth-to-water casing and other pertinent hydrologic information including the physico-chemical quality testing of spring water and deep well discharges. An On-the-Job training on these aspects will be undertaken by the Project Staff. The expected participants are from the LGUs concerned (e.g. PWSDP technical committee members, the municipal engineer, the MPDC and other MLGU representatives) who will be trained on the use of equipments for this purpose. These equipment include the global positioning system, borehole dipper and flow meter.

Geo-resistivity/Geophysical Survey and Training – this involves the introduction of electric current into the ground and measuring the difference in electric potential through the use of a geo-electrical resistivity meter. The vertical electrical sounding (VES) technique is to be employed for this purpose. This type of geophysical survey is to be employed in various localities of the study area that show or express potential groundwater availability. This will be done to supplement the information available on the hydrological conditions in the study area. The selection of the sites for VES points is to be based on planned development of water system facilities, together with the initial findings of the well inventory and the geologic mapping activity described in the succeeding discussion.

The general objectives of the geo-electric resistivity survey are the following:

a. To identify the electrostratigraphic sequence and pattern in the surveyed areas;
b. To correlate and infer the corresponding geological or lithologic unit to the electrostratigraphic readings;
c. To determine saline/fresh water interface, if any; and
d. To locate possible local potential groundwater bearing zones,

An On-the-Job training on the principles and application of georesistivity survey as tool for assessment of groundwater availability, including the use of the geo-electrical resistivity meter, will be undertaken. This will be initially conducted by a technical resource person from MGB, Regional Office No. 2 Tuguegarao City. This preliminary training will be done for two weeks, and will cover two of the six PALS priority municipalities. The MGB-10 team of geologists as well as technical representatives from the PWSDP and the two MLGUs will be attending this training. Field activities relative to this survey work for the twelve (12) remaining municipalities shall commence as soon as the first two are finished.

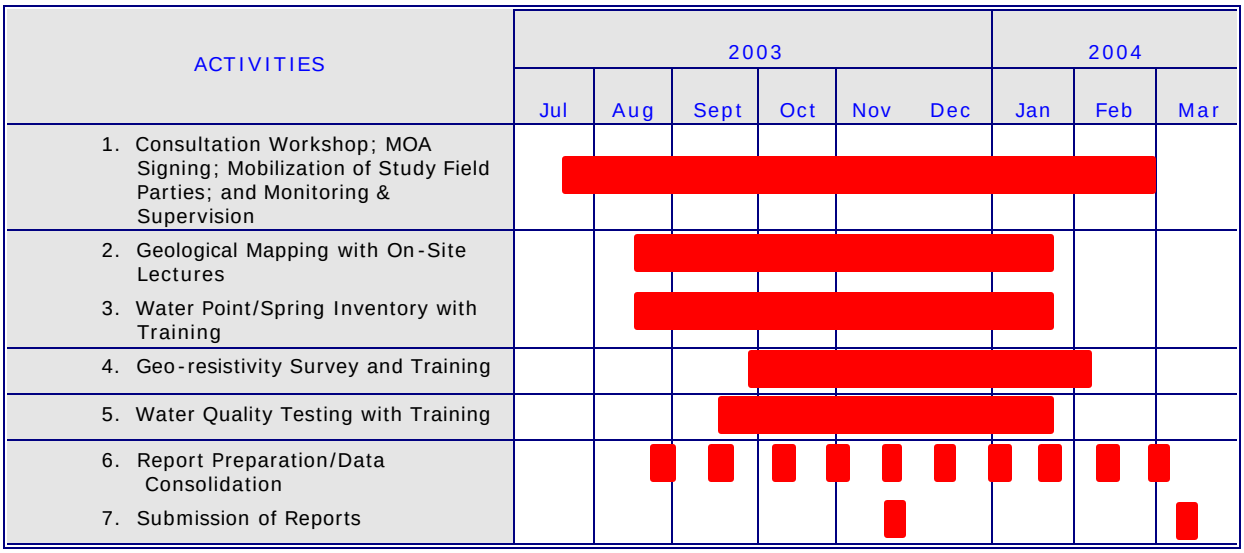
Water Quality Testing/Determination - this activity, among others, aims to generate information on the quality of the spring and groundwater resources within the coverage area and to establish baseline information on the present conditions of the vital resource. Using a set of portable equipment, the participants will also be trained on on-site analysis that will include the determinations of the amount of Salinity, Chloride, Conductivity, Dissolved Oxygen, Temperature, pH, heavy metals (e.g. Chromium, Cyanide, Gold, Iron, Magnesium, Manganese, Mercury, Nickel, Tin and Zinc), Total Coliform and BOD5 on water coming from a point source. Data on such analysis will serve as benchmarks for comparison with the information that will be gathered during monitoring activities, including those that will be acquired or collected after this project is completed. Invited participants to this training are technical representatives from the environmental and water sector of the concerned LGU, where the activity is being undertaken, as well as representative(s) from the concerned Municipal Health Office.

Report Data Consolidation – All information to be generated from the hydrogeological/groundwater assessment shall be consolidated and documented presenting the groundwater resource potentials of the covered fourteen (14) municipalities of the province. Also to be prepared during this part of the activity are figures and illustrations describing the same information previously mentioned.

Report Presentation and Submission - the completed reports for the six PALS municipalities will be presented and submitted first, followed by the eight remaining municipalities. Together with the latter is a consolidated report describing among others the results of all the activities undertaken covering the fourteen (14) municipalities.

Schedule/Time-frame

Shown below in Gantt Chart form are the different activities to be undertaken.



Funding Requirements

The project has a total estimated cost of PhP4,469,670.00, which requires support from the PALS Program of PhP2,499,600.00, a counterpart contribution of PhP345,000.00 from the Provincial Government and 14 MLGUs, and PhP1,625,070.00 from MGB-10. A summary of this budgetary requirement is presented in a table below.

BUDGET CLASS	PALS Contribution (PhP)	LGU Contribution (PhP)	MGB-10 Contribution (PhP)	TOTAL
Salaries/Wages	-	126,000.00	1,117,470.00	1,243,470.00
Equipment Outlay/Cost	2,000,000.00	219,000.00	438,100.00	2,657,100.00
Operating Cost	499,600.00	-	69,500.00	569,100.00
TOTAL	2,499,600.00	345,000.00	1,625,070.00	4,469,670.00

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