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# Gender, Disaster, and Resilience: Assessing Women's Water and Sanitation Needs in Leogane, Haiti, before and after the 2010 Earthquake

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## **Keywords**

Women, Water, Sanitation, Haiti, Earthquake

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## Abstract

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## Introduction

This study investigates differences in men and women's access to water and sanitation in Leogane, Haiti (population ~300,000), a town situated at the epicenter of the January 2010 earthquake. Access to clean water and sanitation is recognized as a human right under the Universal Declaration of Human Rights<sup>1</sup> and is also one of the Guiding Principles on Internal Displacement of the U.N.'s Office for Coordination of Humanitarian Affairs, which oversaw the earthquake response in Haiti (Schuller 2010a). Reports cited a lack of potable water and sanitation as one of the main factors in determining the spread of the cholera epidemic that occurred after the introduction of the virus into the country by UN peacekeepers from Nepal, which to date has led to more than 640,000 infections and more than 7,965 deaths (as of January 2013)<sup>2</sup>. Decisions about water and sanitation have profound health impacts on society as a whole but also have uneven gendered impacts, when:

- a) Access to water and sanitation is not universally distributed;
- b) Women and girls are primarily responsible for unpaid labor and time spent in collecting water, cleaning and waste disposal;
- c) When security for women and girls is compromised by unsafe access to water and sanitation.

Drawing on research data from a National Science Foundation funded rapid assessment research study undertaken in the city and surrounding commune of Leogane in May-June and July-August 2010, this article will explore some aspects of these issues<sup>3</sup>. The overall goal of this research was to understand: a) measurable differences in men's and women's access to water and sanitation systems both before and after the earthquake; b) whether on-the-ground WASH sector actors were including local stakeholders, particularly women, in water and sanitation management; and c) whether stakeholders could potentially engage in the decision-making process more effectively. We also sought to ascertain how gender inequity might be manifested in the disaster recovery process itself, both specifically in relation to the short-term provision of water and sanitation infrastructure, and in the longer-term development of plans for addressing the lack of water and sanitation infrastructure.

## Water and Gender Equity After Disasters

Increased access to safe drinking water and basic sanitation can improve quality of life, maternal health and reduce child mortality. In addition, the United Nations World Water Development Report 4 (WWDR4) contains a key Chapter 35 on "Water and Gender", which makes the following gender-specific points:

Supporting women's access to and their control over water will in turn improve their access to secure livelihoods and sources of food, which will benefit both their own health and that of their families. Access to water also provides relief to women who walk long distances in unsafe environments to fetch water... Unsustainable and short-term decisions [...] have different social and economic consequences for men and women in the community [...] ultimately] af-

1 [http://www.who.int/water\\_sanitation\\_health/humanrights/en/](http://www.who.int/water_sanitation_health/humanrights/en/)

2 The Government of Haiti is seeking \$2 billion for a ten year plan to improve water and sanitation in response to generally accepted evidence that the UN MIUSTAH forces accidentally introduced cholera into the country. <http://www.guardian.co.uk/world/2012/nov/29/haiti-appeal-cholera-nepal-peacekeepers>.

3 This project was sponsored by the National Science Foundation through its RAPID solicitation via the Sustainability program in the ENG Directorate (grant ENG 1032184). Campbell's Soup Co. generously donated a laptop computer for the collection of data in the field. Contech also made a financial contribution to the project. The authors would like to thank Jean Vernet, Lavaud Vernet, Yves Rebecca, Zach Nord, and Adam Zahn for their contributions to this project.

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fecting poor women the most (UNESCO 2012, Addendum, p.2).

The WWDR4 chapter goes on to call for the mainstreaming of gender considerations in water governance. This includes ensuring that “the water dialogue is always guided by the General Assembly resolution of 28 July 2010 that declared water a human right; engendering “water policy to enable the broad participation of women in water” governance; improving women’s access to water; and enhancing the capacities of both men and women “to understand and address gender differences and concerns in water management” (Ibid, Addendum, p.2).

Although security was not a focus of our research, we note that lack of access to clean water and safe sanitation facilities have been reported as a factor in the personal insecurity faced by women and children in the internally displaced persons (IDP) camps in post-earthquake Haiti. As the Haiti Equality Collective argue in their Gender Shadow Report on the Post-Disaster Needs Assessment:

In IDP camps where only 1 bathroom exists for every 130 people, [and] a significant lack of facilities’ lighting and few or [no] bathing facilities, women suffer higher rates of gender-based violence. Rapes often take place around sanitation facilities at night. Women who are forced to bathe out in the public completely exposed become high targets for sexual violence (Haiti Equality Collective 2010, p. 22).

