Environmental Finance Center
Syracuse University

Puerto Rico Small Water System Needs Assessment

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Executive Summary

In February 2019, the Syracuse University Environmental Finance Center (SU-EFC) conducted a focus group event for the leaders of small, rural and peri-urban community water systems not served by Puerto Rico Aqueduct and Sewer Authority (non-PRASA systems) in Adjuntas, Puerto Rico. Themes identified during the focus group form the basis of this report, a needs assessment of community water system providers in Puerto Rico. This assessment confirms critical needs for non-PRASA systems as:

- funding information and language access,
- support for new and repaired infrastructure,
- community engagement and education, especially in water conservation, and
- capacity-building skills

SU-EFC recommends technical assistance providers use this assessment to guide program development. Responsive technical assistance, coupled with formation of an alliance of the community systems, can meet the needs identified by the people who manage these essential drinking water services for Puerto Rico's rural and peri-urban communities.

Introduction

On February 2, 2019, Syracuse University Environmental Finance Center (SU-EFC) conducted a focus group event for the leaders of small, rural and peri-urban community water systems not served by Puerto Rico Aqueduct and Sewer Authority (non-PRASA systems) in Adjuntas, Puerto Rico[1]. The purpose of the focus group was to gain insight into the needs that rural communities have regarding water resources protection and drinking water infrastructure investment. The goals of the focus group were to identify what assistance these communities need and identify what technical assistance is - or is not - working, based on their responses to SU-EFC's questions.

Overarching analysis goals were to compile the needs discussed and to identify themes based on participants' concerns— the barriers and opportunities—related to technical service provision. Thus, themes identified form the basis of this report, a community needs assessment of small, non-PRASA water providers in Puerto Rico.

SU-EFC staff were motivated by the desire to understand the needs of small water systems after the devastating island-wide impact of Hurricane Maria on September 20, 2017. Most of these systems rely on volunteer labor and operate with limited resources. SU-EFC hypothesized that the experience of the hurricane and the struggle to rebuild afterwards would bring focus and clarity to the needs of these systems, which serve a critical role to provide safe water supply to communities across Puerto Rico. This assessment is intended to inform future work in developing responsive technical service programs to meet the needs identified by the people who manage these essential systems.

Methods

To assess needs of small water systems, SU-EFC chose to use a focus group format. A focus group is a conversation among a group of people who interact or have an issue in common. The facilitator asks specific questions about a topic of interest in a safe and confidential environment. The focus group format was selected to understand how a group of small water system managers think about their experiences and their technical assistance needs since Hurricane Maria, to gain insight on why they hold the opinions they do, and to provide information to influence development of future technical assistance programs.

Question development

SU-EFC prepared for the event through a series of staff meetings to define goals, develop focus group format and a list of questions, and brainstorm location and recruitment. Staff with experience working in Puerto Rico informed goal and question development, while a staff member with experience in conducting focus groups developed a series of specific questions derived from these conversations.

[1] For this document, peri-urban communities are defined as inhabited areas that surround towns and cities, neither strictly rural nor urban, instead sitting in the transition zone between these environments.

Staff also used the wide variety of background reading available since the 2017 hurricanes to inform question development. The questions were designed for a two-hour, facilitated conversation with participants, beginning with a discussion about current infrastructure needs, and ending with thoughts about technical assistance needs. The Results section of this report includes the focus group questions.

Site selection

SU-EFC staff selected Adjuntas, in the central highlands of Puerto Rico, to increase the likelihood of recruiting rural water system managers to the event and where SU-EFC has conducted successful workshops for small water systems in the past. A hotel-restaurant with ease of access to a main north-south road (Highway 10) provided a comfortable setting for participants.

Recruitment

SU-EFC capped event participation at 30 individuals, to keep facilitation and conversation manageable for Spanish-speaking staff. SU-EFC used existing email lists of Puerto Rican Non-PRASA water systems contacts from its US Environmental Protection Agency-funded project, Smart Management for Small Water Systems, to recruit workshop participants. The recruitment email is in Appendix A. There was no cost for participants to attend the focus group, except their own travel expenses.

