

Nature-Triggered Disasters and the Involvement of Armed Forces: Exploring a Civil-Military Collaborative Framework

K. Ahmed, C. Emdad Haque, N. Agrawal, S. Sakib

Abstract

Nature-triggered disasters have been causing havoc in Canada over the past decade. Although many of these hazards cannot be prevented (e.g., earthquakes), their impacts can be managed through judicious planning and by mobilizing national resources. Considering the relentless force of nature and the degree of anticipation and preparedness needed, Canadian civil and military institutions must synergize to optimally utilize human capital, knowledge, and financial resources. Both the Canadian Armed Forces (CAF) and civil society actors have emphasized the importance of enhancing adaptive capacity and reliance on the armed forces for disaster response. As such, frequent involvement in domestic responses diverts the CAF's focus away from national and international security threats, underscoring a serious national concern. Against this backdrop, the present paper analyzes existing civil-military cooperative models in Disaster Management in Canada and the USA. Three objectives are set: a) to explore the armed forces' main tenets and approaches to disaster and emergency management, b) to find similarities and differences in institutional and resource priorities (before and during the onset of extreme nature-triggered events), and c) to identify the best collaborative practices and modes of operation of stakeholders involved. Using a case study approach, a desktop review of policy papers and an event database for two large-scale disasters: one in the United States (Hurricane Katrina in 2005) and one in Canada (the 1997 Red River flood in Manitoba) was carried out. The results offered the following major findings: a) organizational and cultural differences between the civil and military authorities in both countries drive the nature of disaster management; b) centralization vs. resource decentralization has remained the key factor in speeding up disaster response; c) political and legal scope and limitations in civil-military cooperation are often blurred; and d) the sole application of the Command, Control, and Communication (C3) approach becomes problematic when a multi-stakeholder approach is preferred for disaster management.

Introduction

Natural disasters now hit all regions of Canada at unusual times of the year. In 2021, for instance, British Columbia experienced floods in November (Government of British Columbia, 2021), and Hurricane Fiona affected the Atlantic coast from September 14–24 (Canadian Broadcasting Corporation, 2022 ; Hunter, 2022). Experts and Government estimated the damage to infrastructure of the nature-triggered extreme events costs in billions of dollars (Canadian Broadcasting Corporation, 2022 ; Hunter, 2022). In response, the federal, provincial, and municipal governments all took steps to mitigate the effects, restore infrastructure, and help their citizens. The Canadian Armed Forces (CAF) were also requested by provincial authorities to provide immediate relief according to mandated responses at the federal level, yet its frequent involvement is now being criticized by observers who argue that such engagement should remain as a last resort.

The United Nations Office for Disaster Risk Reduction (UNDRR) defines a disaster as "a serious disruption of the functioning of a community or society at any scale due to hazardous events interacting with conditions of exposure, vulnerability, and capacity (United Nations Office for Disaster and Risk Reduction, n.d.), leading to human, material, economic, and environmental losses and impacts." Here, when the community or society exhausts resources and decides to call for external assistance, "capacity" refers to that point. "Civilian authorities (i.e., provinces) call upon the armed forces for assistance for various reasons, including the armed forces' ability to respond quickly, their specialized training for operating in difficult situations, their unique resources (e.g., airlifting capacity), their interoperable command, control, coordination, and communication systems, and finally, the trust that requesting authorities and citizens place in them.

CAF's deployment in disaster response depends on the magnitude and type of the disaster and the civil authorities' requests. However, challenges exist in joint activities conducted by two different groups, i.e., civil authorities and armed forces, with different work cultures. The latter are trained to fight conventional wars against a nation-state and thus receive training to win over a hostile military in combat. Obviously, natural hazards and disasters are not considered "typical enemy combatants" that require neutralization. That raises the question: to what extent and in what ways should armed forces get involved in dealing with nature-triggered disasters (as enemies) within national borders and during peacetime? CAF is to be deployed as a last resort in Canada, but some argue that the term "last resort" is used loosely. According to Major General Paul Prevost's 2021 testimony, between 2017 and 2021, seven requests for a military response to provincial emergencies were made (an average of four requests per year); these do not include the 118 requests for assistance during the pandemic period (Brewster, 2022). Such frequent requests caused reverberations in policy circles in the aftermath of Hurricane Fiona-related deployments. Richard Fadden, a former Canadian national security adviser, warned a parliamentary committee that successive federal governments had relied too much on the military to handle nature-triggered disasters at home, jeopardizing the armed forces' "unity of function" (Brewster, 2022).

In Canada, CAF personnel are deployed in disaster response in two ways: within the territory and extraterritorially (in foreign countries) for relief operations following major nature-triggered disasters. In this article, two large-scale, nature-triggered emergencies are chosen for analysis: the 2005 Hurricane Katrina in the USA and the 1997 Red River flood in Manitoba. These cases involved major assistance from armed forces during the crisis as well as the mobilization of significant national resources. The key research question is: What are the key aspects of managing nature-triggered disasters through civil-military collaboration? It is also relevant to seek answers to the following questions: What is the nature of civil-military collaboration gleaned from the case studies? What are some of the challenges in forging a national-level collaborative civil-military model?

This article is divided into three parts. In the first part, statutory laws governing civil-military cooperation are discussed, followed by case studies (from Canada and the US). The third section deals with the challenges and lessons learned.

