USING BEHAVIORAL INSIGHTS TO IMPROVE DISASTER PREPAREDNESS, EARLY WARNING AND RESPONSE MECHANISMS IN

HAITI

eMBeD |GFDRR WORLD BANK GROUP

CONTENTS

ACKNOWLEDGEMENTS

1

Introduction

Given the high exposure in Haiti to natural hazards, ensuring that proper disaster preparedness and response mechanisms are well established and managed can save lives. Systems such as Municipal Civil Protection Committees (*Comités Communaux de Protection Civile* – CCPCs) have played an important role in reducing casualties from natural disasters in recent years. However, structural and behavioral barriers have limited desired evacuation behaviors in Haiti. This report leverages behavioral science to identify key entry points to improve early warning systems (EWS) and enable people to evacuate to safe locations before adverse natural events, including hurricanes. The behavioral approach allows for the detection of barriers related to psychological and social factors that go beyond access and cost.

The objective of this report is to understand, through a behavioral approach, the structural and behavioral barriers that limit evacuation decisions in Haiti. Our goal is to identify key entry points to improve EWS and enable people to evacuate to safe locations in anticipation of a hurricane. This type of approach is based on the understanding that people think automatically, socially, and with mental models (World Bank, 2015). The framing of a problem, the context in which decision making takes place, and details of the design of an intervention play such an essential role in determining behavior that not accounting for them can result in an ineffective intervention. Thus, looking for both structural and behavioral barriers means to examine a wider set of influences and pay attention to the social, psychological, as well as economic factors that affect what people think and do.

Informed through desk research and primary qualitative data (interviews and focus groups), this report maps the decisions and actions that influence individuals in Haiti and identifies the barriers impeding people from following EWS and seeking safe shelters. They are:

1. **Warning dissemination and communication:** EWS messages do not always reach the population due to limited resources and funding. When messages reach the population, people often do not understand them given that the language is unclear and lacks information about the desired behavior. Furthermore, people may distrust the messenger.

2. **Preparedness and response capacity:** Messengers may lack appropriate training to make people evacuate and contingency plans may not be available or up-to-date. Moreover, people lack preparation experiences. The population lacks access to resources needed to evacuate and has difficulty accessing shelters. Often the experiences of emergency evacuation shelters are dissatisfactory. Some perceive shelters as unsafe as structures do not always abide by building codes/norms, resulting in not everyone preferring to evacuate to a shelter.

3. **Risk knowledge and internalization:** People struggle to internalize the level of risk. They either underestimate the risk level due to state of denial or fatalistic belief or they experience myopia, preferring to stay with their possessions (short-term gains) instead of evacuating to a shelter (long-term gains).

In a complex context such as Haiti, potential solutions range from simplifying communication messages and channels, training messengers to deliver concise and persuasive messages, designing clear messages to counter fatalistic beliefs, and using loss aversion framing to nudge people to internalize risk and evacuate. To keep shelters preserved and promote codes of conduct, a community recognized figure could be set up as a shelter manager.

The following document is organized as follows. Section two describes the methodology while section three outlines background and context. Section four describes the functioning of Haiti's disaster risk management system. A fifth section explains barriers to safe evacuation. Section sixth provides key ideas for the design of the intervention(s). Finally, section seven provides concluding thoughts. Detailed information on hurricane classification and diagnostic activities conducted can be found in the appendices.

Photo: UPC-DPC

2

Methodology and description of data

The evidence in this diagnostic is based on qualitative research: desk review, key-informant interviews, and qualitative fieldwork. The diagnostic started with an extensive desk review of existing reports and research papers on (i) EWS in the Haitian context, (ii) empirical research on evacuation behavior, and (iii) case studies in developing countries. The reports helped inform the background section as well as our in-depth understanding of how the current disaster risk management system works in Haiti. Through a meta-analysis comprising various research papers (Huang, Michael K., & Prater, 2016), we learned that, throughout the world, people are more likely to evacuate when they have an accurate understanding of the severity of a storm. Severity has numerous facets including intensity, damage, landfall, and rapid onset. Moreover, people use rules of thumb to help them determine their personal risk, including if their neighbors are evacuating and if businesses in their community are closing. Some studies found that women with children are more likely to evacuate. Several case studies of evacuation experiences in Marikina, Philippines, Mumbai, India, Uganda, and rural Indonesia show that risk perception about the likelihood and severity of a hazard is one of the key factors that predicts risk preparedness. To complement past research

findings and to better understand the complex nature of the issues surrounding disaster preparedness, EWS and response mechanisms in Haiti, the team interviewed key informants such as the Civil Protection Directorate (*Direction de la Protection Civil* – DPC), national counterparts working with the DPC, international partners working on disaster risk management (DRM) in Haiti (UNDP, USAID, OCHA), and NGOs. A total of nine interviews were conducted, all in Port-au-Prince and its surrounding vicinity.

Qualitative fieldwork was later conducted to capture individual experience, choices, perceptions, and attitudes towards evacuation in Haiti. Fieldwork aimed at understanding barriers to EWS and what limits people's ability to evacuate to safe locations during a hurricane. The methods chosen for this study were six Focus Group Discussions (FGDs) and 16 Semi-Structured Interviews (SSIs) with a purposely selected range of actors from three categories: (i) CCPCs, (ii) community leaders, and (iii) the general population. Community leaders included teachers, Red Cross staff/ volunteers, pastors, women's group leaders, departmental delegates, and beyond (see Appendix 1 for more details). The general population included men and women that did and did not evacuate in the past. The diversity of interviewees is essential in qualitative research to gather more detailed information on behaviors and barriers to safe evacuation. Local consultants transcribed audio recordings of FGDs and interviews in Creole. Data was coded in Excel.

Sites and respondents were intentionally selected to answer our research questions best. Site selection was done through a two-stage process. We first looked at communal sections that were located within a risk area and who had a relatively easy access to a shelter. The second stage controlled for past performance (good or bad) and location (rural or urban). The DRM World Bank (WB) team provided a list of five communal sections that met our preferred criteria and logistical requirements. They helped select Paillant (pop. 16,000) and Les Cayes (pop. 86,780), municipalities located in Nippes and Sud departments, respectively. Paillant was selected as the rural site and positive deviant,[1] where the team visited the *Centre d'Etudes Classiques Theophile*.[2] Les Cayes (in Sud) was selected as the urban site and the team visited Lycée P Guerrier shelter because its access to

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1   Paillant is known as a good practice in terms of preparedness and CCPC performance. A positive deviant is an approach to behavioral and social change based on the observation that in any community there are people whose uncommon but successful behaviors or strategies enable them to find better solutions to a problem than their peers, despite facing similar challenges and having no extra resources or knowledge than their peers (Wikipedia, 2018).

