Part IV: BARANGAY SURVEYS, PENINSULAR & NEAR ISLANDS

Methodology

The survey and evaluation of the water resources of Guiuan were carried out by traversing the rural locations and village population centers on foot. This entailed a short bicycle or motorboat ride followed by going house to house questioning the residents as to where they accessed fresh water for clothes washing and bathing. Once the location of the well was established, a GPS waypoint coordinate was captured using a Garmin GPSmap 76CSx.

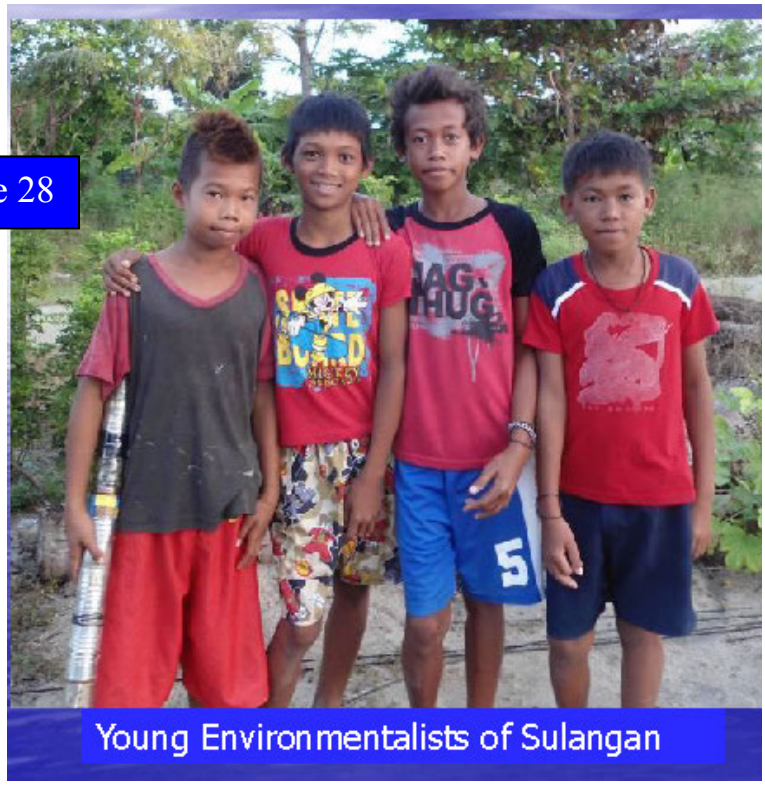
Digital photos were taken with a Sony Cybershot 12.1 MP Camera to record the condition of the well structure and a vertical image down the well if possible. The photo evidence was used to estimate depth to the water table, water condition, the presence of pump piping, among other qualitative data. The surveyor took area photos if location environmental factors were significant for the evaluation. The location was established by the source of the well, typically the concrete structures, and not necessarily by the location of the pump. The presence and condition of Barangay and Municipal Water Systems was also recorded.

The results of the survey represent a sampling of the wells. In virtually all instances, residents were willing to invite the surveyor on to their property and enthusiastically show their well and explain some of their issues with fresh water. In going house to house, an attempt was made to complete a comprehensive survey of the barangay and include most all wells, however some were omitted. The raw data was imported into the ArcGIS ArcMap 10.2 using DNRGPS Version 6.1.0.6. The numbering of the wells was designated by renaming the photos to identify the sequence location along the survey track. The point shape file was layered onto the Barangay boundary layer and the points were then graded by the associated well number. When association of the point data and photo qualitative data was unclear, the time stamps between the camera and Garmin were used in the sort. In some cases where data points were

grouped closely together, time stamps were instrumental in matching the qualitative data with the spatial data.

In many instances, one individual or groups of young environmentalists were eager to give the surveyor a complete tour of the barangay and a comprehensive inventory of the wells Slides 28 & 29). In Barangay San Jose on Manicani Island, the elementary school allowed a group of students to accompany and assist in the field work. It was particularly beneficial to the purposes of the survey and assessment to identify an individual with extensive knowledge of local water resources and issues. Often a resident was very interested in hearing my concerns about cross- contamination between wells. The survey methodology, while concentrating on the collection of specific location and quality data, was conducted to allow time to discuss with the residents their concerns and issues related to the environment.

Slide 28



Individual barangay surveys took two to three hours to conduct and effort was expended to survey most all areas, major roads and paths. Where there were few wells, as in the higher elevations, the survey includes most all of the wells. In denser populated areas, some residents were not home. In the more affluent properties secured with fences and gates, the water source was not included in the survey. Conversely, wells in common public areas more likely to be included in the survey. In many cases, especially in the rural areas, wells on private property were being shared with neighbors. If the survey required more time and energy, and if fatigue on the part of the surveyor became a factor in completing a thorough barangay survey, the survey was stopped and picked up the next day at the same location. Often, when the survey was interrupted, refreshments were shared at a local store. The relaxed atmosphere and walking

tour facilitated effective communication and collection of anecdotal information about the barangay and the current situation.

