Infomapper

A Publication on Surveys, Mapping and Resource Information Technology

Volume XXII ISSN-0117-1674 2015

FEATURE

Scholarship for NAMRIA's Human Resource: *Reap*ing the Fruits

Since the time of NAMRIA's creation in 1987, there has been a shared recognition among its leaders of the importance of its people as its greatest asset and of the need to enhance their competencies and develop their skills, knowledge, and aptitudes in order to strengthen the agency.

The popular use of terms might have changed, from "personnel" or "manpower" to "human resources," but the goal of development with regard to people assets remains the same. Basically it is still NAMRIA's policy to provide "a continuing manpower development program to upgrade personnel skills and capabilities" and the agency is still "constantly exploring possibilities for its personnel to be able to participate in training courses, conferences, seminars, and workshops as well as avail themselves of scholarship grants offered here and abroad" (Vol. 1, number 1 April 1988 issue of the NAMRIA Newsletter).

Through the years, NAMRIA has been maintaining linkages with local and foreign institutions which provide training and scholarship grants to employees. The end goal of the agency is a finishing scholar or trainee who is more well-molded and efficient. For such a returning scholar or trainee is the promise of better career opportunities and for NAMRIA is the promise of the scholar or trainee's contribution to the enhanced performance of its mandate.

Securing those promises are the service contract and a "re-entry plan or proposal for the application of newly-acquired skills or expertise" (Executive Order number 367, series of 1989). Other institutions refer to the re-entry plan or proposal as re-entry project. The service contract is basically an agreement between the scholar and his or her office that involves the rendering of services for a specified period which corresponds to the duration of the study or training.

NAMRIA refers to its mechanism for the application of the learning of its returning scholars as re-entry action plan. Its description to date is as follows: it should aim to address an identified development gap or concern of a branch of the agency and involve action steps with specific accountable person/s, timeline, and resource requirements; it should also promote commitment between scholars and their supervisor; and as part of the respective workplans of the agency branch and division concerned, should envision to contribute to the strategic goal of the organization. The criteria for a successful re-entry action plan of the agency's scholars are 100% completion and the institutionalization or installation, with evident outcomes, of what the scholar wishes to achieve for the agency.

This issue of Infomapper features in part recent re-entry plans or projects of the agency's scholars, along with their different learning journeys. Thankfully, to date, NAMRIA has had a very good return on investment for its returning scholars. Kudos to the scholars focused on achieving their dream with their hard work and sacrifices. With the rippling effect of the success of each re-entry action plan or project, the agency is therefore emboldened to continue to make available for its people opportunities to improve themselves, their agency, and eventually their country, along with extending every possible support for them to finish their studies and bring their learning home.•

Published by the Geospatial Information Services Division-Geospatial Information System Management Branch (GISD-GISMB)
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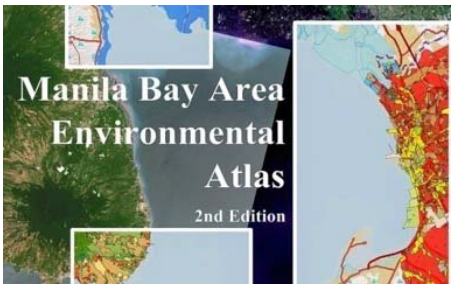

NEWS:

FEATURE

Implementing Employee Engagement Mechanisms in NAMRIA: A PMDP Re-entry Project

*by Xenia R. Andres**

Project Start: The PMDP and the ReP

The Public Management Development Program (PMDP), the national government's Career Executive Service Development Program, is "an intensive program that provides comprehensive and multi-modal learning opportunities for public managers. It aims to foster careerism in government and promote stability in the bureaucracy by producing a corps of public managers that embody competence, integrity, and commitment. Specifically, it aims to help participants develop a keen appreciation of the vital role of public managers in the overall development process; foster kinship and mutual support among government leaders; deepen the bench of qualified and competent successors to the incumbent government executives; and develop competent government leaders who are committed to the welfare of the people and the development of the nation." (Development Academy of the Philippines [DAP], 2015)

In PMDP parlance, the re-entry action plan is called re-entry project (ReP). The ReP is "an integrating activity where the scholar draws from his/her significant experiences and learning in the various courses and activities of the PMDP curriculum to address agency- or customer-specific concerns and opportunities. It also creates a space or social laboratory that enables the scholar to demonstrate the extent to which he/she has internalized the PMDP concepts, mastered the skills developed, and applied them as competencies appropriate and useful to the context of his/her workplace." (DAP, 2013) The PMDP ReP has the following characteristics: citizen-centric, collaborative, relevant, innovative, and visible. It is implemented with the support of a PMDP faculty adviser (FA) and an institutional partner (IP) from the scholar's agency.

The ReP on implementing employee engagement mechanisms in NAMRIA aimed to initiate improvement in organizational and employee performance and capacity. Specifically, it aimed to conduct an employee engagement survey to gather baseline data, develop awareness and competence of NAMRIA officials and middle managers on employee engagement, and recommend strategies to institutionalize employee engagement in the agency. The ReP was implemented from May to August 2014 with Mr. Arthur Luis P. Florentin, Fellow in Personnel Management, as FA and NAMRIA Administrative Division Chief Concepcion A. Bringas as IP.

The ReP Context

The ReP context consisted of the priority development areas under the Social Contract of President Benigno S. Aquino

The scholar presents her ReP to top and middle managers.

Cascading in San Nicolas office

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Project commitee meetings

III; NAMRIA's mandate, strategic directions, and Organizational Performance Indicator Framework; a problem analysis through organizational assessments, and a solution analysis. The organizational assessments of the Philippines Australia Human Resource (HR) and Organisational Development Facility on NAMRIA were used in the problem analysis. These assessments are the Strategic Partner Organisation Profile, 2011-2012; Strategic Planning Project, 2013; and NAMRIA HR Development (HRD) System Audit, 2014.

The NAMRIA HRD System Audit (Baltazar, 2014a) indicates that the foremost organizational capability critical to ensure the achievement of NAMRIA's mandates and strategic initiatives is motivating employees to high performance and accountability. This is essentially employee engagement. However, other findings appear to be working against employee engagement. Low morale, satisfaction, and commitment among employees were noted as evidenced by the high incidence of absences, tardiness, and turnover. The absence of baseline data on employee engagement, lack of awareness and monitoring on employee engagement, and dearth of coaching and mentoring skills from managers were seen to likely compound the agency's efforts at motivating employees. Despite these findings and observations, NAMRIA is committed to create an engaging work environment that empowers employees to achieve their full potential.

As the central mapping agency of the Philippine government, NAMRIA plays a vital role in the socioeconomic, environmental, and developmental activities of all sectors. Therefore, an engaged workforce is important in order to deliver the relevant quality maps, nautical charts, related environment and natural resources data, and geospatial services on time.

Macey, Schneider, Barbera, & Young, (2009) and Russell & Russell, (2010) see engagement as happening on the individual level wherein a person demonstrates commitment/attachment/concentration towards work and organizational goals through diligence, initiative, innovation, and delivery of quality results. These definitions imply that employee engagement is a form of energy and enthusiasm towards work which becomes observable through how the employees handle and persist at work.

The 2012-2016 Philippine Quality Award Criteria for Performance Excellence forwards workforce engagement, the collective version of employee engagement. Workforce engagement is the extent of workforce commitment, both emotional and intellectual, to accomplishing the work, mission, and vision of the organization.

Usec. Peter N. Tiangco, NAMRIA Administrator, signed a special order on 12 May 2014 authorizing the three-month implementation of the Employee Engagement Project and the creation of the Project Committee. The committee comprised an Executive Sponsor/Champion, Process Owners, Focal Persons, Project Manager (this writer), and Secretariat. The Project Committee had the responsibility of defining NAMRIA's employee engagement and development process as well as promoting, implementing, and sustaining employee engagement strategies. Employee engagement is a workplace approach designed to ensure that employees are committed to their organization's goals and values, motivated to contribute to organizational success, and are able at the same time to enhance their own sense of well-being (Investors in People [IIP], 2014).

The project had four phases, namely, the Initiation and Planning Phase, the Execution Phase, the Monitoring and Evaluation Phase, and the Close-out Phase. The Initiation and

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Planning Phase involved the creation of an Employee Engagement Project Committee in NAMRIA which served as the ReP Project Team. The Execution Phase encompassed the assessment of employee engagement in NAMRIA through an IIP survey tool and the conduct of employee engagement seminar workshop for NAMRIA officials and middle managers.

The Monitoring and Evaluation Phase involved the monitoring and evaluation of the implementation of the action plans of officials and middle managers on employee engagement through coaching and mentoring. The Close-out Phase involved the closure of the ReP wherein recommendations on employee engagement strategies were submitted for future implementation in NAMRIA.

Deliverables, Outputs and Findings, and Recommendations

The ReP deliverables were (1) project plan on employee engagement, (2) analysis of survey results on employee engagement, (3) capability building and action plans on employee engagement, and (4) report on the implementation of action plans on employee engagement with suggestions and recommendations. There was an option to include the administration of the same survey tool after the ReP as post-evaluation.

The following activities were undertaken in order to produce the deliverables: (1) creation of the project committee and conduct of meetings; (2) administration and result analysis of employee engagement survey; (3) conduct of orientation/focus group discussion (FGD) and seminar-workshops on employee engagement, performance culture, and coaching and mentoring; and (4) monitoring and validation of action plans on employee engagement through coaching and mentoring.

Table 1 shows the employee engagement survey results. The presence of the indicators of each of the 10 drivers of employee engagement was assessed.

NAMRIA is doing very well in the area of Continuous Improvement with many indicators present. Improvements need to be carried out in the areas of Business Strategy, Leadership and Management Strategy, Management Effectiveness, Involvement and Empowerment, Learning and Development, and Performance Measurement. Effort needs to be exerted in the areas of Learning and Development Strategy, People Management Strategy, and Recognition and Reward. The results were submitted to top management in order to address the gaps.

The orientation and FGD aimed to relate employee engagement to a learning and performance culture, identify factors that nurture learning and performance, and consider strategies that will foster learning and performance. Meanwhile, the seminar workshops aimed to (1) capacitate top, middle, and line managers on employee engagement mechanisms that lead to organizational and individual performance improvement; and (2) establish a coaching and mentoring mechanism that complements the Civil Service Commission (CSC) Strategic Performance Management System. The topics discussed were the Line Leaders' Role in HR Management, Employee Engagement, Employee Engagement Survey

	Employee Engagement Indicators		Findings
1	Business Strategy		Recently established but can be cascaded
2	Learning and Development Strategy		Learning and development linked to business but needs clearer criteria
3	People Management Strategy		Need to encourage more people to contribute ideas
4	Leadership and Management Strategy		Need to more clearly define management capabilities
5	Management Effectiveness		Need for clearer criteria for management effectiveness
6	Recognition and Reward		Need for more recognition
7	Involvement and Empowerment		Need for more consultation
8	Learning and Development		Need to be more deliberate in providing learning and development
9	Performance Measurement		Need to enhance and communicate evaluation
10	Continuous Improvement		Management and development of people has improved

Table 1: Employee Engagement Survey Results

Results, Coaching and Mentoring Concepts, Mentoring Conversations, and Mentoring Relationships and Strategies.

Around 37 and 100 NAMRIA leaders and managers participated in the orientation/FGD and seminar-workshops, respectively, which had Mr. Florentin as resource person. The outputs of the activities were enhanced top- and middle-management competency on employee engagement through coaching and mentoring as well as action plans per participant, division, and branch on engaging employees through coaching and mentoring.

The action plans, which were implemented from June to December 2014, aimed to create a coaching and mentoring culture in NAMRIA and support the career management and holistic development of employees. The plans included conducting staff meetings and teambuilding activities; onboarding/mentoring of enlisted personnel, newly promoted middle managers, and newly hired staff; cascading of coaching and mentoring concepts; identifying areas of concern, mentors, and mentees; coaching and mentoring of employees on nautical charting software, geographic information systems technology, and programming; training on different duties or work onboard survey vessels; and assessing the employees' strengths and weaknesses based on the Individual Performance and Commitment Review (IPCR). Administrator Tiangco directed the implementation, IPCR inclusion, and monitoring of the action plans through the issuance of special orders.

The action plans on the application of coaching and mentoring in the workplace were monitored and validated per branch. The process owners accomplished most of the action plans committed to be delivered and attained from June 2014 until the monitoring and validation period. Significant findings on the plan implementation were involvement and empowerment, employee performance improvement and motivation to work, camaraderie and building harmonious work relationships, skills improvement, effective communication, and the importance of a standard documentation and process in the conduct of coaching and mentoring.

Some of the success indicators to quantify the key significant findings were the increased participation of employees during the last three sessions of the orientation activities and cascading of updates and developments on NAMRIA programs and the reduced incidences of absence and undertime from June to August 2014. The indicators are being continuously monitored given that time was very limited for monitoring during the ReP period. That there may be other factors contributing to the work attendance and punctuality of employees is being considered.

