Comparative performance of alternative humanitarian logistic structures after the Port-au-Prince earthquake: ACEs, PIEs, and CANs

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Abstract
The paper analyzes the performance of different post-disaster humanitarian logistic structures that arose in response to the Port-au-Prince earthquake of January 12th, 2010. Based on field work conducted by the authors, the paper defines a typology of structures; assesses their relative performance in terms of delivering relief aid; and identifies the causes that explain the differences between them. Three structures are defined for comparative purposes: Agency Centric Efforts (ACEs), Partially Integrated Efforts (PIEs), and Collaborative Aid Networks (CANs). These structures differ to the extent to which they are integrated with the local social networks during the relief effort. Representative examples were analyzed to illustrate their inherent strengths and weaknesses, and reach conclusions of general applicability. The authors strengthen the analyses with discussions of “comparables,” i.e., other cases not fully discussed in the paper that shed additional light onto the performance of the structures.

The paper’s analyses are based on dozens of interviews, both formal and informal, conducted with individuals directly involved in the relief effort, complemented with critical analyses of news accounts, and reports produced by the agencies involved. Based on its chief findings, the paper makes policy recommendations to maximize the effectiveness of future relief distribution efforts in response to disasters of various sizes.

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1. Introduction
The tragic January 12th, 2010 Haiti earthquake impacted a highly vulnerable population when—after decades of political, social and economic turmoil—its internal capacity to respond to such an event was at its lowest. In its wake, tens of thousands of individuals lost their lives, and legions of others were injured and traumatized. Without any doubt, the Port-au-Prince disaster—which technically met the criteria that define a catastrophe (Barnshaw et al., 2008)—is one of largest human tragedies to have taken place in the Americas in the last several decades.

Following the earthquake, a massive international response ensued. Thousands of planes and ships transporting aid arrived at the island, and, in a convergence similar to other events (Fritz and Mathewson, 1957; Scanlon, 1991; Wenger and Thomas, 1994; Zakour and Gillespie, 1998; Kendra and Wachtendorf, 2003), tens of thousands of volunteers from all over the world also arrived to participate in the response. The relief operations did not run smoothly, and a number of prom-
inent and experienced relief agencies had major problems delivering aid to those in need. The most visible—though not the only—manifestation of these problems was the inability of some agencies to find the trucks they needed to distribute aid (New York Times, 2010j). This “truck crisis” prompted the designation of planes loaded with trucks as one of the top three landing priorities at the airport (New York Times, 2010), and urgent appeals to the Government of the Dominican Republic and international donors for help getting trucks. There were also major delays setting up the network of Points of Distribution (PODs), and numerous security problems requiring large security details to protect convoys. As a result, the massive volume of aid piled up at the Port-au-Prince airport. In desperation, air drops were used to distribute aid to Internally Displaced People (IDP) camps (CNN, 2010; Daily Mail, 2010). This undoubtedly well-meaning decision was roundly criticized as a less-than-dignified approach to helping survivors. Criticism and arguments also followed alleging that the air drops benefited the strongest individuals, not necessarily those most in need of assistance.

The authors’ field work identified, in contrast to these difficulties, a number of unheralded relief operations that were able to deliver relief aid to the survivors, find the resources required, and conduct operations in a very efficient manner, without the security problems that plagued other efforts. A key objective of this paper is to identify the factors that explain these contrasting performances, and to translate lessons from the Haiti experience into policy recommendations. The paper aims to contribute to the humanitarian logistics (HL) and disaster response literature by conducting a critical analysis of the HL structures that emerged during the Port-au-Prince response.

The research is based on interviews conducted by the authors with individuals directly involved in the relief effort. In accordance with Institutional Review Board procedures, their wishes have been respected regarding the release of their identities and the information provided. The several dozen formal and informal interviews conducted took place during a sequence of trips to: Haiti (the first just 10 days after the event); the Dominican Republic; and other centers of the Haitian diasporas, such as Miami. This information is complemented with media accounts and official reports.

The authors defined a basic typology of HL operations comprised of three types: Agency Centric Efforts (ACEs), Partially Integrated Efforts (PIEs), and Collaborative Aid Networks (CANs); which differ to the extent that they are integrated with local social networks and structures during the relief effort. Representative examples were analyzed to illustrate their inherent strengths and weaknesses, and to reach general conclusions. The analyses were strengthened with discussions of “comparables,” i.e., cases not fully discussed in the paper that shed light on the performance of the HL operation types. In the case of the ACEs, the primary example is are the United Nations (UN). The performance of the PIEs is exemplified by the joint effort of the Dominican Red Cross and Haitian Red Cross. The Servicio Social de Iglesias (SSID) is used to illustrate the work done by the CANs.

The analyses’ limitations are also worth discussing. One relates to the selection of the case studies. In large disasters, there are literally tens of thousands of independent and uncoordinated relief efforts, some very tiny. For example, the authors learned of a small restaurant in Santo Domingo (Villar Hermanos) that sent one of its two small trucks loaded with bread and water to Port-au-Prince just days after the earthquake. Other relief efforts are notably large, such as the one orchestrated by the World Food Program (WFP). Along this continuum, one finds emergent and expanding efforts (Dynes, 1970), self-organized by individuals, companies, churches, aid groups, governments, and the like. Such heterogeneity makes it difficult to pick a handful of cases as “representatives” of the key types. Another complication is the highly uneven amount of data available about individual operations. Working within these challenges, the authors selected as case studies those operations that seem to represent each operation type, and for which they had the minimum amount of data required for meaningful analyses. Although the consistency between case studies and comparables provides assurances that the findings are robust, the reality remains that those cases discussed here represent a small fraction of the numerous relief efforts that took place. Future research should study other operations to complement this work.

Importantly, since the paper focuses on a catastrophic event, care must be taken when attempting to extend its conclusions to smaller disasters. A key reason for the singularity of catastrophic disasters is that the bulk of the relief aid has to come from outside of the impacted area (Wachtendorf et al., in preparation; Holguín-Veras et al., 2012a,c). The tremendous increase in demand for critical supplies; the partial and sometimes complete destruction of local inventories of goods; the severely disrupted private sector supply chains; and the impact to neighboring jurisdictions that might otherwise have provided aid, all contribute to the increased reliance on outside support. This stands in contrast with small or localized disasters (e.g., a tornado), where unaffected businesses, individuals, or government agencies located in the surrounding areas are key sources of relief. The disaster vs. catastrophe distinction is not just a matter of scale, it is definitive; the corresponding relief operations are qualitatively different (Holguín-Veras et al., 2012a).

This paper is one of only a handful of studies that have looked into the real-life performance of HL systems, and the first for which the authors were able to collect field data so soon after the event (Holguín-Veras et al., 2007, 2012a,b). It is one of the few research publications that uses insights gained from field work to provide policy recommendations to improve future responses, as done in Urbina and Wolshon (2003) and Chang and Nojima (2001). Third, it contributes to the under-studied field of HL, with real-life accounts of the operations after a catastrophe (Haghighi and Oh, 1996; Holguín-Veras et al., 2012a).

The paper has an introduction and eight sections: Section 2 provides a brief summary of the research methodology; Section 3 discusses the immediate impacts of the Port-au-Prince earthquake; Section 4 discusses a typology of HL structures identified in Haiti, characterizing their main features; Sections 5–7 discuss the role of Agency Centric Efforts (ACEs), Partially Integrated Efforts (PIEs), and Collaborative Aid Networks (CANs) in the response; Section 8 analyzes general features of relief distribution, the abilities of the various HL structures, and the relevant policy implications; and Section 9 presents the chief findings of the research conducted.
2. Brief summary of the methodology used

In general terms, the authors followed the methodology outlined in Fig. 1. The research started immediately after the earthquake, when a team of researchers was assigned the task of compiling and archiving all relevant media articles, videos, and pictures. These materials were analyzed to identify and highlight any relevant information, and catalogued in an electronic database for future use. The researchers placed special emphasis on information concerning the disaster relief effort, population needs, infrastructure conditions, problems encountered by responders, and any other that might be relevant for the analyses. This provided the input materials used to construct a basic timeline of events.

Concurrently, the authors scheduled field trips to the disaster area, and to other locations of importance to the response. In addition to Port-au-Prince, the authors visited Santo Domingo, Dominican Republic, and Miami, Florida. The authors expected that for issues of proximity and logistics, Santo Domingo, and the Dominican Republic in general, would play a central role in the response. Miami was another important location because, as home to hundreds of thousands of individuals of Haitian descent, it was expected to be an important staging area for the humanitarian effort originating in the United States. In total, ten trips were made to Haiti, the Dominican Republic, and Miami.

