

Assessment of Groundwater Resources Field Survey Results Guiuan, Eastern Samar,
Philippines

Peachtree City, Georgia

October 10, 2018
William Thurman Nutt, Jr.

MS, Environmental Science, Columbus State University, 2012
MS, Rural and Small Town Planning, University of West Georgia, 2009
BS, Commerce and Business Administration, University of Alabama, 1979
AAS Air Conditioning Technology, Griffin Technical College 2008



REPUBLIC OF THE PHILIPPINES
NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY

PHILIPPINE NATIONAL VOLUNTEER SERVICE COORDINATING AGENCY

2F NEDA BLDG., NEDA SA QC, EDSA, DILIMAN, 1100 QUEZON CITY, PHILIPPINES

hereby presents this


CERTIFICATE OF APPRECIATION

to

WILLIAM THURMAN NUTT, JR.

of the United States Peace Corps (USPC) for his role in enhancing and promoting international cooperation through dedicated and selfless volunteer service in the Philippines during the period from 31 May 2014 to 5 December 2014.

Given this 2nd day of December 2014 at PNVSCA, Quezon City, Philippines.


JOSELITO C. DE VERA
Executive Director

About the Author:



William Thurman Nutt, Jr.

A native of Opp, Alabama, William graduated from the University of Alabama in 1979 with a BS degree in Finance. William first served as a US Peace Corps Volunteer in the Philippines from 1979 to 1981 assigned to the Mayor's office in Sogod, Southern Leyte as a Small Business Consultant. He transferred mid-service to the Family Health Program with responsibilities for all of Southern Leyte.

After the Peace Corps, William taught English in Japan for five years and went on to have a successful 25 year career as manager with a Japanese electronics manufacturer in Georgia. In response to the Typhoon Yolanda crisis in Region VIII where he first served as a volunteer in the Philippines, William was accepted to the US Peace Corps Response Volunteer Program and was assigned to the Local Government Unit of Guiuan, Eastern Samar. The islands of Samar and Leyte make up Region 8 in the Visayas.

William has a Master of Science degree in Environmental Science from Columbus State University, Columbus, Georgia and a Master of Science in Rural and Small Town Planning from the University of West Georgia. He is currently in the dissertation phase of a Doctor of Public Administration Degree from Valdosta State University in Georgia. William's research is focused on the environmental land use policy concerns in the Philippines and is primarily a continuation of his work in Guiuan. He is currently residing in Peachtree City, Georgia working as an ISO 14001 Lead Auditor for Underwriters Laboratory. William speaks Cebuano, Spanish, and Japanese.

EXECUTIVE SUMMARY

In the Summer and Fall of 2014, the recovery efforts from the effects of Super typhoon Yolanda were well underway in Guiuan, Eastern Samar. Rebuilding the houses and infrastructure by the local government, assisted by International and Philippine based NGO's, the community has been mobilized around the commitment to "build back better". Repairs and improvements to the freshwater supply are apace with the other aspects of the daily life in Guiuan currently undergoing renewal. This survey conducted in September to November 2014, December 2015, and July 2018 while incomplete, gives a good overview of the condition of significant environmental aspects of the wells in Guiuan and other factors affecting the ground water system of the municipality. Major outlying islands are included in the survey.

As with any man-made system, there must be a corresponding maintenance plan to ensure the ongoing utility and sustainability of the things we build in our communities. Also essential to the ongoing viability of our systems is the concept of continuous improvement. Given the wide range of conditions and stage of development of the water resources across the communities of Guiuan, it is essential that a comprehensive management system incorporating continuous improvement principals be adopted. The system will recognize best practices in water source management already being employed by many communities in Guiuan. Such a system, similar to one suggested in this report, will serve to allocate resources based on common-sense principals and existing technologies.

Also essential to a healthy watershed, the condition of the ecosystem that protects and cycles the resources nature provides needs to be recognized and preserved. The landscape in Guiuan is currently being regenerated by natural forces and assisted by concerted replanting efforts on the part of local leaders. The regeneration efforts will work toward restoring essential natural systems and the services they provide. Restoration and regeneration efforts should be based on the natural and sustainable principals of natural ecological succession that recognize the vulnerabilities of the Geology of Guiuan and the resilience of the natural systems in which Guiuan has been blessed. Priorities for restoration and conservation are also needed in the active mining regions.

As of July 2018, much progress has been made in the relocation of those in temporary shelters. Two new resettlement areas in Cogon and Tagpuro are of concrete construction similar to townhome two-story design. Communities were transplanted intact if possible.

