

## **NWRB Major Programs/Projects and Status of Implementation for CY 2020**

### **1. Development of Groundwater Management Plan and Establishment of Groundwater Monitoring Wells in Critical Areas**

In pursuance to the urgency of protecting the groundwater resource of the groundwater constraint areas and recognizing it as a reserve resource that may be tapped during extreme drought and disasters, the NWRB proposed the development of groundwater management plan (GMP) which started in 2014. This is in collaboration with LGUs, NGAs, private and academic institutions. It will provide a comprehensive picture of the groundwater aquifer not only in terms of defining their locations and areal extent, but also in terms of their hydraulic properties and internal characteristics.

NWRB started the program, "Development of Groundwater Management Plan for Highly Urbanized Water Constraint Areas" which piloted in the city of Iloilo. Final report for Iloilo was already completed in 2014. Policies on groundwater management in the area based from the recommendations in the plan will be formulated.

As of 2019, there are already eleven (11) GMP developed for some cities and their surrounding areas. Groundwater management plan were already completed in the areas of Iloilo, Cagayan de Oro City, Angeles City in Pampanga, Bacolod City, Baguio City, Metro Manila, Metro Cebu, Zamboanga City, Batangas, Tagbilaran City and Cavite City and surrounding areas. For 2020, GMP for Masbate City and surrounding areas will be developed.

Major component of the program is the establishment of groundwater monitoring wells in the critical areas with GMP. This will serve as a mechanism of monitoring the effectiveness of existing groundwater policy in the area as well as basis for appropriate protection and conservation interventions.

As of 2019, there's already a total of forty-six (46) groundwater monitoring wells established in eleven (10) groundwater constrained areas with GMP. The first areas established with eight (8) monitoring are Iloilo City and surrounding areas in 2014 which are already operational until present. From 2015-2019, different water constrained cities and their surrounding areas were installed with wells. Ten (10) wells in Cagayan de Oro City, six (6) in Angeles City, four (4) in Metro Manila, four (4) in Bacolod City, three (3) in Bacoor, Cavite, three (3) in Mabalacat Pampanga, one (1) in Talisay, Negros Occidental, four (4) in Metro Cebu, one (1) in Talisay, Cebu, and two (2) in Zamboanga. Data collection on water level and water quality from these wells is being conducted by NWRB to monitor the trend of groundwater level and quality in the areas.

For 2020, establishment of groundwater monitoring wells in Tagbilaran, Panglao, Batangas City, Lipa City and Cavite City and surrounding areas will be conducted after coordination with concerned LGUs and Department of Education (DepEd). Local Government Units (LGUs) are involved in the identification of monitoring wells' site and provision of land area to NWRB for the installation of well through a MOA among LGU, Department of Education (DepEd) and NWRB.

The overall goal of the program is to effectively and equitably manage the groundwater resources of the study area through the development of a systematic and science-based management strategies that does not only consider current situation but as well as the future impact of climate change to ensure long-term sustainability of this resource.

## **2. Comprehensive Water Resources Assessment for Major River Basins**

Comprehensive Water Resources Assessment for Major River Basins is a long term program of NWRB to formulate a scientific report of the available water considering the current changes and trends in the use of water resources such as climate change and increasing developments.

The NWRB first conceptualized the Comprehensive Water Resources Assessment (CWRA) for the Agno River Basin which was completed in June 2016. Four (4) river basins were assessed from 2017 -2019 as follows: 1) Panay River Basin; 2) Davao River Basin; 3) Jalaur River Basin; 4) Bicol River Basin. As of 2019, there are already five (5) major river basins with CWRA. For 2020, CWRA for Cagayan de Oro River Basin will be conducted.

The results of the study provide scientific basis for planning, programming; and project implementation towards more responsive and flexible policies in addressing current water issues particularly the impact of climate change. Recommended water policies and management strategies based from the project results are tools to enhance water resource allocation. LGUs can adopt and use the study results in their water resource development and management initiatives.

## **3. Sustainability of Listahang Tubig (Water registry) Database**

The Listahang Tubig started as a project in 2014 supported by a partnership among the NWRB as the lead agency, DILG, and the LWUA under a MOA with other cooperating agencies namely the NEDA, USAID, PAWD, and all Provincial/Municipal Local Government Operations Offices and Local Government Units (LGUs).

Its primary objective is to create a database of water utilities operating in the Philippines and to facilitate improvement in water regulation and water service delivery through access to information of participating water service providers (WSPs).

In 2015, the first of its kind countrywide survey was completed by the five assessment teams of World Bank through the utmost cooperation of all participating parties. Although it's primary objective is only to create a database of water utilities operating in the Philippines, it expanded to generating profiles, establishing a benchmark for level 3 water utilities, facilitating improvement in water regulation and water service delivery through access to information of participating water service providers (WSPs).

