



Water as a Casualty of Conflict: Threats to Business and Society in High-Risk Areas



United Nations Global Compact



The CEO Water Mandate

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Water as a Casualty of Conflict: Threats to Business and Society in High-Risk Areas

Companies and their investors must consider a range of social and environmental factors when operating in conflict-affected and high-risk areas. Issues such as armed hostilities, human rights abuses, labor difficulties, and corruption can pose serious threats to business operations and society. In light of these threats, in 2010, the UN Global Compact and Principles for Responsible Investing (PRI) jointly developed guidance (consistent with the Global Compact ten principles) to assist companies in implementing responsible business practices in these high-risk areas. Thus far, however, these efforts have not specifically considered water's unique role in conflict and how impacts on water systems can affect business operations.

While much work has already been done on how water use and pollution can exacerbate conflict, this white paper focuses more broadly on the ways conflict and high-risk situations can affect water systems. This paper provides a framework for understanding the nature of water challenges in conflict and high-risk areas and how these, in turn, affect business operations and society. It incorporates examples of impacts on business operations, and anecdotally highlights what companies are doing in response.

The Evolving Nature of Conflict

The nature of conflict and the human responses to it have changed significantly in the past several decades. Conflict has moved predominantly from interstate to intrastate; from ones with a classic geopolitical or ideological nature, such as the Cold War, to ones focused on natural resources competition, identity, and state failure; from between superpowers to within developing countries or countries in transition; from traditional state-run armies to smaller privatized security forces (guerillas, mercenaries); from military security to human security, and from state-led towards multi-track diplomacy (example: Track 2 diplomacy) (Nelson 2000). Conflict and security response have also moved from response and intervention to prevention.

There are many ways to characterize modern conflict in order to understand and assess overall risk. The Heidelberg Institute for International Conflict Research (HIIK) has defined a political conflict as “a positional difference regarding values relevant to a society between at least two decisive and directly involved actors, which is being carried out using observable and interrelated conflict measures that lie outside established regulatory procedures and threaten core state functions, the international order, or hold out the prospect to do so” (HIIK 2011). An “actor,” as referenced in the definition, can be an individual, a state, an international organization, or a non-state actor. Likewise, the “values relevant to a society” include:

- Territory
- Secession
- Decolonization
- Autonomy
- System/ideology
- National power
- Subnational predominance
- International power
- Resources
- Other

IIK also distinguishes five levels of conflict intensity, which are defined according to the stage of physical violence: dispute, non-violent crises, violent crises, limited war, and war (Table 1). Disputes and non-violent crises are classified as “low intensity,” whereas limited and outright wars are classified as “high intensity.” Figure 1 displays the number of both intrastate and interstate conflicts in 2011 according to the level of intensity. The vast majority of interstate conflicts are either disputes or non-violent crises, whereas most intrastate conflicts are violent crises.

Table 1. The Terminology of Intensity Levels

Source: IIK 2011

Intensity Level	Terminology	Level of Violence	Intensity Class
1	dispute	non-violent conflicts	low intensity
2	non-violent crisis		
3	violent crisis	violent conflicts	medium intensity
4	limited war		high intensity
5	war		