The field trips focused on gathering information and data that would characterize the HL effort, and identifying lessons learned that could benefit future HL operations. The interviews followed standard Institutional Review Board procedures. The majority of the participants provided information on the condition that their identities were kept confidential. The interviewees represented organizations large and small, international and local, governmental and non-governmental, secular and faith-based, and established and emergent. Collectively, they provided a comprehensive picture of the different HL structures. Most of the interviews took place on the ground, while others were conducted by phone. The authors tried to interview individuals at different positions within the organizations, from the upper management, to those at technical and operational levels. The organizations interviewed, in turn, had different functions within the overall HL process, from procurement, transportation, and staffing, to the organization, care and distribution of critical supplies to beneficiaries. In conducting the interviews, the team used an interview script to ensure that key topics would be discussed. Interviewees were also asked to suggest names of other individuals who might shed light on the HL operations, and these individuals were also contacted for interviews. To the extent possible, the information obtained was validated with external sources, to ensure that the picture that emerged would be as accurate as practically possible.

The authors synthesised the key findings and policy implications in parallel with the interview effort. Emerging findings were further discussed with the interviewees as part of second interviews (most participants were interviewed more than once). The feedback received, if deemed appropriate by the authors, was then incorporated in the paper’s findings.

3. Immediate impacts of the Haiti earthquake

The Port-au-Prince earthquake had a huge impact on both the demand and supply of critical supplies. The first and most obvious impact was on the demand side, when suddenly, more than 3 million people in Port-au-Prince and other locations (United States Agency for International Development (USAID), 2011) found themselves either injured, homeless, or without access to food, water, and other life-sustaining items (Office for the Coordination of Humanitarian Affairs, 2011). It is not yet clear how many people died in the earthquake, as there is controversy about the numbers (Fox News, 2010). The Haitian government’s estimates initially of 100,000, and then, a year later, 316,000 fatalities (Reuters, 2011)—have been challenged by an unpublished report by the United States Agency for International Development suggesting no more than 85,000 deaths (National Public Radio, 2011; Schwartz, 2011). Ironically, this report has also been the subject of criticism (Associated Press, 2011). Regardless of the actual number of fatalities, which will probably never be accurately known, the Port-au-Prince earthquake was a major human tragedy.

In addition to the human toll, a large portion of the supplies that households had in store were lost to the earthquake, as thirty to sixty percent of buildings in Port-au-Prince collapsed or were severely damaged (Anglandes et al., 2010). Lack of potable water—a perennial problem in Port-au-Prince—became a life-or-death problem as the earthquake disrupted the operations of local suppliers (i.e., a handful of mid-size companies, and numerous unregulated vendors who sell untreated water that they get from the subsoil using small electric pumps).
At the same time, the private sector (formal and informal) that routinely bring supplies to Port-au-Prince experienced major disruptions due to impassable roads, the death or injury of business partners, and the collapse of the phone network. It is very telling that it took 6 days for a trickle of local products to start to appear in the Port-au-Prince market (New York Times, 2010e,f), and more than two weeks for the “... surviving supermarkets...” to reopen (New York Times, 2010i). (This is the same amount of time it took in Japan for private supply chains to start functioning after the Tohoku disasters (Holguín-Veras et al., 2012b).) Significant portions of the inventories of both local businesses and relief organizations were destroyed in Port-au-Prince when warehouses and commercial centers collapsed. The loss of the supplies at three out of the four massive warehouses kept by the UN was of great significance, as they held the kind of critical supplies needed in the initial response (New York Times, 2010i).

The earthquake damaged major components of the transportation infrastructure: the seaport, Port-au-Prince airport, and the road connecting Port-au-Prince to the Dominican Republic. The road was promptly repaired by the Dominican Government, which opened a lifeline to the city. The seaport suffered major damage as piers and cranes were destroyed, which required the use of less efficient ships equipped with cranes, and/or construction cranes to unload cargo. The port opened to traffic only after a floating pier was anchored there 10 days after the event (United States Southern Command, 2010). The airport was also damaged, particularly its passenger building and communication tower, though portable air traffic control equipment operated by the U.S. Air Force arrived the day after the earthquake. However, since the runway was usable, planes were able to land almost immediately after the earthquake, and they did in such numbers that a logjam was created on the tarmac forcing a 24-h landing freeze in day two of the response (United States Southern Command, 2010). In day three (Friday January 15th), the airport reopened with a priority landing system (New York Times, 2010k; Wall Street Journal, 2010a,b), which led to complaints from prominent relief groups. For instance, the World Food Program and Doctors Without Borders complained that their planes should have been allowed to land in Port-au-Prince instead of being diverted to Santo Domingo; “Their (US Air Force) priorities are to secure the country. Ours are to feed. We have got to get those priorities in sync.” (New York Times, 2010j).

Another important factor had a significant impact: the earthquake decapitated the leadership of key institutions that otherwise would have been expected to play a key role in the response. The earthquake killed the leadership of the United Nations Mission for the Stabilization of Haiti (known by its Spanish acronym, MINUSTAH), the local leadership of the Catholic Church, and numerous government workers; and it destroyed 14 out of the 16 buildings that housed government ministries (New York Times, 2010d). These leaders were the natural partners of international aid groups; the individuals that would normally help groups distribute aid locally. Their loss would have significant consequences.

In essence, the humanitarian crisis was aggravated by a combination of factors that led to the isolation of foreign relief groups: a huge surge in the population’s needs, and those associated with the response itself (Holguín-Veras and Jaller, 2011); destruction of local inventories of critical supplies; disruption of the private sector supply chains; major damage to critical components of the infrastructure; a severely weakened internal capacity to respond; and the loss of local leadership. Some of these factors have been observed in other disasters, as research conducted on Japan makes clear (Holguín-Veras et al., 2012b). The following sections discuss HL structures identified during the research.

4. Typology of humanitarian logistic structures

The authors’ analyses suggest that HL structures need to be classified on the basis of their level of integration with the impacted area’s social fabric. Central to these terms and definitions is the concept of a “foreign” group, which here means any group that (from the same or another country), but which is not part of the local social fabric of the impacted area. Although there is a continuum of possibilities, the relevant operations could be exemplified with three types. At one end of the spectrum are operations performed by a group that is foreign (outsider) to the area, with little or no integration with the locals. This case is labeled Agency Centric Effort (ACE), as the operation is based on the internal capacities of the group. At the other end, are networks of individuals/groups that are part of both the community impacted by the disaster, and part of a larger network that extends to other communities, such as a religious group. This type is referred to as a Collaborative Aid Network (CAN). In between these, there are endless possibilities depending onto what extent, and in what way(s), they integrate with the locals. To refer to these cases, the paper uses the term Partially Integrated Effort (PIE). While tempting to think that a highly integrated PIE could become a CAN, this is not the case. A CAN is a completely local effort that exists (typically, for another purpose) and cannot be replicated by a PIE that, by definition, has a foreign component. At one end of the spectrum are operations not integrated with the locals; while at the other are operations intrinsic to the local community. A foreign relief group could do its work either as an ACE or a PIE, and while in most cases, this is a matter of choice, the choice could be constrained by circumstances on the ground. Finally, it is important to reiterate that these classifications apply not to the groups themselves, but rather to the relief operations performed.

Fig. 2 depicts the ideal HL types. As Weber notes, ideal types are not meant to be considered perfect or preferred models, but rather constructs against which one can measure the fit of actual cases (Weber, 1949). Here, too, the models presented reflect the constructed forms of the networks as a way to understand their very different approaches to HL in disaster events. To facilitate interpretation, colors and patterns are used to represent the ownership/nature of the various links in the networks. In the case of the ACE, the entire process is under the control of a foreign relief group (represented in the figure by clear arrows and circles). In PIEs, there is an articulation between the foreign and local group(s), in which the latter help...
with the local distribution of supplies. In most cases, these are international/domestic non-profit/non-governmental organizations that focus on humanitarian assistance. The CAN is a completely different case as it has significant presence in both inside the impacted area and the rest of the country, predating the disaster as the CAN exist for another purpose. The fact that large components of the CAN are outside the impacted area enables its nodes to gather critical supplies (e.g., through donation drives and other efforts), in addition to the supplies that they could get from outside donations. As implied in Fig. 2, there are substantial differences between the types in terms of network size. ACEs may be able to gather an impressive amount of supplies, but since they are constrained by their internal capacity to deploy man-power and assets, the number of points of distribution (PODs) they can put in place is limited. PIEs, by virtue of exploiting existing local networks are able to deploy more PODs than can ACEs. However, neither is able to match the manpower capacity of the CANs, which build on foundations of large and strong social/religious networks.

Table 1 shows a basic comparison of the key HL features for each type, organized in two groups: logistical and social. The former considers the nature of key tasks/components of the HL process, and the type's performance capabilities; while the latter characterizes the nature and extent of the linkages between the type and the impacted area and population.

The logistical features identified focus on the transportation and local distribution of supplies from the origins—typically outside the impacted area—to the population in need. In terms of the capacity to transport supplies to the site or to nearby staging areas, foreign relief groups have the upper hand as they typically have access to high capacity transportation modes. CANs—originally created for another, non-HL purpose—do not have...
the logistical structures or access to assets that foreign relief groups have. For that reason, ACEs and PIEs are expected to outperform CANs in terms of sheer ability to transport cargo to the site. In terms of the ability to transport supplies to the PODs, there are some counterbalancing effects that make it difficult to judge a priori how CANs would perform relative to ACEs and PIEs. Foreign relief groups may be constrained by low levels of integration with the local networks, as demonstrated in Haiti. CANs, on the other hand, may be limited by their ability to secure the large quantities of relief aid required for major relief efforts. The advantage of CANs lies in the size and strength of the local delivery networks they are capable of accessing. CANs possess a fundamental strength: extensive networks with strong social ties that can quickly refocus their efforts to HL.