The NWRB was tasked to sustain the cloud-based system where the basic data of WSPs would be made available to all users. As the Listahang Tubig administrator, the NWRB continuously populate, validate and update the data to support various stakeholders on their data requirements.

All WSPs were enjoined to encode the necessary data in the said website, which is intended to be updated annually thereafter. WSPs will update and upload the data directly in the Listahang Tubig website, <http://listahangtubig.cloudapp.net>. As of 2019, there are already 26,374 WSPs registered in the Listahang Tubig.

Orientation Workshops on the Listahang Tubig are being conducted in different provinces for the updating/uploading of data/information to the Listahang Tubig website (<http://listahangtubig.cloudapp.net>). There are ten (10) provinces (Benguet, Mountain Province, Batanes, Oriental Mindoro, Occidental Mindoro, Antique, Zamboanga Del Sur, Misamis Oriental, Misamis Occidental, and Surigao del Norte) programmed for 2020 where another orientation workshops will be conducted

#### **4. Automated Real Time Monitoring System (ARMS) for Major Dams**

The ARMS Project is a joint project between Mapua Institute of Technology (MIT), Philippine Council for Industry, Energy and Emerging Technology Research and Development – Department of Science and Technology (PCIEERD-DOST) and the National Water Resources Board (NWRB). The pilot testing to remotely monitor real-time hydrological parameters in the watershed and dam reservoir using installed sensors which are all based in WMO standards will help in estimating the amount of available water in the basin. Monitoring of dam reservoirs has been one of the major role of NWRB and having real -time data will help the agency in making efficient decisions.

The overall objective of the Project is to provide an automated real-time monitoring system of measured hydrological and operational parameters at the dam/reservoir for an accurate assessment of situation. These will serve as basis for critical decisions during emergency and crisis management.

**ARMS – 1 for Ambuklao Binga and San Roque Dams** started in 2016 and still ongoing. Installation of nine (9) automatic weather stations for monitoring of 7 parameters (temperature, humidity, pressure, rainfall, wind speed & direction, and soil moisture) and three (3) water level stations is already completed. Database system for archiving information installed in NWRB is already operational. Enhancement of the sensors and the system is on-going.

**ARMS-2 for Magat Dam** started in 2017. Nine (9) automatic weather stations and one (1) automatic water level sensor are already installed with on-going enhancement.

**ARMS -3 for Pantabangan Dam** started in 2018. Preparation for the installation of the five (5) automatic weather stations and one (1) automatic water level sensor is on-going.

## **5. Design and Development of Groundwater Monitoring System for Metro Manila, Cagayan De Oro, Bukidnon and Iloilo Groundwater Monitoring Wells**

The project is the development of an automated real time monitoring system for groundwater data thru a sensor network. Groundwater data will be distantly monitored in real time basis from the 22 monitoring wells established in Metro Manila (4 wells), Cagayan de Oro (9 wells), Bukidnon (1 well) and Iloilo (8 wells). This is a joint project between Philippine Council for Industry, Energy and Emerging Technology Research and Development – Department of Science and Technology (PCIEERD-DOST) and NWRB.

The data collected will be used in calibrating the developed modeling tools and will also serve as a tool to monitor the possible impact of climate change in terms of GW levels.

The project started in 2018. There are already eight (8) wells installed with sensor system for real time monitoring as of 2019.

For 2020, instruments/sensor for other fourteen (14) monitoring stations will be installed.

## **6. Enhancement of NWRB Water Permitting Management Information System (WPMIS)**

One of the main functions of NWRB is granting or issuance of water permits. In order to fulfill its mandate of providing water for all in an effective and sustainable manner, the internal processes which starts from the filing of the application, evaluation and the grant thereof must cope with present technology, thus migrating from manual filing and screening to automated filing and processing.

The development of NWRB Water Permit Management Information System (WPMIS) which was completed in 2019 is one of the agency's efforts in addressing changes requiring ICT (Information and Communication Technology) to cope with the technicalities of the modern times. With the project, the filing, screening and processing of water permit applications will be automated putting a greater weight or emphasis on digital aquifer analysis for a more science based water allocation for existing and future water users.

Since the WPMIS is a new system for WPA, the developed system should be performing well. Enhancement of the system will be implemented in 2020.

### **Other projects for implementation in 2020**

- 7. Digital Library Project** - Electronic library system which will collect, centralize, and digitize water-related information materials stored in NWRB.
- 8. Disaster Recovery Project at NWRB Main Office and Cebu Extension Office** - A Hyper Converge Infrastructure (HI) that rebuild and run as quickly and effectively the agency's information system through internet via virtual private network at Cebu Satellite Office if unforeseen disaster or emergency events interrupt critical operation of NWRB.
- 9. Development of Human Resource Information System (HRIS)** - System for the collection and storage of data on NWRB employees.