The recommendations based on the results of the monitoring and validation activities included the (1) continuous cascading of coaching and mentoring concepts to employees; (2) conduct of coaching and mentoring and performance management learning and development sessions for middle managers; (3) formulation and adoption of a standard process and documentation format in coaching and mentoring, including the development and production of an employee handbook or information kit; (4) inclusion of coaching and mentoring in the recognition and reward program of NAMRIA; and (5) utilization of a project management tool in the monitoring and evaluation activities. In the course of implementing the ReP, there were activities that evolved as offshoots of the project. These activities were the creation of the NAMRIA Morale and Welfare Committee and the conduct of a People Strategy and Leadership Branding seminar-workshop.

The Employee Engagement Project Committee saw the need to integrate under one umbrella group and give a face to all the efforts that NAMRIA has been and will be undertaking to uplift the welfare and well-being of its employees. It also aimed to make the employees aware of the existence of such efforts and future initiatives. The Morale and Welfare Committee was created on 08 July 2014 to institutionalize, implement, and coordinate the various activities of the agency's Morale and Welfare Program. The program enhances the mechanisms for a productive and balanced work-life environment and a harmonious management and employee

Meetings on the creation of the Morale and Welfare Committee

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Fast-Tracking Preparation of CLUP Using Orthoimage as Base Map

by Engr. Brian A. Dela Cruz and Engr. Mary Jane R. Montemor***

The current inadequacy of large-scale geospatial data needed by stakeholders, especially Local Government Units (LGUs), is basically the performance gap of NAMRIA which is now being addressed through the ongoing Unified Mapping Project (UMP). Since topographic map production is only limited, however, not all topographic geospatial datasets are readily available. The ReP, entitled *Fast-Tracking Preparation of CLUP Using Orthoimage as Base Map* sought to introduce the use of orthoimageries, as an immediate geospatial reference data to bridge this gap. The ReP of the Project Team Leader was a major requirement for the Master in Public Management Development Program-Middle Managers Class of the Development Academy of the Philippines. The program consisted of eight months of study, three (3) months of which were dedicated to the implementation of the ReP from May to July 2015.

NAMRIA

NAMRIA, being the central mapping agency of the Philippines, is mandated to provide the public with mapmaking services. It has a mission to deliver accurate, timely, and accessible geospatial products that include topographic maps in support of national development. These geospatial products are vital to address the national government's development plan for an improved quality of life, sustainable development, and disaster risk management, among others. For detailed planning, large-scale topographic maps are required by LGUs, among different sectors, for the development and updating of their Comprehensive Land Use Plan (CLUP) as mandated by the Housing and Land Use Regulatory Board (HLURB). The CLUP is a document embodying specific proposals for guiding and regulating growth and development of a city or municipality. Current CLUPs mostly utilize existing NAMRIA medium-scale topographic maps at 1:50,000 scale, if large-scale topographic maps at 1:10,000 scale are not available.

Part of the training exercise was the production of different thematic maps per assigned group. The thematic maps showcased the different extracted features.

At present, NAMRIA has a limited production of large-scale 1:10,000 topographic maps which only cover urban areas. The agency is addressing this problem through the UMP which aims to generate 1:10,000 large-scale topographic maps covering the whole country. However, the targeted 11,000 map sheets cannot be produced immediately. Select areas are prioritized each year and those for the whole country will only be finished by year 2020.

This, however, must not limit the public in the use of geospatial data for their purpose. The UMP includes procurement of a country-wide very high-resolution satellite imagery (VHRSI) in 2014 which produced seamless orthoimages that were processed to correct geometric and systematic distortions. These orthoimages are the reference imageries used in the production of topographic maps and will be the take-off point of the ReP implementation.

The ReP

The primary purpose of the ReP was to demonstrate how NAMRIA can be an effective agent in fast-tracking the preparation of thematic maps for the CLUP and facilitate capability building of LGUs which were not customarily done in the past. Its specific objectives and deliverables within the three-month period of implementation in the recipient LGU were to: (1) provide trainings on image interpretation and Geographic Information System (GIS) in developing thematic maps; (2) conduct capability building of an LGU in

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producing thematic maps; and (3) provide assistance in the production of thematic/ composite maps.

The recipient LGU of the ReP's actual project implementation was the Municipality of Nabas, Aklan, a fourth-class town with huge growth potential. The common problem of LGUs in the preparation of their CLUPs is the lack of large-scale base maps specified by the HLURB. To comply with such requirements, other LGUs resort to using surrogate data that are unreliable for planning needs. This has been the case with Nabas Municipality. It was discovered during assessment that the Municipality needs assistance in updating its CLUP in order to formulate a detailed and adaptive development plan that fits with its present situation.

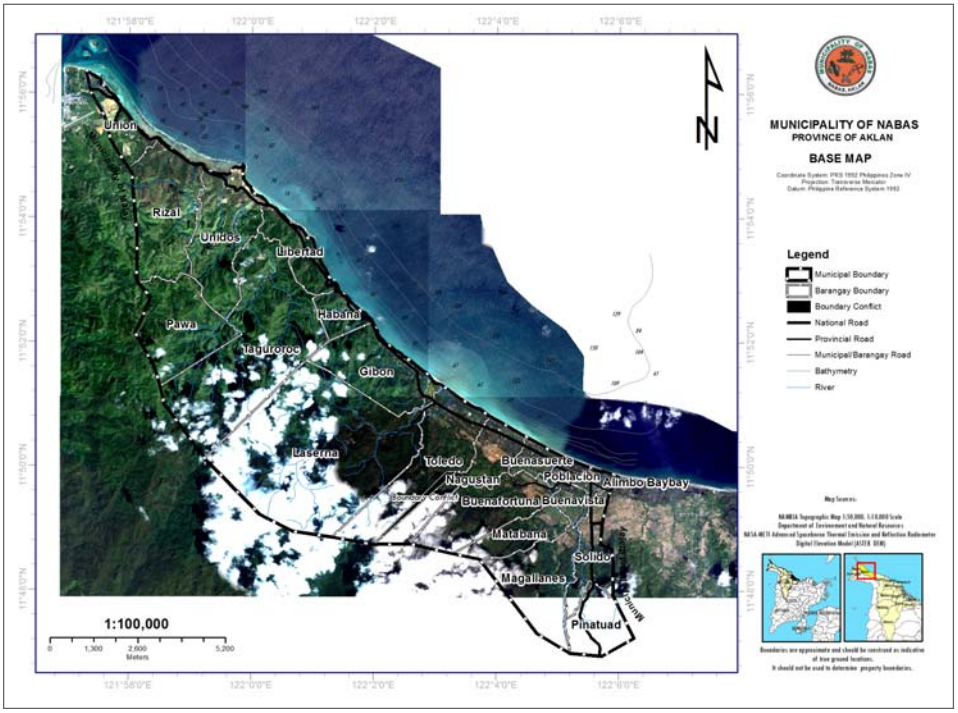
The utilization of orthoimages of VHRSI as base map is a paradigm shift that the ReP introduced to prevent LGUs from using unreliable data in their CLUP and also facilitate capability building in the process. This capability building is another important aspect of the project which enabled LGU staff to enhance their knowledge and skills through trainings on image interpretation, and basic and advanced GIS. With these trainings, the trained staff were able to demonstrate their acquired knowledge by producing thematic maps. This is significantly needed in disaster preparedness and situational awareness, in emergency response, as well as in land-use planning for sustainable development.

Stages of the Project and Outputs

The Project consisted of these stages: (1) Map Preparation Using Orthoimage; (2) Capability Building (GIS Training and Data Management); and (3) Production of Thematic/Composite Map.

Map Preparation Using Orthoimage

The ReP process mainly consisted of this stage where planning and preparation of data needed for the project were conceptualized. The outputs of this stage were updated geospatial data and thematic maps referenced from orthoimage map.



Existing base map georeferenced using orthoimage

Planning

The first phase of the ReP required coordination with the NAMRIA Mapping and Geodesy Branch (MGB) and establishment of the Project Committee championed by Deputy Administrator Jose C. Cabanayan Jr. and the ReP Team consisting of select technical staff from Cartography and Photogrammetry Divisions. The Project Committee served as the steering committee while the ReP Team facilitated planning and needs assessment of the project and assisted in image-mapping production. The ReP Team also conducted capability building of recipient LGU. The LGU's cooperation with the ReP Teams ensured smooth implementation of the project and timely delivery of outputs.

Image Processing

The raw VHRSI, together with the Digital Elevation Model (DEM) from Interferometric Synthetic Aperture Radar (IfSAR), underwent two (2) major stages of image processing before an orthoimage was produced. These major stages were: (1) georeferencing and rectification; and (2) mosaicking and tiling which involved image correction from various geometric distortions and mosaicking/stitching of different satellite image scenes, respectively. The output, a mosaic image, was still processed for color enhancement/balancing to produce an orthoimage with uniform image tone and contrast.

Data Gathering and Field Identification

Data gathering was done in the recipient LGU by conducting an inventory of existing thematic maps and other data. Some data were converted and processed from analog to digital and

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made it GIS-ready. The orthoimage was printed and inspected by the LGU Field Team while assisted by the ReP Team. Some areas and unidentifiable features in the orthoimage maps were noted for field identification.

In field identification, data collection, including geographic names, was done by conducting actual ground truthing using Global Positioning System (GPS) equipment. The use of this equipment and image interpretation of orthoimage map were skills included in capability building. Through these skills, key personnel from the recipient LGU were able to demonstrate what they learned in the field.

Data Integration

Data integration is a vital component in producing thematic maps. Datasets acquired from different sources, including those gathered in the field, were integrated and edited to produce a composite thematic map. This activity ensured that all the data are accurate and PRS92-compliant as referred to by the standards and specifications of HLURB.

Geospatial Mapping

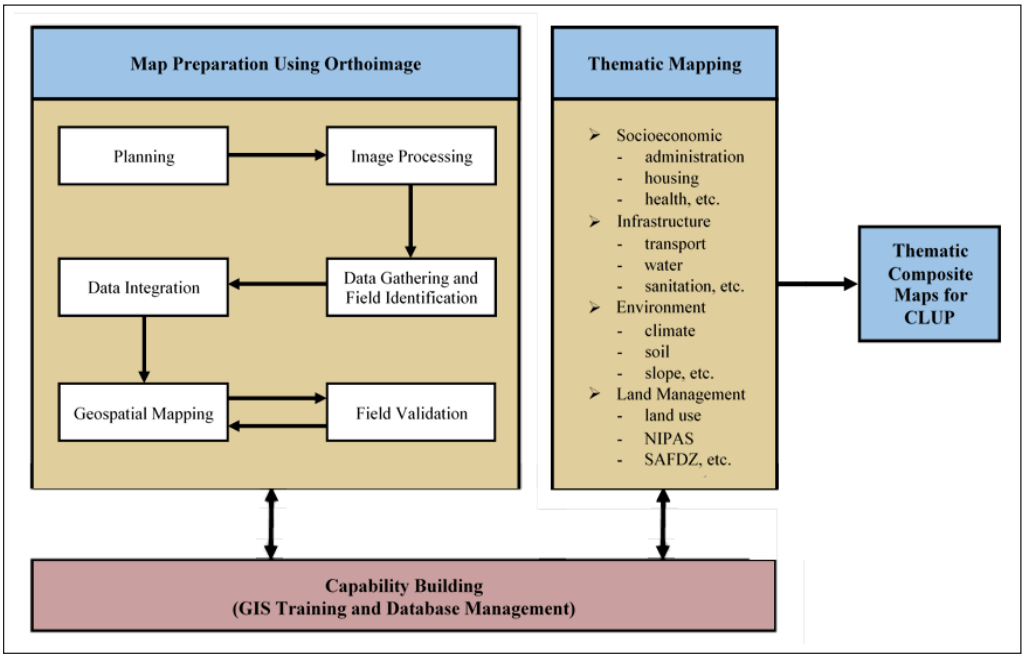
In this activity, all geospatial datasets were prepared and loaded into the geodatabase and evaluated accordingly. The map layout was prepared in accordance with HLURB requirements. Map printouts of initial map manuscripts were prepared for field verification and LGU consultation.

Field Validation

The printed map manuscript was subjected to field validation to ensure completeness and accuracy of map information. In this activity, the Field Team consulted with the LGU and other key local officials to verify geospatial data shown in the map.

Capability Building (GIS Training and Database Management)

In this activity, the ReP Team conducted training workshop on image interpretation and basic and advanced GIS for MPDOs and key technical personnel of the recipient LGU. Respective training workshops on Orthoimage Interpretation and on Basic GIS were conducted during data gathering and field identification while the Advanced GIS training with Database Management was done simultaneously with field verification. In order to demonstrate the use of orthoimage, some thematic layers were produced as sample applications.