In Table 1, the social features describe the nature and degree of integration with the social environment in which the relief work takes place. Here again, CANs are expected to outperform foreign relief groups as CANs will likely be better integrated and have: a better command of local conditions, language, and culture, more legitimacy, and better access to a large network of contacts. Not only are CANs very large, the strong social links among its members predate the disaster. These features make CANs ideal mechanisms for disaster relief distribution. Discussed next is the observed performance of these structures during the Port-au-Prince response.

5. Agency-Centric Efforts (ACEs)

The different agencies in the United Nations (UN) system have had a significant humanitarian and public safety presence in Haiti since the 1990s. Initially, the United Nations Observer Group for the Verification of the Elections in Haiti observed the election preparations in the country. When the situation in Haiti worsened following the 1991 coup that overthrew the legitimate president (B. Aristide), an International Civilian Mission in Haiti, a joint United Nations-Organization of American States mission, was deployed in 1993. Later that year, the UN established the first peacekeeping operations in the country (United Nations Mission in Haiti, UNMIH), but due to lack of cooperation from the Haitian military it was not fully deployed. Between 1994 and 2000, the UN deployed a multinational force to maintain a stable environment in the country. Throughout this period, different missions participated: the UNMIH, the United Nations Support Mission in Haiti, the United Nations Transition Mission in Haiti, and the United Nations Civilian Police Mission in Haiti (United Nations, 2011). These efforts provided a measure of democracy, and set the conditions for modest improvements in civil society. However, there were problems, as the armed conflict of 2004 forced the creation of the United Nations Stabilization Mission in Haiti (MINUSTAH). The goals of the MINUSTAH were to support and ensure a secure and stable environment, restructure and reform the national police, help with disarmament, demobilization, and reintegration programs, restore and maintain rule of law, public safety and order, and protect civilians. Between 2004 and 2010, the mission had to adjust its operation concept and strength to adapt to changing political, security and socio-economic conditions in the country (United Nations, 2011a,b). The force has ranged from 10,000 to 15,000 personnel, between troops, police, international and local civilian staff, and volunteers (United Nations, 2011a,b).

To a great extent, the UN was successful in bringing a measure of stability to both the political and humanitarian crises that plagued Haiti after the fall of the Aristide government in 2004. In 2008, the UN conducted a fairly successful humanitarian operation following the massive flooding produced by a series of storms (Tropical Storm Fay, Hurricane Gustav, Hurricane Hanna and Hurricane Ike) that hit the country in rapid succession, which led to the death of nearly 800 Haitian citizens (CNN, 2008). For the most part, in conducting these efforts the UN followed the PIE model, relying on “implementing partners” that delivered the assistance to the people in need. The catastrophic event of January 12th, 2010 would provide this highly experienced and professional network its most difficult challenge.

To appreciate the problems faced by the foreign relief groups that operated as ACEs requires an understanding of the earthquake’s impacts on the local leadership structure. Of great import are the cases of the MINUSTAH, the Catholic Church (probably the largest and most important institution in the country), and the Haitian Government. In a different scenario, the MINUSTAH could have conceivably spearheaded the HL response. It had a strong command and control structure, the assets (e.g., trucks, heavy equipment), the security personnel to ensure public safety and the mandate to do so. Instead, with their leadership killed, witnesses reported “...total chaos...”; “...everybody was crying...”; “...no coordination capacity...” (Holguín-Veras, 2010a,b,c,d); “The collapse of the headquarters of the United Nations mission here robbed the relief effort of a central command.” (New York Times, 2010b). Not only did the MINUSTAH fail to respond, many of their duties, such as patrolling the streets, had to be taken over by others (New York Times, 2010a). The earthquake’s impacts on the Catholic Church—a moral and spiritual force in Haiti—were equally significant. With the Bishop killed, the Catholic Church was unable to mount a coordinated response. The earthquake also impacted the Haitian Government destroying 14 out of the 16 buildings that housed the various ministries, making coordination a lot more difficult. The lack of leadership from Haiti’s President during the first days of the crisis did not help rally the country. Showing a profound disconnect with the suffering of the masses, one of President Preval’s first statements reflected his concerns about “...not knowing where he would sleep...” as the Presidential Palace had been damaged (New York Times, 2010d). In essence, the political leaders failed the Haitians at a moment of crisis. The government—perceived in the best of times as ineffective—was completely absent during the first weeks of the response (New York Times, 2010g). For instance, 10 days after the earthquake—when the first author visited Port-au-Prince—there was no visible government or police presence in Port-au-Prince.
The institutions of local governance that could have played lead HL roles were in complete disarray and unable to respond. This presented a major, unprecedented challenge to foreign relief groups: accustomed to partnering with local institutions, when they could not find any, they were forced to do the local distribution themselves. In essence, foreign groups that were inclined by tradition and pragmatism to operate as PIEs, had to operate as ACEs. The story is well told by the experience of the first American search and rescue teams to arrive: “American rescue teams were among the first to experience the knot of troubles. Usually, when they set down in a country after a natural disaster, the local government has already identified buildings where there are known survivors so they can race to the scene. But here, without government input, they had to drive through the city themselves, making snap assessments about where survivors were likely to be found. They had trouble getting their equipment; its arrival at the airport was delayed for several days. Then they faced a shortage of vehicles, gas and drivers at the United States Embassy” (New York Times, 2010g).

When the tsunami of international aid started to arrive in Port-au-Prince, the ability of these ACEs to deliver aid to survivors—in a city now clogged with debris that had grown with no formal planning, street signs, and very few formal streets—was significantly hampered. What was needed at that point were experienced local truckers with small trucks that could navigate the obstructed streets. Unfortunately, the foreign relief groups could not find them. They were disconnected from the local knowhow and distribution channels critical to effective aid distribution in a large and complex urban area. Deprived of their natural partners, and without mechanisms to identify and locate reliable truck owners, they could not deliver the supplies (Holguín-Veras and Jaller, 2010a,b,c). The crisis could have probably been averted if, at this juncture, the local business class had offered to help with the relief effort either by lending their trucks, as their Japanese counterparts did after the Tohoku earthquake (Holguín-Veras et al., 2011), or by helping connect foreign groups to the numerous trucking associations in Port-au-Prince. However, the interviews indicate that the ACEs received little or no help from the local business class; the humanitarian crisis continued.

The lack of trucks created a situation so desperate that “…equipment for distributing supplies…” was designated as the third highest priority for airplane landings at the Port-au-Prince airport almost a week after the event (third after water and water purification equipment, and before medical supplies) (New York Times, 2010i). The international aid piled up at entry points with no way to move. In desperation, the decision was made to use helicopters and planes to drop relief supplies to the survivors (CNN, 2010; Daily Mail, 2010). This practice prompted criticisms from many who deemed it disrespectful of the dignity of those in need, as the air drops generated chaos in the camps, and mainly benefited the strongest (LiveLeak, 2010a,b). Quite tellingly, the State Department had rejected the use of air drops days before because of the turmoil they would create (CNN, 2010; Daily Mail, 2010). The “truck crisis” persisted. In the words of the UN Chief in Haiti: “We have the food to be distributed,” and “We just don’t have the vehicles.” (New York Times, 2010f). Fuel shortages compounded the situation. (Guardian, 2010). The UN reported needing 10,000 gallons of diesel per day from the Dominican Republic just to keep water trucks circulating (New York Times, 2010f). Ironically, the UN had plenty of trucks, though the wrong kind (Office for the Coordination of Humanitarian Affairs, 2011). Witnesses reported seeing dozens of large UN trucks near the airport that were unsuited for local distribution in a post-disaster environment, which requires the use of small trucks (Holguín-Veras, 2010a,b,c,d).

The net effect of all of this was a humanitarian crisis of unprecedented proportions. The few statistics publicly available clearly show a painfully slow response: in day one of the crisis, the Government of the Dominican Republic reported sending 39 trucks with canned food, 10 mobile kitchens, and 110 cooks able to provide 100,000 meals per day (Europa Press, 2010) to both survivors and volunteers; in day three, the United Nations reported having fed 8000 individuals (New York Times, 2010k); in day four, the American military reported having distributed 130,000 rations of food, and 70,000 bottles of water (New York Times, 2010f); and in day six the WFP reported planning to distribute 200 tonnes of food at eight locations, which was expected to reach 95,000 people (New York Times, 2010c). As of Sunday January 31st, 2010, 639,200 people had received a meal from the United Nations’ World Food Program, or about twenty percent of the estimated three million in need (New York Times, 2010b). Later, the WFP indicated that it could take a month to distribute supplies to all of those in need (New York Times, 2010h). Reports 1 month after the disaster of people without food coupons attempting to gain forced access to distribution sites (BBC News, 2010) confirm that distribution was not meeting needs.