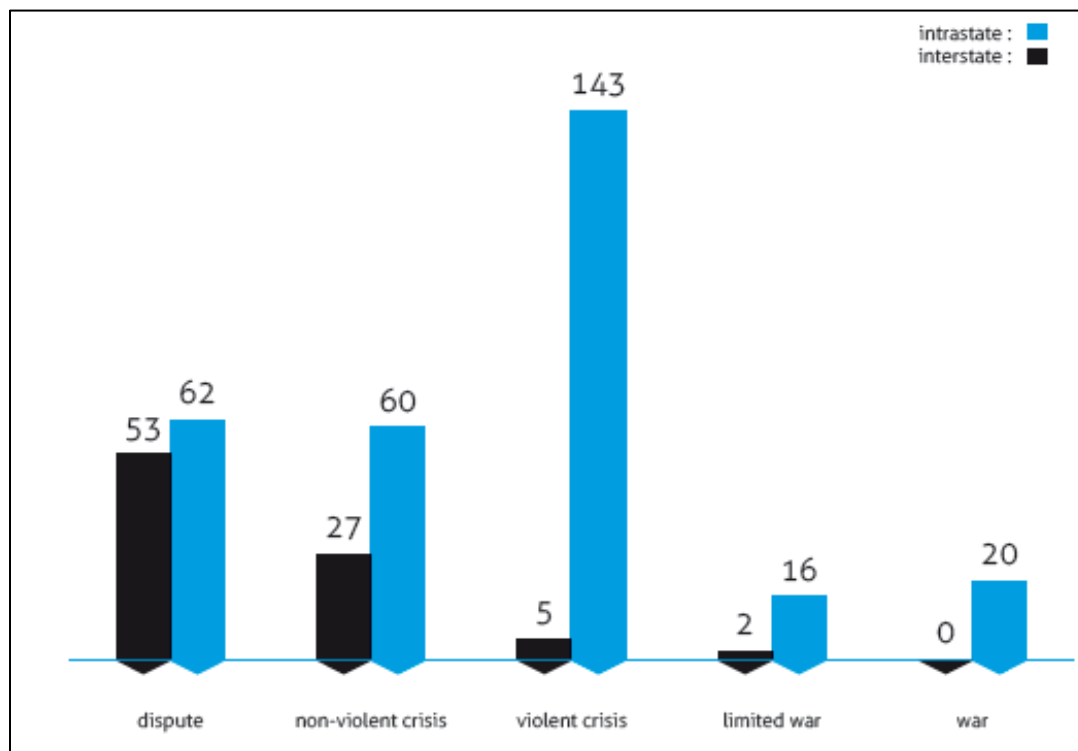


Figure 1. Number of Intra- and Interstate Conflicts in 2011 by Intensity Level

Source: IIK 2011

For this paper, we use the UN Global Compact's definition of conflict-affected and high-risk areas, broadly defined as areas experiencing violent conflict, political and social instability, abuses of human rights and political and civil liberties, or that are transitioning from violent conflict to peace. As outlined in the Global Compact and PRI Report (2010), the following conditions could prevail in high-risk and conflict-affected areas:

- human rights violations;
- presence of an illegitimate or unrepresentative government;
- lack of equal economic and social opportunity;
- systematic discrimination against parts of the population;
- lack of political participation;
- poor management of revenues, including from natural resources;
- endemic corruption; and
- chronic poverty with associated heightened risks and responsibilities.

Conflict and Risks to Water Systems

Conflict can affect water systems through impacts on water resources directly, as well as on the planning, construction, operation, and management of the water system. We use the term **water system** broadly to encompass all necessary components that relate to access and delivery of water from its source to the point of use to disposal. This definition includes a range of water access and distribution systems, from a private well supplying a single use to large, complex municipal systems serving a plethora of uses. This definition of the water system also includes the governance institutions and those involved in directly managing water resources, which can range from simple, community-based organizations to large utilities and government agencies.

Impacts to water systems are organized here into the following four categories (adapted from the sustainable livelihood framework described by Ellis (1999)): (1) natural resources; (2) physical infrastructure; (3) human capital; and (4) socio-political and financial systems.

- 1) **Natural Resources:** Natural resources refer to the resources themselves and the ecosystem services that these resources provide. For the water system, natural resources include both the quality and quantity of surface and groundwater.
- 2) **Physical Infrastructure:** Physical infrastructure encompasses the tangible, non-living capital resources of a community. For a water system, this infrastructure can range from a basic well to a complex, centralized system with electrically-powered distribution networks delivering water directly to the point of use. Impacts on the physical infrastructure of a water system are those that affect the man-made resources of a community associated with the access, delivery, and treatment of water from the source to the point of use to disposal, such as groundwater pumps, canals, and treatment plants.
- 3) **Human Capital:** Human capital refers to the abilities, talents, and knowledge provided by members of a community. For a water system, human capital is comprised of the individuals engaged in water system development, operations, and maintenance, e.g., system operators, decision makers, and regulators.
- 4) **Socio-political and Financial Systems:** Socio-political systems are those that facilitate operation of a society. They include formal and informal networks, e.g., government agencies, decision-making bodies, and utilities, as well as the social bonds, norms, values, trust, and other connections that facilitate collective action. Financial systems

include the region's financial sector, water ratepayers, as well as international donor organizations, investors, and other external income sources. Socio-political impacts to the water system are impacts to those organizations, decision-making bodies, and social connections that help develop, manage, and operate the water system. Financial impacts to a water system are those that affect its ability to build, operate, and maintain water systems.

All of these categories are interrelated, and an impact in any one will often affect others. For example, destruction of wetlands can increase pollution in a downstream reservoir (thereby affecting the natural resources). In addition, this pollution can also contribute to the spread of disease among water system employees (affecting the human capital). Moreover, some impacts do not fit neatly into any one category; for example, corruption affects human, socio-political, and financial systems. Thus, there is a natural overlap in these definitions, although this paper attempts to minimize such redundancies.