Conceptual Considerations

Disaster management (DM) is defined by the UNDRR as "the organization, planning, and application of measures preparing for, responding to, and recovering from disasters" (United Nations Office for Disaster and Risk Reduction, 2023). The "Six Factors Desirability and Effectiveness of Armed Forces Deployment," which are timeliness, appropriateness and competence, efficiency, absorptive capacity, coordination, and costs, encapsulate the main ideas and approaches of civil-military collaboration. In addition, for humanitarian assistance, armed forces are mostly engaged following one of four models: the detached deployment of military assets, use of military assets to augment civil manpower, use of the military as a substitute for civilian workers, and use of the military in security and policing roles. As mentioned earlier, the armed forces' involvement in humanitarian aid operations during nature-triggered emergencies has a long history. A literature review reveals some common rationales in favour of armed forces deployment. Armed forces can play an important role in supporting any civil authority due to their inherent strength in providing rapid logistical support with a well-defined organizational structure (Apte, 2013 ; Barber, 2013 ; Heaslip, 2012, 2014). The armed forces also have the capacity and competence to solve issues that often arise during an emergency (Heaslip, 2014 ; Kovács & Tatham, 2009). Armed forces are also more proactive in planning compared to other civil organizations dealing with emergencies (Miskel, 1996). Military command-and-control capacity and having assets ready to be deployed make the armed forces' support crucial during a crisis (Barber, 2013 ; Heaslip, 2014 ; Kovács & Tatham, 2009). Depending on the scale and nature of disasters, the US and Canada have enacted laws and regulations that outline the mode of employment, command authority, and rules of engagement, with a particular focus on assisting local law enforcers and recovery plans. For example, the Oslo Guidelines of 1994 (United Nations Office for the Coordination of Humanitarian Affairs, 2017)

address the use of military and civil defence assets following natural, technological, and environmental emergencies. The purpose of these guidelines is to provide a framework for the use of military and civil defense assets in DM, particularly in situations where civilian authorities are overwhelmed or unable to respond effectively. The signatories to the Oslo Guidelines include representatives from a wide range of organizations, including national governments, international organizations, non-governmental organizations, and military organizations. The guidelines have been endorsed by the United Nations and are considered an important reference for DM practitioners and policymakers. The Oslo Guidelines address a number of key issues related to the use of military and civil defense assets in DM, including coordination and cooperation between civilian and military authorities, the use of military resources for logistics and transportation, the provision of medical and humanitarian assistance, and the protection of civilians and their property. These guidelines stipulate the need for principles and standards for improved coordination in the use of military and civilian assets in response to emergencies. They define the military's role in humanitarian assistance in three ways: direct and indirect assistance and infrastructure support.

The Cases-in-Point

Military involvement in domestic emergencies and disasters often becomes an imperative mobilization for a nation, but it is still a contested issue for two reasons: first, armed forces are not generally trained to support civil administration in the aid of civil power; and second, no dedicated units within an armed force are maintained that can be promptly mobilised exclusively to support disaster mitigation. The two case studies that follow offer an overview of the events and laws that governed the armed forces' involvement.

Hurricane Katrina in the USA

Hurricane Katrina, a tropical cyclone that struck Louisiana and Mississippi in the southeastern USA on August 28, 2005, is considered one of the deadliest and costliest disasters in recorded US history (Nirupama, 2013 ; McTaggart-Cowan et Al, 2007). To manage the crisis, the US federal government deployed 70,000 military personnel, the largest deployment in history for disaster relief operations (Burke, 2016 ; Berthelot, 2010).

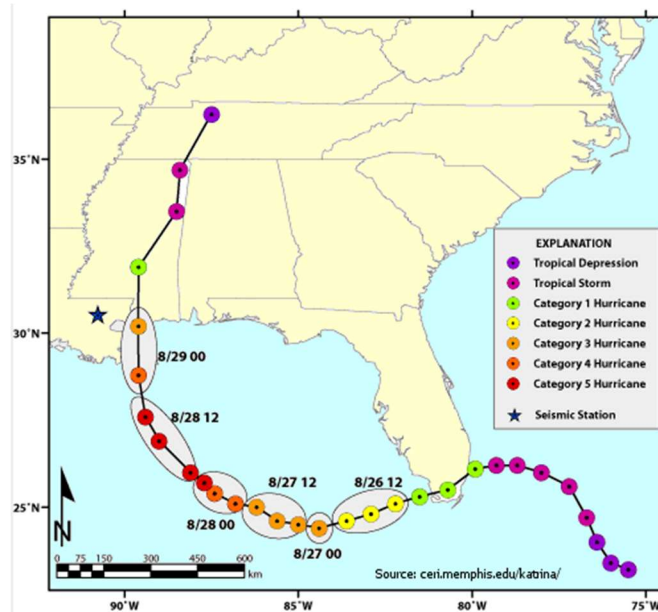


Figure 1: Hurricane Katrina's path from http://donsnotes.com/hist/images/katrina_path.gif

On August 23, 2005, Hurricane Katrina formed as a Category 1 storm over the Bahamas. It quickly gained strength as it moved over the Gulf of Mexico, reaching Category 5 status with sustained winds of 281.6 km/h on August 28.

On August 29, 2005, Hurricane Katrina made landfall as a Category 3 storm near Buras-Triumph, Louisiana, with sustained winds of 201.2 km/h. The storm surge caused by the hurricane breached the levees in New Orleans, leading to catastrophic flooding that lasted for weeks.