Twenty days after the disaster, the UN finalized plans to create 16 points of distribution (PODs), a number far below what was needed for a city of more than two million residents, and a clear indication of the lack of resources for local distribution. Not surprisingly, tens of thousands of desperate individuals flocked to these PODs, requiring 60 police officers and UN troops just for crowd control (New York Times, 2010b). As a point of reference, the highest capacity POD (Type I), designed by the United States Army Corps of Engineers (USACEs) to deliver to 20,000 individuals per day, requires an average of 80 staff members to do all the tasks needed (both the distribution of supplies and crowd control) (U.S. Army Corps of Engineers, 2010). Reflecting the difficulties in securing the required resources, it took the UN 19 days to set up the first nine PODs, 20 days to have 12 PODs in operation, and 21 days to establish 14 PODs (New York Times, 2010b). This provides a clear indication of the challenge—in terms of manpower, equipment, and logistics—associated with setting up the POD network.

The “truck crisis” subsided with the arrival of 200 trucks from the Dominican Republic, which the Dominican Government arranged for after receiving an urgent request for assistance from international groups, plus another 190 trucks donated by a prominent private foundation (the latter trucks could not carry more than half their nominal cargo capacity because they came equipped with automatic transmissions that could not navigate the steep hills with full loads). Haitian truckers complained—with reason—that there was no need to hire foreign truckers as there were more than enough Haitian truckers. Two weeks after the disaster, the UN created a registry of Haitian truckers (none existed before) which enabled the ACEs to access...
local truckers (Holguín-Veras and Jaller, 2010a,b,c). The creation of the registry marked the end of the truck crisis, providing the ACEs with a mechanism to hire local truckers needed for the distribution effort. The truck registry enabled the ACEs to find all the trucks needed to run the relief operations with local truckers.

The authors’ conclude that the difficulties experienced by the ACEs were not the result of incompetence, lack of motivation, or complacency on the part of their staffs, as was implied by elements of the popular press. In fact, many of these individuals are experienced and motivated professionals, possibly among the best in the world. Instead, the ACEs faced problems of a structural nature, related to their lack of connectivity with local logistic networks. In essence, without the assistance of their natural counterparts, and the local knowhow, material, and human resources that these partners provide, the foreign relief groups were forced to take on an unfamiliar role.

The “truck crisis” was a symptom of root problems: the lack of connection to local networks and assets; and the practical impossibility of setting up a large POD network of great complexity within the short timeframe demanded by the circumstances. The ACEs also faced security problems, which required the use of armed cars and security details to ensure the integrity of the deliveries and safety of the staff. As the “Convoy to Nowhere” demonstrated, other ACEs, including a small foreign relief group, experienced similar problems (Wall Street Journal, 2010a,b).

This research’s most striking finding is that a number of unheralded relief efforts did not experience such problems. These operations were able to transport significant amounts of aid, without any problems, finding both the equipment and staff needed, and operating without the safety issues that plagued the ACEs. This remarkable feat accomplished by the Partially Integrated Efforts (PIEs) and Collaborative Aid Networks (CANs) is discussed next.

6. Partially Integrated Effort (PIE)

The term Partially Integrated Effort (PIE) refers to structures in which a foreign relief group joins forces with a local partner. Usually, this is a tactical decision based on mutual convenience or interest, though sometimes there is a longterm relationship that binds the partners together. The PIE format is probably the most widely used in humanitarian assistance, as it enables a foreign group to leverage its resources by collaborating with the locals. The team identified and studied a number of operations that belong to this group. It is important to highlight the Dominican Red Cross/Haitian Red Cross, and Operación Mano Amiga (Operation Friendly Hand)/Ministry of Women Affairs of Haiti.

6.1. Dominican Red Cross

The Dominican Red Cross (DRC) has a long history of collaboration with the Haitian Red Cross (HRC) (Holguín-Veras, 2010a,b,c,d). In the four years previous to the earthquake, the DRC had trained more than 1000 staff members of its counterpart in Haiti. On January 12th, 2010 there were about 500 Haitians studying at Dominican colleges and universities that had been, or were being, trained by the DRC. In addition, the DRC has numerous staff members fluent in Creole, Haiti’s indigenous language.

On hearing news of the earthquake, the leadership of the DRC attempted to establish communication with its contacts in Haiti. After an hour, they were able to talk to their colleagues at the HRC in Port-au-Prince. At 7 PM of January 12th, 2010, the DRC organized a meeting with the Haitian students receiving training in Santo Domingo at the time; 75 students participated. The DRC decided to include one Haitian citizen in each of the DRC response teams sent to Haiti. By 7:00 AM, the morning after the quake, a number of search and rescue teams equipped with supplies left for Haiti, thus becoming the first international teams to come to the victims’ aid (Holguín-Veras, 2010a,b,c,d). Interestingly, instead of sending the teams to locations determined at random, each of the DRC teams was sent to the community of its Haitian member. The expectation was that by going to locations where the DRC teams had contacts the efficiency of the response would be improved; the teams would have an easier time organizing and engaging local support. The information provided indicates that this seems to have worked very well.

A key DRC priority was to establish a logistical corridor to deliver supplies. The earthquake had severely impacted the neural center of the country; the internal capacity to respond was at its lowest. The DRC secured priority processing at the Santo Domingo Airport, which helped ensure minimal cargo delays there. Warehouses were set up at the DRC headquarters (the industrial park of Alma Caribe, San Cristóbal) and at a location offered by the Ministry of Education at Haina to classify the goods received. In addition, the DRC had a number of warehouses at the border towns of Jimani, Pedernales, Dajabón, and Elias Piña, which assisted nearby communities. As in previous disasters, due to the news reports of scarce water in Port-au-Prince, the DRC received massive water donations from countries like the United States, Venezuela, and even Spain. Reflecting on the cost-effectiveness of transporting ordinary bottled water from faraway countries, DRC officials decided that “…every bottle of water transported from a foreign country deprives three or four individuals of the water that could be provided if the money is used to buy the water locally…” (Holguín-Veras, 2010a,b,c,d).

Donations received by the DRC (in Santo Domingo) were handled differently depending on whether or not they were properly packed and labeled. If they were, the donations were sent directly to Port-au-Prince, to one of three warehouses managed by the DRC, the International Committee of the Red Cross, or others. The DRC also used its warehouse at SONAPI (an industrial park located near the airport and seaport in Port-au-Prince) to process, classify and distribute supplies. If they were not labeled properly, the donations were sent to one of four warehouses in Santo Domingo for sorting and processing.
To avoid the problem of overwhelming the local responders with supplies that were not high priority at the moment, the DRC only sent supplies requested by the local teams. In spite of this precaution, the amount of cargo flowing to Port-au-Prince was so large that on one occasion five trucks had to be stopped at Jimani, a border town in the Dominican Republic, for 5 days, because the warehouses at Port-au-Prince were full and could not take the cargo. The DRC delivered relief supplies to about 50 PODs. The operations relied on large trucks to transport the supplies from Santo Domingo to Port-au-Prince, and small trucks following a scout pick-up truck to deliver supplies to the PODs (Holguín-Veras, 2010a,b,c,d).

In all cases, the DRC teams organized the local population in collaboration with local leaders, assessed the conditions on the ground, determined the type and amount of supplies needed, and then requested them from Santo Domingo. This enabled the DRC to send relatively small shipments in small trucks that met the needs of the survivors without the use of security details. This tight collaboration with the locals: engendered significant support; guaranteed an orderly process of aid distribution; provided the locals with assurances that they would be properly and respectfully treated; and ensured that the aid reached its intended target. The latter is sometimes difficult to accomplish, as the next story illustrates. A response team from a foreign country distributed a large quantity of high energy biscuits by handing them out to passers-by in Port-au-Prince. Having distributed the biscuits, they decided to drive to Santo Domingo to order more. To their great surprise, when they reached the border they found that large quantities of the very same biscuits were on sale at the gate. At that point, they could continue driving to Santo Domingo to order more biscuits, which could take several days; or simply buy the biscuits that they had just handed out. In a demonstration of sober pragmatism, they purchased the biscuits at the border, and collaborated with a local group to distribute these re-bought biscuits to the survivors.

In contrast to the lack of substantial business support in Haiti, the DRC received substantial assistance from Dominican businesses. At the height of the crisis, the DRC had 500 trucks at its disposal, made available by different companies on different terms (Holguín-Veras and Jaller, 2010a,b,c). These companies lent their trucks to the DRC for different lengths of time, ranging from a weekend to three weeks. Some companies absorbed the full costs, while others provided only the truck, leaving the DRC responsible for paying driver wages and fuel.

Given the media portrayal of the relief effort as chaotic and unsafe, it is important to note that the research found that the DRC did not experience any security problems, in spite of the fact that they did not use security details. During the entire operation, not a single truck was robbed, or a single staff member threatened. For this safety record, the DRC credits tight integration with the locals, and the use of small trucks with small shipments for specific communities.