Table 2 summarizes the primary and secondary impacts of conflict on each of the water system categories described above. Primary impacts are those that affect water systems directly. Secondary impacts are those that indirectly affect the water system by impeding other services and materials critical to system operation, such as electricity systems or chemical manufacturing. The following sections discuss these risks in further detail.

Table 2. Types of Risks, and the Impacts to the Water system and Society

Impact Category	Risk	Primary impact on water system	Secondary impact on water system	
Natural Resources	Armed conflict and related activities	<ul style="list-style-type: none"> Sufficient water may not be available for all uses Pollution can make water unusable or make treatment more difficult and expensive 	<ul style="list-style-type: none"> Damage to other resources, e.g., forests or grasslands, that can adversely affect water availability and water quality 	
	Exploitation of natural resources for personal or political gains			
Physical Infrastructure	Armed conflict and related activities	<ul style="list-style-type: none"> Water-related infrastructure damaged or destroyed Records and data lost or stolen Reduced access to chemicals and materials necessary to operate the water system 	Damage or destruction of infrastructure and materials critical to water system operations, e.g. energy resources, transportation infrastructure, and communications systems.	
Human Capital	Fear and migration	Skilled workforce needed to develop, manage, and operate water system is lost or weakened	Skilled workforce needed to operate other systems critical to water system operations is lost or weakened	Over-exploitation or damage to natural resources
	Sickness, injury, and death			
	Physical barriers to movement			Physical barriers to water access
Socio-Political and Financial Systems	Distrust and misunderstanding	Lack of trust in the safety of the water system		
	Corruption	Bribery and extortion for water services can increase costs and reduce effectiveness	Bribery and extortion for services that the water system depends upon can increase costs and reduce effectiveness	
	Weakened or ineffective governments and institutions	<ul style="list-style-type: none"> Reduced ability to create, implement, and enforce equitable water regulations or policies Management more difficult overall Lack of repairs, upgrades, and overall maintenance 	<ul style="list-style-type: none"> Environmental management not prioritized by governments and other institutions Inability to develop and maintain city services and utilities critical to water system operations Increased resource exploitation 	
	Reduced financial capacity	<ul style="list-style-type: none"> Inability to finance capital, operational, and maintenance costs 	<ul style="list-style-type: none"> Reduced capacity to respond to natural disasters 	
	Power imbalances	<ul style="list-style-type: none"> Access to water resources controlled by one person or group Reduced ability to ensure fair and equitable access and allocation to all users 	<ul style="list-style-type: none"> Access to other services critical to water system operations controlled by one person or group Other services critical to water systems deliberately weakened by one person or group 	

Impacts on Natural Resources

Conflict and instability can negatively impact natural resources and the ecosystem services those resources provide. Armed conflict and related activities can impact resources directly and indirectly, as can exploitation of natural resources for subsistence and for financing war activities.

Armed conflict and related activities can degrade water resources in a number of ways. Direct action against facilities supporting military activities can release harmful contaminants into the environment. During the Kosovo War, for example, NATO forces targeted a major industrial complex in Pančevo, which included a petrochemical plant, a fertilizer plant, and a major oil refinery. Hazardous substances were released into the environment as a result of the strike and the ensuing fires. Smoke from the fires produced “black rain,” threatening air, food, and water safety in Pančevo, as well as in downstream and downwind countries, particularly Bulgaria and Romania (UNEP and UNCHS 1999). Bombs, missiles, and other explosives can create craters, compact soil, and contribute to erosion, all of which can degrade water quality (Lindén et al. 2004). Disposal of human casualties can also threaten water quality. During the Rwandan genocide, for example, bodies washed or were thrown into water systems, affecting the water quality of the entire Great Lakes region (Tesi 2000).

Prolonged periods of conflict can result in exploitation of natural resources for subsistence or financial gain. For example, refugees may be forced to migrate to areas lacking adequate water supply and sanitation, increasing competition for water resources and decreasing availability for other uses and for the environment. This migration can also impact water quality by increasing erosion and pollution, especially when adequate sanitation and waste management facilities are unavailable. Refugees may be forced to establish crops on marginal lands not suitable for agriculture, or to convert wetlands, forests, or other ecosystems to farmland. These land-use changes can negatively impact water quality. Additionally, crops may need to be irrigated, increasing competition for water resources.