Areas targeted for relocation were the fishing villages along the jetties near downtown Guiuan. There is limited success, with families often keeping two residences. Residents have two years before they are expected to contribute to the ongoing maintenance of the new villages. Along with the more robust construction are well designed provisions for stormwater drainage, municipal water and recreational areas in the new communities. The downtown terminal and pier are currently undergoing renovation and the completion of the Historic Church Restoration is complete as are Public Market repairs and improvement. The New Municipal Hall construction is behind schedule. Like many municipalities in the Philippines, Guiuan struggles with solid waste disposal.

RECORD OF MAJOR REVISIONS

December 4, 2014	Initial Issue and Presentation to Peace Corps and Guiuan LGU
February 21, 2015	Formatting Issues/Typos and posting on-line.
March 12, 2015	Additional Research, Illustrations, WWII, etc.
June 26, 2016	Addition of Homonhon Section (December 2015)
November 20, 2017	Addition of EMS of fictitious "Calamansi Mining Company"
October 10, 2018	Update: Results of July 2018 visit. Hamarawon Results. Dividing report online.

TABLE OF CONTENTS

About the Author	ii
EXECUTIVE SUMMARY	iii
TABLE OF CONTENTS.....	iv
Part I: INTRODUCTION	1
Background.....	1
Initial Mapping Methodology.....	5
Geology of Guiuan.....	9
Guiuan and World War II.....	12
Part II: GROUNDWATER MANAGEMENT	14
Introduction.....	14
Understanding the Groundwater System: Modeling.....	16
Saltwater Intrusion	21
Sources of Freshwater.....	23
Typhoon Yolanda Considerations.....	28
Continuous Improvement.....	30
Part III: ECOLOGICAL CONSIDERATIONS	34
Threats to the Watershed	34
Coconuts and Ecological Succession.....	37
Promoting Reforestation	40
Part IV: BARANGAY SURVEYS, PENINSULA & NEAR ISLANDS.....	41
Methodology	41
Survey Results	44
PART V: BARANGAY SURVEYS, HOMONHON ISLAND	48
Barangay Summaries	66
REFERENCES	108
Appendix A: Calamansi Mining Company EMS.....	128



PEACE CORPS
RESPONSE

**VOLUNTEER POSITION
DESCRIPTION**

GENERAL INFORMATION:

Country:	Philippines
PCRV Position Title:	Land and Water Use Mapping Expert
Site Name (location):	Municipality of Guiuan, Province of Eastern Samar
# PCRVs Requested:	One (1)
Desired Start Date:	March 2014
Length of Assignment:	Six (6) Months

SECTION 1:

Partner Background:

Partner Organization Name:	Local Government Unit of Guiuan (LGU Guiuan), Province of Eastern Samar
Organization Type:	Local Government Unit
Organization's Mission and Goals:	<p>Vision: THE PREMIERE BUSINESS AND TOURIST DESTINATION IN EASTERN VISAYAS, WITH GOD-LOVING, HAPPY, PEACEFUL AND HEALTHY PEOPLE ENJOYING QUALITY LIFE WITHIN AN ECOLOGICALLY-BALANCED AND SAFE ENVIRONMENT WITH HIGHLY PROFESSIONAL, COMPETENT, EFFICIENT AND EFFECTIVE GOVERNANCE”.</p> <p>Development Goal: Improve the quality of life of the people while protecting and conserving the environment.</p>
Name and Title of PCRV Counterpart:	Ms. Nenet Ecleo Municipal Planning and Development Coordinator (MPDC)
Other primary stakeholders (if any):	<ul style="list-style-type: none"> ○ The Mayor and other key decision-makers – review, approval and adoption of the plan ○ Barangay Captains – Will provide support to the project team during the conduct of land use mapping ○ Representatives and organizations from affected communities ○ Private and informal sector enterprises ○ Vulnerable groups (poor women, children, the elderly, handicapped, etc.) ○ Civil society organizations and religious groups ○ Planning and environmental protection agencies ○ Academe

	<ul style="list-style-type: none"> ○ Media representatives – for proper dissemination of the plan ○ Representatives from national government agencies
--	---

Project Background:

The Local Government Unit (LGU) of Guiuan recognizes that one of the areas for effective development is its development planning process. The long-term plans such as the **Comprehensive Development Plan and Comprehensive Land Use Plan (CLUP)** that Guiuan-LGU currently have must be reviewed and updated inasmuch as it is the basis of the medium-term and short term plans. The said plan is a major document where other sectoral plans are integrated and therefore must serve as the basis for implementation and monitoring.

The first CLUP the municipality has formulated was for the period 2003-2012. In 2012, the Housing and Land Use Regulatory Board (HLURB) provided technical assistance to the LGU through modular trainings for the CLUP team members to purposely update the Plan. Unfortunately, the training did not yield the desired results. The seemingly tight and rushed training schedule requirement had a negative effect on the depth and extent of data collected, the quality of analysis and ultimately the final output. Moreover, much of the database contained in the CLUP has since been obsolete, given the time period within which they were collated and utilized. If left at its current state, it would affect much of the sectoral and spatial analyses, and therefore impact on land use decisions. Such decision-making is crucial especially at present, when the municipality is in the process of recovery after being hit by Super typhoon Haiyan (Yolanda).