The ReP Framework

Capability building on GIS and production of thematic maps enabled printed documents to become GIS-ready so that, when overlaid with orthoimages, they will help the LGU formulate accurate and immediate decisions on municipal planning and development. The result of ReP project implementation in the Municipality of Nabas, Aklan is quite impressive that 17 of its staff successfully finished basic and advanced GIS trainings using ArcGIS. The participants were grouped accordingly and were tasked to come up with a thematic map using their printed documents. Each group had a significant thematic map output which was presented to local officials. For example, the rural health unit group was able to produce a map wherein the prevailing rate of Tuberculosis (TB) cases were displayed over orthoimage maps after processing TB incidence and population information from their printed documents. The participants were amazed at the discovery of what they can do. One of them even exclaimed, *puwede pala*! Continuing intervention was also initiated by the Municipality through its Facebook group account where queries were posted and answered by the training team of NAMRIA. This continuing intervention facilitated coaching and mentoring of key technical personnel of the LGU, thus ensuring positive empowerment.

The LGU's vision to be a "globally competitive community with sustained economic growth and people living abundantly and harmoniously with nature" has been strengthened.

Production of Thematic/Composite Map

This activity involves creation of thematic layers by key LGU personnel who were assisted in the production of thematic data compilation during training workshops. The LGU Team converted printed documents into GIS-ready and also gathered datasets from different government agencies. Other needs such as scanning and georeferencing of printed maps were done by the ReP team since the LGU does not have large format scanner.

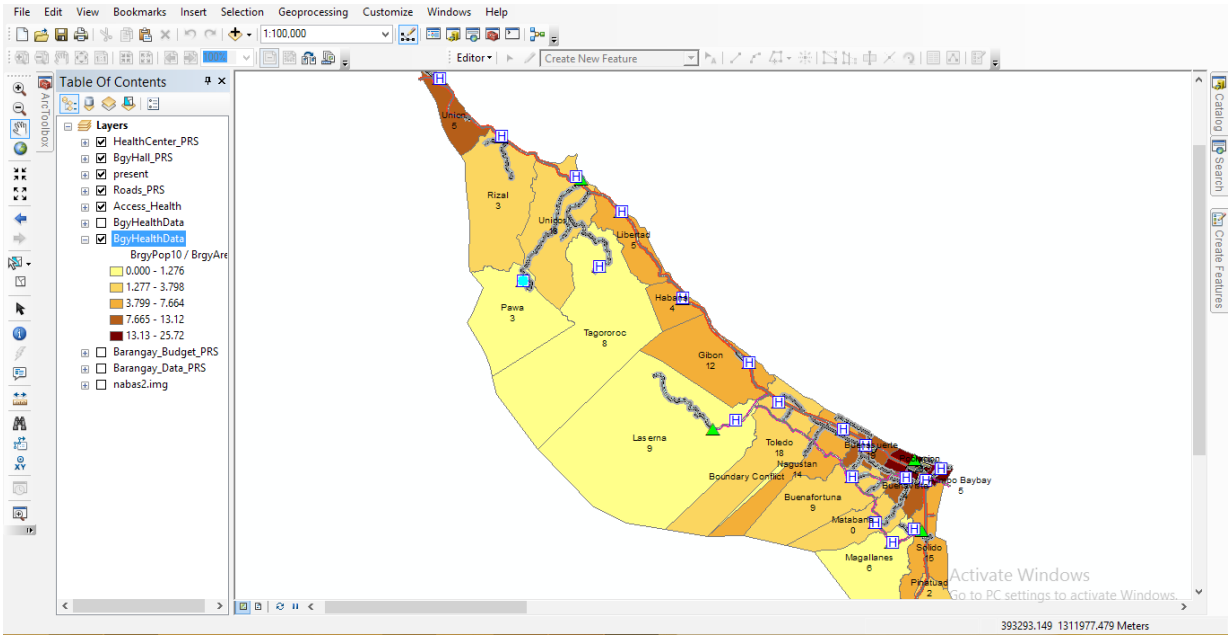
The final output of the ReP was a composite thematic map wherein all data were integrated. Accuracy and completeness of datasets were evaluated so as to ensure that development plans will not be compromised. The final output shall be used to formulate development planning and zoning ordinance needed for the CLUP.

The ReP team explains to the participants the concept of image interpretation and its importance for the updating of CLUP especially with regard to land use.

Lessons from the ReP

Leveled-Up Awareness

The ReP gave an opportunity to increase awareness of the recipient LGU, department heads and participants alike, in the use of latest technology to effectively contribute for local development. Participants were from different departments and offices, had different skills, and most, if not all, did not have technical competency in GIS or mapping in general. At the onset, majority were very apprehensive about the training workshop, yet all of them enjoyed it as it progressed. This was especially the case when they applied what they learned using their respective unit's data for analysis. The LGU became aware of easy retrieval and processing of data and other possibilities that could finally realize immediate response to the needs of the community. The resiliency of the LGU staff to overcome whatever they had to face went above and beyond their personal intentions.



Population density map - a mini-project output of the GIS training workshop

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The Modernization of the Philippine Geodetic Reference System

*by Ronaldo C. Gatchalian**

Since 1999, the United Nations (UN) has been promoting the enhancement and compatibility of space-based navigation positioning systems, e.g., Global Navigation Satellite Systems (GNSS) to improve the efficiency of transport, search and rescue, geodesy, and other activities. Cooperation and coordination among all countries for an integrated global observation were also strengthened. To ensure the long-term sustainability of this integrated global observation, i.e., Global Geodetic Observing System (GGOS) and adoption of the International Terrestrial Reference Frame as the foundation reference frame, the UN encourages member states to adopt and sustain a common geodetic reference frame called Global Geodetic Reference Frame (GGRF) through Resolution A/RES/69/266.

There is economic and scientific importance as well as a growing demand for an accurate and stable GGRF for the earth. An accurate and stable GGRF allows the combination of geometric positioning (e.g., GNSS) and gravity field-related observations, e.g., Gravity Recovery and Climate Experiment (GRACE); the reference for location and height in geospatial information used in earth science applications that require precise positioning such as sea-level and climate change monitoring, natural hazard and disaster management (http://ggim.un.org/docs/A_RES_69_266_E.pdf).

In response to the UN initiatives and to cope with trends in modern geodesy, NAMRIA started to implement the modernization of the Philippine Geodetic Reference System (PGRS). The modernization is within the scope of Geodetic Network Development, one of the strategic initiatives identified by the agency towards building a geospatially empowered Philippines by 2020. A draft executive order on "Adopting the Philippine Geocentric Datum of 2016 (PGD2016) as the standard geometric reference of survey and maps in the Philippines" is being finalized to mandate the modernization of the PGRS.

Existing Systems

The current geodetic reference system in the country is the Philippine Reference System of 1992 (PRS92) with its corresponding local definition of World Geodetic System 1984 (WGS84) for horizontal positioning; and the mean sea level (MSL) with the preliminary geoid (i.e., Philippine Geoid Model 2014, PGM2014) for vertical positioning. The adoption of PRS92 as the standard reference system for surveying and mapping activities became mandatory through Executive Order No. 45, series of 1991 which was amended and extended until 2010. The PGRS and its components are shown in Figure 1.

Horizontal Control Network

The original local geodetic datum used in the Philippines is the Luzon Datum of 1911. It was used as reference in topographic and hydrographic surveys from 1927 until 1986. All cadastral surveys had been tied to this datum until 2006.

With the advent of the Global Positioning System (GPS) and in 1988, during the implementation of the Natural Resources Management Development Project (NRMDP), PRS92 was established as the modern geodetic reference system at that time. The network originally comprised of 471 first- to third-order stations, and after the PRS92 Densification Project from

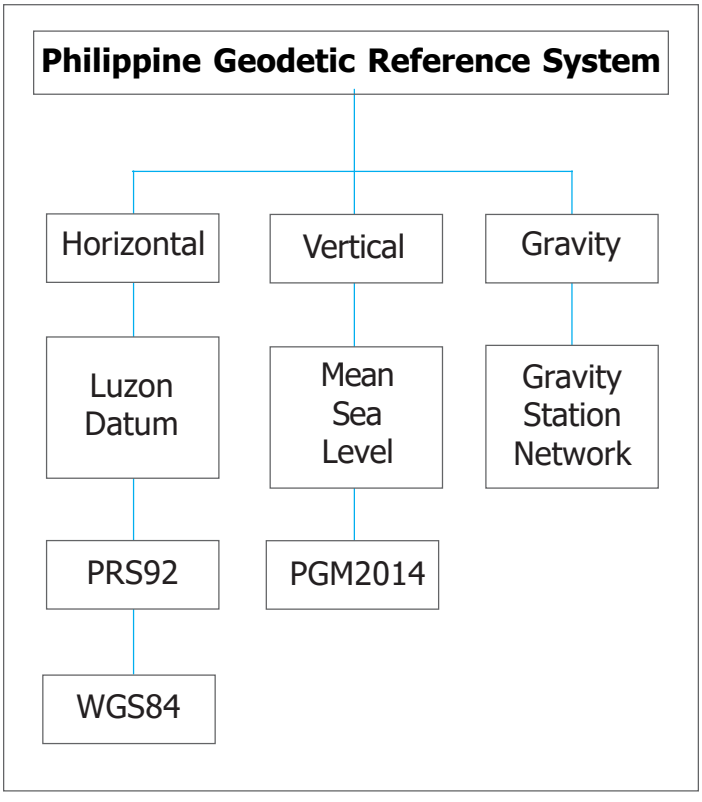

Figure 1: Existing Reference System in the country

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2007 to 2012, over 50,000 zero- to fourth-order geodetic control points were established nationwide. PRS92 is related to WGS84 via seven parameters and has the same ellipsoid and origin as the Luzon Datum of 1911 except for geoid/spheroid separation of 0.34 meter.

Vertical Control Network

The vertical control network is referred to the MSL and its benchmarks (BMs) are propagated using geodetic levelling techniques. The United States Coast and Geodetic Survey (USC&GS), in the early 1900s, established the level network and was subsequently densified in the following decades with intermittent levelling campaigns carried out throughout the islands.

A PRS92 campaign was conducted from 2007 to 2012 to establish BMs in major roads of every province and municipality nationwide. A total of 22,851 BMs were established along major roads nationwide during the campaign. These first-order level networks were connected to their respective reference tidal BMs to provide local MSL elevation.

Gravity Control Network

Until 2006, gravity observations in the country were few and far between, with gravimetric surveys being conducted by visiting scientists only. During the PRS92 campaign, 1,711 gravity stations were established in provinces and municipalities nationwide. Together with the airborne, satellite gravity, and altimetry data, the land gravity stations were used to compute the PGM2014.

In GNSS surveys, it became much easier to estimate MSL elevations using a geoid model. The geoid is an equipotential level surface of the oceans at equilibrium, proposed by C.F. Gauss as the "Mathematical figure of the earth" (Hofmann-Wellenhof, 2005). Applying a geoid model in GNSS surveys will eliminate the conduct of levelling. On 28 October 2014 with the assistance of Denmark Technical University (DTU-Space) and National Geospatial Intelligence Agency (NGIA), a preliminary geoid model (i.e., PGM2014) was computed for the country with an accuracy of 0.30 meter.

Modernization of the PGRS

Positioning techniques have evolved and geodesy has been modernized due to advancements in technology and earth dynamics. PRS92 is a static and local system, which has corresponding local WGS84 coordinates that are not aligned to the ITRF and therefore cannot account for geodynamics (i.e., earth changes). The modernization will address these limitations and inconsistencies and will also change the way MSL elevations of points are determined.

The Goal and the Objectives

The primary goal of the modernization program is to develop and provide access to an authoritative geodetic reference system aligned with a global geodetic reference frame, that will serve as the common reference for all surveying and mapping activities in the country.

The modern PGRS is specifically envisioned to: improve geospatial positioning (i.e., one-centimeter accuracy in real time, 4D positioning) and management by full utilization of data from space geodetic techniques such as GNSS, meet multisectoral positioning requirements of the surveying and scientific community that are consistent with international standards, facilitate and promote the use of the new system, connect to a global geodetic reference frame (i.e., ITRF) and contribute to its realization, and account for geodynamics in geodetic measurements and positioning.

Strategies: Pathways to the Goal and the Objectives

Strategies have been outlined to achieve the modernization goal and objectives. These strategies are: densification of the Philippine Active Geodetic Network (PageNET); development and maintenance of the Philippine Geocentric Datum 2016 (PGD2016); development, refinement, and validation of a deformation model; development and maintenance of the Philippine Geodetic Vertical Datum 2020 (PGVD2020); and strengthening of core competencies on geodesy and deformation modelling and massive IEC campaigns.

Figure 2 illustrates the five-year implementation plan for the modernization of the PGRS.

Densification of PageNET

The establishment of six permanent GPS Stations in 2008 paved the way for the modernization of the PGRS. The permanent GPS network called PageNET was established with the goal of providing a connection to the ITRF, at the same time facilitating the surveying and mapping activities in the country. In line with the modernization, more stations are targeted for establishment in order to improve the quality, availability, and reliability of positioning services.