6.2. Operación Mano Amiga (Operation Friendly Hand)/Ministry of Women Affairs

The Dominican Republic’s Centro de Operaciones de Emergencia (COE) was abruptly interrupted in the midst of a tabletop exercise by the news of the Haiti earthquake. They received word directly from the Dominican Embassy of the severity of the situation in Port-au-Prince, and the Dominican Embassy then made arrangements for the COE to take over SONAPI (an industrial park in Port-au-Prince). Soon after, the leadership of the operation concluded that they were not capable of doing local deliveries in Port-au-Prince, and they began trying to find suitable partners in the Haitian Government. After frantic calls, the only person they were able to contact was Mrs. Marjorie Mitchell, the Minister of the Ministry of Women Affairs. They struck a deal: the Dominican Government would transfer the cargo to her staff at SONAPI, and she would arrange the local distribution. According to Dominican officials interviewed, this arrangement worked well, as it enabled the locals to take care of the local distribution of the aid (Holguín-Veras, 2010a,b).

6.3. Defensa Civil

The Dominican Civil Defense (DCD) and the Haitian Civil Defense (Protection Civile) had a similar experience. On hearing news about the earthquake and the activation of the National Emergency System in the Dominican Republic, the DCD proceeded to contact Protection Civile to assess the local needs (Holguín-Veras, 2010a,b,c,d). The DCD camped at SONAPI, together with other components of the Dominican effort (e.g., industrial kitchens, search and rescue), and collaborated with Protection Civile in search and rescue, and humanitarian logistics. The DCD reported to the authors their only incidence of theft, which was promptly solved. Two containers loaded with supplies were stolen from a location close to Haiti’s Central Bank. The DCD called the Police Chief, and the unopened containers were returned 45 min later. Although the collaboration between DCD and Protection Civile was deemed a success by the individuals involved, there were tense moments. At some point, the Haitian government issued a decree confiscating the supplies being transported to Haiti. The DCD and the rest of the volunteer groups refused to comply. Soon after, the decree was rescinded.

As discussed in this section, fairly successful operations were conducted with the cooperation of local counterparts in a PIE format. The knowhow, manpower, and resources provided by the locals played a key role in ensuring effective relief operations. It is worthy of mention that Dominican Red Cross’s, and Defensa Civil’s access to local contacts gave them a quick start; while in the third case (Operación Mano Amiga) the operation was made possible by the “frantic phone calls” that enabled them to find a suitable local partner. If it had been unable to find such a partners, Operación Mano Amiga would very likely have been forced to follow the ACE model.

Central to the success of these PIEs was their decision to favor effectiveness (i.e., ensuring that supplies reach the survivors) over efficiency (i.e., ensuring no loses or inappropriate use of supplies). In so doing, the PIEs implicitly accepted the fact that some supplies could be diverted away from their intended recipients. Yet, emphasizing that the bulk of the supplies
reach the needy was a better strategy than emphasizing the proper use of all of the supplies (a strategy which also meant more time for the aid to reach its beneficiaries). To a great extent this decision was made possible because of the lack of constraints on the use and distribution of the aid. Had these groups been constrained by donor requirements mandating control and custody of the supplies, or by the use of authorized implementing partners, it is doubtful that these PIEs could have implemented the successful operations that they did.

7. Collaborative Aid Network (CAN)

The term Collaborative Aid Network (CAN) refers to the collection of individuals and their social/religious connections, logistical systems, and physical spaces that make possible the social mission of an aid group. In some cases, the CAN has a religious mission, though this is not always the case. They are inherently collaborative, and tend to focus on aiding the needy, hence the name. In most cases, CANs: (1) are very large with hundreds, to tens of thousands, of individuals; (2) cover the entire geography of the country; (3) have a very horizontal structure without pronounced hierarchies and chains of command; (4) are embedded in the local populations (more precisely, are part of); (5) are trusted by the locals; (6) are comprised of motivated volunteers; and (7) possess detailed knowledge of local conditions. Although there must be many others, the authors identified three notable cases: Servicio Social de Iglesias, Caritas Dominican Republic-Haiti, and the Plataforma de Ayuda a Haití (Plataforma de Ayuda a Haití, 2010).

7.1. Servicio Social de Iglesias (SSID)

The Servicio Social de Iglesias (Evangelical Churches’ Social Service), or SSID, is the social arm of the Evangelical churches in the Dominican Republic (Servicio Social de Iglesias Dominicanas (SSID), 2011a,b). A non-profit organization, it was created in the early 1960s to help low income families being hurt by the international embargo that followed the fall of the dictatorship of Rafael L. Trujillo. The SSID is part of an international network of religious aid groups, which includes Action by Churches Together (ACT), Church World Services, and Christian Aid. The SSID is routinely involved in relief efforts and humanitarian activities in response to hurricanes, floods and other emergencies (Holguín-Veras and Jaller, 2010a,b,c; Servicio Social de Iglesias Dominicanas (SSID), 2011a,b). In order to ensure prompt access to critical supplies, the SSID pre-positions a basic set of supplies at five locations in the Dominican Republic (Barahona, San Juan de la Maguana, Dajabón, Sabana Grande de Boyá, and San Pedro de Macorís). The SSID relies on permanent staff and part-time volunteers to conduct their operations. The SSID is supported by sixteen Evangelical Councils, each with an average of 500 individual churches for a total of about 8000 churches.

Of great relevance to its response, the SSID and the Evangelical churches in both Dominican Republic and Haiti had been collaborating in the “Dominican–Haitian Dialogue of Churches.” The “Dialogue” was created in 2002 with funding from the Norwegian Government to promote economic development, peace, and understanding between the two countries, which share a troubled history (Diálogo Dominico Haitiano de las Iglesias Evangélicas, 2005). As part of this effort, church leaders from both countries meet on a regular basis to work on joint projects to aid the needy. This has enabled them to get to know each other, and develop strong social bonds. The last meeting of the Dialogue had been in December 2009, with the next meeting scheduled for January 13th, 2010 (the day after the earthquake).

On hearing that a massive earthquake devastated Port-au-Prince shortly after 5 PM, the leadership of the Dialogue in the Dominican Republic met at 7:30 PM to decide how to help. They immediately contacted their counterparts in Port-au-Prince to identify the needs on the ground, and gathered information that water, medicine, and tents were the most urgent needs (interestingly, trauma medication was not identified as a priority). The SSID also requested aid from their international partners (World Church Service and the Norwegian Church Services), and on January 13th, 2010 it was decided to funnel the collected aid through the SSID (Holguín-Veras and Jaller, 2010a,b,c).

SSID implemented three different mechanisms to distribute aid: (1) through the Dialogue, to five IDP camps with a total of 23,000 people (done regularly for about 2 months); (2) to two IDP camps at Gantier and Boen with 667 families and about 3000 people, that were adopted after the first month of the disaster and still being supported as of July 2011 (with assistance of ACT Alliance, Church World Service, and Christian Aid); and, (3) sporadically through three hospitals and two IDP camps in Léogâne to 10,000 to 12,000 people. In addition, they provided logistical support to the ACT Alliance partners and World Vision as they scheduled regular trips to Port-au-Prince (Mondays, Wednesdays, and Fridays) and back to Santo Domingo (Tuesdays, Thursdays, and Saturdays). Dominican World Vision also used SSID to distribute its aid to Port-au-Prince.

At the beginning of the relief effort, the leadership of the SSID attended meetings with international relief agencies in Santo Domingo. However, they decided to stop attending because they “...did not like the approach. International groups were talking to each other, but not with the Haitians.” (Holguín-Veras and Jaller, 2010a,b,c). The SSID made a point of engaging the Haitian leaders of the camps as part of their relief effort. This ensured an equitable distribution of the aid, provided the population with a trusted point of contact, and enabled SSID to gather the volunteers needed for the relief effort. The trust the locals had for their leaders fostered an environment of calm even when circumstances were dire. It is very telling that on January 20th, 2010, a US helicopter dropped supplies at the Salvation Army camp that the SSID was supporting. The operation, undoubtedly well meaning, produced great commotion and a break of the social order that had been established.
through local organization. In response, the leaders went to the US Army headquarters and requested that no more air drops be made at the camp. Their request was accepted, and the camp was removed from the list of camps scheduled for air drops (Holguín-Veras and Jaller, 2010a,b,c).

During the first phase of the response (until the end of January), SSID’s relief effort conformed to a two-echelon distribution system that included two distribution centers in Santo Domingo and Port-au-Prince, a staging area in Jimani, and a set of supply and demand nodes. As part of the operations, the different Evangelical churches in the Dominican Republic gathered those supplies identified as needed in Haiti, and sent them to SSID’s warehouse in Santo Domingo. From there, the trucks transported the goods to a staging area in Jimani, a small community located at the border between the Dominican Republic and Haiti. Then, the supplies were transported to the Seminario Nazarene (Church of the Nazarene, 2010) in Port-au-Prince—which acted as a distribution center—in convoys of 3–4 medium size trucks of 6 tonnes capacity. The local churches, acting as PODs, sent small pick-up trucks to get the supplies needed and to distribute them to their members. This system was replaced in the first week of February with point-to-point distribution from the staging area at Jimani to the IDP camps under the responsibility of the SSID. This new strategy was possible because the main streets had been opened, and conditions at the IDP camps had improved. Thus larger trucks could be used to transport supplies to the larger camps.