2   Initially the team planned to visit Ecole Note Dame de la Victoire shelter, but the school was not accessible since it was in session during the visit.

schools allowed us to speak to teachers who commonly communicate EWS to students.

Analyzing qualitative data provide in-depth details about experiences, attitudes, and perceptions. Qualitative data analysis allows researchers to uncover unexpected themes during analysis (Fusch and Ness 2015, Tracy 2010). Although qualitative data analysis does not prioritize the quantity of statements over richness and detail, a rule of saturation point was followed. According to this rule, the researcher will explore data until no new themes can be identified (Fusch and Ness 2015). Also, the sample is not and does not pretend to be representative of the whole population. The objective was not to test causal links or to generalize findings, but to capture views and experiences of people and the ways they express them.

The recruitment strategy followed best-practices and was successful in recruiting desired profiles. Mobilization was conducted one week in advance with the help of the Departmental Technical Coordinator from the DPC and the Board of Directors of the Communal Section (*Conseil d'Administration de la Section Communale* – CASEC). Once in the field, the team further mobilized participants by going door to door distributing flyers, accompanied by a community member.

As is common in qualitative research, our study overcame some challenges in its implementation. The initial dates for fieldwork were pushed back due to country-wide protests from October 15 to October 22, 2018. Furthermore, in Paillant, the CASEC had misunderstood some of the instructions, so many of the members of the CCPCs FGD on the first day were also community leaders, such as pastors, teachers, or public health representatives. Therefore, the team was unable to get their perspectives from the other roles that they play in the community, but only as CCPCs volunteers. The field team worked with the CASEC to recruit additional community leaders after the initial CCPCs FGD. In Les Cayes, the member designated to assist in mobilization only mobilized community leaders he was close to and would not assist in the mobilization of the general population, introducing a potential bias in the data. The field team made its best effort to further mobilize the general population in a short-time frame to reduce this bias.

Photo: UPC-DPC

3

Background and Context

Haiti is highly exposed to natural hazards. Over 93 percent of its surface and more than 96 percent of the population are exposed to two or more hazards, primarily hurricanes, floods, earthquakes, and landslides, but also tsunami and drought (World Bank, 2018). Haiti is highly subject to earthquakes, created by the interaction of the Caribbean and North American tectonic plates. Other secondary hazards impacting Haiti include landslides, torrential debris flows, soil liquefaction, and tsunamis. The *Grand-Sud*, which includes the departments of Grand'Anse, Nippes, and Sud are more vulnerable to hurricane risks, and the Nord and Nord Ouest Departments are highly exposed to the risks of floods and tsunami.

The human and economic impact of disasters has been extremely severe, due to Haiti's exposure to hazards, the high vulnerability of its infrastructure, unplanned urban expansion, and institutional fragility. Between 1961 and 2012, the country experienced more than 180 disasters causing the death of more than 240,000 people (World Bank, 2018),[3] including the death of about 220,000 people after the 2010 earthquake (World Bank, 2015). Regarding economic impacts, the 2010 earthquake destroyed the equivalent of 120 percent of GDP and Hurricane Matthew resulted in estimated damages and losses equivalent of around 32 percent of GDP.

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3   An event is considered a disaster by the EM-DAT database if (i) it caused at least 10 deaths, (ii) affected at least 100 people, (iii) caused an emergency declaration or (iv) led to a call for international assistance.

Additionally, the potential future maximum losses that could be caused by hurricanes and earthquakes occurring within a 250-year return period are estimated at US$1.6 billion (13.3 percent of 2016 GDP) and US$2.41 billion (27.5 percent of 2016 GDP), respectively (World Bank, 2018).

Climate change will increase the frequency of, and impacts from, extreme weather events. In 2017, the Maplecroft index ranked Haiti as amongst the top three most vulnerable countries in the world to climate change (Maplecroft, 2018). With forecasted increases in temperature from 1.2ºC to 2.3ºC by 2100, Haiti will likely experience a rise in the frequency and intensity of hurricanes while more than doubling the length of the dry season (World Bank, 2018). The increased frequency of hurricanes is already evident in historical data (Figure 1).

FIGURE 1. HURRICANES IN HAITI (1950-2018)

Source : National Hurricane Center https://www.nhc.noaa.gov/aboutsshws.php
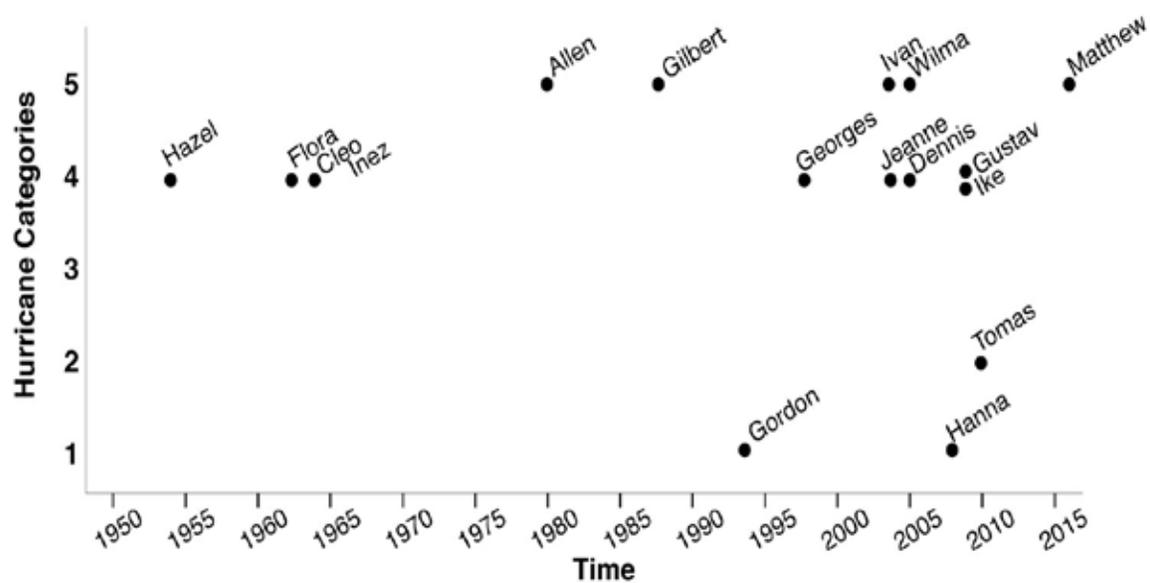
Additionally, Haiti has not been able to reduce the vulnerability of its infrastructure (public and private buildings) and residential buildings through the application and enforcement of building regulations. Available data indicates that built-up areas in Haiti are particularly vulnerable. Most Haitians live in self-produced housing, built without the appropriate technical expertise, where 51 percent are exposed to flood events and 60 percent are concentrated in high seismic hazard zones (World Bank, 2017). The vulnerability of infrastructure was evidenced by the impact of Hurricane Matthew; 59 percent of the hurricane's damages and losses were in infrastructure and residential buildings and 31 percent were in the housing sector alone.