Anthropologist Mark Schuller has also reported his findings that in July/August 2010, a random sample of IDP camps in Port-au-Prince found that 40.5 percent did not provide water, and 30.3 percent of camps did not have a single toilet. Overall, “toilets were on average shared by 273 people” (Schuller 2012, p. 173; Schuller 2010b), which far exceeds the Humanitarian Charter “Sphere Minimum Standards”, which call for one toilet per 50 people in the short term, with a 3:1 ratio of female to male toilets, which in the longer term should shift to one toilet per 20 people (The Sphere Handbook 2011).

While gender equity is needed throughout the water, sanitation, and hygiene (or WASH) sector, it is clear that improved approaches to promoting women’s water and sanitation access are especially crucial to health, security, and equity in post-disaster situations. A number of recent studies demonstrate that stakeholder-based participatory processes produce better outcomes than top-down authoritative planning processes (Lynam et al. 2007; Reed 2008; Voinov and Brown 2008; Voinov and Bousquet 2010). Our study originally set out to examine whether local participation – including women as well as men – was being incorporated into post-disaster recovery efforts, and how communication between local people, decision-makers, and outside experts might be better fostered. However, there are two major problems that arise in seeking “local participation”: the first concerns the existing structures of power in any society in which participation must be situated, and the second concerns the temporality of immediate emergency

needs after a disaster.

### **The Limits of Participation**

First, while many agree that the mainstreaming of gender perspectives in water management is necessary, studies from the field note that this is often difficult to achieve (Bowmer 2008; Cleaver and Nyatsambo 2011). Others note the frequent failure of water and sanitation projects implemented by external non-governmental organizations (NGOs), especially those that ignore a gender perspective (e.g., Barnes and Ashbolt 2010; Williams 2002). Some attribute the weaknesses of this approach to a neo-liberal agenda that since the 1990s has promoted “[p]rivatization, decentralization and demand management [...]. There was a global commitment to ‘water for all’, and community participation, gender (usually meaning the inclusion of women) and empowerment were all recognized as essential to achieving this” (Coles and Wallace 2005, 3). One problem Coles and Wallace note is that it is not sufficient to simply add a few women into management committees and expect them to voice the needs of all women.

Women’s participation, moreover, does not automatically lead to equitable gender outcomes, nor does it inevitably enable women to speak up effectively. As Schuller summarizes, scholars have found that the “mainstreaming” of gender and participatory models “failed to transform inequalities because of insufficiently theorized models of power (Parpart 1999), particularly concerning gender (Cornwall 2004; Mansbridge 1999) and because local elites dominate the process (Hickey and Mohan 2004b,13; Mohan 2001)” (Schuller 2012, 67). Decentralized local decision-making may actually empower those actors who already have advantages due to gender, age, class or other status hierarchies.

Secondly, although stakeholder participation, including by women, is now widely recognized as essential in sustainable water sector management (Pahl-Wostl 2002a, 2002b; Etienne 2010, 2011), there is a further gap between stakeholder participation and the countervailing post-disaster desire for implementation of “quick fixes” that occurs after any disaster. In the aftermath of a disaster such as the 2010 earthquake in Haiti, both governmental and non-governmental organizations may be overwhelmed by the scale of immediate needs and may lack the capacity to act in a coordinated fashion. While quick fixes developed in a top-down or expert-driven process are often easier to implement, in the long term these solutions are often ineffective and inconsistent with the goals and capacities of local stakeholders (Kennedy et al. 2008; Lawther 2009; Leon et al. 2009).

In particular, quick, top-down decision-making processes may overlook women’s needs. The over-representation of both foreign experts and men in infrastructure management and engineering-related fields, in which technical knowledge is highly valued, may exacerbate the general exclusion of local women in decision-making. Schuller notes that in Haiti, “29 percent of women aged fifteen to forty-nine have not had any formal education, compared to 15 percent of men,” only 10 percent of science students at the





public university are female, and only an estimated 20 percent of female students finish high school (Schuller 2012, 35). The lack of education may act as built-in limits on the ability of women to effectively participate in decision-making if it is defined as a “technical” problem to be solved by professionals and experts.

In the following sections we present the research context in post-earthquake Leogane, Haiti; the methodology of the rapid assessment; the findings relating to gender and water and sanitation; and finally a discussion with some specific policy recommendations. Overall we will examine how the interview and workshop results suggest that many people in Leogane are aware of equity and social justice issues concerning access to water and sanitation. And in contrast to current NGO provision of temporary solutions and government plans to rebuild centralized systems, the participants in our study call for a combination of centralized and decentralized



Photo 1: Women, including one pregnant, waiting for water being distributed from an emergency bladder at an IDP Camp, Haiti, July 2010 (Photo credit: M. Sheller)

systems, single household and culturally appropriate shared points of access, and public and private sanitation options.