Impacts on Physical Infrastructure

Most water systems are comprised of physical infrastructure used to access, transmit, and distribute water resources, as well as equipment and tools for maintenance and repair work. More advanced systems will include facilities designed for storage and treatment as well as communications and records systems (Zeitoun 2005). Other physical infrastructure may be necessary for the proper functioning of the water system, including electricity generation and distribution systems, transportation infrastructure, and more.

Damage to critical points in the water system can cause shortages or degrade water quality. Physical infrastructure is especially vulnerable to intentional or unintentional impacts from armed conflict and related activities. For example, in the Occupied Palestinian Territories, Israeli Defense Forces in Jenin intentionally destroyed or damaged booster pumps, water lines, and valves. Other system components were damaged unintentionally by tank traffic and the construction of a trench designed to restrict Palestinian movement (Zeitoun 2005). Transmission and distribution systems require continuous maintenance, and can even become sources of pollution when an adequate disinfectant residual is not sustained, water pressure is low, service is intermittent, or infrastructure is in general disrepair. For example, damage to transmission and distribution systems can allow cross-contamination of untreated water or wastewater with drinking water supplies (Lee and Schwab 2005). In general, centralized water systems are more vulnerable to conflict than decentralized systems, as relatively less damage can disrupt supply to a greater number of people. Systems that rely on a single source of water are also especially vulnerable (Zeitoun 2005).

Conflict and instability can result in the destruction, theft, or loss of data and information critical for the proper functioning of the water system. These data can include customer information, which can hinder the ability of a water system to bill customers for services. Information on land and property ownership, as well as occupancy can be accidentally or deliberately lost, further complicating management of the water system (Vanasselt 2003). In addition, loss of data on pre-conflict environmental conditions can complicate long-term impact assessments (Lindén et al. 2004).

Generally, access to materials is impaired in times of conflict, and water systems can be impacted by shortages of essential treatment chemicals, equipment, and building materials. In Liberia, years of civil war have led to the deterioration of the water system from conflict-related damage, a lack of maintenance, and a shortage of electricity. In 2004, water production was less than 10% of 1991 levels, and was only available in small areas of the capital city, Monrovia (UNEP 2004).

Dams are important physical resources typically linked to the provision of drinking water, electricity, and flood control, and damage to dams can impact the flow of drinking water and reduce electrical output. The Mount Coffee hydropower plant in Liberia was damaged in 1990 during the first civil war when the intake dam was breached and the dam wall damaged (UNEP 2004). Electricity and water were soon cut off and staff fled the facilities (Herald Wire Services 1990).

Damage to other utilities' infrastructure can have indirect impacts on the water system. Electricity is needed to run all aspects of a modern, centralized water system, thus damage to electricity generating facilities and transmission lines can interrupt water supplies. This was evident during the Kosovo War, when NATO bombing of electricity grids disrupted water and power supplies (UNEP and UNCHS 1999). Likewise, damage to transportation infrastructure can prevent workers from reaching the facility or accessing areas needing repair work. Damage to communications infrastructure, hospitals, schools, government buildings, chemicals processing facilities, and more all have indirect impacts on the water system.

Impacts on Human Capital

Water and wastewater systems are often complex networks that require an educated and trained workforce for proper operation and maintenance. Conflict creates gaps in human resources, where workers are no longer available to do their job because of fear, sickness, injury, direct recruitment into the conflict, or death. Military activities can also force water system workers to relocate to a less dangerous area. Reductions in workers in any sector of the economy (e.g. electric utilities, public transportation, chemicals manufacturing) can indirectly impact a water system.

Barriers to movement are common in times of crisis, and can negatively impact water system workers and other members of the community. Curfews, checkpoints, and other barriers can make movement of workers difficult, if not impossible, and can threaten operation of systems necessary to deliver clean drinking water and manage human waste. Violent conditions can make traveling to and from work too dangerous for water system operators and other members of the community.

These barriers to movement also restrict the population's access to water resources. Fences, blockades, and landmines can directly impede access to a water source, whereas barriers such as checkpoints can make access more difficult and time-consuming. Dangerous conditions and the threat of violence can also prevent individuals or communities from accessing a water source. During the Bosnian War, when the water system in Sarajevo stopped functioning, thousands of civilians were injured and hundreds killed collecting water from the Miljacka River, which was highly exposed to shelling and sniper fire (Sudetic 1994).