At present, 34 permanent GPS stations, often called active geodetic stations (AGSs), have already been established with plans to ultimately put up 200 active stations by the end of 2020. The target is a nominal spacing of less than 70 kilometers throughout the country with a network accuracy of 5 parts ts

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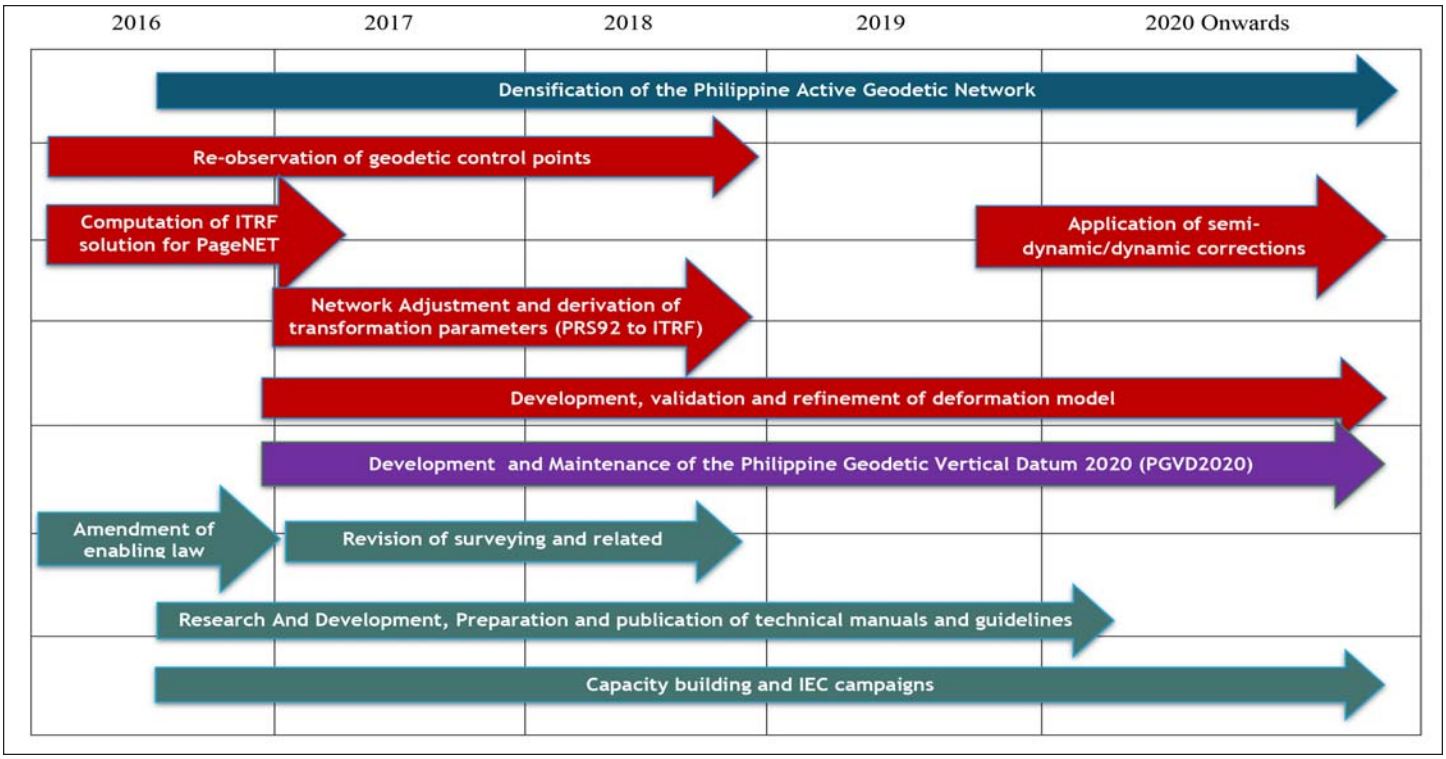

Figure 2: Implementation Timeline from 2016 to 2020

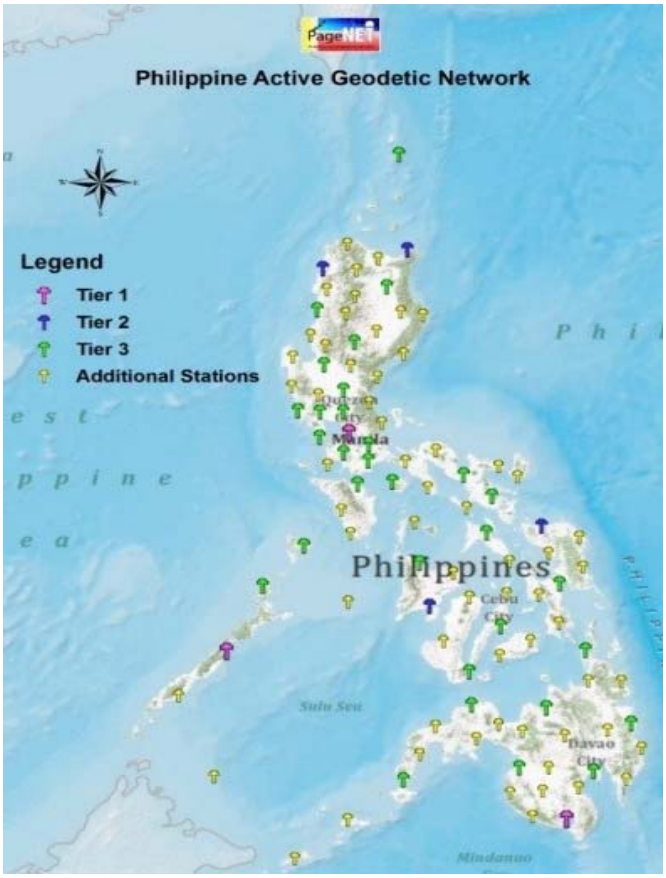

Figure 3: Envisioned total number of AGS by 2020

per million. Figure 3 shows the locations of the 200 AGSs.

Development and Maintenance of the PGD2016: Alignment to the ITRF/Migration to a Semi-Dynamic/Dynamic Datum

The PGD2016 is the upgrade of PRS92 to a geocentric datum. It will be aligned to the International Terrestrial Reference Frame (ITRF) and will be capable of monitoring the effect of ground deformations on the geodetic control network.

The ITRS is an Earth-Centered and Earth-Fixed (ECEF) reference system wherein the definition of terrestrial coordinates to the highest possible accuracy is based. The ITRF is its physical realization. The ITRF is maintained by the International Earth Rotation Service (IERS) through a worldwide network of ground stations using a combination of four space geodetic techniques: Very Long Baseline Interferometry (VLBI), Doppler Orbitography and Radio positioning Integrated by Satellite (DORIS), GPS, and Satellite Laser Ranging (SLR). It is closely aligned to WGS84 to within one centimeter. The ITRF has been constantly updated due to advancement in technology and availability of more data, the latest being ITRF2014. The differences in the coordinates between realizations are attributed mainly to crustal deformations and tectonic plate motions (https://www.iers.org/IERS/EN/

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NAMRIA Conducts Tide and Current Observations in Manila Bay

*by Norelius G. Baloran**

NAMRIA conducted tide and current observations at the coastal municipalities of Limay, Bataan and Puerto Azul, Ternate in Cavite in an effort to gather physical oceanographic data and information on Manila Bay. The survey was done in connection with the implementation of the Operational Plan for the Manila Bay Coastal Strategy (OPMBCS) by the DENR, in collaboration with NAMRIA through the Manila Bay Coordinating Office (MBCO). The OPMBCS is pursuant to the writ of Continuing Mandamus issued by the Supreme Court on 18 December 2008 and its subsequent *en-banc* resolution dated 15 February 2011 to clean up, rehabilitate, and preserve Manila Bay. The Supreme Court ruling designated the DENR as the primary government agency responsible for the enforcement and implementation of the OPMBCS.

In a Memorandum of Agreement between the DENR and NAMRIA, an updated Bathymetric Map of Manila Bay covering the water areas along Metro Manila, Cavite, Bataan, and Pampanga will be compiled in order to update the Manila Bay Environmental Atlas (MBEA). The Atlas is a significant tool used by the government to formulate and implement policies and institutional mechanisms for Manila Bay's sustainable development. The output data from the Atlas are significantly contributing to the planned design of hydrographic models that will describe the motion of waters in Manila Bay including the water surface elevation, current velocity, temperature and salinity, as well as transport and fate of constituents included in a coupled transport model.

As part of its project component,

Conducting tidal leveling in Puerto Azul, Ternate, Cavite

The CDS pressure-type tide gauge installed in Puerto Azul, Ternate, Cavite

Deploying a current meter to measure tidal current speed and direction in Puerto Azul, Ternate, Cavite

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* *Oceanographer IV, Chief of the Oceanographic Surveys Section of the Physical Oceanography Division-NAMRIA Hydrography Branch and holds a Master's degree in Management and is a Doctoral Student of Public Management at the Pamantasan ng Lungsod ng Maynila*

Towards a Spatially Integrated Agenda for Manila Bay: Updating of the 2007 Manila Bay Area Environmental Atlas

*by EnP. Annrou R. Ramos**

The Current Environmental State of Manila Bay

Manila Bay's environmental state has continued to decline over the past years. Its historical and cultural significance, as well as its economic capacity to support livelihood, is gravely affected by increasing population demands coupled with an array of environmental challenges. The environmental challenges include insufficient solid waste management and sanitation practices by the communities, harmful emission discharges from industries, and incidences of marine oil spills.

The renowned sunset in Manila Bay

The overexploitation of Manila Bay, which caused its deterioration over time, has been the center of the Supreme Court En Banc Decision in "Metro Manila Development Authority et al. vs. Concerned Citizens of Manila Bay" promulgated on 18 December 2008 under General Register numbers 171947-48. The decision has been a hallmark case under the Philippine judicial system with the plaintiffs, a group of 14 young but civic-minded men and women, filing a suit before the Regional Trial Court (RTC) in Imus, Cavite against 13 executive agencies** for neglecting to perform their mandated duties. The plaintiffs stated that the inaction of the defendant agencies has caused Manila Bay's deterioration. The complaint alleged that the water quality of Manila Bay has fallen below the allowable standards set by laws. After a decade of deliberation, the Supreme Court decision became final in January 2009—mandating the defendant-agencies to clean the Bay and submit a concerted, concrete plan of action for the purpose.

While the Court's decision is legally-binding, the defendant-agencies took on reactive responses for compliance. Most of their programs and projects were implemented on staggered timelines across various levels of governance, which often led to duplication or insufficient efforts. Also, research and development was not factored in these initiatives, particularly the use of geospatial information and services. The responses were at the reactive level, and the ensuing practices were rampant not just in the defendant agencies, but also in the LGUs within the Manila Bay Area (MBA).

The optimal utility of geospatial information and services is being recognized as a crucial input to planning and implementing an effective, concerted, and concrete rehabilitation strategy for Manila Bay. In detail, geospatial datasets aid national government agencies (NGAs) in formulating science-based laws and policies which can be used by LGUs in Regions III, IVA, and NCR to improve their respective land and sea uses. Updated maps, charts, and other geospatial information provide technical inputs endeavored by the academe, private sector, and civil society organizations.

Institutionalizing Geospatial Information as a Rehabilitation Strategy

At present, various geospatially-related projects, programs, and activities are being implemented by the defendant agencies and other key partners to comply with the Court's decision. These include, but are not limited, to the Comprehensive Report (CORE) Card of the MBA, Manila Bay Modelling Studies, Project Know your Map Well (KNOWELL), and Manila Bay Database System—all of which use geospatial information to analyze results and frame the necessary recommendations. Despite the increasing use of geospatial information, establishing a common platform to address completeness and veracity of all geospatial data holdings for Manila Bay remains a challenge.

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** *MMDA, DENR, DOH, DILG, DECS (currently known as DepEd), DA, DBM, MWSS, LWUA, DPWH, PPA, PCG and the PNP Maritime Group*

The DENR attempted to address this predicament by spearheading the first edition of the Manila Bay Area Environmental Atlas (MBEA)*. At the time the publication became available in October 2007, it was seen to bind all existing efforts to provide a comprehensive yet verifiable contribution in framing science-based laws and policies.

As defined, the MBEA is a compilation of data and information in the form of thematic and composite maps, graphs, and tables outlining the characteristics and status or condition, and the major environmental issues of the MBA. The atlas was intended to be a source of data and information for policy formulation, planning, decision making, monitoring, and overall management of the MBA, as embodied in the Manila Bay Coastal Strategy. Furthermore, the atlas was also designed to enhance awareness on the different natural resources and 'engineered' structures and facilities in the MBA, their current environmental statuses, and the impact of different uses and users of Manila Bay**.

To be adept with changing environmental trends and technological innovations, it was envisioned that the atlas will be updated as a regular project of the Manila Bay Coordinating Office (MBCO) of DENR.