### Context

The city of Leogane is situated on a coastal plain approximately 30km west of Port-au-Prince, with the commune of Leogane extending into the surrounding rural areas and nearby mountains. Approximately one-third of the commune’s 300,000 people live in the city’s urban center. The ~114 km<sup>2</sup> coastal plain is underlain by a productive shallow unconfined aquifer that typically can be accessed at depths of 5-10 meters below the surface. At greater

4 Working with a women’s organization on water and sanitation projects in the Dominican Republic, for example, Adela Williams reports that rural water systems installed by outside organizations were out of service within a year because, “local knowledge was not taken into account... engineers and construction experts carried out the work with no reference to the local community” (Williams 2002, p. 6-7). Yet even when MUDE insisted on 40 percent participation by women in local water committees, “the discussion and decision making tended to be dominated by the male community leaders” (Ibid, p. 7).

depths (25-30 meters) a confining layer separates the unconfined aquifer from a deeper confined one. Two rivers bisect the commune and are accompanied by a multitude of smaller tributaries, irrigation canals, and drainage ditches. Portions of the city of Leogane were, at one time, supplied with drinking water by a centralized gravity-driven distribution system built with international aid money in the early 1980s. The system was fed by an artesian spring on the eastern side of the Momance River but was rendered inoperable during the 2008 hurricane season when floods washed out the river bed and destroyed the piping. At the time of this study, responsibility for the defunct system was being transferred to a regional office of the Direction Nationale de l’Eau Potable et de l’Assainissement (DINEPA) as part of the decentralization and reorganization of the water sector under a 2009 national water law. In the meantime, the people of Leogane have coped with an informal decentralized infrastructure for water provision, consisting of home wells, bottled and bagged water sold by private companies, communal wells, and water distribution points set up by NGO’s after the earthquake.

The sanitation situation in Leogane is comparable to the rest of the country. Haiti is the only country in which access to improved sanitation has significantly decreased over the past decade as indicated by the 2008 sanitation report by the World Health Organization (WHO)/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP). Until 2009, there was no governmental organization with the responsibility to improve sanitation (Varma et al. 2008). The percentage of the urban population with access to sanitation fell over the last decade from 44 percent percent in 1990 to only 24 percent in 2008, and in rural areas from 19 percent to only 10 percent (WHO 2010). As Macleod (2009) points out, “The country’s existing water regulatory agencies do not account for sanitation, resulting in the absence of any sewage systems as well as isolated and inadequate wastewater systems, no control of hospital waste and according to the Pan-American Health Organization, bad excreta disposal practices, which are polluting almost all 18 water sources supplying Port-au-Prince (PAHO, WHO)” (Macleod 2009, 11).

Based on our physical survey of post-earthquake sanitation conditions, Leogane is characterized by a lack of central sanitation systems, with only small-scale property based septic systems. Also, there is no collection network that collects and subsequently directs sewerage, such as an outfall at the coastline. Rather, sanitation infrastructure includes septic and flush toilet systems, pit latrines, and open field disposal, all of which are elements of a completely decentralized (and privately managed) sanitation system. Sanitation infrastructure reflects the socio economic structure of the residents of Leogane; those that can afford to live in downtown Leogane tend to have reasonably adequate flush toilets that empty into attached private septic systems (which eventually have to be either back-filled or emptied by hand and dumped, usually at sea), while the poor utilize makeshift latrines or open defecation. We examine these social patterns in more detail in the results section



|                    | Number of Respondents | % of Respondents |
|--------------------|-----------------------|------------------|
| <b>Age Group</b>   |                       |                  |
| 18 years and under | 3                     | 1.7%             |
| 19-30 Years        | 54                    | 29.8%            |
| 31-50 years        | 54                    | 29.8%            |
| 51 Years and Over  | 46                    | 25.4%            |
| Didn't Answer      | 24                    | 13.3%            |
| <b>Gender</b>      |                       |                  |
| Male               | 90                    | 49.7%            |
| Female             | 81                    | 44.8%            |
| Didn't Answer      | 10                    | 5.5%             |
| <b>Employment</b>  |                       |                  |
| Employed           | 53                    | 29.3%            |
| Unemployed         | 118                   | 65.2%            |
| Didn't Answer      | 10                    | 5.5%             |
| <b>Location</b>    |                       |                  |
| Center City        | 58                    | 32.0%            |
| City Periphery     | 17                    | 9.4%             |
| Outlying Areas     | 95                    | 52.5%            |
| Didn't Answer      | 10                    | 5.5%             |

Table 1. Demographics of survey participants

below.

One of the major infrastructure challenges in post-earthquake Haiti was therefore the immediate need for sanitation systems, in a context where there were no existing sewage treatment facilities, no centralized collection systems, and a displaced population congregating in both large and small tent camps. The immediate emergency response, led by foreign NGOs, involved building thousands of shallow pit latrines at as many camps as possible. While this addressed the most pressing hygiene needs, it was not implemented with an eye toward any long-term or even medium-term solution to the sanitation crisis. Funding from international donors might enable the Haitian government to build centralized water and sanitation systems in some urban areas, and in fact some are already being built. However, the question remains how to make such infrastructure projects sustainable, economically, ecologically, and socially.