In addition, the frequency of natural disasters makes it harder for Haiti to recover fully. In 2018, just two years after Hurricane Mathew, a 5.9 earthquake shook Haiti and killed 11 people (The New York Times, 2018).

Hurricane Mathew (2016) is considered the most recent devastating hurricane that has made landfall in Haiti. Hurricane Matthew made landfall in Haiti's western peninsula as a category 4 and caused a loss equal to roughly 32 percent of GDP, about 600 deaths, and 2 million people affected, particularly in the southern regions of Haiti (Government of Haiti; United Nations; European Union; Inter-American Development Bank and World Bank, 2017) (Map 1). Although the death toll was high, deaths associated with Hurricane Matthew were significantly lower than 2004's Hurricane Jeanne (approximately 3,000 deaths) and 2008's Hurricanes Fay, Gustav, Hanna, and Ike (approximately 800 deaths) (World Bank , 2018). The most affected provinces by Hurricane Matthew – Grand'Anse, Nippes, and Sud – are home to nearly 1.6 million Haitians (14.5% of the country's population, estimated at 10.9 million in 2015).

MAP 1. SPATIAL DISTRIBUTION AND IMPACT OF HURRICANE MATHEW

1. Speed (mph), per commune

2. Estimation of infrastructure damage (USD) per commune

Source: National Hurricane Center/University College London/CNIGS Spatial Team, October 2016
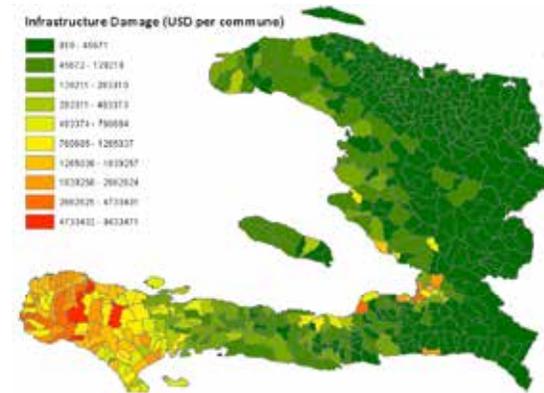
Source: Haiti Rapid Post-Disaster Buildings Economic Loss Assessment D-RAS, World Bank

A report by the Haiti Disaster Risk Management and Reconstruction Project (DRMRP) links the reduction in loss of lives to the establishment of CCPCs (World Bank , 2018). A CCPCs is a municipal level committee formed of volunteers from the community who coordinate first emergency responses, warn the population about a storm, and help people find shelters as part of the EWS (Box 1).

BOX 1. MUNICIPAL CIVIL PROTECTION COMMITTEES (CCPCs)

Source: DPC

Municipal Civil Protection Committees (*Comités Communaux de Protection Civile -* CCPCs) are responsible for evacuating populations at risk and have been instrumental in saving lives. The role of CCPCs is crucial in the National Risk and Disaster Management System (*Système National de Gestion des Risques et des Désastres* – SNGRD) as they are the closest to the population and can go from door-to-door to explain EWS, communicate the alert, and organize their community for evacuation when a disaster is about to happen. CCPCs are composed of volunteers and have successfully engaged in Haiti's most adverse natural events, including FGHI (Hurricane Fay and Tropical Storms Gustav, Hannah and Ike) in 2008, the January 2010 earthquake, Hurricane Tomas in 2010, and Hurricane Matthew in 2016. In rural areas with little access to traditional communication channels (phones, radios, newspapers), volunteers can reach people that are isolated.

Structure of CCPCs

CCPCs are directed by the DPC, through the Departmental Civil Protection Committees (*Comités Départementaux de Protection Civile -* CDPC). They work in all stages of the SNGRD: preparedness, response, and recovery. There is one CCPC per municipality, totaling 140 CCPCs formed by 3, 100 volunteers serving the entire population of Haiti. CCPCs' responsibilities include disseminating early warnings, evacuating populations to shelters/safe havens, conducting search and rescue, providing first aid in the aftermath of a disaster, and conducting preliminary human losses and material damage evaluations. Once a year, they receive a set of standardized trainings from the DPC on how to perform their duties and cover the following topics: internal management; emergency and response planning, including early warning, evacuation and protection of people; emergency communication; shelter management; and risk mapping. Beyond the yearly training, CCPCs are active in their municipality all year long, as they organize simulation exercises, conduct information campaigns for the community on preparedness-related aspects, and prepare and update the municipal's contingency plan in support to the municipality. Since CCPCs are dependent on volunteers, their ability to operate is vulnerable to high volunteer turnover. CCPCs volunteers are not entitled to benefits, insurance, or reimbursement for expenses.

Assessment of CCPCs

CCPC capacity has significantly improved since 2013 thanks to the standardized training provided by DPC, with support from various partners. CCPC capacity is evaluated by DPC and each CCPCs is assigned a score from 1 to 4 (excellent to weak), depending on organizational and functional factors combined in a performance index. The index includes factors related to the institutions represented in the committee, number and nature of specialized training received (internal management; emergency and response planning, including early warning, evacuation, and protection of people; emergency communication; shelter management; and risk mapping); whether they have developed and maintained an emergency and contingency plan; number of years the CCPC has been active; the level of implication of the mayor in the committee; and the level of coordination with the Departmental DPC (Map 2).