In pursuing the completion of the updated CLUP, the Guiuan LGU will take into consideration not only pre-existing conditions but also new physical and socioeconomic realities brought about by Haiyan. To this end, the municipality finds it extremely necessary to update its baseline information, which has been greatly altered by the impacts of the typhoon, and which the LGU does not have the capacity to develop and manage. Moreover, the translation of this information into spatial representations such as maps would also be fundamental in crafting a sound, rational CLUP.

Guiuan intends to build on what has been accomplished post-disaster, including post-disaster assessments, rehabilitation plans and other technical assistance provided by development partners. It will be creating a Team following the Rationalized Planning System, with the Municipal Planning and Development Office (MPDO) acting as coordinator. The Team will be in place upon the arrival of a technical consultant, in this case, the PC Response Volunteer.

Role of the Volunteer and Duties & Responsibilities:

The PCRV will be a member of the Planning Team who will perform the following responsibilities:

- The PCRV shall participate in the gathering of sectoral data, and provide technical assistance in data processing, analysis, and presentation.
- The PCRV shall assist in the facilitation and documentation of Barangay

(Community) Workshops and Assemblies.

- The PCRV shall provide technical support in the survey and mapping activities for the land use planning.
- The PCRV shall assist in the writing, packaging, and presentation of the final output.

Volunteer Deliverables:

- Data Management
 - Sectoral databank e.g. residential, agricultural, commercial, etc.
 - Trained municipal data managers on survey instrument formulation, data collection, processing, analysis, and presentation
 - Written report based on the sectoral databank
- Planning and Coordination
 - Conducted coordination meetings with all concerned stakeholders
 - Written report on coordination efforts
- Survey and Mapping
 - Generation of hard and soft copy of all different maps pertaining to land use planning (*Land-based natural resources, Marine resources, Protected areas, Settlements, Population and demography, Infrastructure and utilities, localized hazards, Public and private properties, existing land and water use, land/water use conflicts and boundary disputes, Analytical maps, vulnerability maps, land use projections/computations, others*)
- Drafted technical inputs to the Comprehensive Land Use Plan (CLUP) 2014-2022

Minimum Qualifications:

- Graduate of environmental related field or Master's Degree in urban/rural planning;
- At least two years working experience in land use planning and documentation;
- Must have expert knowledge on data banking and mapping technologies (e.g GPS, GIS data integration, etc.);
- Demonstrated ability to live and work under challenging emotional and physical conditions;
- Excellent people skills with demonstrated flexibility and patience.

Desired Qualifications:

- Very good coordination, networking and public relations skills
- Very good data crunching capabilities

Working Conditions:

Considering that the place is fresh from the devastation, the general working environment is challenging, both emotionally and physically. Hence, the PCRV's flexibility and patience will be very valuable to complete the assignment.

The PCRV will hold office at the Municipal Planning & Development Office (MPDO). Office supplies and equipment including desktop computers and internet access will be accessible to him/her anytime. Most of the work will be in the office and some travel would be

necessary for coordination and networking. The PCRV will be working closely with the Municipal Planning and Development Coordinator. It would be very helpful for the PCRV to have his/her own computer or laptop the computers. Communication line is very challenging since the infrastructure was also devastated. Access to internet is available but limited and main communication line is through mobile phone.

Public transportation to and from his/her housing accommodation and around town are “pedicabs” or tricycles (motorcycle with side cart).

The LGU Guiuan will spend 5 days orientation for the PCRV. There will be a situational orientation about the LGU Guiuan before and after the typhoon “Yolanda”. Discussion on the current efforts to draft the 2014-2022 CLUP and ocular visits of the Barangays (communities) of the Municipality will also be done. The PCRV will be introduced also to the municipal officials, department heads and the members of the Barangay Council explaining briefly the nature and scope of their assistance.

Housing & Living Conditions:

The housing accommodation for the PCRV is located in the town’s urban area more or less half or a kilometer in distance from the municipal building (office station). He/she will be staying in a rented two-storey apartment. One of the two bedrooms will be exclusively occupied by the PCRV. It has basic amenities such as adequate water and electricity. The living room, dining area, kitchen, toilet and bath is shared. Commercial and public establishments are just within a 500m radius.

Although there are available provisions of basic housing necessities, the living environment brought about by the super typhoon may equally be challenging both emotionally and physically.

Country Programming& Reporting:

The PCRV position is in line with the PCR Strategic priorities and PCR Philippine Plan for 2011– 2015 where Disaster Risk Management (DRM) is the top priority program area.