Event Procedure

Two Spanish-speaking SU-EFC staff, and one Puerto Rican colleague affiliated with Casa Pueblo, an Adjuntas nonprofit organization, facilitated three focus group tables of approximately ten people each. Prior to convening the discussions, introductions and a stretching exercise established a comfortable environment. Participants completed a brief consent form and questionnaire to gather data about their organization. Digital recording devices were used at each table. After two hours of conversation using SU-EFC's series of questions, the groups finished their focus groups and gathered for lunch at the hotel.[2]

Data Analysis

The focus group event was a one-time event to gather qualitative information through conversation with a self-selecting, small group of people representing non-PRASA water system managers across Puerto Rico – a "snap-shot" in time and representation to assess the needs of small water system leaders in Puerto Rico. Subsequently, this report is derived from a qualitative, informal analysis of the focus group conversations that occurred in Adjuntas, to identify needs and relevant quotes. The primary analysis unit was the focus group; SU-EFC compiled topics mentioned by any member of the focus group. If quotes can be attributed to specific participants, SU-EFC shared them anonymously. SU-EFC took a comprehensive approach to analysis to capture all the ideas presented in the focus groups. There was no attempt to capture frequency with analysis— for example, "green infrastructure was mentioned six times."

Coding the Data

The coding structure was be both deductive and inductive. The deductive code was developed from the literature and SU-EFC professional experience, which informed the development of the focus group script, including a short list of overarching themes. The inductive codes came from the discussion groups themselves and were added to the coding structure after an initial review of the audio recordings by the coders. Spanish-speaking SU-EFC staff translated directly from Spanish into English as they reviewed audio recordings to code the focus group discussions.

SU-EFC staff followed "best practice" tips for inductive coding:

- Listen for the meaning of what the participants were saying rather than trying to fit their comments into the deductive coding system.
- Avoid preconceived notions and listen for unexpected insights.
- Capture, as much as possible, insights that come from what is not said, what is rejected by individuals or the group, and what interactions occur between participants.

Results

Thirty-one people participated in the workshop. SU-EFC staff facilitated discussions and recorded six hours of participant response to focus group questions at three discussion tables. Community leaders from ten rural and peri-urban water systems across Puerto Rico found common concerns and learned from each other regarding system management strategies and needs.

> After Maria, I've gotten to know about other community aqueducts, so we've discovered we are not alone.

According to written questionnaire responses, community leaders represented nine water systems which served from 32 - 156 households. Seven systems were sourced by a well, two were sourced by surface water. No respondents were paid by the water system they served, but six of the systems had either paid or unpaid staff. In response to the question, "Do you know who will manage the water system after you?" fifty percent did not know.

Facilitators led discussion at each table with the questions listed in this section. Reporting and analysis of coded content is included with each question.

1 What issues with water infrastructure most concern you in your community now?

Participants discussed a common need for new and improved infrastructure to replace old equipment and, in cases mentioned at each discussion table, to meet the demands of an increasing population. Many of the community aqueducts are old and cannot comply with the new regulations and safety codes. The aging infrastructure and lack of funds for constant maintenance have resulted in leaking pipes, broken tanks, and tanks without enough

[2] SU-EFC staff recognized that the focus group format was taxing to participants and added an element of interest to the day to make it more enjoyable to attend. Subsequently, after lunch, participants were invited to tour Casa Pueblo and a forested conservation area owned by the nonprofit, which serves as source water protection at the headwaters of the Río Grande de Arecibo, which supplies water to more than a million people from Adjuntas to Arecibo.

storage capacity. Continually fluctuating energy supply puts a strain on the infrastructure; a reliable energy source is needed, and communities have identified renewable energy such as solar panels as a solution.

Community leaders identified lack of funds for infrastructure as a concern. Many community aqueduct systems do not have meters installed, and a fixed rate is charged for unlimited consumption. Subsequently, water is used by community members indiscriminately. Over-consumption burdens systems and increases the expenses for maintenance and disinfection. Participants noted that community members are not fully aware of water conservation practices. Discussion at each table identified the "low-hanging fruit" solution of meter installation, but participants noted meters are expensive to install, and community members are not willing to pay more for the water service.

Legal assistance is needed as many of the communities face issues with the water systems' land ownership and land titles. Participants identified the need for changes in their communal aqueduct bylaws to increase water tariff rates and stipulations allowing them to cut off service for the non-paying residents.

a. Have these concerns changed since Irma and Maria?

