



Strengthening market systems that provide water and hygiene items for cholera mitigation and emergency preparedness in Haiti

Nicolas Villeminot

Abstract: *In the context of the cholera epidemics in Haiti, a pre-crisis market analysis (PCMA) was conducted in Artibonite to study the supply of and demand for various water- and hygiene-related items. The objective was to inform current and future assistance modalities, whilst avoiding a negative impact on local markets and supporting local businesses. The market analysis found that the majority of households already purchase soap from local traders, but very few have handwashing facilities in their home. A good uptake of chlorine-based disinfection products was observed, including specific products to treat water for drinking. In addition, an extensive local supply of calcium hypochlorite (HTH), traditionally used by water services operators, was found to be available to individuals on Haitian markets. The market for water containers was also found to be strong, with the recycling of buckets and jerry cans used to import vegetable oil and other products. However, buckets with a tap, which are recommended for safer water handling and distributed during emergencies, were not available in the market. The findings from the PCMA are being used to strengthen market systems and supply chains to enable households to access water and hygiene commodities in Artibonite rather than to provide in-kind commodities directly as part of humanitarian responses. A marketing scheme was successfully piloted to encourage the purchase of water treatment products while promoting the installation of taps on households' buckets. But another initiative to link water committees, national authorities and the wholesaler of HTH stalled due to disagreements about the role of authorities in supplying the product.*

*In memory of Francis Alerte, Head of Department
for Action Against Hunger in Haiti*

Context

Haiti is the poorest country in the Americas, ranked 163 on the Human Development Index (UNDP, 2016). More than 50 per cent of the 11 million Haitians live in extreme poverty. The country is extremely vulnerable to natural disasters, floods and hurricanes, but also to droughts, earthquakes and outbreaks. Since October 2010,

Nicolas Villeminot, Action Against Hunger, New York, USA; Jonathan Parkinson, Oxfam, London, UK;
Pierre-Yves Rochat, Rezodlo SA, Petion-Ville, Haiti

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cholera outbreaks have affected the country, with 817,000 cases killing over 9,700 people (UNOCHA, 2017). Active in cholera response and prevention since the first days of the outbreak, Action Against Hunger (AAH) became in June 2013 the water, sanitation and hygiene (WASH) focal point for the National Cholera Eradication Program for the North-East Department and North Artibonite, under the leadership of the Haitian Water and Sanitation National Agency (DINEPA), the Ministry of Public Health and Populations (MSPP) and UNICEF.

In 2010, WASH actors focused mainly on emergency cholera prevention programmes. Priority activities included distribution of hygiene items, chlorine disinfection of contaminated points, quick-fixes of water systems, and sensitization of the communities and key stakeholders with the contamination routes and ways to prevent and address the disease. Despite a decrease between 2010 and 2017, the epidemic remains active, exacerbated by poor hygiene and sanitation conditions, contaminated water, and seasonal patterns, in particular heavy rains triggering an upsurge in cholera cases and diarrhoeal diseases through contamination of water sources. Hand-washing with soap is a critical barrier against person-to-person contamination. Water treatment, especially chlorination both at community level and household level, and safe water storage and handling are also key to the National Plan for the Elimination of Cholera (MSPP and DINEPA, 2016). Household chlorination improves the microbiological quality of water and reduces the risks of diarrheal disease (Classen, 2015).

Various options for chlorination are now available in the market in Haiti. Private actors promoting these products, benefiting from sensitization campaigns conducted by non-governmental organizations (NGOs), are trying to create a profitable market in both urban and rural areas. However, the free distribution of water-purification tablets and other hygiene items by the government and relief agencies is believed to undermine the market and negatively impact the private sector: the National Strategy for Household Water Treatment and Storage in Haiti (DINEPA, 2016) underlines the 'wait-and-see' attitude of users until the next distribution, and the corresponding distortion of the market related to the lack of demand caused by the handouts. Distribution of hygiene products such as soap, water containers and water chlorination products also consumes a great deal of resources, logistics and staff.