Impacts on Socio-Political and Financial Systems

Conflict and high-risk situations often degrade the ability of governments, organizations, and financial institutions to operate effectively. Instability can reduce the ability and incentive of governments and institutions to manage water systems and resources, finance water system improvements, or collaborate with water system managers, especially when more immediate needs must be prioritized. For example, in the West Bank and Gaza, investment in the water sector is 10% and 2% of planned levels, respectively, and the majority of funds go to emergency projects rather than long-term capacity investments (The World Bank 2009). Conflict can reduce the capacity for the utility to remain financially solvent by impacting its ability to collect revenue. Although the water system in Jenin had been collecting 70-85% of water bills, the rate slowly fell to zero during a period of heavy conflict. In some cases, costs were never fully recovered (Zeitoun 2005). Additionally, weak governments can allow for the introduction of industries and practices that pollute and exploit water resources, making the adequate provision of clean, safe drinking water more difficult and expensive.

Conflict also makes responding to new crises more difficult when the institutional capacity does not exist to respond adequately. Droughts, floods, and other events can exacerbate water problems that existed as a result of the conflict. In Zimbabwe, after a long period of economic crisis and political instability, a cholera outbreak that began in August 2008 infected more than 60,000 people and killed nearly 3,000 people (ICRC 2009). The virulence of the disease was exacerbated by a drinking water shortage, poor sanitary sewage disposal systems, and the collapse of the healthcare industry (Physicians for Human Rights 2009).

Conflict-affected and high-risk areas are especially vulnerable to corruption as a result of reduced transparency and governmental capacity. Corruption can distort efficient allocation of resources within an economy, alter power dynamics, increase the cost of water to consumers, weaken public institutions, and negatively impact water quality. In addition, corruption increases transaction costs and discourages investments in infrastructure. The water industry is particularly vulnerable to corruption for a number of reasons. Water governance is often spread among agencies and organizations, increasing the ability for corrupt practices to go unnoticed (Transparency International 2008). The technical complexity of projects makes avoiding public scrutiny much easier. Large-scale construction projects require physical and financial resources, and the difficulty in overseeing each component of the project makes it susceptible to corruption. Because water is an essential resource, suppliers have greater power, particularly in times of scarcity, to demand bribes and kickbacks for increased or preferential supply. Finally, informal (e.g. trucked) water suppliers interact personally with consumers, and are not necessarily subject to the same standards or laws as a centralized system (Stålgren 2006; Transparency International 2008).

Linking Water System Risks to Business Risk

Much work has been completed to assess business risk in conflict-affected and high-risk areas. These efforts use indicators to map or rank conflict by region or country. For example, each year, the global risk consultancy Control Risks estimates the likelihood of political and security risks to business. Political risks address the likelihood that state or non-state actors will negatively affect business operations in a country through regime instability or interference. Security risks address the likelihood that state or non-state actors will engage in actions that harm the financial, physical, or human assets of a company, as well as the extent to which the state is willing and able to protect such assets (Control Risks 2012).¹ Table 3 outlines countries that were expected to present high or extremely high risk to business

¹ For more detail on these definitions, please refer to Appendix A.

in 2009. Some countries, such as North Korea, were expected to pose an extremely high political risk, but a low security risk. Others, such as Somalia, Afghanistan, and Iraq, were expected to pose a high risk in both categories.

In addition to mapping business risk, a second body of work has sought to understand the impact of conflict on business operations. The findings of this work uses a similar categorization scheme to the one presented earlier, looking at topics such as the human toll of conflict, damage to physical infrastructure, natural resource impacts, absence of rule of law, etc.² These efforts, however, do not generally incorporate the specific risks to the water system that have been outlined in this paper.

The following section describes how impacts on water systems can affect businesses operating in conflict-affected and high-risk areas, providing a few anonymous examples of how companies have been impacted. The information for this section was drawn from a review of publicly-available business-related documents, a survey of companies, and consultation with representatives of a handful of businesses working in conflict-affected and high-risk areas.

² A number of authors have highlighted similar categorizations including Jane Nelson, International Alert, and the Country Indicators for Foreign Policy Project. Some authors identified direct and indirect impact categories which include social, political, economic, natural resources, litigation, reputation costs, and direct security costs to protect operations. For more information please see Nelson 2000, Campbell 2002.