Each water system manager participating in the focus group experienced unique challenges after Hurricane Maria, but many shared the same realization about the vulnerability of their aqueducts. Government agencies were extremely slow in responding to the crisis, and participants stressed the community work which was almost entirely responsible for rebuilding their systems. Recently, government agencies have become more aware of the existence of the community aqueducts and instead of providing much-needed assistance, they are more concerned with following regulations and there has been an increase of fines levied.

The disaster caused by Hurricane Maria drew international attention and many non-profit organizations offered help to Non-PRASA communities, which resulted in the donation of several solar energy systems. Although communities have recognized the benefit of having these renewable energy systems, participants noted a lack of knowledge on how to fully operate them and how to de-install them before future storms and hurricanes.

Participants discussed the need to have separate funds designated for emergencies. After the hurricanes, construction material prices significantly increased, and having spare parts and tools can be of benefit for a quick response. Contrary to the PRASA clients, the Non-PRASA communities were able to have their water systems up and running in just a couple of days or weeks after the hurricane. They were even able to provide water to neighboring communities.

> "The municipality arrived a month after Hurricane Maria with water bottles. This means that if the men in the community wouldn't have fixed the system immediately, no other water would have arrived until a month later.

b. Are there issues with lack of access to potable water in your community?

Participants did not identify new, significant issues regarding lack of access to potable water after the hurricane.

2 As your community rebuilds after Hurricane Maria, what opportunities do you see for improving water resources protection?

The most observed opportunities for improving the protection of water resources were improvements of infrastructure, use of renewable energy, and water conservation (wise use of water). While SU-EFC staff prompted participants regarding issues like land use-planning, green infrastructure and erosion control, these were not significant opportunities for the participant communities.

a. What resources do you need to achieve those changes?

Participants noted that in order to achieve these opportunities, technical & legal assistance, higher rates, funds (to make repairs, buy meters and supplies), outreach opportunities, and the support of community members are needed.

b. Is there an existing means for involving the community in making decisions about those opportunities (actions), or is that lacking?

The water system managers uniformly identified the lack of public participation as a challenge to overcome. While the small water system community boards follow a democratic governance model, on many occasions the meetings do not have quorum to pass new bylaws or increase the fixed rates. They mentioned the need of finding new strategies to engage the community in meetings and increase their willingness to conserve water.

3 How can you improve and prepare water system infrastructure for future disasters?

The development of preparedness plans is needed along with the support, training and capacity development from government agencies and non-profits. They are aware of the importance of having spare parts, equipment and available cash to immediately repair possible damages caused by disasters. The need for improved community commitment was noted at one table, reinforcing the theme of community involvement and engagement discussed in previous questions.

a. What skills, training and things do you need to achieve those changes?

The water system managers mentioned improvement of communication strategies and conflict resolution techniques as necessary to achieve the desired changes. They also mentioned a need for education on appropriate water use, water conservation and renewable energy infrastructure. Training in water quality protection and adapting to droughts was discussed at one discussion table, droughts were mentioned in the context of the impacts of climate change on non-PRASA systems. Participants at one table responded positively to training in workforce development and mentioned continued capacity development training was needed for non-PRASA leaders, including developing better relationships with government entities.

4 What are your financial needs regarding water resources protection and infrastructure investment?

Participants at one table noted the fixed rate their communities pay for drinking water service is not enough to cover operational cost. Participants noted their actual budgets prevent expansion, purchase or repair of meters, water tanks, and pumps, or digging new wells. They need technical and legal assistance and the support from the community to change the rate structure determined by their bylaws.

a. What financial resources are available that you are aware of?

Changing or enforcing the rate structure was acknowledged as an option to generate revenue. Participants at one table noted after Maria, some communities changed their rate structures to cover fuel costs as they relied on electric generators to pump water for their systems. The same table mentioned cutting off water for non-payers to assure payment. Participants were somewhat aware of the availability of grants and loans, but discussion at one table noted a

> Since no one has helped me before, I ignore the opportunities mentioned.

lack of awareness for who funds non-PRASA system projects.

b. What are the barriers to your community receiving available financial resources?