Updating of the 2007 Manila Bay Area Environmental Atlas

In keeping with the demand for geospatial data holdings, the MBCO embarked on the updating of the 2007 Manila Bay Area Environmental Atlas in November 2013 through DENR Special Order number 2013-644. The updating was considered a timely effort as the Supreme Court and the Senate Committee on Environment and Natural Resources both adjudged the rehabilitation of Manila Bay and the abutting river systems as a priority national program. More so, the benefits and uses of Manila Bay as a potential resource were gaining public attention from the general public.

NAMRIA in the Updating Process

As the central mapping agency of the government, the technical expertise of NAMRIA in geospatial information and management has been recognized by the MBCO as a necessary component in the updating of the 2007 manuscript. A Memorandum of Agreement (MOA) was forged between MBCO and NAMRIA to concretize the partnership. The MOA stipulated the specific roles and responsibilities of the involved parties—with NAMRIA tasked to prepare and ensure the consistency of all map holdings with the manuscript and the overall layout. The facilitation of various fora and workshops to source all identified data requirements also formed part of the agency deliverables.

A participatory approach was employed in the updating process, where a Technical Working Group (TWG) composed of selected agencies, offices, and other key partners was established to provide and analyze the listed data requirements. NAMRIA Support Services Branch (SSB) Officer In Charge Director Febrina E. Damaso was designated as the TWG Chair and was assisted by selected staff from the Geospatial Information Systems Management Branch.

Three-day writeshop with the MBEA TWG members held in Tagaytay City in February 2015

When compared to the 2007 manuscript, the second edition of the MBEA "focuses more on socioeconomic and environmental trends, as well as the emerging issues in the MBA. Rigorous discussions on Land Cover, Water Quality of Water Bodies, Water Supply and Sanitation, Solid Waste, Hazard-Prone Areas and Climate-related Trends were included in the second edition. Moreover, trends and their analyses were also provided to expound on the dynamics of the Bay's ecosystem. All these emerging issues and responses were linked to the passage of the Supreme Court En Banc Decision for Manila Bay, its impacts and resulting trends emanating from said legislation. Providing trends analyses will help NGAs, LGUs and other stakeholders to better align and accomplish their rehabilitation efforts for Manila Bay"**.

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**Published by GEF/UNDP/IMO Regional Programme on Building Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) and the Manila Bay Environmental Management Project (MBEMP) of the DENR, Republic of the Philippines in October 2007*

***2nd Edition of the Manila Bay Area Environmental Atlas, 2015*

Perceived Challenges and Recommendations

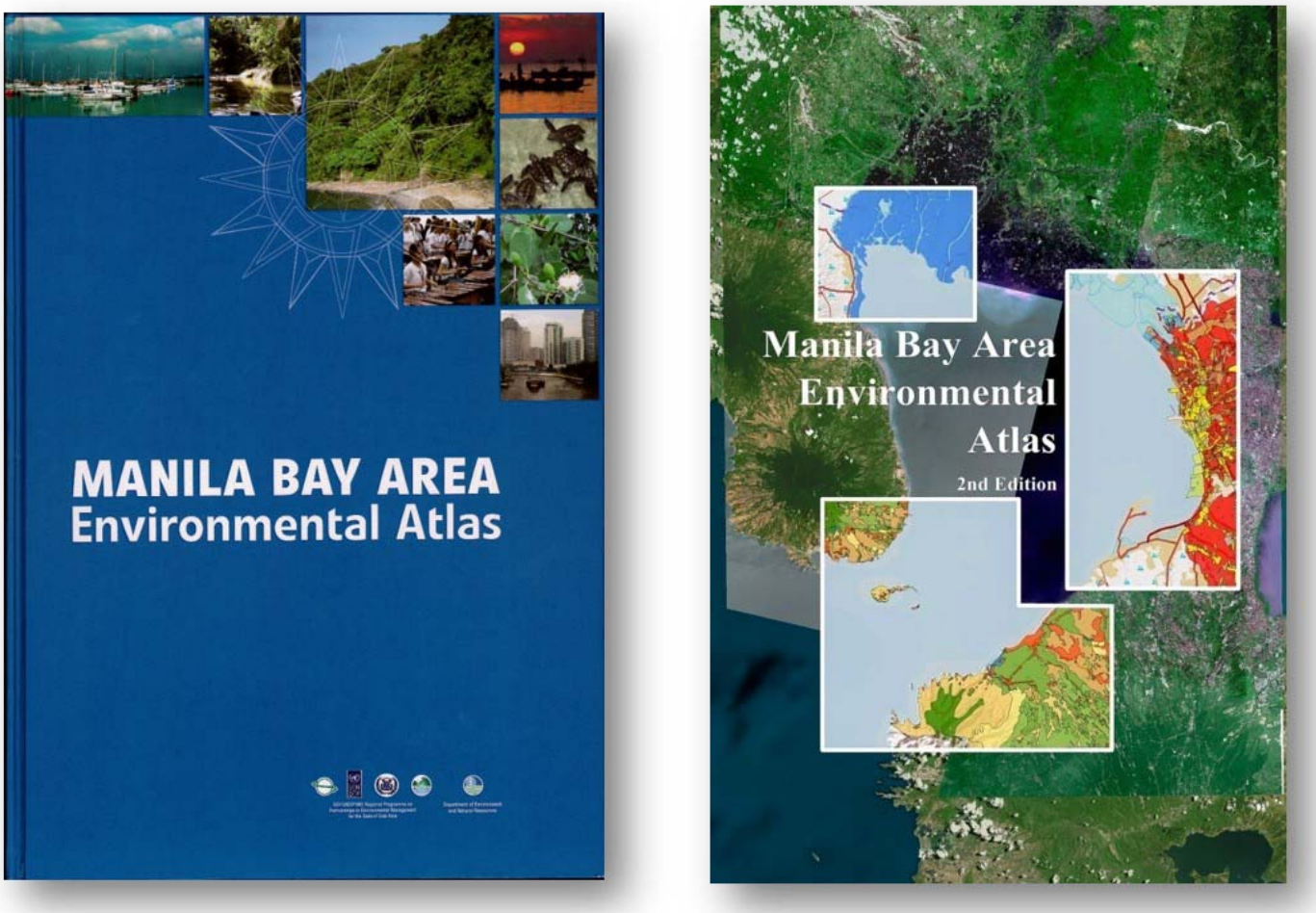
All existing management plans and interventions for Manila Bay require an interjection of accurate and timely geospatial information. While this requirement was recognized, there were specific challenges encountered during the updating process for the 2007 Manila Bay Area Environmental Atlas.

First, the availability of baseline data posted certain limitations on the probable topics to be reflected in the updated edition. An in-depth discussion of land and sea uses on the local level using the CLUPs and Zoning Ordinances further magnified all enlisted issues. These issues include observed land conversion and forest degradation trends, as well as pollution incidences from vessels.

Extensive baseline data gathering from all levels will satisfy this requirement. This manner of data gathering should be accompanied by the development of a repository system for geospatial data holdings to ensure easy access of raw data holdings. These concerns can be responded to by the capabilities of the Philippine Geoportal Project (PGP) of NAMRIA.

Second, the minimal utilization of geospatial information by most stakeholders impeded the production of selected map holdings. This required additional time and resources for the TWG members.

Aside from accessing and utilizing PGP data, NGAs and LGUs can build their respective geographic information system (GIS) capacities by investing on training programs and short courses. NAMRIA, through its Geomatics Training Center (GTC), offers extensive learning opportunities on basic and advanced GIS, among other modules. In addition, stakeholders can also utilize open source mapping platforms to mainstream geospatial data management in all identified services. Achieving such will provide the stakeholders with planning tools for improved local governance.



The respective cover designs for the 2007 and 2015 versions depict the richness of Manila Bay's flora and fauna (left), and the emerging use of geospatial technologies for its management (right)

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NEWS

NAMRIA, TESDA conduct GIS Operations Seminar for KSA trainers

by Jeffrey M. Aguillon

NAMRIA, in cooperation with the Technical Education and Skills Development Authority (TESDA), conducted GIS Operations Seminar for 10 trainers from the Technical and Vocational Training Corporation (TVTC) of the Kingdom of Saudi Arabia (KSA). The learning event was held at the NAMRIA Geomatics Training Center (GTC) on 05-16 October 2015. Engr. Mary Jane R. Montemor of the Mapping and Geodesy Branch (MGB) served as the resource person with Mr. Edgar R. Roldan and Mr. Erwin M. Gofredo, also of MGB, as technical assistants.

In 2005, TESDA signed a Memorandum of Agreement with the KSA Government, which was represented by their General Organization for Technical Education and Vocational Training, now referred to as the TVTC, for cooperation in the Field of Technical and Vocational Education and Training.

In 2015, the TVTC requested TESDA for 175 of their trainers to undergo training in various technology areas including GIS. TESDA, recognizing the expertise of NAMRIA in the field of GIS, decided to tap the agency's resources and provide the training in GIS for the participants. During the opening program, Geospatial Information System Management Branch (GISMB) Director John Santiago F. Fabic welcomed the participants and gave a brief background about the agency. He cited, among others, the seminar's being the first undertaking between TESDA and NAMRIA in the field of GIS.

The closing ceremony for the TVTC trainers was held at the TESDA Women's Center on 16 October 2015. NAMRIA was awarded a certificate of appreciation for this activity.•

The GIS Operations seminar participants along with (starting third from left) Mr. Roldan, Mr. Godfredo, and Engr. Montemor of MGB

Participants during the lecture with Engr. Montemor

Opening program with the officials and staff from NAMRIA led by GISMB Director Fabic (seated leftmost) and from TESDA, Department of Foreign Affairs, KSA, MFI Foundation Inc., and Metals Industry Research and Development Center

NAMRIA is recertified for ISO 9001:2008

by Cherrylin D. Mendoza

NAMRIA has earned its ISO 9001:2008 recertification of registration for its Quality System Management (QMS). The recertification was granted by the Certification International Philippines, Inc. (CIP) on 05 October 2015 and will be valid until 14 September 2018. The recertification symbolizes the mark of approval for NAMRIA's effort of delivering quality service to its clients, for its core process on mapping and geospatial information management. The agency's first certification was officially given on 02 October 2012.

NAMRIA has surpassed a total of six rigorous surveillance audits since it started its journey for ISO certification in 2011. Prior to the issuance of the recertification, the agency underwent two surveillance audits in 2015. The fifh surveillance audit held on 11 May 2015 was conducted by CIP auditors Mr. Renato Julian M. David and Ms. Liza G. Rosal for the following areas: (1) Geospatial Information Services Division (GISD), Customer Satisfaction/Customer Feedback of the GISD, and Geospatial System Development Division of the Geospatial Information System Management Branch (GISMB); (2) Survey Support and Physical Oceanography Divisions of the Hydrography Branch (HB); (3) Cartography Division of the Mapping and Geodesy Branch (MGB); (4) Financial and Management, and Engineering Services Divisions of the Support Services Branch (SSB); (5) Verification of previous audit findings; (6) Corrective/Preventive Action of the Internal Audit; and (7) Management Review on the Validation of Scope and Use of Certification Mark.

The sixth surveillance and reassessment audit was held on 25-27 August 2015. The CIP auditors were Mr. Renato Julian M. David, Mr. Justo R. Batoon Jr., Mr. Carlos I. Somera, and Mr. Arnel D. Guevera. The audit covered all the divisions of the agency branches, namely: MGB, Resource Data Analysis Branch, SSB, GISMB, and HB including the two surveying vessels, *Barko ng Republika ng Pilipinas* HYDROGRAPHER (BRPH) PRESBITERO and BRPH VENTURA.

At the presentation of the audit results in the closing meetings for both the fifth and the sixth audits, the CIP audit teams pronounced their positive recommendations for the agency's continued certification to ISO 9001-2008. In their report, they also declared previous audit findings as verified and closed, and cited some minor non-conformities and opportunities for improvement.

In both occasions, Administrator Peter N. Tiangco expressed to the CIP the gratitude of NAMRIA for guiding the agency in improving its client service. He further stressed NAMRIA's positive reaction to the audit findings because these will help continually benefit the agency's clients. Presently, NAMRIA is gearing towards possible migration from ISO 9001:2008 to ISO 9001: 2015.•

ISO 9001:2008 Certificate of Registration awarded to NAMRIA

Updates on the Philippines-Korea Official Development Assistance Project on Ocean Observations and Hydrographic Surveys

*by Norelius G. Baloran**

The Government of Korea-funded project to establish infrastructure to support maritime safety, response to climate change, and prevention of natural disasters; and develop the Philippines as an advanced maritime country has moved forward with recent accomplishments made by NAMRIA's Hydrography Branch (HB).

The upgrading of the Tacloban Primary Tide Station into a real-time, telemetry-capable station jumpstarted the project. Korean experts travelled to Tacloban in Leyte to install sea level and weather data acquisition instruments. A Memorandum of Understanding between the NAMRIA HB and the Korea Hydrographic and Oceanographic Administration (KHOA) was formally signed on 12 October 2015 during the visit of Mr. RYOO Jae-Hyung, KHOA Director General. Adding to the cooperative arrangement was the conduct of technical training for HB personnel on Ocean Observation Systems, Nautical Charting, and Data Processing of 3D Charts held at the HB Conference Room on 05-09 October 2015.