Peace Corps Response requires monthly and final reports, evaluation, and Description of Service (DOS). The PCRV must submit a copy of all materials created during the period of service with their final report to Peace Corps Response Coordinator.

Supervision Requirements:

The Peace Corps Response Volunteer will report to the Peace Corps Country Director or his/her designee. A PCRV will be expected to abide by all Peace Corps rules and regulations. The PCRV will also be expected to report to a designated point of contact within the partnering organization on a periodic basis to be discussed during orientation with the LGU Guiuan.

The Peace Corps Response Coordinator will be responsible for overseeing the work of the PCRV that will work on the assignment.

Orientation:

Orientation for Peace Corps Response Volunteers can vary both in length and content depending on the country and project in which the Response Volunteer is placed. PC Response Volunteers are required to complete standardized sessions, including safety and security and reporting allegations. Post level sessions on administrative policies and procedures, health and wellbeing, and project specific information can be designed to fit the Volunteers experience and need. Additionally, PCRVs will receive a short orientation from partner organizations upon arrival at site.

Safety and Security:

The PCRV will receive a comprehensive safety and security briefing during orientation with Peace Corps. It is critical that PCRVs use caution and common sense and follow the security guidelines developed by Peace Corps Philippines. Volunteers who violate safety and security protocols may be administratively separated. Further information on safety and security can be found in the Welcome Booklet upon acceptance.

Nanayaa Kumi
1111 20th Street, NW, 7th Floor
Washington, DC 20526
nkumi@peacecorps.gov
1-800-424-8580, ext 2248 or 202-692-2248
Fax:202-692-2251
Fax: 202-692-2121



DESCRIPTION OF SERVICE
UNITED STATES PEACE CORPS RESPONSE
PHILIPPINES

WILLIAM THURMAN NUTT, JR.
MAY 31, 2014 TO DECEMBER 5, 2014

Peace Corps Response Volunteer William Thurman Nutt, Jr. started his service on May 31, 2014 in the Philippines. Following a ten-day orientation in Manila, he began work with the Local Government in Guiuan, Eastern Samar. William was assigned to the Municipal Planning office, in Guiuan, Eastern Samar as a

COMPREHENSIVE ENVIRONMENTAL LAND USE PLANNING AND MAPPING EXPERT.

As member of the Guiuan Recovery and Rehabilitation Group created to coordinate response efforts in the wake of Typhoon Yolanda, William was responsible for mapping and assessing the groundwater resources of Guiuan. He participated in the gathering of local environmental data, and provided technical assistance in data processing, analysis, and geo-spatial presentation.

In this role, he carried out the following duties:

1. Coordinated the ArcGIS geo-referencing and digitizing the blueprint cadastral survey maps and other printed maps of the 60 barangays to produce an accurate political boundary map.
2. Conducted a comprehensive field survey of 37 Rural Barangays, to assess and map the condition of water resources. Survey included 969 wells and pumps as well as locations and condition of barangay and municipal water system access points. Ecologically sensitive areas and watershed aspects such as zones of vulnerability and recharge areas were also identified and mapped.
3. Assessed the wells and pumps on a 10-point scale to rate the improvement aspects of water resources, along with a suggested continuous improvement management plan based on international standards.
4. Provided an analysis of the karst groundwater system, sources of freshwater, and saltwater intrusion, taking into account the geological context of Guiuan and Typhoon Yolanda recovery considerations.
5. Assessed threats to watershed and ecological sensitive landscapes affected by Yolanda and provided recommendations relating to the natural forest succession and recovery process.
6. Prepared Barangay specific maps and descriptions of the water resources that summarized the findings and presented to the municipal planning officials of Guiuan a formal report of survey results.

ACKNOWLEDGMENTS

First, I would like to thank the government of the United States of America for giving me this opportunity to serve in Guiuan. Ms. Nanayaa Kumi, my recruiter in Washington D.C. helped me at every step in the long and difficult application-approval process. In-country Program Manager, Mr. Milo Cruz, and Ms. Shiela San Jose, Program Assistant, along with the PC-Philippine staff in Manila, all provided support and advice along the way. Everyone was instrumental in making my experience a success. Ms. Lani Berino, who always made travel easy, was especially helpful during my emergency leave in The States.

To my counterparts in the Guiuan Planning office, Ms. Nenita Ecleo, and Mr. Rectito Melquiades, I wish to offer my sincere thanks for the support on the job, hospitality and friendship. I would also like to thank Mr. David Garcia and BJ Gochoco from UN Habitat for their technical and logistical assistance in the office and in the field. Overall I have never worked with a group of more dedicated public servants and talented young professionals such as I have been fortunate to be associated with in Guiuan over the past six months.

And finally I would like to thank Mr. Elysar Sevilla, the student caretaker at my residence who helped me stay safe, secure, well rested, and fed in my comfortable home during my stay in Guiuan.