Focus of the project

A partnership with the private sector could enable agencies to improve efficiency and reduce the cost of distribution. It could also identify best practices to support making hygiene items profitable for entrepreneurs and available to customers. In this context, AAH, under the guidance of Oxfam and with the support of the United States Agency for International Development (USAID)/Office of US Foreign Disaster Assistance (OFDA), explored the linkages between cholera response and preparedness and the capacity of the market, using PCMA (Juillard, 2016). The study took place in the department of Artibonite – Haiti's largest department, with a population of 1.7 million, of which 40 per cent live in urban areas – including over



Figure 1 Map of Haiti with the three locations of the study: Gros-Morne, Gonaives and St-Michel-de-l'Attalaye

300,000 inhabitants in Gonaives, the administrative centre. Since 2010, Artibonite has recorded 150,000 cases of cholera (Pan-American Health Organization, 2017), and several recurrent contamination sources are reported in various localities. The project was carried out in three of those communes where epidemiological data for 2016 showed the highest number of cases: Gros-Morne, Gonaives and St-Michel-de-l'Attalaye (Figure 1).

The project focused on understanding what interventions could contribute towards the eradication of cholera through a market-based approach, while supporting preparedness for the numerous risks of natural disasters in Haiti. It hypothesized that local markets could regularly supply some of the most critical items preventing cholera contamination – such as soap, chlorine water treatment and improved drinking water storage, while identifying the demand from customers for these products – rather than relying on a shrinking humanitarian assistance. An established market could also be used in other emergencies, such as floods or cyclones, to reduce the direct provision of these items by agencies and gain efficiency.

Methodology

The project utilized the PCMA approach (Juillard, 2016) as part of a multi-country programme led by Oxfam.

The project ran from February 2016 to June 2017 and was implemented in two phases: 1) a field survey using the PCMA approach to understand the market, and 2) pilot activities to strengthen the local market. The preparatory phase was delayed with the emergency triggered by cyclone Matthew in October 2016, and the field survey was carried out between March and April 2017. The activities were undertaken between April and June 2017 under the supervision of AAH. The market survey took three weeks. The information from the survey was analyzed and presented in workshops with government representatives of DINEPA and MSPP. A series of potential activities were then identified, and two were selected for piloting as described below.

Products found in the kits distributed during outbreaks – in particular chlorine-based products for household water treatment (HHWT), improved water storage containers, and soap used for handwashing – were the focus of the study. Eleven types of products belonging to the three categories (HHWT, water storage, soap) were assessed through household surveys designed to characterize demand and market surveys to understand the supply chains and the market actors in these supply chains. In total, 301 households were interviewed by three teams of two investigators. Direct observations of the products in the households were made to confirm declarations as well as to identify the physical location for handwashing and water storage. Residual chlorine was measured in stored drinking water. Ninety-six market actors were consulted, including distributors and wholesalers in Artibonite and producers and importers in Port-au-Prince.

The Haitian consulting firm Rezodlo SA was selected to facilitate the study with the support of a team of 11 AAH staff. The project also intended to build capacities and draw out learning for the WASH sector about market analysis and crisis preparedness. Training was carried out to strengthen the capacity of the teams and of local distributors. The lead consultant received in-person and remote guidance from UK-based Oxfam staff with experience in PCMA, who in turn received reports at the various steps to draw trends and lessons from the various PCMA experiences.

Results from the market survey

The PCMA highlighted findings in the three product categories.

Soap for handwashing

In urban areas, 90 per cent of households have at least one form of soap in their homes; in rural areas, 87 per cent of households do. Bath soap and laundry soap are the most common forms available. Other types of soap are liquid or powder soaps. More than half of the households had more than one type of soap in their home at the time of the interview, with 96 per cent of the respondents stating that they used both laundry and bathing soap for an estimated average expense of 250 HTG (4 USD) per month. Only one respondent acknowledged having received the soap from an NGO donation; all others purchased it on nearby local markets or in shops in urban centres.

Only 6 per cent of households are equipped with some sort of handwashing device or system specifically designed to facilitate the practice. The handwashing device is characterized by a physical water container in a well-identified location of the compound for the practice of handwashing by the household. The containers are either basic (without a tap) or improved (e.g. with tap or tippy-tap).