During the second phase, predominantly small trucks and pick-ups transported supplies from Jimani to the IDP camps. This operation translated into a safer, more secure, and more effective relief effort. First, the use of small vehicles and shipments reduced their value as a target of robberies. Second, since the shipment was meant for a specific camp, the residents there had an incentive to protect it, as did the criminal element, which could not risk alienating the local population of which they were a part (the information provided to the authors confirmed that local criminals protected the shipments). These decisions may help explain why none of the SSID’s trucks were robbed during the relief effort.

The operations implemented by the SSID at the Salvation Army camp illustrate their work. This camp was the largest the SSID worked with, with 7000 people and 2150 families. Typically, two small trucks of 5 tonnes and 7–9 m in length were loaded with supplies in Santo Domingo. After crossing the border at Jimani, the drivers continued to Fond Parisienne (a community on the way to Port-au-Prince), where they picked up a local leader who came from Port-au-Prince to accompany them the rest of the way. The SSID leaders showed great insight by sensing the needs of communities that had been overlooked in the distribution of aid. On hearing that the towns located along the highway connecting Jimani to Port-au-Prince had not received relief aid, the SSID decided to engage their leaders and supply the towns. This helped them ensure the safety of both drivers and cargo in that part of the journey.

At the IDP camps in Port-au-Prince, they secured the help of 80 volunteers on a rather permanent basis. Typically, 100 volunteers were needed: 40 men to unload the trucks, and 60 women to split the rations and do the distribution. Unloading the trucks took about 2 h, preparing the rations took 6 h, while distributing the rations required another 6 h. In terms of productivity, these numbers translate into 16 staff-hours/ton to unload, 72 staff-hours/ton to split rations, and 72 staff-hours/ton to distribute the rations to the people in need. This provided supplies for 3000–4000 people (about 750–1000 family size rations). The trucks left Santo Domingo at 6 AM, taking 6 h to travel the 290 km to Port-au-Prince. The rations were distributed the next day from 6 AM to noon (Holguín-Veras and Jaller, 2010a,b,c).

In total, the SSID was involved in distributing supplies to 23,000 individuals on a regular basis for about 2 months; 3000 individuals at two IDP camps from the second month on; and an additional 12,000 individuals sporadically. They also supported two health centers. Undoubtedly this is an outstanding performance for a group of predominantly volunteers who generated the bulk of the relief aid that they distributed (Servicio Social de Iglesias Dominicanas (SSID), 2011a,b).

7.2. Plataforma de Ayuda a Haití

The day after the Haiti earthquake, a diverse group of Dominican civic and social organizations (Centro Bonó, Centro Cultural Poveda, Centro Montalvo-Bonó, Colectiva Mujer y Salud) decided to work together to participate in the relief effort, and created the Plataforma de Ayuda a Haiti (Platform to Help Haiti, or the “Platform”). The Platform created a number of work groups, including: coordination (with local organizations in Haiti), bi-national advocacy, donations management, volunteer management, health, information and communications, fund raising, and infrastructure (Plataforma de Ayuda a Haiti, 2010). The coordination group conducted several visits starting as early as January 14th to assess the situation, diagnose needs, and coordinate activities with Haitian and international organizations. The visits allowed them to quantify needs, and to identify the best distribution strategies. The distribution center in Tabare became the activity hub for all of the Platform’s work groups (Plataforma de Ayuda a Haiti, 2010).

The communications group was responsible for keeping Platform members informed about the response operations, and disseminating information to the public. On January 14th, the group created a Google group to provide updates about the response activities, both at Port-au-Prince and Santo Domingo. Additionally, a blog—updated periodically—provided articles, video, and situation reports. After the initial response phase, the communication group was in charge of a plan to foster programs to strengthen the bonds between the two countries, and to develop strategies for research, training and communication with the theme “at Haiti for Haiti” (Plataforma de Ayuda a Haiti, 2010).

The volunteer management group was led by two NGOs (Fundación Etnica Integral and CEDAIL) and three social organizations (Comité para la Defensa de los Derechos Barriales, Comité Zona Norte and Frente Amplio de Lucha Popular). This group was in charge of organizing and allocating the volunteers needed for the other groups, and also fulfilling requests from other organizations.
In terms of donations management, the Centro Bonó in Santo Domingo was used as the main distribution center. Here, donations were handled and supplies gathered from other distribution centers that had been set up by the Platform's organizations group. After the aid was received, supplies were organized and classified, and then sent to a warehouse lent by a Dominican company (Fructuosas S.A.). At this location, the supplies were further classified by commodity type and arranged in pallets to be sent either directly to Port-au-Prince, or to a warehouse at Zona Franca in Barahona. This was performed in collaboration with teams at Jimaní and Port-au-Prince. The Platform also sent teams to the border to coordinate with the authorities, which allowed expedited border crossings during rapidly changing conditions (Plataforma de Ayuda a Haití, 2010).

When the supplies arrived at the Noviciado de los Jesuitas in Port-au-Prince—which played the role of distribution center—the work was performed in two stages. In the immediate response, representatives from different IDP camps approached the center with lists of requirements that were verified by visits to the camps. Later on, the distribution arrangements were made by the beneficiaries or their representatives, who were also in charge of allocating the supplies at the camps. In the second stage, eight distribution points/centers were placed at different locations of the affected area: Noviciado de Jesuitas, at Tabarre; Centro de Cité aux Cayes (coordinated by the Petites Soeurs de L’Evangile de the Focoltre Sisterhood collaborating with the St. Louis/Marie de Mont Fort parish); Center Saint Louis, located behind the Saint Louis parish; Pacot, at the Mont Font parish; Orphanage Foyer Marie, Reine des Apôtres de Leogane; Hospital Cardenal Léger, Leogane; Canape Vert; and Ville Manrese. The use of these locations also allowed for the distribution of supplies to camps that were not being aided by other organizations. The activities decreased in April 2010 when inspections at the border tightened, leading to a slowdown in the flow of aid.

In terms of medical attention, the Platform received support from more than 25 organizations. The health group’s objectives were mainly to offer medical services, and to organize and coordinate. This group was able to treat more than 15,000 people in the initial days of the crisis, mainly through a medical camp set up in Leogane. With other organizations helping in Haiti (e.g., Groupe Ecologiste pour un Developement Durable en Hait, Actions des Citoyens pour la Restauration et le Developement de la Region de Palme, and local officials), the Platform’s medical and health group fostered reconstruction and development programs. From the camp, food was also distributed to other locations such as Mellier, Gros Morne and Carrefour Vert (Plataforma de Ayuda a Haití, 2010).

8. Analyses and policy implications

The performance of the HL structures that emerged after the Port-au-Prince earthquake was determined by their ability to quickly establish an efficient local distribution. Operations such as ACEs that tried to create such a network from scratch faced huge obstacles that took them weeks to overcome. In contrast, PIEs and CANs—by virtue of exploiting existing social networks—were able to put in place efficient local distribution efforts much faster than the ACEs. In essence, the ability to do the local distribution was the constraining factor. This insight is consistent with the well-established experience in commercial logistics that the most challenging part of the distribution process is the so-called “…last mile delivery…” problem. The magnitude of this challenge is relatively easy to understand when one considers the amount of cargo needed at the impacted area, and the number of PODs and manpower required to do the job.

The amount of cargo to be transported after a large disaster is extremely large, as it must satisfy the needs of the population in need, and the response itself. Dynes et al. (1972) and Taylor and Quarantelli (1976) termed these, respectively: disaster agent-generated demands, and disaster response-generated demands. Agent-generated demands are those generated by the impacts of the disaster agent on the community, while response-generated demands result from the activities part of the response.

In terms of agent-generated demands, a number of guidelines define the minimal amounts to be handed out to survivors. The suggested quantities exhibit a wide range. For instance, the USACE (U.S. Army Corps of Engineers, 2010) suggest a minimum of 5 kg of water and food if ice is not provided, and 10 kg if it is; the SPHERE Project suggests 7–14 kg of water per day plus half a kg of food (The Sphere Project, 2011); while in Japan about 20 kg/day of supplies were handed out to the survivors at the beginning of the response (Holguín-Veras et al., 2011). In addition, one must consider the response-generated demands. Although there are no hard data available, a rough estimate based on the Hurricane Katrina response suggests that response-generated demands are about three times the size of agent-generated demands (Holguín-Veras and Jaller, 2011). This implies that anywhere from 20 to 80 kg/day of supplies could be needed to satisfy the needs of both population and the response. In an urban area of more than two million people like Port-au-Prince, this translates into 40,000 to 160,000 tonnes of supplies per day. This huge undertaking has to take place in the midst of widespread infrastructure damage.