After hitting Louisiana, Hurricane Katrina moved northward through Mississippi, causing widespread damage and flooding. It weakened as it moved inland and eventually dissipated over the eastern United States.

Table 1 below shows the summary of the impact on people and structure.

Affected people	Various environmental data	Cost	Resources used
<p>1.2 million people were displaced.</p> <p>The death toll was more than 1,800**</p> <p>Among the affected 44% were black and 70% were poor people***</p>	<ul style="list-style-type: none"> • Impacted 90,000 square miles of territory from central Florida to eastern Texas • Winds topped 280 kmh at its peak as a Category 5 hurricane • Storm surge on the Mississippi coast reached 30 feet • Produced 33 tornadoes 	<p>\$161 billion in damage</p> <p>\$38 to \$44 billion insured losses*</p>	<p>Deployment of 42,990 National Guard personnel and 17,417 active-duty personnel, 20 US ships, 360 helicopters, and 93 fixed-wing aircraft. The DoD Received a total of 5.5 billion dollars for rescue and relief operations; reparations [26]</p>

Table 1: Hurricane Katrina-related losses (US Department of Commerce, 2022 ; Reid, 2019)

*(McTaggart et Al, 2007)
**(Mayfield, n.d. ; Barbier, 2015)
***(Allen, 2007)

In sum, more than 1,800 people lost their lives, with many more injured or missing. The storm caused an estimated \$125 billion in damage, making it the costliest hurricane in U.S. history. The levees in New Orleans were breached, leading to catastrophic flooding that lasted for weeks and displaced hundreds of thousands of people. The storm caused widespread damage and destruction in Louisiana, Mississippi, and other parts of the southeastern United States, including damage to homes, businesses, infrastructure, and the environment. The government response to Hurricane Katrina was widely criticized for being slow and ineffective, particularly in terms of providing aid and assistance to those affected.

The response preparation started two weeks before the landfall; the Department of Defense (DoD) through Northern Command (NORTHCOM) started planning and deploying resources before receiving requests from any agencies, such as the newly established Department of Homeland Security (DHS). The Federal Emergency Management Agency (FEMA) was placed under the umbrella of the DHS from its previous cabinet level. The DHS was established in 2002 in response to the 9/11 terrorist attacks by combining 22 different federal departments and agencies into a unified, integrated cabinet agency. President George W Bush declared an emergency for Louisiana on August 27, and NORTHCOM started its operations, which were later termed "Joint Task Force Katrina" (JTF-Katrina). Hurricane Katrina made landfall along the northern Gulf Coast on August 28, 2005 and a second landfall along the Mississippi Gulf Coast on August 29. After this, the president issued a federal declaration of emergency, and the JTF-Katrina was officially activated on August 30^[26].

There were legal and bureaucratic issues at both the local and federal levels that negatively impacted civil-military relations. The conflicting opinions between the then-mayor of New Orleans (the most impacted area) and the Governor of Louisiana on seeking military assistance caused confusion, demonstrating a bottleneck for effective cooperation between the armed forces and civil authorities. There were legal constraints on military engagement during the event as FEMA lacked the resources needed to manage the crisis (Samaan & Verneuil, n.d. ; Elsea & Mason, 2012 ; Kapp, 2022).

The coordinated integration of local, state, and federal administrations with the US military was acknowledged to have fallen short during Hurricane Katrina. When civil and military authorities establish coalitions with dissociated command structures, coordination and communication problems are frequently amplified (Drabek, 2003). One study notes a dozen key failures in management, some of which are relevant in this regard (Gheyntchi, 2007). A lack of effective communication, poor coordination, and ambiguous authority relationships created confusion about whether the federal government or state government was in charge. Confusion and ambiguities also existed in regard to the discourse of counterterrorism vs. all hazards, training standards, and preparedness. More importantly, there was little or no reflection of "lessons learned" from past large-scale extreme events. Performance evaluation was not integrated, while rumour and chaos dominated the process.

Some legal constraints also complicated the process of receiving assistance from the armed forces. The Posse Comitatus Act states that national guard units can act as law enforcers, whereas the Army, Air Force, Marines, and Navy can not be used to enforce domestic law.^[26-29] According to the Stafford Act, the president has the authority to activate and use DoD forces if other government agencies fail to respond (Samaan & Verneuil, n.d. ; Elsea & Mason, 2012 ; Kapp, 2022). These acts contradict each other, creating a barrier to the military response as they reveal the opposite order in terms of providing jurisdictional power to the armed forces. The main issue was the conflict between the decisions made by the New Orleans mayor and Louisiana governor (Burke, 2016), while the president and federal government issued military support without the state government's consent; this posed a unique challenge (Burke 2016 ; Samaan & Verneuil, n.d.). In reality, a lack of clarity on who had authority between the

National Guard and federal forces resulted in limited operational and tactical coordination (Burke, 2016 ; Teague, 2007).

Laws and Conventions Governing Civil-Military Collaboration in the USA

In the USA, "Military Support to Civil Authorities" is considered a matter of departmental policy and doctrine. The US DoD, in its 2005 Strategy for Homeland Defense and Civil Support, clearly outlines "domestic emergencies and for [the involvement of] designated law enforcement and other activities" (Kapp, 2022). The USA's National Preparedness Goal states the need for "[a] secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk" (FEMA, 2023).