MAP 2. CCPCS' RANKING (1-4) IN 2016 AND 2018
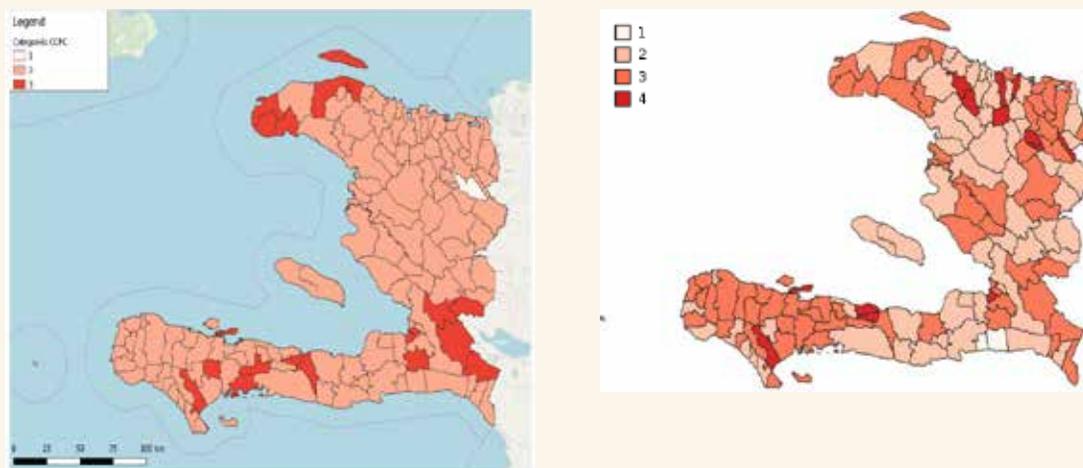
Source: World Bank analysis based on data from the Disaster Risk Management and Reconstruction Project (P126346).

Note. CCPC of Category 1 are deemed "Excellent", those of Category 2, 3 and 4 are evaluated as "Good", "Average" and "Weak" respectively.

While the decrease in death tolls from hurricanes is promising, Haiti can still improve its resilience to shocks and reduce its exposure. Several structural barriers inhibit the government, local population, and NGOs from making progress on improving resilience to natural disasters. Buildings are poorly constructed and building codes are sparsely enforced, making Haiti's building infrastructure vulnerable to hurricane force winds (World Bank, 2018). The EWS is weak and inconsistently implemented and, according to the Thematic Committee Evacuation and Management of Emergency Shelters (*Comité Thématique Evacuation et Gestion des Abris Provisoires –* CTEGAP), the number of emergency evacuation shelters is insufficient to meet the needs of Haiti's population, particularly in rural areas.

A thorough study on shelter coverage for the population in areas highly exposed to flood hazard in the Sud, Grande Anse, and Nippes Departments (Grand Sud) revealed the need for the expansion and improvement of the shelter network. There are currently 314 emergency shelters in the Grand Sud covering 1.6 million people, in particular 447,589 living in areas highly exposed floods (100-year return period). The multi-criteria methodology developed by the DPC to assess shelter needs and prioritize interventions combines GIS data and field information that considers: (i) flood risk[4]; (ii) accessibility (3 km radius or about a 45 minute walk); (iii) number of people at risk with regards to existing shelter coverage; and (iv) existing shelter building characteristics, such as size, land availability, and level of destruction post-Matthew; among others. According to study on shelter coverage already conducted by DPC for the Grand Sud, additional shelter capacity is very high for all three departments.

Additionally, while structural vulnerability data is not systematically available for shelters, experience from Hurricane Matthew and field evidence collected preliminarily by the DPC and the National Center of Geo-spatial Information (*Centre National de l'information Géo-Spatiale* – CNIGS) demonstrated the poor structural and functional state of most shelters, which are not built to withstand a 100-year return period event. At the same time, behaviors associated with disaster preparedness and evacuation can prevent Haiti from improving its resilience to shocks (World Bank, 2019). As a result, the DPC is working to strengthen and expand its emergency shelter network with the support from the World Bank.

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4   A 100-year return period flood event was used as it would be associated with floods
     caused by a high category hurricane.

4

Disaster Risk Management in Haiti

4.1 Operating model

Haiti has a complex structure to organize its National Disaster Risk Management System. Within the Ministry of Interior and Local Authorities, the DPC oversees the design and implementation of the National Disaster Risk Management System (*Système National de Gestion des Risques et des D*ésastres – SNGRD) and coordinates the response actions to disasters and risk management (Figure 2). The highest unit within the SNGRD is the National Committee for Disaster Risk Management (*Comité National de Gestion des Risques et des Désastres* – CNGRD), which brings together the highest authorities of the state (including most ministries) and the civil society (Red Cross). The CNGRD oversees the planification, organization and coordination of all actions aimed at the reduction of risks and the response to disasters. The Permanent Secretariat is in charge of coordinating all technical actions that are to be implemented during a disaster by the Emergency Operation Center (*Centre d'opérations d'urgence* – COU). The SNGRD has thematic committees to establish plans to manage risks and disasters, a consultative committee from civil society, and an international committee composed of international and non-governmental organizations supporting DRM actions.

FIGURE 2. SNGRD ORGANIZATIONAL PLAN

National Committee for Disaster Risk Management (CNGRD)

Chaired by Prime Minister. It is comprised by the all the ministers and the Haitian Red Cross President

Permanent Secretary for DRM
Comprised of all sectorial focal points

Risk Reduction in Sectors

Sectorial Committes

Territorial level risk reduction actions

Emergency Prepardness, Response and Recovery

Emergency Prepardness, Response and Recovery Committe

Emergency Operations Center
National (COUN), Department (COUD), Municipal (COUC) and local levels (COUL)

Source: Adapted from the *Ministère de L'Interieur et des Collectivités Territoriales,* « Plan National de Gestion des Risques et des Désastres *2019-2030* » page 43.

Volunteers within CCPCs select and propose to the local mayors which buildings could be used as emergency evacuation shelters. The CCPC negotiates the conditions of use for the structures and ensures that these shelters meet the following criteria set by the DPC under its Shelter Management Guide "G*uide de Gestion des Abris d'Evacuation*" (*Secretariat Permanent de Gestion des Risques et des Desastres*, 2013).

1. Emergency evacuation shelters must not be in a flood zone,

2. They must be close to vulnerable people and basic social services, including hospitals or health centers,

3. They must be accessible to people with disabilities, and

4. They must be secure.

Of the almost 1,500 emergency public shelters in the country identified by the DPC (comprised of schools, municipal buildings, and other public buildings, e.g., courts and city halls, community centers, as well as some private buildings) more than 90 percent are schools. When emergency evac-

uation shelters are multifunctional centers such as auditoriums, churches, or gymnasiums, they must be able to stop their activity in time to be used as an evacuation location.[5]

4.2 Roles and key actors

When a climate event is about to happen, the EWS conveys information through multiple steps and agents (Figure 3). When a hurricane is approaching, forecasts are interpreted by experts at the Haiti Hydrometeorological Unit (UHM). During an emergency, the Prime Minister activates a state of emergency alert and the Office of the Secretary becomes a National Emergency Operation Center (*Centre d'Opérations d'Urgence National – COUN*). COUN notifies departmental delegates, who then activate the Departmental Emergency Operation Center (*Centre d'Opération d'Urgence Départemental* – COUD). The COUD notifies the mayors, who then activate the Communal Emergency Operation Center (*Centre d'Opération d'Urgence Communal* – COUC), where, in theory, mayors relay this information to CCPC. Finally, the latter disseminates weather related information to the population and evacuate populations to shelters as needed.