The manpower needed for local transport and distribution is also of vital importance. To illustrate the magnitude of manpower necessary, a hypothetical though plausible example, inspired by the experience of the SSID, is discussed. Consider the case of a truck driver (with a helper) who makes the 6-h trip from Santo Domingo to Port-au-Prince in a semi-trailer with 30 tonnes of supplies (12 staff-hours of work) that required 10 staff-hours (with forklifts) to be loaded. Unloading the cargo from the semi-trailer and loading it on six 5-tonne trucks would take 40 men about 6 h, for a total of 240 staff-hours. Transporting the cargo to six different PODs could take, in terms of average conditions in Port-au-Prince, about 3 h per round trip, leading to 36 staff-hours of drivers and helpers. Unloading the cargo at the PODs would take about the same effort, i.e. 240 staff-hours, as loading the small trucks. However, splitting the rations and distributing them to the population would require...
1080 staff-hours each (i.e., 6 PODs, 60 persons, 3 h each). These results imply that the long-haul portion requires about 22 staff-hours (10 staff-hours loading, plus 12 staff-hours driving); the local distribution consumes about 276 staff-hours (240 staff-hours unloading and loading the small trucks, plus 36 staff-hours driving to PODs); and that preparing and handing out the supplies requires a staggering 1320 staff-hours (240 staff-hours unloading, plus 1080 staff-hours preparing rations and handing them out to survivors). All of this means that local transport of the supplies to the PODs requires about 12 times the effort of the international long-haul trip; while preparation and distribution of the rations require 60 times the staff-hours required for the 290 km trip. Equally significant is that, although these estimates are based on the use of manual labor, the results are robust: even if the productivity increases by an order of magnitude (e.g., using ready to distribute rations, hand carts), the local distribution still remains the most difficult part. This provides an indication of the amount of effort required per POD.

The third important aspect of the agent-generated demands is the number of PODs required. Jaller and Holguín-Veras (in preparation) established that the optimal number of PODs depends on walking and waiting costs of survivors, and setup and operational costs per POD. Furthermore, in urban disasters where streets are clogged with debris and driving is not possible, walking is the only option, and thus a limiting factor of the area served by a POD. The authors estimate that delivering the aid to the more than 2 million residents of Port-au-Prince, scattered over more than 90 km² of challenging terrain, with few formal streets and highways, could require between 100 to 200 PODs for optimal distribution. Assuming that each POD requires 80 staff/volunteers, (to organize/control the crowds, ensure the safety of the staff, and for other support functions) anywhere between 8000 and 16,000 staff members are needed to distribute the aid; plus another 4000–5000 to load and transport the cargo to the PODs. Gathering, training, and putting in place such a workforce is a huge logistical undertaking. These numbers are equivalent to one division of average size in the U.S. Army, about 20,000 troops, that typically take 3–4 weeks to be fully deployed. These estimates are consistent with the experience of the US military in Haiti: by January 22, they had a total of 13,657 personnel in Haiti (3258 ashore, 10,399 afloat); and by the end of January they had over 22,200 people, both on the ground and offshore (United States Southern Command, 2010). Factoring in the challenge of deploying the staff to hundreds of PODs, many of them in inaccessible locations, instead of deploying them to a handful of central locations as the US Army did in Haiti, the estimate of 3–4 weeks to deploy the manpower required at the PODs sounds reasonable.

The key implication is that it is not practical for foreign relief groups to attempt to create a local distribution network after a large urban disaster. It simply takes too long to be of any help. Even if POD staffers are selected from the local population, recruiting and training them is a challenge, especially as it has to take place in the impacted area. For these reasons, the local distribution after a catastrophic urban event is bound to become the bottleneck of the entire relief effort, requiring tens of thousands of committed staff members and volunteers. This conclusion has sobering implications. As the experience in Haiti demonstrated, a successful local delivery operation requires a logistical structure (e.g., properly trained individuals well connected to others in the network, information systems, checks and balances, chains of command, minimum level of trust among the members), and assets (e.g., trucks, space) and manpower; all suitably distributed throughout the impacted area in a timely manner. Creating such structure is a major challenge, because HL is a socio-technical process, in which both the social and the technical sides have to work well for the relief effort to be successful. Thus, reliable supply chains require solid human and information networks, which determine the performance of the overall system. If the participants do not know their roles, or if they cannot perform them, the supply chains fail. The same applies to the systems that manage the information flows. Creating the vast network of individuals and systems required to successfully do HL from scratch takes a significant amount of time and resources, both of which are in short supply in post-disaster response operations.

In the case of the ACEs, the lack of manpower forced them to distribute the aid using the small number of PODs that they and their implementing partners could create. Since the number of PODs was tiny in relation to the needs, they were flooded with tens of thousands of desperate Haitians looking for supplies. This, in turn, required the use of large security details for crowd control, which further reduced the manpower available for other tasks. This lack of manpower, together with the time it would take them to set up the local distribution network, leads to the inescapable conclusion that ACEs cannot be expected to play a key role in the local distribution of aid after a large urban disaster. The HL needs exceed what their inherent structure could offer.

The key insight is that transporting supplies to the site of a large urban disaster is likely to be the least difficult of all of the HL phases. In contrast, the local distribution is expected to be, by a significant margin, the phase that consumes the largest amount of resources, and takes longer to set up with foreign resources. In a context in which the ability to distribute locally is constrained, and the long-haul transportation to the site is not, it should come as no surprise that the relief aid piled up at the entry points, as it happened at the Port-au-Prince airport.

The research suggests that PIES and CANs are likely to do a better job than ACEs, for a number of reasons. For PIES, the integration with a local network enables the foreign relief group to take advantage of the local knowhow and the human and technical resources of the local partner, as well as the legitimacy that the local network may have with the population. Another reason is the time it takes to assemble the necessary resources for local distribution: while in ACE operations, the bulk of the resources are brought from the outside; in both PIES and CANs an important portion of the resources are locally obtained, which is significantly faster. In a post-disaster context, where time is of the essence, this is an important consideration. In light of these findings, clearly foreign relief groups should avoid the ACE model, because integrating operations with local relief groups in a PIE format would be a much better alternative. As long as the bulk of the supplies reaches the people in need, a PIE with an improvised connection to a local network may be more effective than an ACE that ensures perfect use of the supplies, but takes weeks to distribute them.
The analyses previously discussed can be summarized in Table 2, which shows the authors’ assessment of the relative capacity of the different structures to effectively conduct PD-HL logistics operations. As shown, there is a remarkable degree of complementarity between foreign groups and CANs, as the latter are strong where the former are weak: integration with the local environment and capacity to undertake the local distribution. Conversely, foreign groups excel in their ability to muster resources and supplies to be transported, while CANs, because of their predominantly local focus, are weak in that regard.

Clearly the analyses indicate that CANs are ideally suited to be the backbone of the local distribution effort after large disasters or catastrophic events because they: (1) are very large, thus able to provide the manpower needed to do relief distribution in a post-disaster environment; (2) are already on the ground and geographically distributed, which eliminates or minimizes the need for relocating volunteers, equipment, and supplies; and removes the need to transplant or create an alternative distribution structure; (3) have a large distributed structure, with many nodes (such as churches) scattered over the entire area which make them extremely resilient, and allows the network to absorb the large inflows of supplies needed as part of the response to a large or catastrophic disaster; (4) have very strong social/religious connections that contribute to cohesion and collaboration among members; and (5) are comprised of individuals naturally inclined to help the needy. The authors believe that there are no alternative structures (pre-existing, or to be created) that could match what the CANS could provide.

For instance, the SSD estimates that it is supported by a network of about 11,000 churches (8000 in the Dominican Republic, and another 3000 in Haiti) with about half a million members. There are not many social, religious, or military structures that could boast networks of such size (the Catholic Church may be the only one larger, though the authors could not find data about the size of its networks). The huge size and distributed nature of CANs, as well as the strength of the connections between its members, has enabled them to remain functional after disasters (some of them, such as the Catholic Church, have existed for thousands of years). Although many individual members of the CANS discussed in this research died during the earthquake, the ability of the networks to function was never in question. What provides the CANS with their extremely resilient nature are the size and strength of their connections.

The research suggests that responding to a catastrophe is best done in combination with large, resilient, and highly connected (internally and externally) pre-existing social networks. The circulatory system works well as a metaphor for humanitarian logistics: just as capillary vessels distribute the blood to all the body’s cells after it is received from the major arteries, relief operations work best when supported by a distribution network that widely dispenses the critical supplies received. Just as one cannot connect the aorta directly to the capillary vessels, foreign groups should not attempt to undertake the bulk of the local distribution effort. In this context, foreign groups are like the major arteries that have the blood (critical supplies) but lack the local capillarity needed for effective local distribution. In contrast, the CANs have the capillaries, but lack the material supplies needed by the population. It makes sense, for a fully functional system, to link these together.