In 2014, the Korea International Cooperation Agency (KOICA) offered the Philippines a grant-in-aid, technical cooperation program that focused on the promotion and support of sustainable socioeconomic development of partner countries. Thus, the Korea Official Development Assistance (ODA) was granted to NAMRIA. Through KHOA, a training course entitled "Ocean Observations and Hydrographic Surveys" was conducted with the NAMRIA objective of understanding the various activities and policies, as well as learning recent technological developments in ocean observations and hydrographic surveying.

In that same year, the first year of a three-year-program developed by KHOA was implemented. The overall goal of the program was to strengthen the response capability of the Philippines in case of disasters and accidents at sea and enhance marine technology by sharing with the country advanced oceanographic and hydrographic technology prevailing in the Republic of Korea. Officials and personnel of the NAMRIA HB were sent every year**,** from 2014 to 2015**,** for a four-week training program at KHOA in Busan, Korea. The trainees obtained good understanding of marine and ocean policies and strategies from the training program. As part of the learning experience, the participants were tasked to develop and implement ocean observation and hydrographic surveying training programs.

NAMRIA sent three HB personnel to the second phase of the two-month CAT B Cartography Training Course in

The technical meeting of KHOA and NAMRIA for the activities in Ocean Observation Project

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* *Oceanographer IV, Chief of the Oceanographic Surveys Section of the Physical Oceanography Division-NAMRIA Hydrography Branch and holds a Master's degree in Management and is a Doctoral Student of Public Management at the Pamantasan ng Lungsod ng Maynila*

Mr. Deokwan Choi of KHOA installing the satellite communications antenna for the tide gauge instrument

Installation of Automatic Weather Station of Tacloban Tide Station with NAMRIA personnel Ellison Parojinog (left) and three KHOA personnel

Korea in March-April 2015. One of the highlights of the training was the request of NAMRIA to establish certain methods and procedures to address gaps between the hydrographic data processing phase and the process of nautical chart compilation in order to expedite the use of new or updated charts and publications.

A KHOA board meeting was held in Busan, Korea in December 2015 and this was attended by Commodore Jacinto M. Cablayan, NAMRIA HB director, and Mr. Dennis B. Bringas, chief of the NAMRIA HB Physical Oceanography Division. In the meeting, KHOA signified its intent to upgrade two NAMRIA tide stations. KHOA also generously offered to conduct in the middle of 2016 a short training course in oceanographic data processing directed to advance the competency skills of personnel from the Physical Oceanography Division in packaging oceanographic data.

Looking forward to 2017, KHOA solicited additional project components to which NAMRIA responded by proposing to include other relevant aspects of physical oceanography and nautical charting, namely: tides and tidal current processing software support; capability building on real-time monitoring of ocean surface currents using high-frequency radar; wave, salinity, and surface temperature data collection and processing; and hydrodynamic modelling and production of co-tidal and co-range charts.

The project proposals shall be coursed to KOICA through the Department of Foreign Affairs. KHOA will continue to work on the financial support for the implementation of the said projects come 2017. Lastly, NAMRIA's representatives to the meeting assured KHOA of the agency's continued commitment to the successful implementation of the ODA project and expressed its gratefulness for the KOICA grant-in-aid.•

Completion of technical training of Physical Oceanography Division personnel headed by its chief, Dennis B. Bringas; the training was conducted by KHOA Specialist Mr. Peter Lim.

NAMRIA conducts Advanced Remote Sensing Workshop

*by Cornelio S. Tolentino**

NAMRIA, in collaboration with the United States Forest Service (USFS) Remote Sensing Application Center (RSAC), US Agency for International Development (USAID), and US Department of Agriculture (USDA) conducted the Change Detection and Advanced Remote Sensing Workshop at the NAMRIA lecture hall on 07-11 September 2015.

The overall focus of the workshop was to improve NAMRIA's capacity for detecting, mapping, and monitoring changes in landscape; as well as providing a workflow that can be implemented as future protocol for providing change information about the landscape.

The workshop was attended by 24 technical personnel from different agencies/institutions with a background in GIS concepts and general awareness of remote sensing technology and its common workflows. Twenty participants were from NAMRIA, two from Forest Management Bureau, and two from Geodata Systems Technologies, Inc.

Dr. Karis Tenneson and Brenna Schwert, both remote sensing specialists and technical experts from RSAC, facilitated the five-day workshop. They introduced mainly on the first day the use of google earth in acquiring cloud-free satellite images. On the succeeding days, Dr. Tenneson with the assistance of Ms. Schwert demonstrated the techniques and processes on land cover classification using the E-cognition software. They also covered the processing and assessment of both visual and automated change detection. On the last day, in-class work sessions were done to facilitate a healthy environment about the topic.

The USFS RSAC provides national assistance to agency field units in applying the most advanced geospatial technology toward improved monitoring and mapping of natural resources. RSAC's principal goal is to develop and implement less costly ways for the USFS to obtain needed forest resource information. (Source: http://www.fs.fed.us/eng/rsac/index.html)•

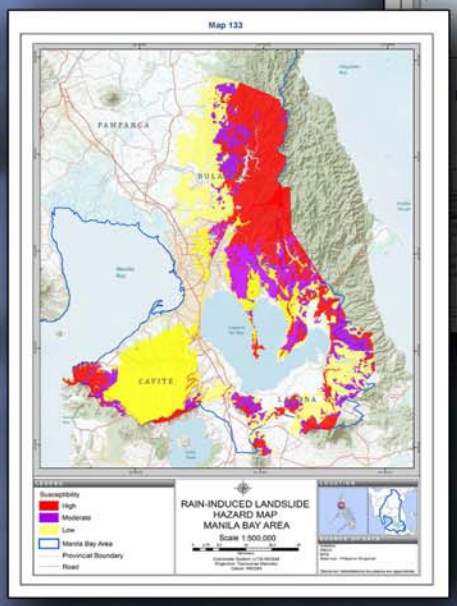
Dr. Tenneson lectures on image processing using object-based E-cognition software.

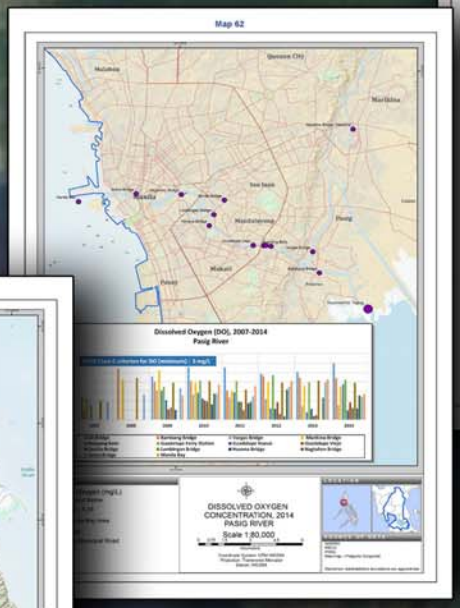
Participants during the image processing exercises

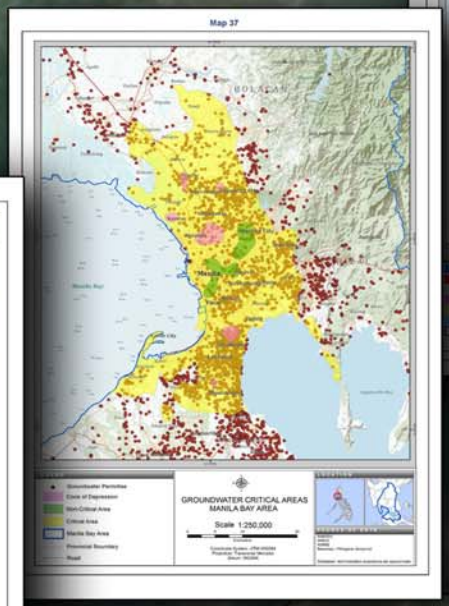
RDAB Director Santos, together with NAMRIA Climate Fellow Ms. Amanda Whitehurst (leftmost), awards certificates of appreciation to Dr. Tennesson and Ms. Schwert.

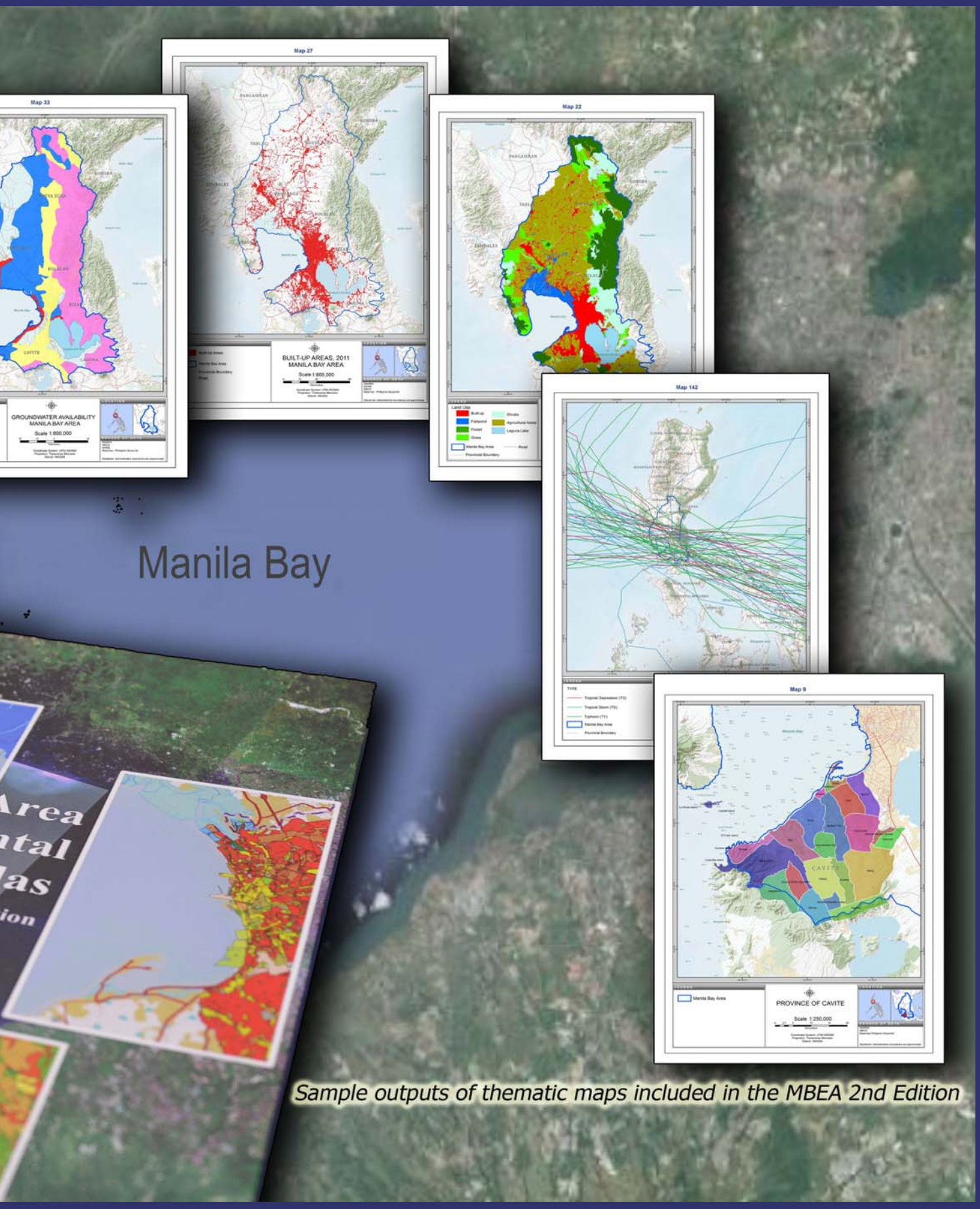
**Supervising Remote Sensing Technologist, Land Resource Division-NAMRIA Resource Data Analysis Branch*

MANILA BAY ENVIRONMENTAL ATLAS









Sample outputs of thematic maps included in the MBEA 2nd Edition

Implementing Employee Engagement... from page 7

relationship. It also enables NAMRIA to achieve improved employee engagement vital to enhance organizational capacity and to retain a pool of competent human resource. A holistic approach ensures the total well-being of every employee: the physical, mental, intellectual, spiritual, and social aspects.

In order to initially address the employee engagement survey results on People Strategy and Leadership and Management Strategy, a seminar workshop on Creating a People Strategy and Leadership Branding was held. The activity aimed to provide the top and middle managers of NAMRIA with the technology to create a people strategy and plan that links people management processes and organizational priorities and to develop the agency's leadership brand statement. It also intended to complement the requirements of the CSC Program to Institutionalize Meritocracy and Excellence in HRM and the NAMRIA Competency-Based System.