The supply chain is characterized by a large number of distributors connected to wholesalers, making soap available anywhere in the area of intervention. Soap is available in a variety of mainly imported brands: 24 and 7 brands were identified for bathing and laundry soap respectively, although the laundry brand Banda largely dominates the market. The market for soap was found to be flexible and fluid: local unregistered distributors buy between a handful and a few hundred bars of soap every two to three weeks from a variety of wholesalers, who themselves procure hundreds to thousands of soap boxes from larger wholesalers or directly from the importers or producers in Port-au-Prince. Figure 2 illustrates the supply chain for laundry soap from retailer through to consumer. The total number of wholesalers is too high to be fully estimated by the survey. All the distributors and wholesalers also sell other items than soap, such as other domestic hygiene products or snacks.

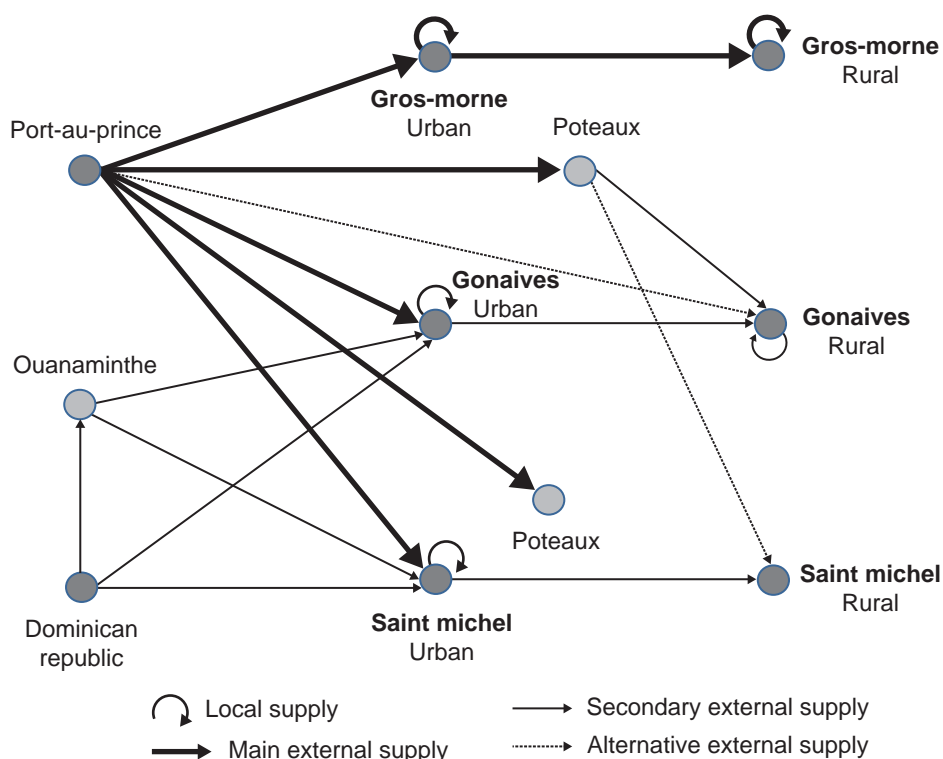


Figure 2 Example of the trade flow for laundry soap

Over 75 per cent of households highlighted that soap is always available for purchase, and very few of them reported buying soap from the same vendor every time. Customers reported choosing their soap based on quality rather than on price, confirming they prioritized soap for their household use. The practice of handwashing with soap is critical to limit the spread of infectious diseases, yet is still very limited, as the EMMUS-VI survey showed, with 76.3 per cent of the households of Artibonite observed without soap for handwashing (IHE and ICF, 2017). The problem of handwashing is therefore not related to access, availability, quantity or price of soap, but rather to the existence of a physical place and handwashing device facilitating this practice.

Chlorine-based household water-treatment products

The percentage of households were found to have chlorine-based products in their homes was 58 per cent of urban households and 64 per cent of rural. Major disparities were, however, observed between localities: for example, 93 per cent respondents of the Gros-Morne urban section had a product, as well as 80 per cent in Gonaives-rural, compared with only 43 per cent in Gonaives-urban and 40 per cent in St-Michel-rural.

The most widely observed chlorine product is in granular form (calcium hypochlorite; HTH), as shown in Figure 3; HTH is a chemical compound generally used for the bulk disinfection of water systems, but found in 35 per cent of all surveyed households.