In terms of the entire distribution effort, the capabilities of foreign relief groups and CANs are best utilized when the former focus on the transportation of the large volumes of supplies to the disaster site; leaving the local distribution to the CANs. Achieving this goal entails engaging the CANs as part of a holistic strategy of community development, risk management, disaster response and recovery. Such strategy is needed to improve the communities’ abilities to minimize risks, address vulnerabilities, develop resiliency, maximize the efficiency of disaster response, and speed recovery. Specific recommendations include:

- Taking steps to develop an integrated logistical structure that will be based on exploiting the particular strengths of both foreign groups to transport large volumes of supplies, and the CANs to locally distribute the aid.
- The creation of a super network, comprised of those CANs associated with credible organizations that would be the local end of disaster mitigation and response process.

**Table 2**

<table>
<thead>
<tr>
<th>Summary of the different structures’ capacity to respond.</th>
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<tbody>
<tr>
<td>Response feature</td>
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<td></td>
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<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Access to physical/financial resources</td>
</tr>
<tr>
<td>Amount of supplies they could bring to the site</td>
</tr>
<tr>
<td>Integration with the local population</td>
</tr>
<tr>
<td>Readiness to respond to a sudden disaster</td>
</tr>
<tr>
<td>Scalability of operations they could undertake</td>
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<tr>
<td>Resiliency of the structure</td>
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<tr>
<td>Capacity to undertake the local distribution:</td>
</tr>
<tr>
<td>Manpower available to the structure</td>
</tr>
<tr>
<td>Geographic coverage of the structure</td>
</tr>
<tr>
<td>Number of PODs they could set up</td>
</tr>
<tr>
<td>Amount of cargo they could distribute</td>
</tr>
<tr>
<td>Capacity to undertake safe operations</td>
</tr>
</tbody>
</table>

*Note:* Best (+++) to Worse (---).
In addition to the reasons discussed, the concept outlined above has a significant advantage with respect to current practices: it is scalable. In the case of small disasters, only a handful of PODs would be activated; while in larger events hundreds of PODs could be engaged. Since the nodes of the CANs are already in place, activating more or fewer PODs is not a problem. In contrast, with current practices that rely on a foreign aid group working on an ACE or PIE format, the arrival of supplies from private sector supply chains is not scalable from the disaster to the catastrophe domain. As established, ACEs and PIEs could be effective in catastrophic events in relatively small communities that require a small number of PODs. As demonstrated dramatically in the the Port-au-Prince tragedy, in catastrophic events impacting large metropolitan areas, ACEs and PIEs will not be able to muster the manpower needed to staff the necessary number of PODs in a reasonable amount of time. Moreover, while the private sector supply chains could play a key role in small disasters, in catastrophic events their ability to help is severely compromised as they are likely to have been impacted by the event itself. All of this implies that HL efforts that rely on CANs are scalable to size, while current practices are not. This sobering conclusion helps explain the poor HL response after catastrophic events (e.g., Katrina, Haiti, Japan).

This approach counters the prevailing practices at many relief organizations, and the emphasis placed on control and custody of the aid flows (which is quite frequently a donor’s requirement, to ensure just distribution of the donated resources). In the opinion of the authors, such just distribution of supplies could be accomplished with proper training and engagement of reputable CANs.

9. Conclusions

The research reveals that in response to the Port-au-Prince earthquake, three key typologies of humanitarian logistic structures emerged: Agency Centric Efforts (ACEs), Partially Integrated Efforts (PIEs), and Collaborative Aid Networks (CANs), and that these structures exhibited radically different levels of performance.

Widely reported in the popular press were the problems encountered by the ACEs, in particular their inability to deliver critical supplies to the survivors in the days after the disaster, and the ensuing pile-up of supplies at the Port-au-Prince airport and other entry points. The research concluded that these problems were a result of the ACE’s lack of connectivity with the local logistic networks that possess the knowhow, manpower, and assets to deliver supplies to the disaster area. Such lack of connectivity was brought about by the earthquake itself, when it led to the death or injury of senior leaders of the two institutions best positioned to organize the local response to the disaster (MINUSTAH and the Catholic Church), and further weakening of the Haitian government. Deprived of the natural partners that typically help them connect with the locals, these highly experienced foreign relief groups were forced to attempt to do the deliveries themselves, and failed. The desperate decision to use air drops was a reflection of their frustrated efforts to deliver supplies to the survivors.

The experience of the ACEs in Haiti provides, probably, one of the most important lessons of this tragedy. Among other things, the fact that the lack of connectivity was triggered by the loss of the local leadership, implies that it could happen again in other urban disasters unless steps are taken to ensure the resiliency of both the local leadership and its connections with the outside of the impacted area. Should part of the local leadership be impacted, there would be others who could make the connection between the outside in the local social and logistic networks.

The research also revealed that PIEs and CANs performed much better than the ACEs, in spite of being much less well equipped and funded than the ACEs, and primarily volunteer organizations without any training in logistics. Their success delivering supplies to the people in need, under such extreme circumstances, is without any doubt the most surprising finding of this research. The PIEs discussed in the paper were able to exploit existing contacts in the impacted area to connect their (foreign) efforts to local support networks. This allowed them to gain access to the local expertise, manpower, and assets that fate denied to the ACEs. As a result, they delivered supplies with great efficiency given the challenging circumstances. The CANs did the same, though at a much higher level of performance, thanks to the size of their networks. The CANs had numerous advantages: (1) the size of their networks, with extensive presence in and out the disaster area (which allowed them detailed knowledge of needs, and the capacity to flow large amounts of cargo without major strain); (2) the trust and respect of the local population (which allowed them to calm and organize the population); and (3) an established place in local communities (which allowed them to organize quickly, and work more easily, with less vulnerability to criminal acts).

The key insight is that the contrasting performances of ACEs, PIEs, and CANs were a direct result of the characteristics of their networks. Although it is likely that the unique characteristics of the Haitian society and economy exacerbated some...
logistical problems, the research conclusion is that the problems faced by the ACEs reflect their structural limitations, and would likely to surface even in more favorable socio-economic environments. The fact that ACEs of all shapes and sizes—ranging from large relief groups to small operations faced similar problems—is an indication that the root of the problem lies in their inherent structure.

The differences in the performances of these HL structures are due to the differing degrees of integration with the local networks. While in the ACE case, the local distribution network has to be created from scratch; PIEs and CANs take advantage of networks that exist for another purpose. Obviously, since extending the function of an existing network is easier and faster than creating a new one, it follows that the most effective way to do local relief distribution of critical supplies is through the PIEs and CANs. The issue of the scale of the disaster must also be considered. In large urban disasters and catastrophic events, only CANs could provide the massive networks required for local distribution within the time required for an effective response. In smaller events, PIEs could work well as long as the local partners could muster the resources needed to staff a sufficient number of PODs. By the same logic, in small disasters, the ACE model could be effective.

In essence, operations that rely on CANs for the local distribution of relief supplies are scalable to size as it is always possible to activate more or fewer PODs as needed; while ACEs and PIEs do not have that flexibility. The expectation that private sector supply chains could play a key role in the immediate response is also dependent on scale: while they could certainly do so in small disasters, the evidence suggests otherwise in catastrophic events. The prevailing practices—based on ACEs, PIEs, and private sector supply chains—has failed in all catastrophic events impacting large urban areas in recent history (e.g., Katrina, Haiti, Japan).

The analyses of the HL structures that emerged after the Haiti earthquake strongly suggest that the humanitarian logistic community must rethink its approach to the distribution of aid. As the Haiti tragedy demonstrated, an emphasis on the transportation of large flows of relief aid without comparable attention to local distribution is unworkable, and the ACEs are bound to find significant obstacles. Thus, there is no practical alternative to using the CANs for local distribution, and engaging them as equal partners in the relief effort. This is particularly important in large urban disasters where critical supplies must be distributed to large numbers of individuals. In essence, the CANs are the only human/logistic networks that could tackle the challenge of local distribution after a large urban disaster of a catastrophic event.

The paper’s chief conclusion is that integrating CANs as a formal partner of relief efforts is imperative. They are the only groups able to provide—within the timeframe required by the circumstances—the local manpower, resources, and knowhow required for distribution. To this effect, the authors recommend: (1) putting in place an integrated logistical structure based on foreign groups transporting large volumes of supplies to disaster sites, and CANs doing the local distribution; (2) creating a super network of reputable CANs to coordinate local delivery efforts; (3) creating a Coordinating Committee of CANs (a VOAD-like structure) to ensure an equitable distribution of resources; (4) training local leaders of the nodes comprising the CANs (e.g., local churches) on risk management, first aid, disaster response, and the like to ensure that they know how to respond, and how best to use resources; and, (5) designating each node/location as a POD to be activated in the event of a disaster so that, in case of need, the node leader can gather CAN members and prepare to distribute the aid when it arrives. Among other major benefits, the pre-disaster designation of the nodes of the CAN as PODs will enable the locals to know where to get first aid, or critical supplies, in case of a disaster. In the authors’ opinion, based on this research, these steps provide the best chance of putting in place resilient and robust distribution networks that will support response after catastrophic events.

The research reported in this paper confirms the importance of integrating relief efforts with the local social networks in the impacted area, and of the major challenge posed by the local distribution of supplies after a catastrophic event. The authors’ hope is that these findings will help improve humanitarian efforts after future disasters and catastrophic events.

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