The National Response Framework (NRF) outlines the required responses to all types of incidents, from natural to anthropogenic. The NRF has five guiding principles: (1) engaged partnership; (2) tiered response; (3) scalable, flexible, and adaptable operational capabilities; (4) unity of effort through unified command; and (5) readiness to act (FEMA, 2021). Additionally, the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 USC 5121–5207) (Elsea & Mason, 2012 ; Kapp, 2022 ; Kapucu, 2016); the Economy Act (10 USC 1535), which empowers federal authorities to order goods or services from other federal agencies (FEMA, n.d.); the Military Support to Civilian Law Enforcement Agencies provisions (10 USC 271-284) (Elsea & Mason, 2012 ; Kapp, 2022 ; Kapucu, 2016); and the Posse Comitatus Act (18 USC 1385), which restricts the involvement of the personnel involved with civilian law enforcement activities where search, seizure, and arrest are included as prohibited activities are some of the rules guiding US civil-military engagement in disaster response (Elsea & Mason, 2012 ; Kapp, 2022 ; Kapucu, 2016). Finally, DoD Directive 3025.18 provides policy and assigns responsibilities for defence support to the civil authorities (Kapp, 2022) (Kapp, 2022 ; FEMA, 2022).

Red River Flood in Canada

In the Province of Manitoba, Canada, the 1997 Red River flood has been referred to as "the flood of the century"(The Canadian Encyclopedia, 1997). A dry summer accompanied by heavy rain in 1996 and a long winter with heavy snowfall in 1997 increased the moisture content in the soil and resulted in flooding (Government of Manitoba, n.d. a). As shown in Figure 2, the geographical extent of the 1997 Red River Basin flood was so extensive that the east-west axis of inundation surpassed 40 km.

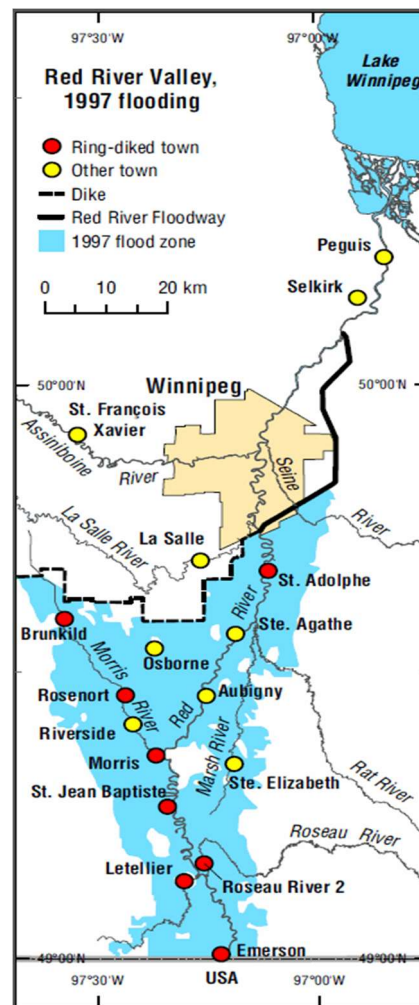


Figure 2: the extent of the flood (Government of Canada, 2023a)

The total estimated cost of damages from the 1997 Red River flood in Manitoba was around CAD \$500 million, including costs for infrastructure repairs and flood-proofing measures. Additionally, over 27,000 people were evacuated from the affected areas. Although there was no direct loss of life attributed to the flood event, the impact on the agricultural sector was significant due to extensive crop damage and losses. The devastation caused by the flood led to the implementation of a flood damage reduction program for Manitoba that aims to reduce the risk and impacts of future flood events in the Red River Valley.

The Manitoba Provincial Government's formal request for military assistance came on April 10. It declared an emergency afterward, followed by an evacuation order on April 23. This mobilization of the CAF had been one of the most significant operational decisions made since the Korean War (Valour Canada, n.d.).

Table 2: Highlights of the losses associated with the Red River flood.

Affected people	Various data	Cost	Resources used
25,447 residents fled their homes for higher ground. Indigenous communities (e.g. Roseau River First Nation) were affected*	<ul style="list-style-type: none"> • 2,000-square-kilometer fan of murky water stretching from the United States border, 110 km north to the southern suburbs of Winnipeg. • The Red River flowed over 800 farms, inundating some of the richest soil in the country and affecting 10 of Manitoba's 14 federal ridings. • An estimated 1,000 homes were damaged* 	\$498,513,577**	A total of 36 aircraft were used, including Griffon, Dash 8, Aurora, Hercules, etc., along with 8500 CAF members.***

Table 2: Red River flood losses (The Canadian Encyclopedia, 1997)

*(Government of Manitoba, n.d. b)

** (Government of Canada, n.d. b)

*** (Conflict and Resilience Research Institute Canada, 2022)

On April 27, the CAF aided local authorities in the construction of dikes. On April 28–29, 1997, provincial authorities ordered evacuations of La Salle, Sanford, and St. Norbert. The armed forces were responsible for command and control of the disaster response, but poor communication and a lack of preparation led to breaching of the sandbag dikes. The CAF were on duty for 24 hours and were involved in building dikes to protect the affected communities, but authorities told them to stop producing sandbags due to concerns that the bags could contaminate the soil with bacteria and other organisms (Conflict and Resilience Research Institute Canada, 2022), resulting in dikes failing. Communication went from the incident commander to the emergency operation center, to the Manitoba Emergency Coordination Centre, and then to the federal government operations centre. Civilian agency planning, accountability, command, control, and communication by authorities were lacking, delaying the armed forces' response and causing needless damage to property and infrastructure (Conflict and Resilience Research Institute Canada, 2022).