In assessing the improvement of the wells, the surveyor noted the presence of a serviceable Jetmatic pump as an improvement, regardless of whether the pump was working or not. The physical condition and surroundings of the pump may have indicated that residents were not using it; however, this was not generally noted in the results of the survey. Consequently, placing a pump back into service, while an obvious improvement for the residents, is considered primarily a maintenance item and not noted in the improvement result score. The method of classifying and evaluating well security, safety, and sustainability shown below is simple and straightforward and was applied across all barangays where surveys were completed. The method represents minimum standards for wells and include, provisions for cover, prevention of surface water to flow into wells, safe access, etc.

Well Improvement Aspect/Points (Slides 30 to 35).

0 -- Well Contaminated: Well contaminated and abandoned. For such wells, substantial effort needed to return well to service, otherwise the well should be properly decommissioned and closed.

1 – Cavity: Simple dug hole without improvements .

1 -- Some Wildlife Protection: Simple cover, netting, etc.)

1 -- Some Runoff Protection: user platforms simple curbing, coco lumber etc.)

1 -- Improved Shaft: culvert, hollow blocks, concrete, etc.

1 -- Concrete Apron: should be more than user platform, ideally complete around well.

1 -- Cover: can be simple, heavy duty, may have been adequate but deteriorated.

1 -- Adequate Cover: tight seal, or sealed-not removable.

1 -- Serviceable Cover: Cover tight and Serviceable.

1 -- Secure and Serviceable Cover: Superior Designed cover prevents contamination. Well can be cleaned and inspected and cover can be safely removed and replaced by women, children, and the elderly.

1 -- Pump (manual, electric, etc.)

"+ " dual design for hatch cover makes for easy access.

E – Exempt Well: Wells that are of historical, cultural, or aesthetic significance and/or in a natural setting to deserve preservation in their current state. Also, in areas with mostly improved wells without easy access, these mostly open wells would serve as emergency water sources in contingency planning. Improvement may still be applied but should be designed to ensure preservation of these special wells. Often these wells were among the first water sources in the barangay to clear up in the days following the Typhoon.

Well Improvement Aspects

- Point 1 -- Cavity

Well 9 Bucao Grade 1

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Well 4 Pagnamitan Grade 1

Well 4 Barbo Grade 1

Well Improvement Aspects

Improvement Points 2 & 3. Points awarded for:

a) Some Wildlife Protection--simple cover, netting, etc;
b) Some Runoff Protection--simple curbing, coco lumber, user platforms, etc.

Well 7 Bucao Grade 2

Slide 32

Well 41 Baras Grade 2

Well 2 San Pedro Grade 3

Well Improvement Aspects

Improvement Points 4 & 5 awarded for:
a) Improved Shaft--culvert, hollow blocks, concrete, etc.)
b) Concrete Apron—ideally complete around well, should be more than simple user platform.


Well 9 Dalaragan **Grade 4**


Well 13 Pagnamitan **Grade 5**


Well 15 Tagpuro **Grade 3**

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Barangay Surveys--Methodology

Well Improvement Aspects

Improvement Points 6, 7 & 8 awarded for:
a) Cover—can be simple, heavy duty, may have been adequate but deteriorated;
b) Adequate Cover--tight seal, or sealed-not removable;
c) Serviceable Cover--Cover tight and serviceable.


Well 16 Salug **Grade 8**

Slide 34


Well 18 Camparang **Grade 6**


Well 34 Campoyong **Grade 8**

The points are assigned depending of the state of improvement and are cumulative, assuming that well development is an incremental and continuous process. For example, if a cover is "Secure and Serviceable" they would be assigned a point for being categorized as such. This well would also get three points for "serviceable cover, adequate cover, and cover". Typically this level of improvement may entail an improved shaft, apron, wildlife, and runoff protection and receive points for those aspects also. Improved wells also get a point credit for being a cavity. As it relates to covering a well, this initial evaluation was somewhat lenient. If the resident made a provision for a cover for their well, they were given points. Covers not applied at the time of the survey, received points with the assumption that the cover would be used to secure the well when it was not in use. Some covers were obviously not being used at the time of the survey and had not been used for some time. The standard calls for "tight

fitting“ covers. Some covers had deteriorated to the point they were not effective at keeping unwanted contamination out. Conversely, some covers, that were very simple in design, were quite effective. Often, covers represented a considered effort to secure the well and were innovative and creative in design.

