Understanding Water Perceptions in Limpopo Province: A Photovoice Community Assessment

Abstract—The authors implemented a modified photovoice project, Ngudo Nga Zwinepe (NNZ) (Learning through Photos), in a village in Limpopo Province, South Africa where water resources are scarce and often contaminated. This project is a first step in a collaboration between the University of Virginia and the University of Venda to develop a model for sustainable water, health and environmental development. NNZ engaged community representatives in an effort to assess and improve the community’s water system. These participants presented the study results to their community, promoting local buy-in. The research team used content analysis methodologies to develop codes and themes regarding water beliefs. Contrary to the researchers’ expectation, the participants did not prioritize the health risks of contaminated water over infrastructure and financing issues. To maintain community engagement throughout the larger project, the researchers must address the community’s primary concerns in the shorter-term while developing educational strategies regarding the health risks of contaminated water.

Keywords—photovoice; community based participatory research; water perceptions; community assessment; Limpopo Province; South Africa; rural environment

I. BACKGROUND

Water resources and municipality supplies across South Africa are scarce and showing little sign of improvement [1]. Faculty at the University of Virginia (UVA) and University of Venda (Univen) have selected a rural community (population 1855) in the Vhembe region to partner with to create a model for sustainable water development in the region.

The project, Ngudo Nga Zwinepe (NNZ) (Learning through Photos) is a community assessment focusing on water perceptions that utilized photovoice and content analysis methodologies to develop a qualitative understanding of the community’s water needs. This paper describes how photovoice was modified to work with this community, discusses the findings of the research, and makes recommendations on the use of photovoice methodologies in this region.

Although these research findings are specific to a small region of northern South Africa, they may provide insights regarding rural water needs throughout the nation. Findings provide indicators of the community’s water perceptions, namely those relating to infrastructure, access, and flow rate. This research also contributes insights on health perceptions related to water, gender roles and cultural aspects made evident through the photovoice process. The photovoice methodology is a successful means to develop buy-in, sustain relationships, and enhance communication.

II. METHODS

A. Photovoice

Wang developed the methodology of photovoice in 1997, by expanding the use of “photo novella” as a means to empower communities while elucidating qualitative data [2] [3]. It “blends a grassroots approach to photography and social action. It provides cameras…to people with least access to those who make decisions affecting their lives” [4]. Photovoice allows participants to photograph, contemplate and then
verbalize stories or simple descriptions about their photo(s) taken in response to a particular prompt, thereby allowing their voices to be heard. This process prevents written text from hindering communication and is effective in a society that utilizes oral tradition to preserve its culture [5]. Health care researchers have employed photovoice as an assessment tool [6] [7] [8].

**B. Content Analysis**

The research team modified Grounded Theory approaches [9] to develop codes based on participant interviews. The goal was to codify, conceptualize, categorize and then theorize about this community’s water beliefs [10].

**C. Process**

Research partners at Univen conducted two community meetings to assess initial buy-in and to request volunteers from the South African study community. 13 people volunteered (6M, 7F); all had affiliation with the community’s “water committee” or had participated in the building of a large-scale water filtration system weeks prior to this research.

The cohort met with the lead researcher and interpreters a total of 4 times:

1) **Initial meeting**

The research team explained the project to the cohort in English and Tshivenda. The team received verbal consent from all participants. Each participant then received two culturally adapted documents and training to aid in photo taking and to help them consider themes related to water. Finally, they were asked to take photos about: “What water means to me.”

2) **Photo taking**

The participants had 7 days to take photographs with water themes. All participants used every photo available on the disposable cameras (27 exposures). After 7 days a total of 314 pictures were developed.

3) **Individual Interviews**

Each participant met with the lead researcher and interpreters after film processing. The participant viewed his/her photos for the first time and was asked open-ended questions about the photo taking process. Questions included “What was it like taking photographs; was there anything that you wanted to take a picture of, but you were not able to; what was going on outside of the frame of this photo; what photo is the most meaningful to you; what do you think should be the name of this project?”

After choosing the “most meaningful” photograph, the participant was asked to tell a “story” about this photo. All interviews were recorded and transcribed verbatim. Two interviews were not recorded because of technical malfunction in the recording device.

4) **Group Interviews/Debrief**

10 members of the cohort chose to attend the final meeting. The research team posted all 314 photographs on large poster board and asked the participants to observe all of the photos taken during the project. The cohort chose 8 photos as the “best” from the 314. The second part of this process included each participant telling his/her story to the whole group. The average time to tell each story in the group setting was notably shorter than the initial interviews. This session was recorded and transcribed verbatim.