Politics also played a role in the flood management efforts. On May 3, 1997, then-Prime Minister Jean Chrétien visited Winnipeg (Conflict and Resilience Research Institute Canada, 2022) and called a national election scheduled for June 2, 1997 (Bothwell, 2021). The federal government's reluctance in the deployment of the armed forces further delayed mobilization and caused a late response (Conflict and Resilience Research Institute Canada, 2022).

Laws and Conventions Governing Civil-Military Collaboration in Canada

In Canada, provincial governments have emergency acts at their disposal to request assistance from the federal government. Section 2(b) of the Emergency Management Act SC 2007, c. 15 states that the CAF will respond to civil emergencies in accordance with the National Defence Act (Branch, 2007). In the National Emergency Response System, federal departments are responsible for planning for emergencies, and in the Federal Emergency Response, the roles of the departments are described: even if during a time of crisis a department fails or their resources get exhausted in logistics, they can seek assistance from other departments (Government of Canada, 2018).

Under Operation Lentus, CAF's national or domestic responses during any nature-triggered disaster are carried out when the capacity of provincial and territorial authorities to deal with an emergency is exhausted (Government of Canada, 2014). Armed forces personnel can participate in a variety of activities, including assisting provinces by filling, distributing, and placing sandbags; mopping up fires; evacuating and transporting people; delivering aid to remote communities; helping law enforcement and provincial authorities disseminate information to the public; and assessing infrastructure safety (Government of Canada, 2014). Typically, the Minister of Emergency Preparedness, Canada receives a request from the province in an emergency and, in collaboration with the Minister of National Defense, approves the request for assistance. The Manitoba Emergency Plan 2018 states that when the province's capacity is overwhelmed, it can call upon federal assistance. For assistance from the Department of National Defense, the request has to be made through the Assistant Deputy Minister or the Emergency Management and Public Safety Division (Government of Manitoba, n.d. c).

Results and Discussions

Natural disasters such as hurricanes and floods can have devastating impacts on communities, infrastructure, and the environment. This section will compare and analyze the similarities and differences between Hurricane Katrina and the Red River flood by examining the response and recovery efforts and discussing the lessons learned and implications for future DM.

First, the USA and Canada have different response structures in terms of the deployment of forces to assist civil authorities. In the seven phases of disaster and emergency management (e.g., prevention, mitigation, preparedness, response, recovery, reconstruction, and rehabilitation) (United Nations Office for Outer Space Affairs, 2023), armed forces are typically deployed for the response and recovery phases only. Even though the US and Canada have different response systems, some distinct patterns can be observed.

The two case studies reveal that armed forces were used as a last resort, meaning local authorities were the first to respond, and armed forces were called in much later for assistance due to the magnitude of the disaster. National security requires an executive decision to deploy, and it takes time for the decision makers to assess the needs and consent to deployment while maintaining the consistent application of regulations. However, given the territorial depth of the two countries, the decentralisation of resources might be able to save more lives and protect property and infrastructure. There are no specialised components of the armed forces available to respond with the special skill sets needed for disaster response, as was evident from the two cases. A high degree of coordination makes a difference on the ground, especially when extraterritorial assistance is delivered. Any large-scale disaster necessitates a slew of agencies' efforts concentrated in a single location in a short period of time, necessitating well-practiced, well-coordinated cooperation. If the roles of various stakeholders could be determined and rehearsed before disasters strike (e.g., logistical support, command and control, others), much of the confusion and inefficiency in the execution of joint operations could be eliminated. Often dubbed "rules of engagement" in the military, a dual or triple mission imposed by the authorities on the ground (i.e., civilian leadership) on the armed forces creates an operational and coordination nightmare.

Second, the organisational cultures and structures between the civil administration and the armed forces differ significantly, which often hinders effective collaboration. The armed forces are trained to work as a cohesive team to defeat a conventional enemy on the battlefield. However, their peacetime training also includes communication and coordination with various groups. Disaster zones and combat zones share a few common characteristics, such as uncertainty, distressed civilians, damaged infrastructure, and scarce resources. As the armed forces operate under a hierarchical structure and their C3 is highly stratified and tested during wars, they perform well when given clear direction and resources with a clearly defined mission. In the USA and Canada, some forms of emergency command systems are found in the form of Incident Command Systems, and provinces and states have their own emergency plans. For example, in Manitoba, the Manitoba Emergency Management System is a tool based on the all-

hazards approach. It sets out the structure needed to facilitate an integrated response to major emergencies and disasters within the province. While it is difficult to create seamless collaborative platforms between the military and civil entities within a short period of time, pre-disaster simulated response exercises could equip both with the knowledge to overcome impediments to coordination and forge a "unified effort."