Figure 3 HTH granules repackaged and sold on markets

Chlorine tablets were found in 24 per cent of all households, most commonly the main brands distributed by NGOs/UNICEF/DINEPA (Aquatabs, Oasis). Less common brands were also found, as well as three unbranded products. HHWT chlorine solutions, such as Gadyen Dlo and AquaJif, complete the list of products – in 11 per cent of the surveyed households. Common bleach was found in only one household.

The products were easily available on rural markets or in shops in urban centres. These products are all used for a variety of domestic purposes, from drinking water purification to dish and floor cleaning, hand and body hygiene or food preparation. Liquid HHWT products are systematically used at least for their intended purpose of drinking water treatment, as well as the tablets. Of HTH users, 39 per cent treat drinking water with it.

The HTH and liquid solutions were routinely bought on local markets by the users, while the tablets were mainly provided free by NGOs or local health agents. Therefore, nearly 50 per cent of the respondents effectively purchase chlorine products at market price without external support.

An important finding was the discovery of a well-established market of HTH granules for households. In Haiti, HTH is supplied for free by DINEPA to the water committees in charge of communal water networks. This chemical usually comes with a range of warnings to ensure the safety of the technician handling the product. The finding led to a deeper investigation of the value chain: 2,000 tonnes of the product are imported yearly from China and India by an agro-supplier with a network of 50 shops in Haiti, including 10 in Artibonite, 3 of them in our communes of intervention. From there, it is sold in 5, 10 and 15 kg buckets to smaller wholesalers or shops who sell it in smaller quantities. Along the chain, it is repackaged in small plastic sachets of 15 g (although variation from 8.6 to 23.8 g was observed for some sachets), without indication of brand, safety precautions, expiry dates or conservation recommendations. These sachets are widely found on markets at the stalls of local vendors. The price per sachet (2.5 to 5 HTG; 0.04 to 0.08 USD) makes HTH the most affordable product on the market, but the average monthly consumption makes the price comparable to liquid HHWT products, an estimate of 0.50 USD per month for the household. The margin for the seller is, however, much more attractive than for the alternative products, with a profit between 20 and 100 per cent per unit sold. The market for chlorine-based products was more dynamic than expected, with an unexpected volume of over 10 million USD of HTH sold across the country, with a potential for further growth to penetrate more households.

Household water storage and buckets with taps

Of households, 94 per cent had at least one bucket for water, and 53 per cent even owned at least three. However, only 25 per cent of households had a bucket with a tap. The tap is an important element to avoid direct contact of a contaminated hand or a dirty cup with the water stored in the bucket. While more than 90 per cent of the regular buckets had been purchased on markets by the households, a similar proportion of the buckets with taps were obtained free from relief donations. The buckets are mainly recycled buckets that contained other products, in particular vegetable oil.

An interesting trend showed the progression of jerry cans in households over the past two to three years, as companies exporting on the Haitian market have changed their packaging from buckets to jerry cans, for example Indonesian palm oils exports. Recycled containers are available mainly from urban centres for a unit cost of 1.6 USD, when new buckets, either manufactured in Haiti or imported, are sold for 4 USD, explaining the preference of consumers towards the former. However, the result is the limited availability of buckets, with nearly 40 per cent of respondent highlighting shortages of buckets on markets. There is no regular schedule for replacing a bucket, as it is generally purchased when the bucket is broken. The supply of buckets is patchy, with a mix of local recycling and some bigger distributors, mainly in Gonaives, that procure buckets directly recycled in the main ports of import.

Engagement with market actors for emergency preparedness

Two pilot activities were selected to initiate an improved market engagement in the link with cholera prevention and emergency preparedness, within the limited scope allowed by the project. However, opportunities were identified based on the findings and on consultations with governmental, community-based and private stakeholders. Recommendations were formulated to take advantage of existing markets or to address some of its gaps, in order to:

- increase the frequency of individual handwashing practices to limit contamination
- increase availability and uptake of household water treatment
- improve household-level drinking water storage and handling
- allocate the resources more efficiently in humanitarian responses
- support and mobilize market actors in their capacity to extend and continue their services during crisis.

Marketing and strengthening of the vendors for safe drinking water

Linking the findings on the availability of chlorine products and the lack of adequate storage containers for drinking water, we selected 15 vendors. These entrepreneurs were relatively well-established distributors of liquid chlorine solutions, such as the two Haitian products Gadyen Dlo and AquaJif. They benefited from training on accounting and general business management, the donation of additional stocks (Figure 4) and, finally, being trained and equipped on how to retro-fit a plastic tap to a traditional bucket used for water storage.