**Methodology**

The overall methodology involved a number of different research activities intended to rapidly survey the perspectives of a wide range of stakeholders. The full research team included four professors (three engineers and one social scientist), three community planners from Leogane, six trained Haitian enumerators, and five trained Haitian workshop facilitators. All fieldwork was performed over a five month period, including two one-week trips by the research team to Leogane (May-June and July-August of 2010). The methods included a formal survey, semi-structured and open-ended interviews, field observation, and a one-day participatory workshop, each described below.

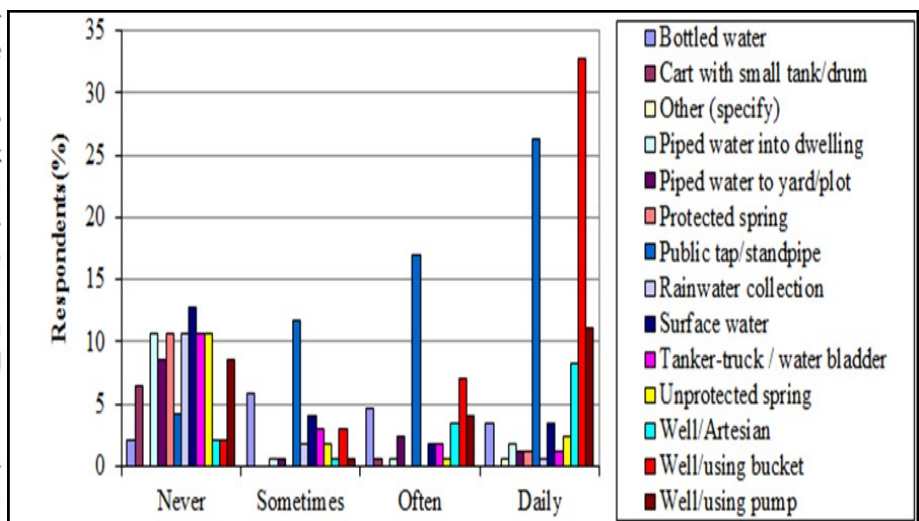
A paper survey was implemented in different sections of Leogane (including the city-center, periph-

eral areas, and outlying areas) using Kreyól-speaking enumerators guided by the research team. A total of 181 residents were sampled. Although it was not possible to implement a fully randomized survey given the post-earthquake fluidity of the population and lack of fixed abodes, we asked the enumerators to approach an equal number of men and women, range of age groups, and people engaged in different types of activities. Table 1 gives an overview of the demographics of the survey respondents, of which approximately 45 percent were women, 50 percent were men, and some were not identified.

The survey included the “core questions” used by UNICEF and WHO for quantifying the percentage of a population that has reasonable access to water and sanitation. The responses were analyzed to determine the number and percentage of participants who used different water systems prior to the earthquake and also to characterize reconstruction preferences. Contingency plots were developed using Microsoft Excel and SPSS 19 (IBM Corporation, Somers, NY), breaking down the results based on age, gender, geographic origin, and employment status. Here we will focus on the results pertaining mainly to gender differences.

A series of interviews (semi-structured, n=19, and in-depth open-ended, n=6) were carried out during both trips, and by telephone from the United States. The 19 semi-structured interviews were conducted by convenience sample, and consisted of current residents of Leogane, expatriate (former) residents of Leogane, and NGO representatives. These interviews were conducted by one or two team members (with a Kreyól translator when required) and digitally recorded. Based on a standardized set of “discussion points” and follow up questions, each interview lasted approximately 45 minutes. The recorded interviews were transcribed in English and coded for analysis with ATLAS.ti (Berlin, Germany). More general participant observations were made at two different Water, Sanitation and Hygiene (WASH) cluster meetings, and in more formal meetings with DINEPA officials, the Mayor’s office, and other NGOs working in the water and sanitation sector.

Figure 1 Water Access Methods prior to 2010 Earthquake, Leogane, Haiti







During the second trip in July/August 2010, the research team conducted a full-day participatory workshop. The team trained 10 Haitian facilitators. The workshop involved 76 community stakeholders representing a range of organizations such as youth associations, women’s organizations, professional organizations, and small farmers’ organizations. Although we did specifically reach out to include women’s organizations, including Mouvement des Fanm (MOFANM), Organizasyon Fanm Progressiste Leyogan (OFPL), and one other community-based women’s organization, we note that 63 percent of the workshop participants were male, and 69 percent were 20-39 years. This is indicative of the prevalence of young men in leadership and public positions in Haiti and suggests that efforts at full social inclusion in participatory processes would have to confront gender inequalities.