Third, the politicization of involving armed forces during an emergency must generally be avoided. The duration of commitment and prioritization of other national events over a nature-triggered disaster can be seen as political; when leaders share their opinions in the media, it can potentially create confusion and misunderstandings among the stakeholders. To ensure a successful response to a disaster, all involved agencies and stakeholders must work together to reach one common goal: saving lives and protecting properties and the economy, and recovering and rehabilitating affected citizens. Both in the USA and Canada, laws governing the deployment and use of armed forces in DM to support civil administration are adequate. However, decisions to deploy military personnel are profoundly influenced by the political forces as they depend on the political regime's approach to the civil-military collaborative culture forged during the pre-disaster period (Botha, 2022).

Fourth, while a community-focused civil-military approach is undoubtedly desirable, its implementation is not supported by the current structures in place. No single "best practices" exists for utilising armed forces in DM anywhere in the world, as they would be dependent on the context and requirements of the particular situation. Nonetheless, certain characteristics can be gleaned from the aforementioned case studies: a) armed forces are only deployed in large-scale disasters; and b) inter-agency collaboration is essential for effective and efficient DM. The two cases demonstrate that, although numerous agencies are involved when a disaster occurs, the local community bears the brunt during and after the disaster. Agencies provide assistance but then depart, leaving communities to regroup and rebuild their lives. Therefore, a response system should be adaptive to the situation by engaging community-based organizations and NGOs and enhancing cooperation among all agencies throughout the year (before the disaster strikes). The responsibility lies with the local administration to ensure the capacity, resources, and capabilities of the community beforehand. In the case of Hurricane Katrina, despite scarce government resources, the Mississippians' reaction was seen as one in which individuals and religious organisations helped each other (Gheyntanchi, 2003).

Fifth, the Canadian Defence and Security Network (CDSN) sponsored a workshop on nature-triggered emergency response and domestic operations, on March 16-17, 2023 at the Royal Canadian Military Institute in Toronto, that explored the critical role of the CAF and civil society actors in emergency management and disaster response. In this workshop, discussions on emergency planning as a fundamental concept of emergency management was held and participants underscored the importance of mobilizing existing community resources to bolster resilience at the local level. Further, the need to forge strong partnerships and foster cooperation to address large-scale emergencies effectively was emphasized. Participants underlined that the CAF's involvement should be task-specific and reserved as a last resort in the emergency management systems in Canada. Moreover, the speakers advocated for flexibility, engagement of volunteers, and historical knowledge of the environment to optimize the emergency management process. They shared valuable insights and reflections on past experiences, including international practices, to maximize the CAF's capabilities while empowering NGOs to help. The speakers drew from their extensive experiences and insights on emergency responses in distinctive regions of Canada, outlining the challenges faced during recent catastrophic events. Finally, the participants proposed the integration of highly skilled and trained CAF veterans into the emergency management realm as a means to enhance the effectiveness of emergency management and disaster response (Conflict and Resilience Research Institute, 2023a, 2023b).

Conclusion

This article presents two major disaster case studies in Canada and the USA to argue for a more cooperative approach to preparation and response strategies in the future, when a changing climate may bring frequent, severe challenges. National and international communities must optimize resources to effectively minimize disaster losses by engaging grassroots community organizations, NGOs, and all levels of government. Armed forces must be utilized as a last resort so that they can focus on what they do best – fulfill their international obligations to support allies. In our analyses of the two cases, we focused on the role of armed forces in DM, laws and statutes governing the use of various agencies, and civil-military relations during the management phase of disasters. In sum, emergency management agencies and administrative structures vary according to government layers (federal, provincial, and municipal). Challenges relating to the restructuring of systems in the wake of previously events that shook the core of the nation are hard to comprehend. However, the politicisation of the military during an emergency should be avoided since it undermines civil-military relations. We must not forget that the "community" is the first to be impacted by a disaster, and it remains there when it is over. Yet, knowledge of disasters and DM is seldom preserved. The two cases also confirm the need for a comprehensive peacetime policy on the use of armed forces in collaboration with civil systems with a dedicated program for regular exercises to rehearse their roles and responsibilities. Since armed forces' engagement in Canada increased due to the persistent La Nina conditions in the Eastern Pacific Ocean as well as COVID-19, it is a good time to have a debate about whether such action weakens the "unity of function" of a cohesive force and undermines preparation for conventional combat.