A marketing scheme was put in place, involving the dissemination of 2,250 flyers to attract customers to buy the HHWT product. The first 100 customers of each vendor could bring their bucket used to store drinking water and benefited from a sponsored offer: the installation of a plastic tap to the bucket, allowing water to be fetched without contaminating it. The operation was a success and a demand for buckets with taps shown to exist: in two weeks, 53 per cent of the 1,500 taps had been claimed, with three vendors already out of stock.



Figure 4 Local vendor restocking with chlorine solutions

This activity increased the visibility of vendors for HHWT, and the awareness of customers about their availability locally, and it tested the demand for a potential market of buckets with taps. The taps had been provided by the project to the vendors, but customer demand for a valued item could create a sustainable value chain. There is interest from some of the 15 vendors to look further into this business which can have an impact on cholera and other water-related disease prevention.

Linking water committees with HTH distributors

Opportunistically acting upon the finding of an established market for HTH, it was envisaged to pilot an alternative to the provision of chlorine through the official channels of DINEPA to the local water supply utilities. Eight community-based water and sanitation committees were identified by DINEPA to rehabilitate and improve their water networks before the cyclone season. Three were selected. Minor rehabilitation work was done on the water networks as a prerequisite to in-line chlorination with HTH, which is a preferred and more systematic way of ensuring safe drinking water than relying on household water treatment. A workshop was held to convene stakeholders and link the HTH importer, AgroService – the private company selling HTH in Artibonite – with the committees.

The objective was to address recurrent shortages of HTH by DINEPA, by ensuring the committees could have regular access to the product, in particular in preparation for natural events (floods, cyclones) that regularly isolate localities from the main centres. A secondary longer-term objective was to initiate a withdrawal or reduction of DINEPA in the direct provision of free HTH to committees, to focus on its regulatory role instead of the logistics of distribution throughout the country when a private sector was thriving in the same localities.

Despite initial interest from DINEPA, the activity came to a deadlock, as its Gonaïves officers finally rejected the idea. During the main workshop in June 2017, the supplier, water committees and a number of representatives from governmental water agencies were interested in starting to look at how this relationship could be set up (payment modalities, subsidies to committees, etc.). However, DINEPA, which holds responsibility for decisions over water safety, had been able to supply HTH in the weeks prior to the meeting, and the water committees acknowledged that they currently had it in stock. A direct relationship between the private supplier and the committees also risked undermining some of the power or influence of DINEPA.

The positive side is that contacts have now been established between all the stakeholders. Local committees know how and where to find HTH locally in case of emergency or shortage. Learning also occurred on the difficulties of balancing practical action with the interests of the stakeholders, which came as a surprise despite the encouraging preparatory work with them. The findings of the study, and these initial linkages between actors, may later influence the position of DINEPA, for example at national level where it could progressively decide to pull out of the direct operation of water systems.

Conclusions and perspectives

The PCMA study is part of AAH strategy of making responses to a crisis based on, or at least sensitive to, the local market. WASH market-based responses to crises remain an excellent strategy for Haiti's recovery. The activities implemented can be used to reduce direct interventions, particularly in localized and recurrent cholera outbreaks, by giving more responsibility to communities, civil society and the State to use the existing market rather than external aid. There will be limitations when markets are fully disrupted by a disaster or if prices cannot match the needs of the poorest households. However, the study showed some interesting results, such as the existence of an HTH market, and presence of soap in most households, as well as confirming some trends, such as the lack of handwashing facilities to support practice, and the existence but insufficient usage of chlorine-based products. The activity also convinced stakeholders that more attention to the market was necessary, as it proved more resilient and developed than commonly described by sector and aid professionals. While longer-term WASH interventions through markets are more advanced, like sanitation marketing models, emergency WASH remains far behind other sectors when it comes to understanding and working with local markets.