Evidence in the field indicates that wells need to be better secured. The quality of the fit of removable well covers varied widely. Ideally, the cover should be designed to prevent contamination and allow for easy access. The highest quality covers observed in the field are both secure (tight) and with an easy to remove hatch that can be removed and replace by anyone. The aspect of serviceability is also graded and is applied with wells with easily removable covers. To insure quality of the water source, wells need to be inspected and cleaned periodically.

In calculating averages for barangays, the exempt “E” wells along with broken and wells not accessible were not included. Wells that have been abandoned and contaminated without being secured, regardless of the state of development get a grade of "0" and are included in the averages. Obviously along with applying superior designed and tight covers, cleaning up these wells will offer the greatest initial improvement in overall scores. One well improvement that was not included in the aspects was permanently installed roofing applied over many developed water sources. This improvement, of obvious benefit to users, was not common and only indirectly affects the quality and security of the water source.

In Figure-23 is a list of barangays included in the survey. The eight barangays on the island of Homonhon were not included in the initial survey period, however, five barangays on that island were surveyed from December 5th to 9th, in 2015. Because of the widespread use of surface water and the relatively small number of wells found on Homonhon, an average for all wells in the five barangays surveyed is calculated. The water resources and ecological

condition of Victory Island has not been surveyed. The surveyor also omitted the downtown areas. The surveys of barangays of Homorawan and Suluan were incomplete and the qualitative data is not included in the overall results. The table in Figure-23 and map in Figure-17 below presents the overall sampling results. The highest most improved wells on average are found in the higher elevations and in barangays with fewer wells. Fortunately, the more improved wells and the most secured are found in the major recharge areas. The sample size is represented in the second map, Figure-18.