Multiple barriers were identified in the process of receiving financial resources. The most relevant barriers are language (Spanish speaking and writing, rather than English), technology (access to internet and computers), and the lack of experience in grant writing. The most common available grants were identified as coming from US federal agencies, although one discussion table recognized lack of knowledge about these grants. Usually the call for proposals are written in English, and the majority of community leaders are not proficient in writing in English. Participants noted this is compounded by the need to research grant opportunities,

> We are not experts in English. Anything that's only written in English is a problem.

meet eligibility requirements such a federal nonprofit "501(c)(3)" status, and hold the land title where the water system is located.

5 Do you have access to technical assistance to help manage your water system? If so, what technical assistance approaches are most useful to you?

With the increased number of non-profit organizations interested in Non-PRASA water systems, there are many possibilities for receiving technical assistance. The preferred kind of assistance are in-person and one-on-one assistance (personalized trainings that work with the unique needs of specific communities), facilitated peer-to-peer learning, such as visiting other non-PRASA systems, and "hands-on" trainings. The desire to have continuous education and licensing for water operators was discussed at two of the tables.

a. Could building a supportive community of similar organizations – a "community of practice" – help you in achieving your goals?

Focus group facilitators prompted discussion about building a support community to help participants achieve their goals. Discussion at two of the tables noted that non-PRASA systems were starting to create alliances, for example, AsocAguAs in Caguas. Participants at all three tables were favorable to this idea and identified needs to: unite island-wide, create similar policies across systems, employ their collective power to push for favorable legislation, purchase supplies in bulk for reduced costs, work together to receive technical assistance, convene and share ideas, learn about and apply for grants, and receive funds directly (noted as bypassing their municipalities).

6 Is there anything you haven't had a chance to talk about that you would like to?

Participants noted at two of the tables that many opportunities are offered but never materialize – organizations and federal agencies have visited their communities, but the communities have

> FEMA is playing with people's needs.

yet to receive any funds. FEMA was singled out as an agency that promises things but does not deliver.

In addition, participants cited a lack of communication and exchange of information with government agencies, contractors, and community leaders, in specific reference to fees the water systems owe. Participants also mentioned a decrease in community participation in aqueduct meetings, the need for environmental education to protect water resources, and the difficulties non-PRASA systems experience related to land titles and land use.

Discussion

For each discussion table, SU-EFC staff identified "overarching" themes during the coding process, in other words, these are themes that occurred repeatedly throughout the focus group conversations. SU-EFC deduced beforehand the following may be overarching themes:

- Awareness of conservation
- Funding
- Difficulty prioritizing many needs
- Lack of capacity/overwhelmed
- Community disengagement

These overarching themes were confirmed throughout the discussions, except the "difficulty prioritizing many needs," which was confirmed at only one table. Community disengagement was an especially strong theme, noted as need for community engagement in decision-making, and for community education on water issues in general. One table noted they are out of ideas for ways to engage and educate.

Lack of awareness of conservation was a predominant theme - participants noted the wasting of water by community members, which reinforces the need for education and engagement. As for funding, participants expressed lack of knowledge about funding opportunities and access, and the need for getting funds directly to

communities to eliminate the use of municipalities or agencies as "middlemen." One table emphasized the feeling of "being left out" of funding opportunities and the need for a resource bank to turn to for financial and technical help.

Conclusion

SU-EFC staff wanted to understand the needs of small water systems after the devastating impact of Hurricane Maria in 2017. SU-EFC hypothesized that the experience of the hurricane and the struggle to rebuild afterwards would bring attention to these systems, which provide safe water to communities across Puerto Rico. This assessment confirms critical needs for non-PRASA systems for funding information and language access, support for new and repaired infrastructure, community engagement and education, especially in water conservation, and capacity-building skills. SU-EFC recommends technical assistance providers use this assessment to focus and augment their programs. Responsive technical assistance, combined with building the alliance discussed at the focus group, can meet the needs identified by the people who manage these essential drinking water systems for Puerto Rico's rural and peri-urban communities.

> Before Maria, many local problems were out of sight but Maria hit us so hard that the first thing it did was change the focus in Puerto Rico, since the hurricanes exposed how bad conditions were, and that attention brought new opportunities and benefits, as we assumed a bigger leadership role in our communities.

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Any opinions, findings, and conclusions or recommendations expressed in this material are solely the responsibility of the authors and do not necessarily represent the official views of the Rural Utilities Service.

Supporting Materials (online)

Appendix A. Recruitment email
Appendix B. Coding worksheets