During the workshop, participants were asked to propose, discuss, prioritize and elaborate solutions to Leogane’s water and sanitation problems. Participants were first divided into five groups, each numbering ten to fifteen members, to brainstorm for solutions. By vote, these groups brought their five top-ranking ideas to the general assembly of all workshop participants. The general assembly voted on the 25 solutions proposed by the five groups, and the five top ranking solutions were elaborated more thoroughly into proposals during afternoon breakout sessions. Pre- and post-workshop surveys with Likert Scale questions were used to gauge participant satisfaction with the process and results. Overall, ~95 percent of the respondents characterized the workshop as “a success”, with ~79 percent strongly agreeing and ~19 percent agreeing with its conclusions.

### Findings on Gender and Water

Figure 1 depicts the percentage of survey respondents who indicated how they accessed different sources of water at different levels of frequency prior to the earthquake.

The three most common water sources accessed for daily needs

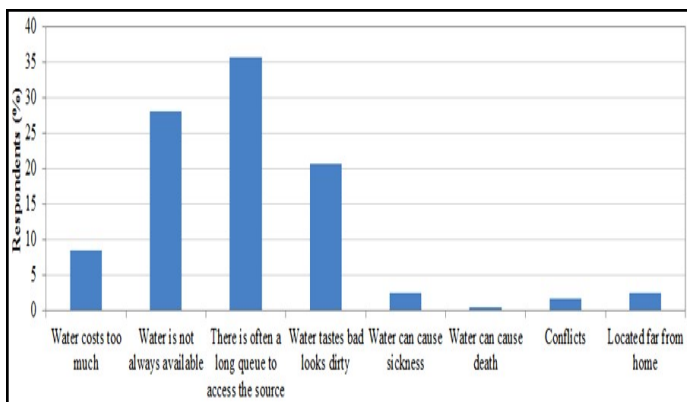


Figure 3 Problems with Water  
Source: FA Montalto, PL Gurian, M Piasecki, M Sheller, H Galada, S O’Connor, T Ayalew, (2013) Supporting Haitian Infrastructure Reconstruction Decisions with Local Knowledge: A Case Study Focusing on Water and Sanitation in Leogane, Final Report on NSF Haiti-RAPID No. 1032184.

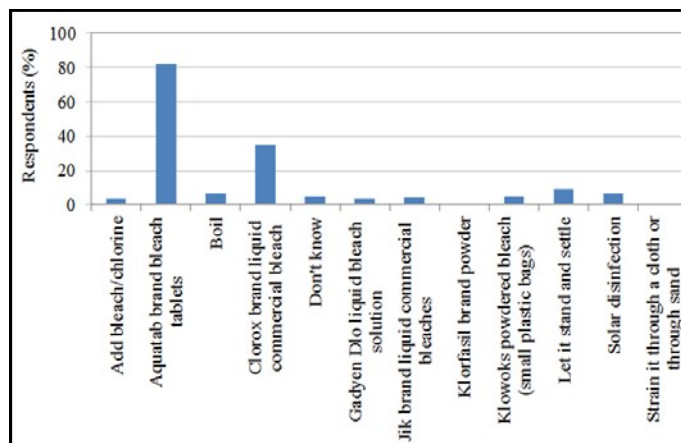


Figure 2 Household Point-of-Use Water Treatment Methods, Leogane, Haiti  
Source: FA Montalto, PL Gurian, M Piasecki, M Sheller, H Galada, S O’Connor, T Ayalew, (2013) Supporting Haitian Infrastructure Reconstruction Decisions with Local Knowledge: A Case Study Focusing on Water and Sanitation in Leogane, Final Report on NSF Haiti-RAPID No. 1032184.

were well using bucket (35 percent), public tap/standpipe (28 percent), and well using pump (12 percent). Of 170 respondents, 74.1 percent said they treated water before drinking it (Figure 2) and the most common form of household treatment was a locally available bleach tablet, known as Aquatab, followed by using drops of liquid Clorox. Of 19 interviewees, 14 were familiar with home water treatment methods, four did not mention the subject in their interview, and only one male resident of Leogane was not familiar with home water treatment. After the earthquake, various NGO’s were providing treated water to IDP camps that was either brought in by trucks and placed in large bladders, or less commonly, through installing various kinds of electricity-dependent filtering and purification systems.

The most commonly cited problems relating to water identified by survey participants, as reported in Figure 3, were “a long queue” (38 percent), “water is not always available” (28 percent), or “tastes bad or looks dirty” (20 percent). The time it took to get to a water source was not identified as a major problem; however, the issue of waiting in lines indicates one of the gendered dimensions of fetching water as a form of labor. One of the most important gender differences in regard to water access found in our survey was that women and girls were more likely than men or boys to be responsible for fetching water, regardless of source (Figure 4). When accessing water from public standpoints or wells, survey responses indicated that collecting water is a task shared by both sexes, but in which women and girls are predominant.