FIGURE 3. HIGH-LEVEL OVERVIEW OF THE EWS STRUCTURE IN HAITI

COUN (activated by Prime Minister) ▸ COUD (activated by Dep. delegates) ▸ COUC (activated by mayors) ▸ CCPC ▸ General Population
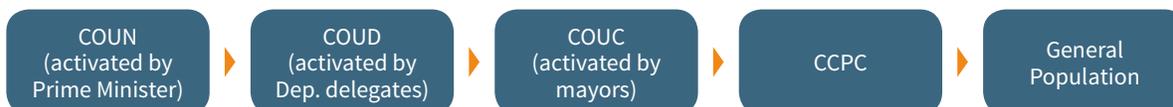
4.3 Preparedness process

Simulation exercises occur at the departmental level but are insufficient to respond to the needs. Every year, one to three departments participate in a simulation organized by the DPC. Participants spend two to three days simulating the mechanisms that must be implemented during a hurricane and the entire evacuation process, including evacuation management and operations. However, these simulations are insufficient given Haiti's exposure to natural hazards. There is also no standard debriefing after the simulation. 'Lessons learned' are not always documented and improvements are not suggested for future simulations in a systematic way.[6]

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5   Basic facility minimum requirements include, a toilet for 50 people, a shower for 30 people, 2m per person (standing), 3m 5 per person (lying down), and sufficient water.

6   Key informant interviews, October 2018.

4.4 Communication channels

Various **communication channels** are used to disseminate emergency messages to the general population:

CHANNEL	PROCESS
Radio	EWS messages are broadcast in the national radio of Haiti, as well as in commercial and community radios in both FM and AM.
SMS	AGERCA[7] and CONATEL[8] send SMS to cellphones and through social media.
Announcements in public spaces	Community leaders are encouraged to disseminate EWS messages in schools, churches, and markets.
Megaphones	Volunteers drive around the community with megaphones or sirens and communicate information about the storm.
Door-to-door visits	In high-risk areas[9], volunteers visit people in their homes and tell them about the approaching storm, instructing them evacuate quickly and prior to the hazard.
Flag system	In some remote areas where standard forms of communication are not possible, a flag system has been designed to communicate storm warning. Flags of three colors (red, yellow, and green) are raised to indicate the intensity of a storm. Locations that the flags are placed include markets, mountains, and major intersections.

4.5 Evacuation process

Ideally, the evacuation process begins long before the storm, hurricane or flood hits the communities. Communities and households are encouraged to have an evacuation plan so that families know what actions to take, what to prepare, and where to go in case of an event. Once the EWS information is received, people are encouraged to travel to a family shelter (i.e. a more solid house of a friend, neighbor, family member, etc.). In case households do not have a family shelter, they are asked to seek refuge in an emergency evacuation shelter prior to the arrival of the hurricane. People are supposed to stay in the evacuation location for no more than 72 hours after the storm passes at which time they should return to their homes.

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7   AGERCA is the institution that represents the private sector, and technically also civil society in the secretariat that manages disasters in the country (SNGRD).

8   CONATEL is the state institution that is responsible for regulatory issues around communication in the country.

9   There is not a precise definition of high-risk areas but are rather defined as areas susceptible to at least one or more vulnerabilities.

5

Key Insights on Barriers to Evacuation

Research has shown that many disaster-related fatalities are preventable if people evacuate to a safer place in a timely fashion. **The main problem we are trying to address in Haiti is that often people do not evacuate in a timely manner when there is an approaching hurricane**. Five main obstacles and related barriers limit people from early evacuation. We analyze behavioral and structural barriers given that both can be tackled with a behavioral approach. Findings in this section have also been identified in behavioral science research looking at risk perception (Milch, Broad, Meyer, & Robert, 2018) and (Kunreuther & Meyer, 2017).

5.1 Obstacle 1: EWS Messages Do Not Arrive

On paper, Haiti's communication plan works. But, in practice, no reliable and effective methods communicate information about an approaching storm to the entire population. As one participant mentioned *"…I did not know Hurricane Matthew was coming…." (FGD Woman, Paillant)*. The team found inefficiencies at each level of the communication pipeline, especially for those in rural regions who are generally more vulnerable.

Barrier 1. Limited resources and funding at all levels

- The DPC has limited operational budget, which limits its ability to fulfill roles such as training, comprehensively coordinating, communicating, accompanying, responding, and assisting in recovery.

- Volunteers have limited access to the necessary equipment or resources to perform their role. Often, they borrow private vehicles or pay out-of-pocket for transportation costs. Without regular access to motorcycles, they cannot quickly and effectively access areas with more challenging terrain.

- The population lacks functional devices used to circulate EWS alert messages. Most people have access to their own or a peer's phone or radio, but it is not guaranteed that the network or the equipment functions. Many do not have the funds to purchase batteries or phone minutes and, as a volunteer explained, "*We can do a lot with phones, but frequently during a catastrophe the networks of Natcom and Digicel stop working. If there was another way of communicating, perhaps by satellite phone, it would be very helpful*" (FGD, CCPC, Les Cayes).

Barrier 2. Lack of standardization on how EWS information is transmitted

- High level communication does not always happen efficiently between sectoral ministries, affecting coordination on all levels.

- There may be confusion about which CCPC is responsible for which areas. As a man explained: *"Every time a hurricane may come, Civil Protection passes on a motorcycle and just arrives at the intersection. When they arrive at that last intersection, they finish speaking and sounding the siren and then do not go anywhere else"* (FGD, Men, Paillant).

- A lack of standardization makes it is unclear what areas have received warnings and which still need to be informed. Prior to Hurricane Matthew, some households were visited multiple times by volunteers while others received no visits at all.

- The means in which information is disseminated varies by area. In many instances, it is transmitted by international NGOs, bypassing the DPC. Additionally, NGOs are not always present and often leave.

- Information circulated through multiple communication channels, especially in the urban areas, can become confusing.