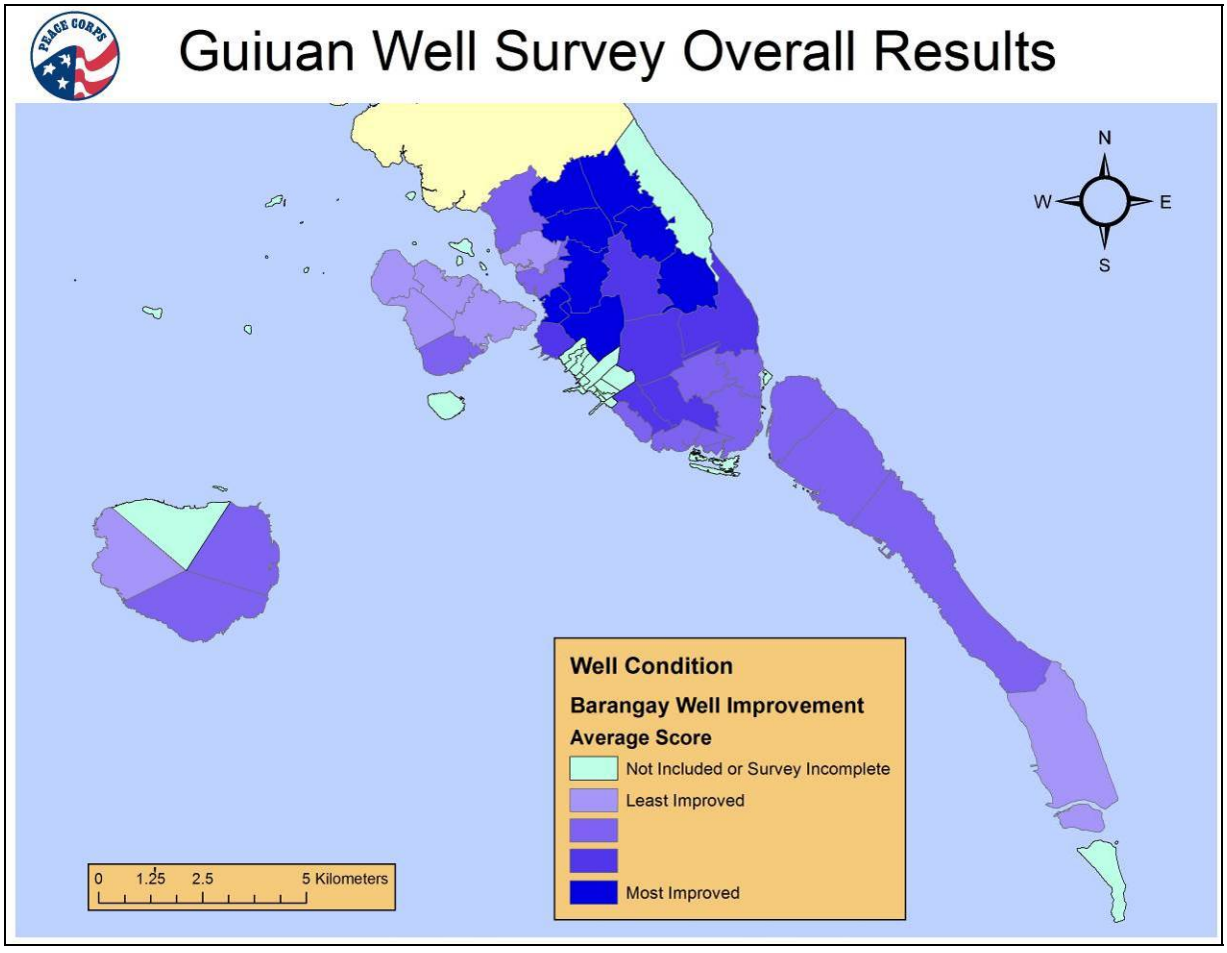

Figure 17: Guiuan Well Survey Overall Results

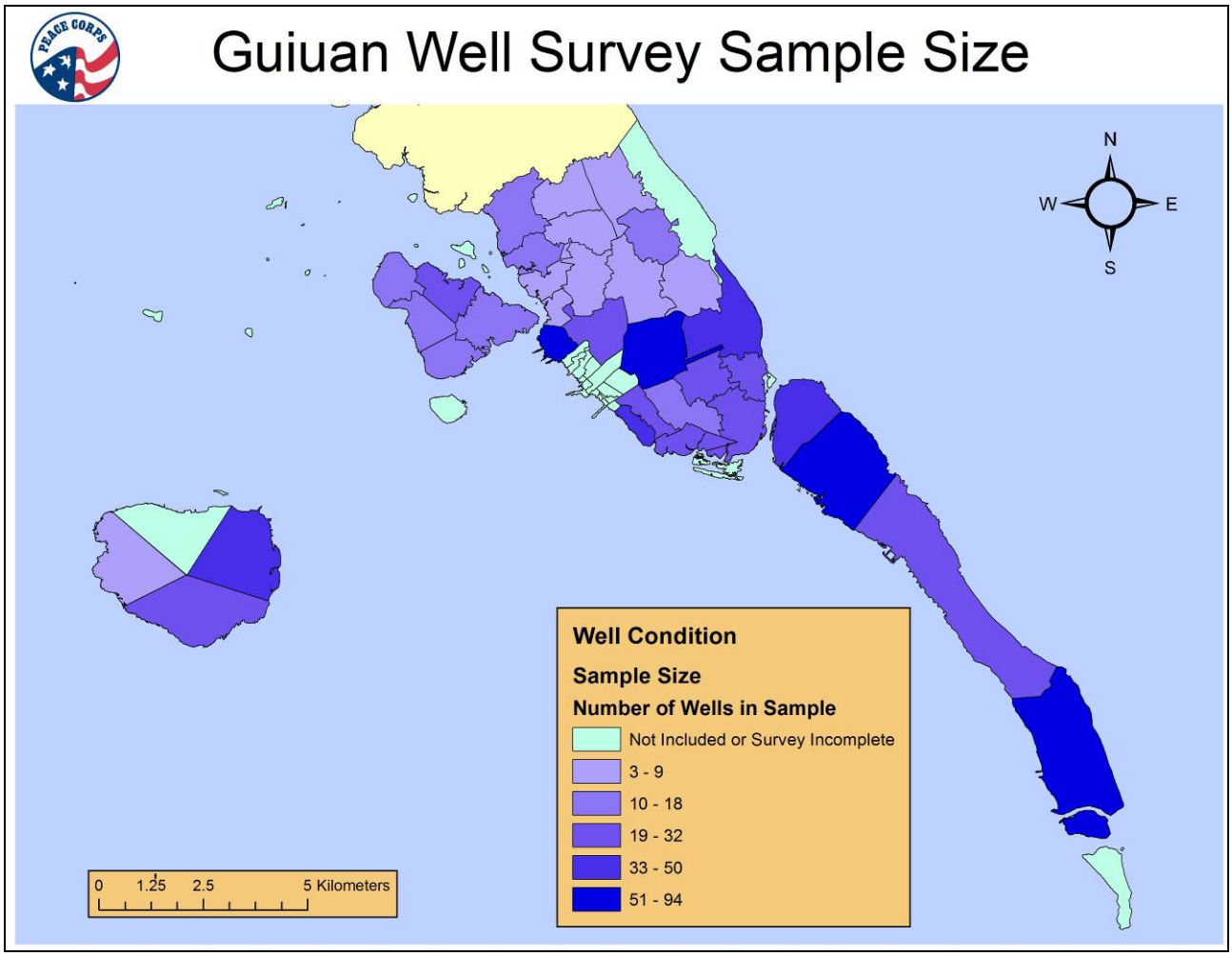

Figure 18: Guiuan Well Survey Sample Size