While we do not claim to have a fully representative survey with clear statistical significance, observations of IDP camps back up the impression that women and children, especially girls, were generally responsible for fetching water, which involved waiting in long queues and carrying heavy loads on their heads (see Photos 1 and 2). Girls were often seen carrying water and even pregnant women were observed waiting in long lines for water without shade, in temperatures in excess of 90 degrees Fahrenheit. Such lines formed in the IDP camps around water bladders and temporary water puri-







Regarding pre-earthquake sanitation conditions in Leogane, the



Photo 3: A young girl carrying water from a water filtration system installed at an IDP camp in Leogane, Haiti, May 2010 (Photo credit: M. Sheller).

main statistical findings of the survey were that 64.6 percent relied on a dry decentralized sanitation practice such as latrines, while approximately 20 percent of survey respondents had no reliable form of sanitation (e.g., many went outdoors or used plastic bags). Prior to the earthquake, in other words, only about 15 percent of respondents had access to a flush toilet. Many toilets that we viewed in the area were not in working condition. However, a contingency analysis on pre-earthquake sanitation conditions also revealed significantly different levels of access to water carriage sanitation by gender, geography, employment status, and age.

Of males, 14.4 percent had a water carriage sanitation system (i.e. a flush/pour toilet) before the earthquake, compared to only 3.7 percent of females. More females (25.9 percent) lacked any sanitation system than males (16.7 percent), although this was not found to be statistically significant and possible explanations are discussed below. Of the employed, 15 percent did not have a sanitation system, compared to 23.7 percent of the unemployed. Overall, the analysis suggests that women, the unemployed, and people from the city periphery were the most likely groups to have not had any access to an improved sanitation system prior to the earthquake, with location on the periphery being most significant.

Those with no sanitation and those who used latrines were the most likely to have shared these with other households, and the majority of participants did not appear to be opposed to sharing sanitation facilities in the future. Nevertheless, the majority of study participants favored “water carriage” sanitation in the future. As part of the reconstruction efforts, 64.6 percent of the survey respondents expressed a preference for a water carriage sanitation system involving a flush/pour toilet. This

preference was most widely held among younger study participants and those from the periphery of the city. However, many other survey participants would also be satisfied with alternative solutions such as pit latrines.

Our own observations and interviews conducted with inhabitants of Leogane, including those who were staying in IDP camps, gave an overview of sanitation practices. Given the lack of any existing centralized sanitation systems, many NGOs working in the area had dug shallow pit latrines alongside the camps. Interviews and observations indicated that keeping these clean was a problem. One interviewee indicated that at her camp there had been a committee formed of twelve women to do cleaning, but “all of them have quit because there is nothing in it for them” because they were not paid and were expected to contribute unpaid labor. Little attention had been paid to the emptying of cesspits, which traditionally was handled by workers known as “bayakou”, a practice that NGO staff members whom we interviewed were not familiar with. One of the obvious gendered elements of emergency sanitation was the creation of separate facilities for men and women; however, these often were placed side by side, and in somewhat remote and unlit locations, which could present security issues for women and children, as noted in the introduction.

Given that women did not seem to have been consulted on their gender-specific sanitation needs, we asked our interviewees to describe any particular issues for women, as well as normal practices prior to the earthquake. Some indicated that “they didn’t have any place to go, so they went under the trees or wherever”. In regard to children’s sanitation needs, interviewees indicated that it was common practice to use cloth rags to diaper babies and “if it is cloth, they wash it in the river”. Three people indicated that babies and smaller children would be held over a hole or sandy area and the waste would be buried in the ground along with soiled diapers.<sup>5</sup>

This interviewee also noted that when the children use the latrines, “they make a mess. Some of the children go without their parents and some of them never used a latrine. They don’t know where to go or what to do,” so that right after cleaning it, she would have to go back and clean the latrine again. As for hand washing: “they use a bucket next to the latrine but people are coming and messing them up.” In this regard it is notable that the Sphere Standards indicate that:

“[P]articular attention should be given to the disposal of children’s faeces, which are commonly more dangerous than those of adults, as the level of excreta-related infection among children is frequently higher and children lack antibodies. Parents or caregivers need to be involved, and facilities should be designed with children in mind. It may be necessary to provide parents or care givers with information about safe disposal of infant faeces and nappy (diaper) laundering practices” (Sphere Standards, Ch. 2, p. 73).



The fact that this did not seem to be happening may have contributed to the rapid spread of cholera in Haiti, which is a virus contracted through direct contact with fecal matter.