Barrier 3. Inexperienced messengers

- CCPCs are composed of unpaid volunteers. This causes high turnover, that needs to be trained on a regular basis. New members have no experience when they start. Mayors may not always understand their role in disaster management. They lack training and an understanding of the role of civil protection. This poses a challenge as it is the mayor's responsibility to activate COUC and work closely with the CCPC. As the General Director of Les Cayes said: *"Me personally, this is not a role I can play. I am only a part of the Mayor/ Municipal office in Les Cayes. Let me take a look because I can't say personally but it is civil protection who is responsible"* (Interview, Mayor, Les Cayes).

5.2 Obstacle 2: People Do Not Understand EWS Messages

When the information arrives, messages are not always adapted in ways the average person in Haiti understands and are rarely validated by trustworthy sources. As a result, people do not always know where to go or what to do or feel urgency in evacuating.

Barrier 4. Unclear messaging

- Messages are not always adapted to local educational and literacy levels. For example, the Saffir-Simpson Hurricane Wind Scale ranging from category 1-5 (Appendix 2) is not informative to the general population in Haiti. As the General Director posed: *"It should be easier for people to understand the different categories. It should be presented in a way that the people understand, in a language that they understand. Perhaps, the words heavier, lighter, more violent"* (Interview, Mayor, Les Cayes).

- Although some seem to be familiar with the flag system, the population is not fully aware of what the three colors indicate or have not they seen flags even if they know where they are supposedly located.

Barrier 5. Distrust in the messenger

- There is a general distrust in the State and its representatives. Past neglect leads the population to perceive them as prioritizing their own interests and pockets. As a delegate explained: *"If you wait for the State, the State will never come"* (Interview, Delegate, Les Cayes).

- Though volunteers within CCPC are members of the community, they may be seen as representatives of the State or NGOs. The pop-

ulation does not fully understand the term volunteer. As one volunteer explained: *"People may think you are not speaking the truth and it is a false alarm." (FGD, CCPC, Les Cayes).*

- The likelihood and impact of a disaster cannot be predicted with certainty due to changing storm trajectories. As a result, false alarms may be given to people that end up not experiencing the damage. This carries the risk of the "cry wolf" effect (Kunreuther & Meyer, 2017), negatively affecting the credibility of the messenger.

Barrier 6. Lack of prior hurricane experience or simulations

- Although Hurricane Matthew is now etched in people's memories, especially in the Southwestern Peninsula, people had little experience with storms prior to its landfall. As a teacher mentioned: *"There were many who understood the warnings, but others…let me tell you, it is a people who need to see to believe. For me, I had experienced Hurricane Allen and did not want to relive that experience" (Interview, Teacher, Les Cayes).* Some people suffer amnesia, a tendency to forget too quickly the lessons of past disasters (Kunreuther & Meyer, 2017).

- Population may not give enough importance to preparedness activities such as yearly simulation exercises due to present bias: preparedness activities have an immediate cost with benefits unclear or in the future.

- Although yearly simulation exercises are conducted, these simulations are insufficient to fully train all actors involved in EWS and the entire population, exacerbated by the lack of disaster preparedness activities in schools.

Barrier 7. Little, wrong, or misappropriate information about best behaviors in a disaster scenario

- Messaging generally informed people to move animals away from ravines, without explanation as to why and what the consequences might be if animals were left by the ravine.

- Messaging said to stay away from windows while most of the population does not have glass windows.

- People were observed taking their animals from the mountains and tying them by rivers, despite the risk of rising waters or swelling rivers.

- The population does not know that they live in high-risk zones or what defines a high-risk zone. The DPC does not have a precise definition, which may contribute to further confusion.

5.3 Obstacle 3: People Struggle to Internalize Risk

Even when information arrives and is understood, people do not realize or accept their actual level of risk. Many negate the information received (state of denial) just because they do not want to believe it. Others feel there is little to nothing they can do to prepare to save themselves (fatalistic belief) so prefer to stay with their possessions instead of saving their lives.

Barrier 8. Underestimation of risk level

- **State of denial:** People tend to underestimate the probability of negative events due to lack of historic references or experiences. Religion is also very present in Haitian society. Culturally speaking, many neither believe something until they have seen it nor think God would let such a disaster befall them. From the experience of a woman: *"I heard about Matthew on the radio and when I told people, they told me I was lying because God would not let such a thing happen to us and everyone said it was in God's hands. They said let's pray and they started to pray…" (FGD, Women, Les Cayes).*

- **Fatalistic belief:** There is frequent resignation to the possible shocks related to natural disasters due to the everyday struggles that most Haitians face. Many believe God will protect them which may stem from both faith and the socioeconomic conditions giving them little option but to put faith in God. As a woman put it: *"You make the preparations that you are able to if you have the means. If you do not have the means, you are the mercy of God's will because if you do not have the means, you may not stay alive" (FGD, women, Paillant).*

Barrier 9. Temporal and spatial myopia

- When faced with an evacuation decision, the population focuses on possessions rather than their lives, experiencing myopia - the tendency to make decisions that prioritize short-term gains when appraising immediate costs at the expense of long-term ones. Volunteers noted that they had to remind people that the most important thing was to save their life, and that everything else comes after. This is most likely due to a combination of socioeconomic conditions and perceived threat the hazard poses.

- Emergency evacuation shelters do not allow livestock, requiring that people leave them behind. Livestock (goats, donkeys, horses) is the households' main productive and financial asset. People cited fearing looters immediately after the hurricane, especially if they

did not have means to secure their house (i.e. sturdy door or strong lock). Little to no police patrol the streets that might deter thieves. Therefore, the preference is to remain in the familiarity of and protect one's home.

5.4 Obstacle 4: People Lack Access to Resources and Shelters to Evacuate

Even when people internalize risk levels, structural challenges prevent them from evacuating. Many people do not have a shelter close to their homes, making it impossible to heed warnings. In rural areas especially, there is a widespread lack of emergency evacuation shelters that can withstand hurricane force winds. People may lack access to transportation or simply cannot gain access to emergency evacuation shelters.

Barrier 10. Lack of resources needed to evacuate

- Quality of and limited access to vehicles and roads limit one's ability to evacuate.

- The locations of vulnerable people (people with reduced mobility, children, elderly) are not mapped and therefore unknown in advance to volunteers.

Barrier 11. Lack of access to shelters

- Some shelters are closed before a disaster occurs. Because most shelters are schools, it is the responsibility of the Ministry of Education in collaboration with Ministry of Interior and Local Authorities to ensure schools are opened once the alert is given by the DPC. In some instances, people have been forced to search for the person holding the keys to the school.