References

- Allen, T. D. (2007). Katrina: Race, Class, and Poverty: Reflections and Analysis. *Journal of Black Studies*, 37(4), 466–468. Available at https://www.jstor.org/stable/40034317&ved=2ahUKewjm_qXtquH-AhWukYkEHSr8AzMQFnoECAAQAg&usg=AOvVaw29W51bExT7MokbzwDrGpr
- Apte, A., Humanitarian Logistics: A New Field of Research and Action. *Foundations and Trends® in Technology, Information and Operations Management*, 3(1), 1–100. (2013). <https://doi.org/10.1561/02000000014>
- Barber, E., *Military Involvement in Humanitarian Supply Chains* [Chapter]. *Supply Chain Management: Concepts, Methodologies, Tools, and Applications*; IGI Global. (2013). <https://doi.org/10.4018/978-1-4666-2625-6.ch081>
- Barbier, E. B. (2015). Policy: Hurricane Katrina’s lessons for the world. *Nature*, 524(7565), Article 7565. <https://doi.org/10.1038/524285a>
- Berthelot, R., *The Army response to Hurricane Katrina*. (September 10 2010). Retrieved August 29 2022 from https://www.army.mil/article/45029/the_army_response_to_hurricane_katrina
- Botha, J., *Boots on the Ground: Disaster Response in Canada*. (April 2022). Available at <https://utorontopress.com/9781487529789/boots-on-the-ground>
- Bowman, S., Kapp, L., & Belasco, A. *Hurricane Katrina: DOD Disaster Response*. 19. (September 19 2005). Available at <https://digital.library.unt.edu/ark:/67531/metacrs7638/>
- Brewster M., *The military can’t be the first line of defence in domestic disasters, MPs told*. Canadian Broadcasting Corporation. (Last Updated October 5 2022). Retrieved from <https://www.cbc.ca/news/politics/fadden-military-fiona-hurricane-natural-disasters-1.6605961>
- Bothwell, R., “Jean Chrétien”. (Last Updated March 23 2021). Retrieved April 25, 2023, from <https://www.thecanadianencyclopedia.ca/en/article/joseph-jacques-jean-chretien>
- Branch, L. S. (2007, August 3). *Consolidated federal laws of Canada, Emergency Management Act*. Available at <https://laws-lois.justice.gc.ca/eng/acts/e-4.56/page-1.html>
- Burke, R. (2016). Lessons from Katrina: Commanding the military during disaster response - then and now. *International Journal of Emergency Management*, 12(3), 221. <https://doi.org/10.1504/IJEM.2016.079016>
- Canadian Broadcasting Corporation, Post-tropical storm Fiona most costly weather event to ever hit Atlantic Canada, new estimate says. (Last Updated: October 19 2022). *CBC News*. Retrieved from <https://www.cbc.ca/news/canada/nova-scotia/fiona-atlantic-canada-insured-damages-660-million-1.6621583>
- Conflict and Resilience Research Institute Canada, “MINDS project webinar #1”. (July 19 2022). Available at <https://www.youtube.com/watch?v=tUfuNZYgVkE>

Conflict and Resilience Research Institute. “Nature triggered emergency workshop #2”. (March 17 2023a). Available at <https://www.youtube.com/watch?v=eN2YVfB5WTI>

Conflict and Resilience Research Institute, “MINDS-CDSN Workshop #2”. (March 17 2023b). Available at https://www.youtube.com/watch?v=6u9J0t17V_M

Chandes, J., & Paché, G Investigating humanitarian logistics issues: From operations management to strategic action. *Journal of Manufacturing Technology Management*, 21(3), 320–340. (2010) <https://doi.org/10.1108/17410381011024313>

Drabek, T. E., & McEntire, D. A. (2003). Emergent phenomena and the sociology of disaster: Lessons, trends and opportunities from the research literature. *Disaster Prevention and Management: An International Journal*, 12(2), 97–112. <https://doi.org/10.1108/09653560310474214>

Elesa, J. K., & Mason, R. C., *The Use of Federal Troops for Disaster Assistance: Legal Issues*. Library of Congress. (November 5 2012). Available at <https://sgp.fas.org/crs/natsec/RS22266.pdf>

Federal Emergency Management Agency (FEMA), National Preparedness Goal. (Last Updated March 21 2023). Retrieved August 30, 2022, from <https://www.fema.gov/emergency-managers/national-preparedness/goal>

Federal Emergency Management Agency (FEMA), National Response Framework. (Last Updated October 15 2021). Retrieved August 30, 2022, from <https://www.fema.gov/emergency-managers/national-preparedness/frameworks/response>

Federal Emergency Management Agency (FEMA), Federal Military Forces Disaster Response: Economy Act. (n.d.). Retrieved August 31, 2022, from <https://emilms.fema.gov/is0075/groups/34.html>

Federal Emergency Management Agency (FEMA), Presidential Policy Directive 8: National Preparedness. (Last Updated October 27 2022). Retrieved August 30, 2022, from <https://www.dhs.gov/presidential-policy-directive-8-national-preparedness>

Government of British Columbia, *B.C. Highway Flood Recovery Projects—Province of British Columbia*. (Last Updated: August 20 2021). Retrieved from <https://www2.gov.bc.ca/gov/content/transportation-projects/bc-highway-flood-recovery>

Government of Canada, *National Emergency Response System*. (December 2 2018). Available at https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/ntnl-rspns-sstm/index-en.aspx#ann_a

Government of Canada, Operation LENTUS [education and awareness]. (April 17 2014). Available at <https://www.canada.ca/en/department-national-defence/services/operations/military-operations/current-operations/operation-lentus.html>

Government of Canada, *Red River flooding*. (n.d. a). Retrieved April 25, 2023, from <https://www150.statcan.gc.ca/n1/pub/11-402-x/2011000/chap/geo/geo04-eng.htm>

Government of Canada, Canadian Disaster Database. (n.d. b). <https://bdc.securitepublique.gc.ca/prnt-eng.aspx?cultureCode=en-Ca&provinces=3&eventTypes=%27FL%27&normalizedCostYear=1&dynamic=false>

Government of Manitoba, Water Management and Structures. (n.d. b). Retrieved April 25, 2023, from <https://www.gov.mb.ca/mit/wms/floodcontrol/redriverbasin/historic.html>

Government of Manitoba, *Emergency Measures Organization*. (n.d. c). Retrieved September 30, 2022, from <https://www.manitoba.ca/emo/provincial/mep.html>