### NGO Sanitation Solutions Compared with Workshop Solutions

Interviews with a range of actors in the WASH Cluster, supplemented by physical observations, indicated that a wide variety of decentralized sanitation technologies were being built on a piecemeal emergency basis by a number of different international organizations throughout the IDP camps. The WASH Cluster Sanitation Strategy Final Draft, issued on 7 March 2010, noted that:

“The choice of technologies to be used to meet the sanitation needs requires a flexible approach, taking into account a number of issues including access to sites, space, and site characteristics. Alternative solutions must be considered and these include: trench latrines, pit latrines, elevated latrines (with or without UD), chemical/portable toilets, biodegradable bags, bucket latrines, carton box latrines, potties for children, and the collection of plastic bags used for defecation through the waste management stream (WASH Strategy, 7 March 2010, p.4).

However, interviews with an administrator in the Mayor’s Office of Leogane indicated that there were problems with this flexible approach: “It is very difficult to deal with the NGOs like Save the Children and ACTED who come and build very shallow latrines, just 1 meter, and they create more problems than they solve” (Interview, Mayor’s Staff, 7/29/10).

Other NGO actors were trying to implement what they considered to be more “sustainable” forms of sanitation. Interviews with staff members of Hands on Disaster Relief [HODR, which later became All Hands], an international NGO working in Leogane, revealed that they were introducing biocomposting toilets in the area:

We are also building composting toilets here, for our warehouse; and will then take them out into the community. The first one we built was for use by the local volunteers – and they have taken to it, they take care of it, clean it, keep it supplied. People from both sides of the spectrum have bought into it – those living in shacks with no wash facilities, and those with houses with flush toilets. We’ll install them in the local volunteers’ communities, and they will be partly public. The volunteers will be like ambassadors into their communities (HODR Interview, 7/29/10, Leogane).<sup>6</sup>

Their efforts were assisted by another NGO known as SOIL,

5 One interviewee stated: “They have little holes in the sand that is where all the diapers go”. For menstruating women, there used to be a tradition of hand-washing towels for re-use, “but now they bury their pads. Basically, now, they buy the disposable type.” Another stated that women using tampons were “flushing them”.

which provided technical support for the project. SOIL had experience building composting toilets in Cap Haitian, and was awarded an \$800,000 contract from OXFAM Great Britain to build them in Port-au-Prince after the earthquake<sup>7</sup>.

However, none of our local interviewees were aware of dry-composting toilets and none had heard of the idea of creating energy from waste, although one thought it was a good idea and one farmer said he had previously used waste as fertilizer.

Workshop participants favored combined public and private sanitation solutions, including water carriage systems (in “modern,” “private,” and “home” bathrooms), as well as “public,” and “shared,” bathrooms. In one of the morning breakout sessions, for example, it was put forward that “it is important for each neighborhood to gain a water treatment system and to install in each shared household yard [lakou] a public toilet.” This fits with local cultural practices, in which multiple inter-related families share common cooking, washing, and toilet facilities in a compound known as a Lakou, which is quite distinct from the alternative vision of a “modern toilet” in each



Photo 4: Children in front of latrines marked H for men and F for women, with a handwashing bucket in front, in a remote area of an IDP camp in Leogane, Haiti, May 2010 (Photo credit: M. Sheller).

home. This idea of neighborhood-level water treatment and shared toilets within a Lakou was not a solution found in any of the government planning initiatives, nor in any of the NGOs we interviewed. Notably, this idea would depend on local cultural knowledge of living arrangements in Leogane.

### Discussion and Policy Recommendations

Our interviews with NGOs and local government officials indicate that there was a lack of coordination in the piecemeal planning and building of decentralized water and sanitation systems, partly due

6. One interviewee stated: “They have little holes in the sand that is where all the diapers go”. For menstruating women, there used to be a tradition of hand-washing towels for re-use, “but now they bury their pads. Basically, now, they buy the disposable type.” Another stated that women using tampons were “flushing them”.





to the urgency of the post-earthquake situation, but also grounded in the deeper-seated lack of capacity in public institutions and prior failures of central planning and coordination. Insofar as new institutions such as DINEPA were being built, they focused solely on centralized water provision, ignoring sanitation and wider issues of ecological sustainability. The surveys and interviews with inhabitants of Leogane indicate that the existing system was failing to ensure equitable access to clean water and hygienic sanitation.

Disruptions to the water supply system posed particular burdens for women, including waiting in long queues to get water, being unable to access clean drinking water, and having to deal with the cost and responsibility of home treatment of water. Weak sanitation infrastructure increased risks of exposure to cholera, failed to address the hygiene needs of women and children, left women vulnerable to violence, and burdened women with unpaid cleaning duties. If women had been consulted on the design, placement, or cleaning of toilet facilities, they might have contributed ideas on safer locations, children's specific needs, and hygiene practices that would help to prevent contact with fecal matter and hence the potential spread of disease.