The ReP on implementing employee engagement mechanisms in NAMRIA closed out with a simple celebration held at the NAMRIA Lecture Hall on 15 August 2014. The activity included a briefing on the project highlights, sharing of insights and good practices on employee engagement through coaching and mentoring, open forum with the scholar, and messages from the executive sponsors/champions.

Building on and Strengthening the ReP Results

The results of the ReP are developed awareness and strategies on employee engagement and enhanced competency of officials and middle managers on employee engagement through coaching and mentoring. The overall benefits of the project are effective performance management, optimized employee performance, sustained delivery of quality service, steady retention of competent successors, and continuous customer loyalty. The intended outcomes are improved individual and organizational performance and enhanced public service delivery as evidenced by client satisfaction and loyalty.

In order to keep the project gains snowballing, the following were recommended in the ReP report for ReP sustainability and institutionalization of employee engagement in NAMRIA: (1) Act on the employee engagement survey findings and survey anew, (2) Build up competence on all levels, (3) Create a culture of coaching and mentoring, (4) Improve performance management, (5) Have a strategy on people, (6) Continuously communicate engagement programs within the agency, (7) Keep the pulse, (8) Recognize and reward, (9) Survey the external and internal clients, and (10) Enhance the morale and welfare of employees.

The NAMRIA Strategic HRD Plan 2015-2019 integrated the employee engagement sustainability efforts in the agency by helping build the required organizational capabilities for NAMRIA, addressing strategic HRD issues, and ensuring the execution of NAMRIA's mandate (Baltazar, 2014b).

Everything undertaken to accomplish the ReP goals and to arrive at the results led to valuable personal learnings. Buy-in support from top management is needed when seeking improvement. The limited time to implement the ReP required that expectations be managed. The challenges posed by the limited time likewise required flexibility. With what the ReP hoped to accomplish, it helped that work and interpersonal relationships are strong alongside communication, delegation, and seeking the wisdom of the institutional partner and the faculty adviser. More than the results and the definitions by different authors, this scholar arrived at a deeper understanding and appreciation of employee engagement. The learning that capped all other acquired learnings is that employee engagement is more about building trusting relationships, interpersonal connections, and organizational commitment.•

Monitoring and validation of action plans on the application of coaching and mentoring in the workplace

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**A copy of the ReP report can be accessed at the NAMRIA Library and Documentation Services.*

Fast-Tracking Preparation of CLUP... from page 11

Capacity Build-Up

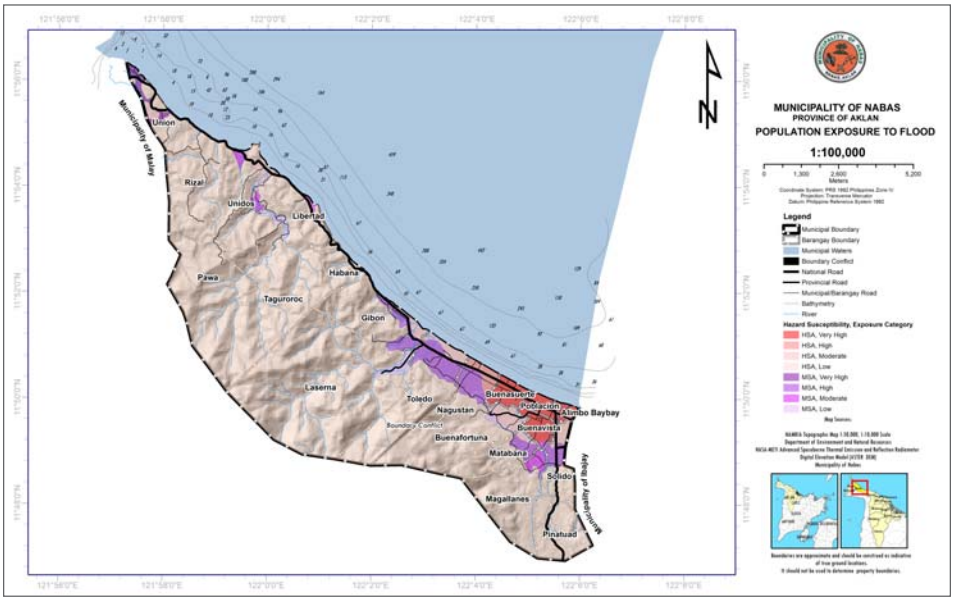
The ReP also afforded the LGU with the ability to jumpstart revision of its CLUP which was stalled because of unavailability of updated and accurate large-scale topographic base maps. In this project, the Municipality of Nabas was given the opportunity to pioneer a different approach in updating CLUP using orthoimage maps as the reference. A provincial HLURB representative who monitored updates from different municipalities quipped "*Guapo ni* (This is very nice). Where did you get this data?" The remark served to solidify the importance of geospatial data in revising and updating the CLUP. The ReP also strengthened LGU personnel in organizing the analysis and processing of their data using GIS. One of the best examples was the output of one participant from the Assessor's Office where he introduced automation in the collection of real property tax by linking it to updated cadastral map and tax declaration data in the geodatabase.

Potential Development Opportunities

Nabas has some grand plans for areas with potential development, especially on ecotourism and theme-park development. With their newly opened wind-power project and the expected operation of an international airport in 2016, the LGU is expected to have an influx of tourists that will open doors for new and bigger opportunities. With that in mind, a holistic approach in mapping out strategies and visioning aided by a revised CLUP will prevail to ensure development sustainability.

Creative Approach

The ongoing Vulnerability and Capability Assessment (VCA) survey to address and ensure readiness of the LGU in terms of disaster resiliency gave a chance to immediately use large-scale orthoimage map to tag each individual house and link it to the VCA survey data. The accuracy of the orthoimage is more than enough and it can be further extended with the use of handheld GPS for verification. There can be substantial savings for the LGU in terms of time, manpower, and money. Based on 2010 survey data, there are about 5,742 individual houses in the municipality. The figure also includes government facilities such as barangay halls and health centers, covered courts, churches, and schools that are vital structures to consider in disaster preparedness.



Population exposure to Flood

Facilitative Factors to Accomplish the Project

The success of ReP implementation was due to several factors and it helped attain project objectives, addressed the needs of every activity, and delivered project outputs on time.

Firstly, management support was the key prime mover in the successful implementation of this ReP. Data provision, fund allocation, and assistance of NAMRIA Mapping and Geodesy Branch Director Ruel DM. Belen, MNSA as the Institutional Partner (IP) basically facilitated smooth progress of the ReP. Secondly, the unwavering support and commitment of the ReP Team in order to conduct training workshops and provide assistance to LGU needs and concerns were very commendable. The ReP Team even provided assistance through online media after the training workshops. Thirdly, the support of the recipient LGU and their confidence in the Project added to its realization. The ReP was timely for the recipient LGU because the revision of their CLUP was ongoing and they were concerned with the unavailability of large-scale topographic maps. They immediately gave their approval when the Project was proposed to them and even shouldered expenses incurred during training workshops. Lastly, the cooperation of municipal officials and key personnel ensured that project outputs were met on time. Engr. Johann Ken V. Juguan, the head of the Municipal Planning and Development Office (MPDO) and concurrently of the Zoning Development Office (ZDO) encouraged and inspired all participants from different units with different work interests to

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engage and participate in the training workshop. The participants were keen enough to learn from the training and to produce the thematic layers required from their unit.

Recommendations for ReP Sustainability

The ReP has been effective in terms of implementation and created impact on CLUP preparation of the recipient LGU. In order to establish sustainability, the following are recommended:

NAMRIA's Proactive Role in Ensuring Availability and Appropriateness of Geospatial Data for LGUs

Availability and appropriateness of geospatial data are some of the challenges faced by LGUs especially when CLUPs are updated every ten (10) years. Although data acquisition alone is not much of a problem because various sources are available today, the main challenges for the LGUs are availability of budget to cover expenses and access to available data. Thus, the LGUs are dependent on geospatial datasets from national agencies especially from NAMRIA which has the capability to acquire latest resources for its mapping needs. The ReP provided a venue for NAMRIA to proactively address client requests and suggest appropriate data to LGUs and recommend immediate solutions as well if data were not available.

Continued Skills Enhancement and Updating of Technology

As we all know, technology is fast changing and adjustment to keep abreast of it is deemed necessary. Today, GIS application in fields such as business, education, natural resources, tourism, health and human services, public safety, transportation, among others, proves that it can play an essential role in collecting, analyzing, and displaying data. In the future, there might be new technologies that may replace GIS or extend its capabilities. But the bottomline is that continued learning and skills enhancement are necessary to support project planning and development of the national and local government. In the ReP, capacity building of LGUs is a vital component to establish sustainability for local governance.

Continued Support through Knowledge Sharing

Continued support and collaboration through social media established constant communication and consultation between ReP and LGU personnel, thus ensuring sustainability to both parties. During ReP implementation, queries of LGUs were posted and answered by the NAMRIA training team. Even after the training proper, there had been exchange of knowledge and techniques which extended skills acquired by all participants.

Possible Replication in Other LGUs

The ReP's success in its implementation can be replicated in other LGUs given the same support from all concerned parties. Although the ReP has already been completed and has shown positive impact in the preparation of CLUP for the recipient LGU, its further enhancement and customization is suggested to fit the needs of other LGUs.

Development Plan as a Manager

A lot has been learned in the course of overcoming the challenges encountered during ReP implementation. The Project Team Leader learned that having a positive outlook encourages others to share and nurture sincere commitments to achieve desired goals. As a manager, he acknowledges his role as like an oar that will steer the Project Team to the direction of a common goal but balance should be considered to avoid compromising the morale and welfare of the team. He acknowledges the fact that he is still inexperienced as a manager and still needs improvement. Continued enhancement and harnessing of lessons learned from the ReP itself empowers him to overcome whatever challenges he will encounter, as he journeys towards becoming an effective and efficient middle manager.•

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DENR DAO 1988-2, downloaded October 8, 2015

http://namria.gov.ph

http://hlurb.gov.ph

http://dilg.gov.ph

The Modernization... from page 14

DataProducts/ITRS/itrs.html).

Per consultation meetings with stakeholders in the last two years, a static datum will be adopted for the next three to five years while a deformation model is being developed. The deformation model will be used after the fifth year for a semi-dynamic or dynamic datum. A static datum is where the coordinates are fixed at a reference epoch (i.e., date) but does not take into account the effects of plate tectonics, while a semi-dynamic datum accounts for it in later surveys then propagates back to the fix reference epoch. A dynamic datum, on the other hand, has reference coordinates that change continuously and also makes use of a deformation model to integrate previously acquired spatial data to the current epoch.

The connection of the country's geodetic reference frame to the ITRF at epoch 2016 will start with the processing of one month of GNSS data gathered from PageNET stations using Bernese software. The solution will be constrained using at least six International GNSS Service (IGS) stations surrounding the archipelago as outlined in Figure 4.

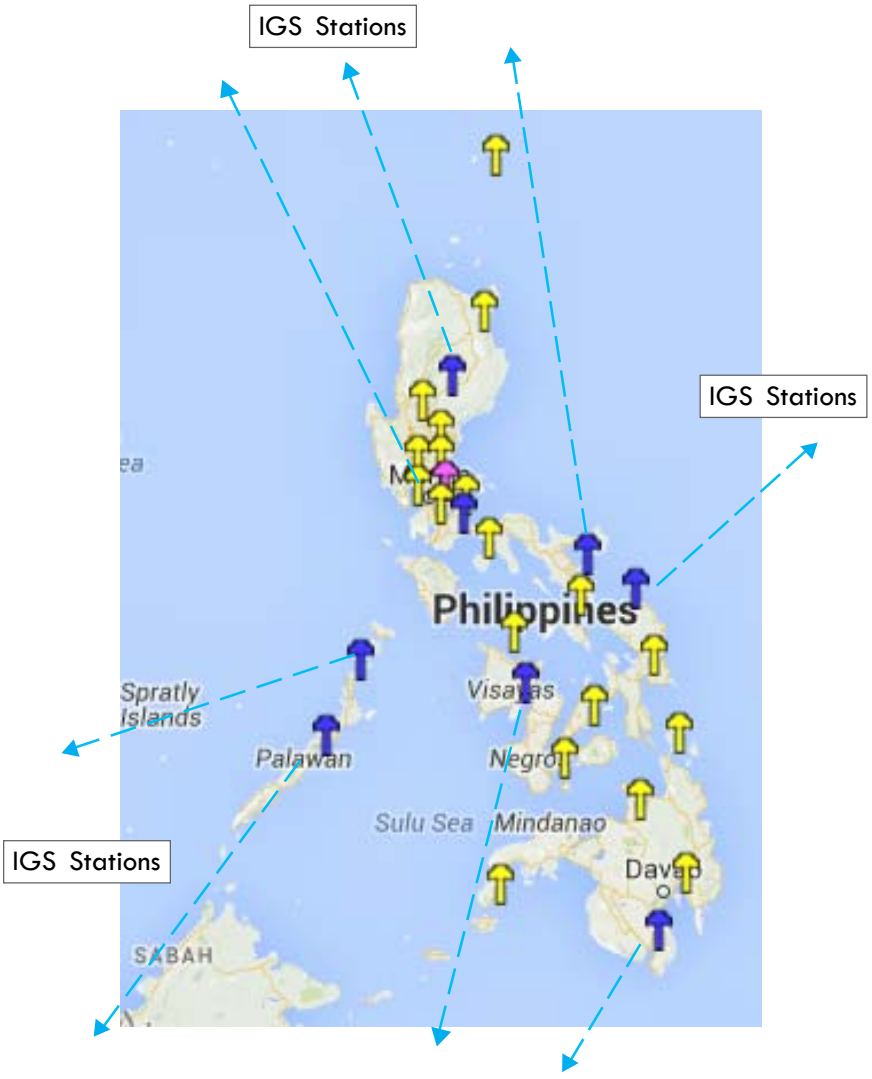

Figure 4: Connection of the Philippine Geodetic Reference Frame to ITRF

Transformation parameters relating PRS92 to the ITRF will likewise be computed and published to facilitate the transformation to and from the new system. Pilot studies on pre-selected areas will be conducted to assess the fit of the PRS92 transformed coordinates to the ITRF. Accordingly, new accuracy standards will be employed following the Federal Geographic Data Committee (FGDC) Standards for Geodetic Networks.