Government of Manitoba, Red River Floodway. (n.d. a). Retrieved September 30, 2022, from https://www.gov.mb.ca/mit/wms/rrf/historical_1997.html

Gheyntanchi, A., Joseph, L., Gierlach, E., Kimpara, S., Housley, J., Franco, Z. E., & Beutler, L. E. (2007). The dirty dozen: Twelve failures of the hurricane katrina response and how psychology can help. *The American Psychologist*, 62(2), 118–130. <https://doi.org/10.1037/0003-066X.62.2.118>

Heaslip, G., *Challenges of Civil Military Cooperation / Coordination in Humanitarian Relief* [Chapter]. Relief Supply Chain Management for Disasters: Humanitarian, Aid and Emergency Logistics. (2012). <https://doi.org/10.4018/978-1-60960-824-8.ch009>

Heaslip, G., Using the military in disaster relief: Systemising challenges and opportunities. *Journal of Humanitarian Logistics and Supply Chain Management*, 4(1), 60–81. (2014). <https://doi.org/10.1108/JHLSCM-03-2013-0013>

Hunter J., Cost of rebuilding B.C. after flooding nears \$9-billion. (Last Updated February 19 2022). *The Globe and Mail*. Retrieved from <https://www.theglobeandmail.com/canada/british-columbia/article-cost-of-rebuilding-bc-after-november-storms-nears-9-billion/>

Kapp, L., *Defense Primer: Defense Support of Civil Authorities*. Library of Congress. (2022). Retrieved from <https://apps.dtic.mil/sti/citations/AD1159331>

Kapucu, N. *The Role of the Military in Disaster Response in the U.S.*. European Journal of Economic and Political Studies. (February 3 2016). Available at <https://www.semanticscholar.org/paper/The-Role-of-the-Military-in-Disaster-Response-in-Kapucu/ff82e954e632f8fd7b6481c47bc7cd0c9a541ed8>

Kovács, G., & Tatham, P. (2009). Responding to Disruptions in the Supply Network-from Dormant to Action. *Journal of Business Logistics*, 30(2), 215–229. <https://doi.org/10.1002/j.2158-1592.2009.tb00121.x>

Mayfield, M. (n.d.). *Tropical Cyclone Report*. 43.

McTaggart-Cowan, R., Bosart, L. F., Gyakum, J. R., & Atallah, E. H. (2007). Hurricane Katrina (2005). Part I: Complex Life Cycle of an Intense Tropical Cyclone. *Monthly Weather Review*, 135(12), 3905–3926. <https://doi.org/10.1175/2007MWR1875.1>

Miskel, James F. (1996) "Observations on the Role of the Military in Disaster Relief," *Naval War College Review*: Vol. 49: No. 1, Article 8. Available at: <https://digital-commons.usnwc.edu/nwc-review/vol49/iss1/8>

Nirupama, N. (2013). Is it possible to rank hurricanes in a unique manner? *Natural Hazards: Journal of the International Society for the Prevention and Mitigation of Natural Hazards*, 67(2), 963–968.

Reid, K., 2005 Hurricane Katrina: Facts, FAQs, and how to help. (Last Updated November 25 2019). *World Vision*. Retrieved from <https://www.worldvision.org/disaster-relief-news-stories/2005-hurricane-katrina-facts>

Samaan, J.-L., & Verneuil, L. (n.d.). *Civil–Military Relations in Hurricane Katrina: A Case Study on Crisis Management in Natural Disaster Response*. (n.d.). Available at http://www.disastergovernance.net/fileadmin/gppi/RTB_book_chp22.pdf

Teague, M.J., *The Domestic Coalition: The Command and Control Relationship Between Active Component and National Guard Forces in Defense Support of Civil Authorities Operations*. (November 6 2007). Retrieved October 1, 2022, from <https://apps.dtic.mil/sti/citations/ADA476794>

The Canadian Encyclopedia, Red River Flood. (May 12 1997). Retrieved September 30, 2022, from <https://www.thecanadianencyclopedia.ca/en/article/red-river-flood>

United Nations Office for Disaster and Risk Reduction, Disaster. (n.d. a). Retrieved September 1 2023 from <https://www.undrr.org/terminology/disaster>

United Nations Office for Disaster Risk Reduction, Disaster management. (n.d. b). Retrieved February 22, 2023 from <https://www.undrr.org/terminology/disaster-management>

United Nations Office for the Coordination of Humanitarian Affairs, *Oslo Guidelines on The Use of Foreign Military and Civil Defence Assets In Disaster Relief*. (2017, May 22). OCHA. <https://www.unocha.org/publication/oslo-guidelines-use-foreign-military-and-civil-defence-assets-disaster-relief>

United Nations Office for Outer Space Affairs, Disaster Management. (n.d.). Retrieved January 30, 2023, from <https://www.unoosa.org/oosa/en/ourwork/topics/disaster-management.html>

United States Department of Commerce, *Hurricane Fiona—September 17-19, 2022*. (n.d.). Retrieved April 26 2023 from <https://www.weather.gov/sju/fiona2022>

United States Department of Commerce, *Hurricane Katrina-August 2005*. (Last Updated September 2022). Retrieved April 5 2023 from <https://www.weather.gov/mob/katrina>
Valour Canada, Red River Flood 1997. (n.d.). Retrieved September 30, 2022, from <https://valourcanada.ca/military-history-library/red-river-flood-1997/>