***Policy Recommendation 1: Implement a more robust participatory process that includes women and other marginalized groups in planning and decision-making.***

Participatory approaches to engineering for sustainable development suggest that a social learning process could take place in which various stakeholders within Haitian society participate in the project at every stage. There are examples of the successful formation of community-based water committees in parts of Port-au-Prince (GRET et al. 2010) which have extended services to many poor communities. They draw on a more robust participatory process, known in French as "accompagnement", or accompaniment. Implementing such a process could help to support experiential learning about the issue at hand, about solutions to technical problems, and about other stakeholders, and might support collective learning or organizational learning (Etienne 2010; Etienne et al. 2011).

This more robust process – involving participation across the entire planning and decision-making process as well as social implementation via participatory committees – is currently not taking place in the effort to rebuild Leogane, but if undertaken systematically could help to generate more equitable and ultimately sustainable responses to the water and sanitation crisis in Haiti. However, many NGOs advocating such processes have not gone far enough in considering the intersection of gender, class, and poverty in limiting the participation by poor women. Gender equity must be central to such stakeholder processes if women's water and sanitation needs are to be met, and the health of the entire community supported.

***Policy Recommendation 2: Include women in decision-making and specifically address gender inequalities through public processes in order to promote more equitable outcomes.***

The current government plan being implemented by DINEPA will make initial investments only in repairing the piped water system and implementing a fee-based user plan. The government plan does not address decentralized systems such as artesian wells and provision of public taps. However, those without property would likely lack access to any centralized system since they would not own property with connections to the system, and poorer groups would likely not be able to pay the user fees. Thus there are social justice implications to the implementation of centralized engineering solutions that the government should take into account.

In regard to sanitation, our analysis suggests that unemployed females and those from the city periphery were the most likely groups to have not had any sanitation system prior to the earthquake, relying solely on open defecation. Yet they would also be unlikely to gain access to such systems after the rebuilding process, since they would tend to live in marginal areas not connected to centralized systems. This means that there would inevitably be uneven social impacts even if a centralized water-carriage sanitation system were to be implemented in the city center. Soliciting women's feedback could help inform system design to mitigate uneven impacts.

Additionally, women interviewees identified problems in the cleaning of latrines, the disposal of diapers, and keeping hand-washing areas clean, all of which are not addressed in most NGO-led or top-down engineering solutions. While promoting hygiene emerged as an important topic in the workshop, we would suggest that there must be a two-way process in which those working in the sanitation sector learn about local cultural practices, especially their gendered dimensions, and support women in making hygiene possible.

While there may be an "ideal" of piped water and "modern bathrooms" in every home, the workshop solutions (a combination of private and public, centralized and decentralized, provision of water and sanitation systems) suggest that a process of stakeholder engagement lends nuance to stated preferences because participants were very aware of the issues of unequal access and social inequity. An integrated solution to Leogane's water and sanitation needs would include a variety of water and sanitation technologies, including the ideal type of "modern," "private," and "home" bathrooms, but also encompassing "public" and potentially "shared" bathrooms in "each neighborhood" or "Lakou."

***Policy Recommendation 3: Cash for Work programs should specifically consider support for women's unpaid labor.***

When building decentralized systems, whether pit latrines or more unusual biocomposting toilets, there is often an unstated assumption that such new systems will be kept clean by the community or by committees, which usually means women, and such labor is currently unpaid. So-called "cash for work" programs in post-earthquake Haiti were often geared toward tasks like rubble removal, primarily undertaken by men, rather than tasks like carrying water or cleaning toilets, primarily undertaken without pay by



women. One way to support hygiene and improve sanitation would be to use emergency cash for work programs not only for male manual labor, but also to support women's cleaning, provisioning, and caring work that is essential to recovery and community health.

**Policy Recommendation 4: Post-disaster situations can benefit from rapid participatory assessments to elicit, document and support local knowledge, practices and preferences, ultimately leading to more appropriate infrastructure systems that will be socially, economically, and ecologically sustainable.**

Despite the clear preference among survey participants for water carriage sanitation systems, the interviews and the workshop suggest that local stakeholders envision an integrated solution that includes decentralized infrastructure and addresses wider environmental issues. In their final proposals, workshop participants made clear that improved water and sanitation must go hand in hand with environmental protection, source water protection, and reforestation efforts.<sup>9</sup>

A shared decentralized water system is potentially more sustainable because it makes fewer demands on economic and ecological resources. Moreover, a combination of private and public infrastructure can help build resilience.

Above all, through modeling an effective workshop process, this study demonstrates a participatory process that infrastructure planners could use first to elicit and document local knowledge, practices and preferences, even in the aftermath of disaster. With further development towards a full model of accompaniment, such community-based participation could then be built upon to include participants in planning and implementing varied infrastructure solutions that fit their community needs. Including women and other marginalized groups in decision-making, planning, and implementation will be crucial for such processes to succeed in supporting gender equity and building societal resilience.

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