5.5 Obstacle 5: People Prefer Not to Evacuate

Given that people are not forced to evacuate, many prefer staying in their homes with hopes they can wait out the storm, thinking the shelter might be more harmful than staying (omission bias). Participants mentioned preferring to seek shelter in a friends' or family member's house instead of an emergency evacuation shelter.

Barrier 12. Unsatisfactory experiences in emergency evacuation shelters

- **Unmanaged**. CCPC volunteers or members of civil society who have had adequate training are meant to manage and set the rules at a shelter. But, rules and codes of conduct are not guaranteed. Their limited presence and oversight may create spaces that are unsafe, frequently overcrowded, and with hygiene challenges.

- **Unsafe**. The DPC has established clear guidance to guarantee safety in shelters (*Secretariat Permanent de Gestion des Risques et des Desastres*, 2013), but a lack of resources means oversight cannot always be guaranteed. Emergency evacuation shelters have no separate areas for women and children. Young men often drink alcohol, smoke, and listen to loud music in the shelter. There is no privacy and people are responsible for their own security and the safety of their belongings. Volunteers cited cases of sexual aggression, especially in urban areas: *"There are sometimes incidences of sexual aggression and rape that go unreported in the shelters" (FGD, CCPC, Les Cayes)*. Many go unreported due to stigma, and because the perpetrator can sometimes be someone the victim knows. In other cases, men benefited from humanitarian aid distributions and used the aid to coerce (transactional sex). There are issues of theft.

- **Lacking resources.** Many people do not see why they should go to emergency evacuation shelters given the lack of resources such as food, water, first aid supplies or care, beds, and sheets. There is no checklist of what should be stored in a shelter in preparation for a disaster. Approximately 90 percent of shelters do not have appropriate WASH (water, and sanitation/hygiene) infrastructure including toilets, latrines and running water. Most emergency evacuation shelters do not have a power source or lighting, flashlights, cleaning or cooking supplies. When supply distributions do happen, they seem to be infrequent and subpar.

Barrier 13. Shelters do not abide by building codes and standards

- Emergency evacuation shelters in the municipalities most heavily affected by Hurricane Matthew were either damaged or destroyed. Many have remained severely damaged: *"Luckily due to the grace of God, we have not had another hurricane after Matthew. We would not survive another one right now, especially since we have not recovered from the Matthew. In October, we just had 7 to 8 days of rain that took out the pigeon pea harvest that usually pays for children's*

school fees. It is always like putting an additional abscess on a blister" (Interview, CASEC, Paillant).

- Family shelters are even less likely to abide by building codes and standards, often due to unenforced regulations or socioeconomic conditions. As a woman leader explained: *"Haiti has a huge problem with its leaders, and the State does not play its role. People construct however they want, wherever they want" (Interview, Woman Leader, Les Cayes).*

Photo: UNDP

6

Ideas to Nudge People to Evacuate to A Safe Place on Time

The team suggests designing measures to anticipate the biases and barriers that contribute to people failing to evacuate. Behavioral recommendations (Table 2, Column 4, in bold) include simplification and saliency of key information and procedures, timely dissemination of messages, changing mindsets regarding perception of risk and evacuation, and strengthening trust towards members of CCPCs.

TABLE 2. BARRIERS AND IDEAS FOR INTERVENTIONS

Obstacles	Behavioral and structural Barriers	Target (through DPC)	Ideas for intervention (in bold, potential behaviorally informed ideas)
EWS messages do not _arrive_ (Warning dissemination and communication)	1. Limited resources and funding at all levels	EWS actors	• Ensure that limited funding is used efficiently and transparently at all levels
	2. Lack of standardization on how EWS information is transmitted	Communication channels, EWS messengers	• Simplify communication channels and create one sole contingency plan • Create vulnerability and resources mapping
	3. Inexperienced messengers	EWS messengers, general population	• Train messengers with behaviorally designed messages • Non-monetary incentives (possibly social recognition) for CCPC to avoid high turnover
People do not _understand_ EWS messages (Warning dissemination and communication)	4. Unclear messaging	EWS messages and messengers, and general population	• Simplify EWS messages through participatory schemes (FGDs), including creating and testing visuals to illustrate threat types and levels • Communication campaign explaining threat types and levels (simplified and salient visuals) • Work with NGO's on the ground
	5. Distrust in the messenger	General population	• Communication campaign promoting CCPC volunteering roles • Involve religious leaders in communicating the message
	6. Lack of prior hurricane experience	EWS actors, general population	• Ordered checklists to help people prepare and make use of social media to circulate • Conduct local simulations with children (design protocols with visuals) • Communication campaigns just before hurricane season (i.e. soap operas) that consider using messaging that refers to localized experiences (i.e. Hurricane Matthew), communicate the severity (# deaths)

Obstacles	Behavioral and structural Barriers	Target (through DPC)	Ideas for intervention (in bold, potential behaviorally informed ideas)
People do not understand EWS messages (**Warning dissemination and communication**)	7. Little, wrong, or misappropriate information about best behaviors in a disaster scenario	EWS actors, general population	• Zoning regulations that better communicate risk/ adapt messages to local context • Tailored messaging per locality • Work with CCPC to have area specific messaging • Action plan depending on risk level (1,2, 3, etc..)
People struggle to internalize risk (**Risk knowledge and internalization**)	8. Underestimation of risk level • State of denial • Fatalistic beliefs	General population	• Provide clear hazard consequences and make use of social media • Clear and simple messages to counter fatalistic beliefs (emphasizing survival rate for those who take precautions) • Setup plans with neighbors (group resilience)
	9. Temporal and spatial myopia	EWS actors, general population	• Build emergency evacuation shelters with space for livestock • Clearer alert messaging focused on saving lives as a priority and everything else coming after (i.e. loss aversion messaging)
People *lack access* to resources and shelters (Preparedness and response capacity)	10. Lack of resources needed to evacuate	General population, CCPC	• Nudge families to set up emergency plans prior to hazards • Map vulnerable people • CCPC to coordinate available vehicles in advance
	11. Lack of access to emergency evacuation shelters	General population	• Assign a champion within the community responsible of opening each shelter

Obstacles	Behavioral and structural Barriers	Target (through DPC)	Ideas for intervention (in bold, potential behaviorally informed ideas)
People *prefer* not to evacuate **(Preparedness and response capacity)**	12. Unsatisfactory experiences in emergency evacuation shelters • Unmanaged • Unsafe • Lacking resources	General population CCPC Government of Haiti	• Socially recognize CCPC (or someone within the community) to nudge them to manage shelters • Consider using churches which are better managed, and which people have a different respect for • Separate area for women and children • Leverage cultural images to promote good behavior in the shelter (i.e. religious sentences posted on the floor) • Create ownership of shelters, and ensure equitable distribution of care • Keep people busy in shelters, make shelters fun (gain framing)
	13. 13. Shelters do not abide by building codes and standards	Government of Haiti	• Enforce law on building codes/norms • Social recognition award for shelters that meet building codes/norms

7

Conclusion

Multiple barriers interfere with decision-making when Haitians are presented with a natural hazard. To evacuate to a safe place, the population needs to receive timely information, understand and trust the message and messenger, internalize risk, and know what to do and where to go. This report highlights that this is often not the case. Many times, the population does not receive alert messages due to avoidable organizational and funding limitations. Other times, messages do arrive but are unclear or the population does not have sufficient preparation experience to know how to react.