Perspectives from users, vendors and stakeholders

The involvement of an NGO in markets was seen positively by market actors. The success of the activity to promote taps on buckets showed that customers buy HHWT products and understand the value of ensuring safe water handling. Distributors, but also wholesalers like AgroServices, were keen to start interacting with NGOs and DINEPA. Any project that can help their businesses thrive and increase their customer base is, of course, to their advantage. In a country where the default emergency response is to implement direct interventions and free distribution to the point that the international aid community is often criticized, this initiative can contribute to refining better recovery and resilience of markets and better integration of the interventions in the practices of communities. It also highlighted opportunities for entrepreneurs, for example regarding taps or handwashing devices that could be sold to communities and to NGOs.

Additional perspectives for activities in Haiti

The project identified some additional perspectives that could not be tested. More advocacy will be needed on the linkages between DINEPA, water committees and the local HTH market, as they could speed up the first responses to a crisis by the communities themselves. AAH is also considering updating its internal contingency plan for 2018, so that it can provide vouchers that will support the recovery of market actors, rather than distributing non-food items kits in future emergencies. In line with the market for safe drinking containers with taps, a market for an attractive and affordable handwashing station would also be necessary to really impact handwashing practices at the household level. These markets would likely need to be supported in part by the aid sector to take off.

Finally, the presence of sachets of HTH on small markets is an opportunity, as it showed the demand of customers to use disinfecting products, but also a public health risk that would require regulation and support. HTH, as with most chlorine products, degrades with light, moisture, temperature and time. It also has corrosive properties, with severe skin and eye damage at high concentration, and harmful fumes if inhaled. The packaging observed on the market – unmarked clear plastic bags – does not provide the necessary information for customers. However, the fact that HTH is widely used and part of a legitimate value chain proves that it is a product known to households and, in reality, not restricted to trained technicians. Work could be done with traders to inform and raise awareness of users on the product, its safety, storage and usage, as well as the complementarity of the liquid HHWT products for drinking water. Working with suppliers on leaflets, posters and improved packaging could allow for further sensitization of the population on risks and preparedness actions regarding cholera or other emergencies.

The PCMA study allowed humanitarian stakeholders to explore different perspectives and opportunities to support the evolution of WASH responses and preparedness to disasters and outbreaks. More learning from other contexts and other humanitarian sectors, in particular food aid, are needed to strengthen the capacity and build the confidence of WASH practitioners in market-based delivery of assistance.

References

Classen T. (2015) 'Household water treatment and safe storage to prevent diarrheal disease in developing countries', *Current Environmental Health Reports*, 2: 69–74 doi: 10.1007/s40572-014-0033-9.

Direction Nationale de l'Eau Potable et de l'Assainissement (DINEPA) (2016) *Stratégie Nationale de Traitement d'Eau à Domicile et de Stockage sur Haïti (SN-TEDS 2016-2020), version brouillon*. Available from: <<http://pepahaiti.net/spip.php?article115>> [accessed 14 March 2018].

Institut Haïtien de l'Enfance (IHE) and ICF (2017) *Enquête Mortalité, Morbidité et Utilisation des Services (EMMUS-VI), Haïti, 2016-2017: Indicateurs Clés*. Available from: <<https://dhsprogram.com/pubs/pdf/PR90/PR90.pdf>> [accessed 14 March 2018].

Juillard, H. (2016) *Revised Pre-Crisis Market Analysis (PCMA)*, IRC, Oxfam and USAID. Available from <http://pdf.usaid.gov/pdf_docs/PA00KZM1.pdf> [accessed 6 December 2017].

Ministère de la Santé Publique et de la Population (MSPP) and Direction Nationale de l'Eau Potable et de l'Assainissement (DINEPA) (2016) *Plan d'Élimination du Cholera en Haïti. Développement du moyen terme Juillet 2016 – Décembre 2018*. Available from: <https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/documents/files/pnec_mt_2016-2018.pdf> [accessed 14 March 2018].

Pan-American Health Organization (PAHO) (November 2017) *Atlas of Cholera Outbreak in Hispaniola, 2010-2017*. Available from: <http://new.paho.org/hq/images/Atlas_IHR/Cholera_Hispaniola/atlas.html> [accessed 6 December 2017].

UNDP (2016) *2016 Human Development Report, Human Development for Everyone*. Available from: <http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf> [accessed 6 December 2017].

UNOCHA (2017) Haiti: Cholera figures (as of 31 October 2017). Available from: <<https://www.humanitarianresponse.info/en/operations/haiti/infographics/infographic-type/infographic/bundles/156260/disasters/59564>> [accessed 30 May 2018].