After the stories, the participants were asked to name the entire project. The research team chose to do this to reinforce empowerment that can be derived from the photovoice approach [4]. The cohort came to consensus that the name should be: Ngudo Nga Zwinepe (Learning through Photos). Finally, each participant received copies of the photos they had taken and a certificate of completion per participant requests.

**III. ANALYSIS OF THEMES**

Nine thematic groupings were codified initially; later they were collapsed into 6 coded groupings. These codes were rated by developing a list of common themes, reducing that list, then noting which participants mentioned which code in their interviews and group presentations. A percentage of occurrences was assigned to each code in order of most prevalent to least prevalent. The codes include: Infrastructure/containment (80%), community (61%), money (53%), food (40%), health/hygiene (38%), and pain (23%). The codes “community,” “money,” “food,” and “pain” are verbatim from the interviews.

<table>
<thead>
<tr>
<th>Code</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure/containment</td>
<td>80%</td>
</tr>
<tr>
<td>Community</td>
<td>61%</td>
</tr>
<tr>
<td>Money</td>
<td>53%</td>
</tr>
<tr>
<td>Food</td>
<td>40%</td>
</tr>
<tr>
<td>Health/hygiene</td>
<td>38%</td>
</tr>
<tr>
<td>Pain</td>
<td>23%</td>
</tr>
</tbody>
</table>

**Figure 1.** Codes and their prevalence in participant interviews

A. **Infrastructure/containment**

The most prominent code was infrastructure/containment. Seven of the chosen 13 photos included the image of a plastic water container, either a 10,000 L “JoJo tank,” a 60 L barrel, a 20 L container, or a 5 L bucket. Two more photos displayed a method of containment such as a pipe and irrigation system. The village uses a system of pipes and taps running downhill from a mountain stream as a primary water source.

Some participants chose to shoot photos outside of the village in the study. Two took photographs of or near an irrigation system, which allows plants such as maize meal (corn) and onions “to be watered throughout the whole year” [11]. Participants who spoke about this irrigation system outside of the village related how important it was to small farms and how all of the farms could receive water.
There is a similarity between the irrigation system and the tap system in the community. The participant who took the photo of the irrigation system explained that when one does not need water, it is necessary to block the flow of water from the irrigation line to one’s own field with a rock, so that farmers further down on the line can receive adequate water volume. “They take shifts to water their farm… just because there isn’t enough water” [12]. This model of piling rocks to close off the water source to a farm is identical to what the members of the study village must do to ensure adequate water flow to their neighbors—they do this by closing off their taps.

Another participant spoke directly to the problem of inadequate flow from the pipes saying “The problem that I have is that there isn’t enough rainfall and water level in the river goes down. So water sometimes does not reach other places in this village, other households. So [community members] actually work with [together] and tell them: No, it’s ok they just tell others not to open their taps at that time, so it can actually reach those that don’t receive the water” [13]. Low flow and inconsistent delivery necessitates the need for water containment, according to another participant: “The tanks that we see in the picture, it’s about the importance of storing water. … (the tanks) actually show that (we) do not get enough water” [14]. This suggests a shared recognition of the need to share water and the importance of storing what is available.

B. Community

None of these codes are completely independent from one another. For example, many participants spoke of infrastructure and the need to get water to more community members in the same breath. Participants spoke about “other people” and how “they” needed more water.

One participant told how a photographed individual came begging for water at the participant’s home: “This person who is on this picture was coming to ask for water. Because where this person stays there isn’t any water” [15]. The participant asserted that his home had plenty of water, and it is no problem to share with his neighbor. Other members of the cohort reiterated this sentiment, that those that had plenty had no problems sharing with those who did not.

One participant indicated that only half of the village receives water from its current purification system. She said that the water council met and asked whether those who had bought into the system and had taps providing purified water would be willing to share some of their allotted liters per day (roughly 20) with village members who were not receiving drinking water [16].

C. Money

Seven of the participants alluded to money, some in the sense of the poverty of the village relating to its poor infrastructure [15] and some pointing out that high-yielding crops can bring money to individuals and the community [11] [12]. A participant who focused her story on crops said, “if there are more [harvestable crops], they can buy tools, which also help them plow their farms… there will be enough maize

meal for people also, which means other people would also be able to live” [11]. Only women participants focused on photos of crops and discussed the need for surplus.

Another participant described how a national chain grocery store, Spar™ would visit the localities and buy surplus crops to sell. Nearly as many participants mentioned community as they did money; contrarily, money was mentioned more frequently than food.