Development, Refinement, and Validation of the Deformation Model

Partnership with counterparts in other countries, government agencies, and academic institutions engaged in deformation studies/ modelling is being considered for the development of a deformation model. A sub-TWG comprising representatives from PHIVOLCS, the academe, and NAMRIA was convened to focus solely on the deformation modelling. Possible partnership with New Zealand is being worked out and a deformation training program for personnel of the Geodesy Division-Mapping and Geodesy Branch of NAMRIA is proposed in the agency's 2017 budget.

Development and Maintenance of the PGVD2020

The PGM2014 has a general accuracy of about 30 centimeters on average across the country. This model is currently being refined into a 10-centimeter or less geoid by establishing additional land gravity stations (41,000 at 25 points per municipality) nationwide. As new gravity data come in, a new geoid will be recomputed until all municipalities have been covered. The ultimate recomputed geoid called

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The Modernization... from previous page

PGM2020 will also be fitted to the levelling benchmarks in order to be consistent with the existing vertical datum. This MSL-based geoid will be called Philippine Geodetic Vertical Datum 2020 (PGVD2020).

Strengthening of Competencies on Geodesy and Massive Information, Education, and Communication (IEC) Campaign

With the shift from geodetic to geocentric datum, the necessary skills of NAMRIA personnel on geodetic reference frame development and maintenance need to be enhanced by their attending technical training programs, conferences, and seminars on reference frames. Accordingly, an extensive IEC campaign will be launched starting 2017. This will address the need to inform and educate the public and private surveying community about the datum change and its effects on the survey and mapping industry.•

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NAMRIA Conducts Tide and Current... from page 15

1

2

3

1. *Fitting an S4 current meter to a bottom mooring dock*
2. *Using a banca platform to deploy a current meter in Limay, Bataan*
3. *NAMRIA oceanographers calibrating a CDS pressure-type tide gauge for commissioning*

the physical oceanographic observations were spearheaded by NAMRIA's oceanographers under the Physical Oceanography Division (POD) of the Hydrography Branch. The oceanographers deployed current meters and installed real-time data transmission tide gauges in Limay, Bataan and Puerto Azul, Ternate in Cavite. Data and information on tides and tidal currents are essential to providing support to the monitoring of hazardous and toxic wastes that flow to Manila Bay and in implementing actions to address the priorities for the improvement of the bay's water quality. •

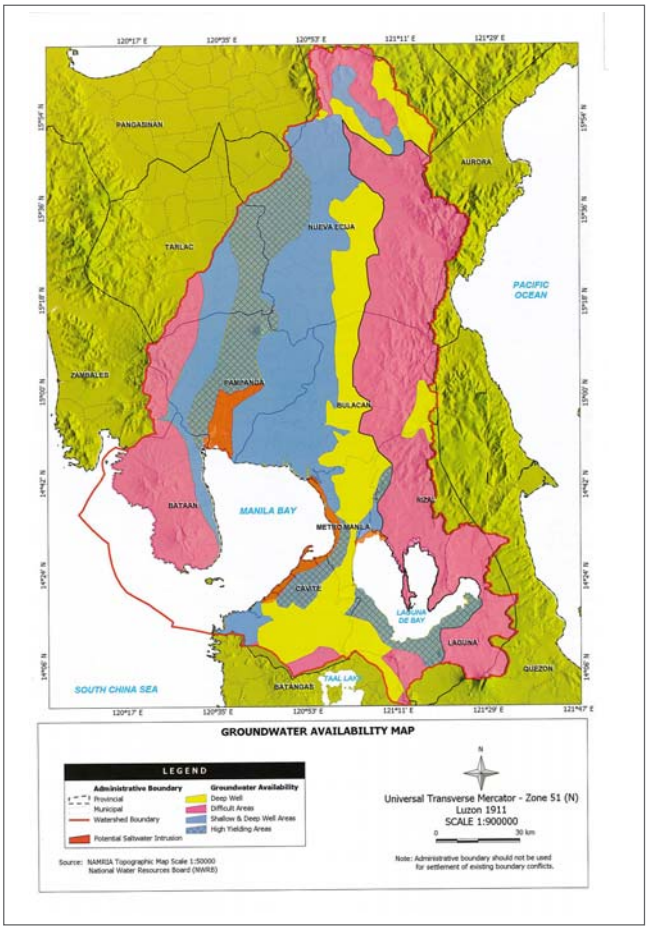
Towards a Spatially Integrated Agenda for Manila Bay... from page 18

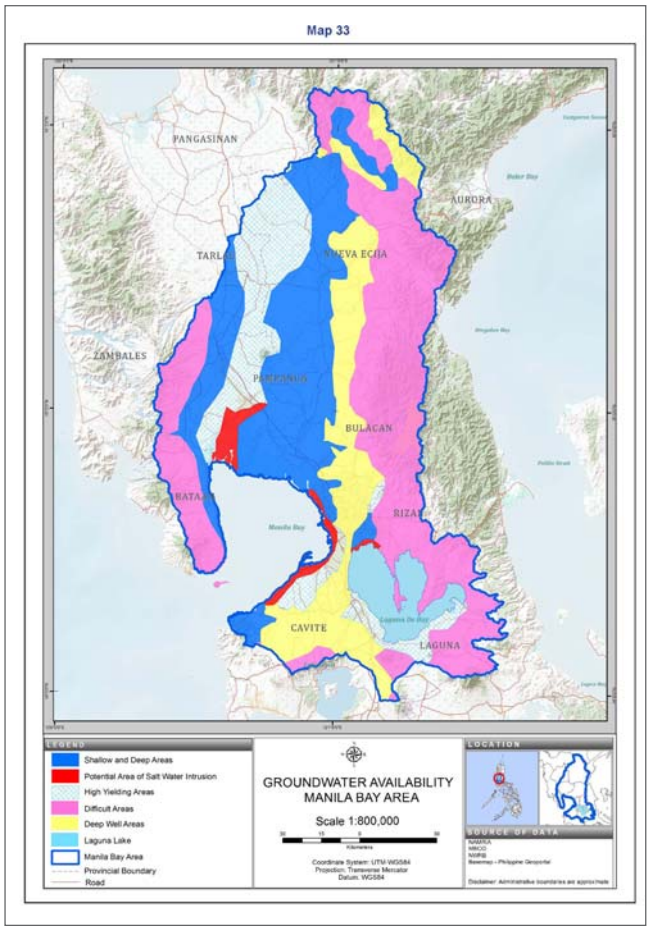
Way Forward

The updated manuscript of the MBEA tells a 'story'—the past lessons which will be crucial inputs to framing necessary interventions for Manila Bay. The 2015 manuscript will also provide decision makers with updated information to enable them to make the necessary policy directions for their stakeholders; will be useful for LGUs in their planning process, particularly in the implementation of proper zoning and other land-use instruments to ensure safety and protection of their constituents; and should also be helpful for NGAs in harmonizing conflicting policies, plans, and programs to ensure the sustainable development of the Manila Bay Area.

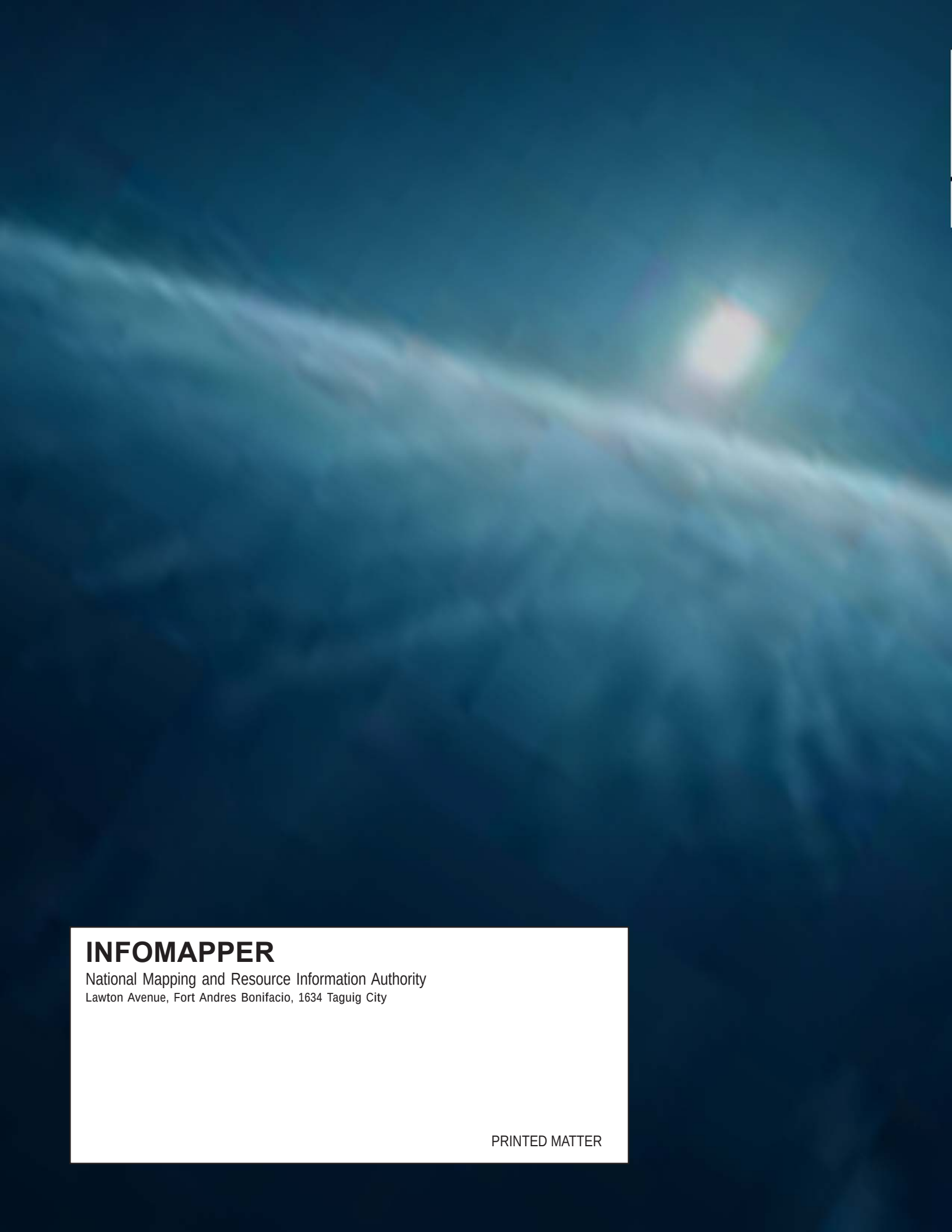
With up-to-date maps, graphs, and tables, the second edition of the MBEA will catalyze movement towards a spatially integrated agenda for Manila Bay. This edition provides crucial inputs to the following: development of a Decision Support System (DSS) through the integration of existing modelling studies; strengthening of the Knowledge Management System, particularly an improved database management for the Bay and the abutting river systems; and the setting up of a refined Monitoring and Evaluation Scheme to assess existing efforts.

Alongside an inclusive partnership and governance strategy, the listed components will comprise the Manila Bay Master Plan, a follow-through document to the 2011-2015 Operational Plan for the Manila Bay Coastal Strategy (OPMBCS). Similar to the 2007 MBEA, the updated edition and its inputs to the plan will provide a framework for enhanced river basin, coastal and ocean governance, and a model for the entire country. •





Map quality was immensely improved with the updated version (map above right) by using the current ArcGIS software and topographic base maps from NAMRIA



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