This research also finds that several barriers contribute to people preferring to stay at home. Not only it is difficult to believe that the hurricane is going to hit your house, but also it is understandable to fear leaving livestock behind. Moreover, people that have had poor experiences with emergency evacuation shelters might avoid them. Finally, often do not have access to either the resources needed to evacuate or to an emergency evacuation shelter, both barriers impeding the evacuation.

Proposed interventions do not need to be costly or complex. Most recommendations tweak, refine, and simplify existing systems using a human centered approach. The team proposes taking an iterative and adaptive approach to designing and testing solutions before scaling up. This approach will ensure solutions are designed based on the realities on the ground and considering the current mindset, beliefs and barriers of the target population. We aim to take advantage of known shortcuts or rules of thumbs to simplify decisions in presence of a hazard. Having said this, the team also recognizes the importance of structural barriers and recommends the DRM

WB team and the Government of Haiti addressing them in a more comprehensive manner if a more efficient EWS is to happen.

Insights from this report have been integrated in the design of the US$35 million Strengthening Disaster Risk Management and Climate Resilience Project (P165870). This Project aims to improve (i) early warning and emergency evacuation capacity in selected municipalities in high climate risk-prone areas, and (ii) the provision of and accessibility to emergency evacuation shelters or "safe havens." The Project comprises four components: strengthening disaster preparedness and emergency response capacity, with a strong focus on strengthening the CCPCs and promoting building regulation and resilient construction practices; construction and rehabilitation of "safe havens"; contingent emergency response; and project management and implementation support. The Ministry of Interior and Local Authorities, through the DPC, will be responsible for the implementation of the Project. Various institutions will be direct beneficiaries of project activities, including the BTB/MTPTC, CNIGS, and the Ministry of Education (MENFP).

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APPENDIX 1
FIELD STUDY METHODOLOGY
AND DIAGNOSTIC ACTIVITIES

Preliminary diagnostic work. Prior to the field visit in October, between October 9th and 10th, 2018, a team from the WB comprised by Emilie Perge, Jimena Llopis and Jessica Hsu (from Poverty and eMBeD) conducted nine SSIs with key informants from governmental institutions (DPC, MSPP, MEN-FP) and international organizations (OCHA, IOM, UNDP) based in Port-au-Prince (see Table 2).

TABLE 1. INTERVIEWS CONDUCTED WITH KEY INFORMANTS AND LOCATIONS DURING THE DIAGNOSTIC WORK

Date	Location	Interviewed	Role and Institution	Contact details
October 9th	DPC	Jerry Chandler	Director of the DPC	chandler.jerry@gmail.com
October 9th	DPC	Marcus Cadet	Coordinator, DRM focal point for MSPP	
October 9th	DPC	Jean-Henry Telemanque	Coordinator GRD, DRM focal point for MNEFP	
October 9th	DPC	Marie Lita Descolines	DPC	
October 9th	DPC	Rose Luce Cadot Prevot / German Jean Elie	USAID, DPC	jeanelieg@yahoo.fr
October 10th	UNDP	Adeline Carrier	Head of resilient unit	adeline.carrier@undp.org
October 10th	OCHA	Alix Nijimbere / Nadege Nodji Mbairaroau	Humanitarian Reporting Officer, Humanitarian Liaison Officer, OCHA	
October 10th	IOM	Giuseppe Loprete	Chief of mission, IOM	gloprete@iom.int

Diagnostic work. Between October 22th and 26th, 2018, a team from the WB comprised by 5 local consultants; Jessica Hsu, Donald Antoine, James-son Vamblain, Manouchka Justin and Reginald Milfort conducted diagnostic work in Paillant and Les Cayes through six FGDs and 16 SSIs with the goal of identifying barriers that limit evacuation decisions (see table 3).

TABLE 2. INTERVIEWS AND FGDS CONDUCTED AND LOCATIONS DURING THE DIAGNOSTIC WORK

Date	Agent	Instrument	Location
October 22th	CCPC	FGD	Paillant
October 22th	CCPC	Interview	Paillant
October 22th	CASEC	Interview	Paillant
October 23th	Men	FGD	Paillant
October 23th	Professor	Interview	Paillant
October 23th	Voodoo Priest	Interview	Paillant
October 23th	Women	FGD	Paillant
October 23th	Women never evacuated	Interview	Paillant
October 23th	Women never evacuated	Interview	Paillant
October 23th	Women Leader	Interview	Paillant
October 24th	Red Cross	Interview	Les Cayes
October 24th	Teacher	Interview	Les Cayes
October 24th	Mayor	Interview	Les Cayes
October 25th	Department delegate	Interview	Les Cayes
October 25th	DPC	Interview	Les Cayes
October 25th	Pastor	Interview	Les Cayes
October 25th	Police officer	Interview	Les Cayes
October 25th	Women leader group	FGD	Les Cayes
October 25th	Women leader	Interview	Les Cayes
October 26th	CCPC	FGD	Les Cayes
October 26th	Director general	Interview	Les Cayes
October 26th	Women	FGD	Les Cayes

APPENDIX 2
HURRICANE CLASSIFICATION

TABLE 3. **HURRICANE CATEGORIES AND IMPACT**

Category	Winds	Damage
5	157 mph or higher	Catastrophic damage will occur
4	130 - 156 mph	Catastrophic damage will occur
3	111-129 mph	Devastating damage will occur
2	96 - 110 mph	Extremely dangerous winds will cause extensive damage
1	74 - 95 mph	Very dangerous winds will produce some damage

Source: National Hurricane Center https://www.nhc.noaa.gov/aboutsshws.php