D. Food

Despite nearly every participant expressing the need for more water flow, volume and/or accessibility, none of the participants expressed scarcity of food. The current hike in global food prices has affected the community somewhat [17]. However, much of the community’s sustenance comes from local farms and kraals. The photographs that focused on nourishment illustrated healthy crops and trees. Each participant stated that these images portrayed strong crops and that they were all doing well despite it being the winter (dry) months. It is also notable that only women in the group spoke about crops and the status of the food sources in the community.

E. Health/hygiene

Those participants that took photographs of bodies of water concurred, “the health of the people who are collecting this water is at risk” [18]. Only one participant mentioned the presence of schistosomiasis saying that it had occurred in this water source a few years ago. He said that the problem could arise again because “kids are still going there to bathe” [19]. Other photos not chosen by the participants in this study showed images of children bathing and women washing their clothes in the community’s water source.

Clothes washing and bathing in the water source did not seem to be a concern to many of the participants. One told the research team that it is easier to wash clothes at home if one has water there. Even if there is water at home; however, one must wash her white clothes in the stream because she needs to scrub her whites on the rocks because they won’t “come clean” [12] at home. She went on to say that she thought it was good that they washed clothes in the stream. Her evidence of this was that “there is so much foam in the river; it kind of invites the fish” [12]. The participant suggested that it is “healthy” for the fish that clothes are washed in the river because all of the soapsuds attract them to the washing site.

F. Pain

The least common theme was that of pain. Participants used the word “pain” in describing the laborious process undertaken by the local water committee to pipe water into the village. They also described as painful the emotion they feel when this infrastructure is intentionally damaged. Another participant described the physical ardent of having to go to the water source to collect water.

One participant shared a photo of a pipe that he had cut and burned to represent the damaged pipes he finds while caring for the water delivery system up in the mountain. People living and
working in these mountains often light fires at night to stay warm. These fires and camps are near the water source. He said, “I found it causing great pain to me just because through that pipe, when water is leaking…there are a lot of people who don’t get water...” [20].

This participant expressed a sense of vulnerability as he attempted to raise awareness amongst the group of a problem that he had ascertained. His final story was emotional and direct as he challenged the members of the cohort: “People should look after their property” [20].

Another participant, who has been involved with the village’s water project since its inception also spoke of pain. She explained that it was pain that helped raise awareness in the community about the need to improve their water infrastructure in order to improve supply. “When they started the project they started it a long time ago when they were feeling pain when they used to collect water from the river, carrying a baby on their back, holding a bucket of washing on their heads” [21].

She told about how community members had struggled to bring about change in this village since the 2004 initiation of this community’s water initiative.

IV. INTERPRETATION OF THEMATIC SECTIONS

The primary concerns of this cohort centered on a lack of adequate infrastructure to deliver and store water. Individuals and the group concurred that better infrastructure would include “more pipes” [22] and continuous flow from those pipes. In addition to improving water access a resounding theme suggested was that all members of the community needed equal access. The descriptions of how those with water share it with those that do not in combination with descriptions of sharing the irrigation supply for crops all point to a communitarian approach to resource availability.

In contrast to the researchers’ expectations, there was very little mention of the deleterious health effects of contaminated water. This research does not provide evidence on why this is the case but it suggests two possibilities: (1) the community does not equate clean water with health and/or (2) the lack of access to water precludes concerns about its quality. Further research should be performed to understand more specifically how this community understands water and its relation to health.

V. CONCLUSION

This research demonstrates that photovoice is a viable method to research water perceptions in this region of South Africa. The photovoice method may prove useful in other disciplines and research endeavors as an assessment tool.

The findings from this study are specific to a single community; however they do suggest important themes for further research. In the case of this community, the NNZ study suggests focusing on: infrastructure needs and community processes. More specifically, this photovoice project emphasizes a need for improved infrastructure, flow rate and equitable access to water in this community.

The research team concludes that there are opportunities to use photovoice as an initial assessment and as a method to gather qualitative data through participatory means. Best-practices would include collaborations with native speakers so data can be interpreted in real-time, and so that participants feel more comfortable sharing meaningful information.

ACKNOWLEDGMENTS

We would like to acknowledge the generous support of the Jefferson Trust at the University of Virginia and the Framework Program in Global Health–NIH/Fogarty International Center (R25 TW007518). Many thanks to the members of the University of Venda Sustainability Club who volunteered their time and energy to interpret interviews, arrange meetings and bridge cultural gaps between researchers and participants. And finally, we have deep gratitude to the traditional leaders who granted us permission to do this work and the community members who shared with us their stories.

REFERENCES

[18] participant 1 interview, July 22, 2008