Table 3. Security and political risks to business

Source: Control Risks 2009

Country	Security Risk	Political Risk	Country	Security Risk	Political Risk
Africa			Europe		
Algeria	High	Medium	Belarus	Low*	High
Burundi	Extreme	High	Russian Federation	High	Medium
Cameroon	High	Medium	East and Southeast Asia		
Central African Republic	High	High	East Timor	High*	High
Chad	High*	High	Indonesia	High	Medium
Comoros	Medium*	High	Myanmar	High	Medium
Côte d'Ivoire	High	High	North Korea	Low*	Extreme
Democratic Republic of the Congo	Extreme	High	Philippines	High	Medium
Eritrea	High	Medium	Thailand	High	Medium
Ethiopia	High	Medium	Central Asia		
Guinea-Bissau	Medium*	High	Kyrgyzstan	High	Medium
Kenya	High	Medium	Tajikistan	High	Medium
Liberia	High	Medium	Uzbekistan	High	Medium
Niger	High	Medium	Southern Asia		
Nigeria	High	Medium	Nepal	Medium*	High
Rwanda	High	Low	Afghanistan	Extreme	High
Somalia	Extreme	Extreme	Pakistan	High	Medium
Sudan	Extreme	High	India	High	Medium
Uganda	High	Medium	Bangladesh	High	Medium
Zimbabwe	High*	Extreme	Sri Lanka	Extreme	Medium
The Americas			Western Asia		
Bolivia	Medium*	High	Armenia	High	Low
Colombia	High	Medium	Azerbaijan	High	Medium
Ecuador	High	High	Georgia	High	Medium
Guatemala	High	Medium	Iraq	Extreme	High
Haiti	High*	High	Occupied Palestinian Territories	High*	High
Panama	High	Low	Saudi Arabia	High*	Low
Peru	High	Medium	Turkey	High	Medium
Venezuela	High	High	Yemen	High*	Medium
Oceania					
Papua New Guinea	High*	Medium			

*Indicates rating represents entire country.

Water-related Business Risk

Past work by the UN CEO Water Mandate and the Pacific Institute highlights the dimensions of water-related business risks stemming from both the nature of a company's water use, as well as the external environments within which the company operates. This work offers a starting point for understanding how conflict-affected water systems may impact business operations. Broadly speaking, these risks fall into three categories:

- 1) **Physical risks** that stem from having too little water (scarcity); too much water (flooding); or water of unacceptable quality. These risks may be caused by a number of different factors including over-allocation of water, droughts, or natural disasters.

In conflict-affected and high-risk areas, these physical risks may be exacerbated along the dimensions described in the previous section. Some examples include the impacts of direct armed conflict that impact natural resources by polluting water supplies or impact physical infrastructure through the destruction of water or wastewater delivery systems. High-risk conditions may also result in inefficient allocation of resources caused by exploitation for subsistence, financial, or political gains, thereby increasing physical risks.

- 2) **Regulatory risks** can stem from ineffective, changing, or poorly implemented water policies. An ineffective regulatory environment may lead to degradation of water resources or an unappealing business environment due to “incoherent policy design or inconsistent application and enforcement” (UN CEO Water Mandate 2010).

Conflict and high-risk areas are usually characterized by increased corruption, highly weakened institutions, major power imbalances, and reduced human capacity that, in total, greatly affect central or local authorities' ability to design and implement consistent water-related policies. This inhibits the ability to ensure water resources are well-managed or that a stable business environment is maintained.

- 3) **Reputational risks** stem from how stakeholders view a company's impacts on water resources, communities, and ecosystems as a result of the company's water use and management practices. Perceived or real adverse impacts on water resources may affect a company's reputation, resulting in “decreased brand value or consumer loyalty or changes in regulator posture, and can ultimately threaten a company's legal and social license to operate” (UN CEO Water Mandate 2010).

Companies operating in high-risk or conflict-affected areas are often subject to added pressure from stakeholders who may question whether a business should operate in these areas and who will pay particular attention to companies' actions to assess negative impacts on water systems that may exacerbate conflict.³

³ There has been a great deal of work discussing these water-related business risks. For more information please refer to Water Scarcity and Climate Change: Growing Risks for Businesses and Investors. Pacific Institute & Ceres (2009); Investigating Shared Risk in Water: Corporate Engagement with the Public Policy Process, Pegram et al. (2009); Watching Water: A Guide to Evaluating Corporate Risks in a Thirsty World, JPMorgan Global Equity Research (2008); At the Crest of a Wave: A Proactive Approach to Corporate Water Strategy, Pacific Institute & BSR (2007); Understanding Water Risks, Orr et al. (2009).

The research for this paper has revealed that many companies and investors have not specifically considered how conflict affects water systems, or by extension their businesses. This could be due to the already complicated nature of the operating environments in high-risk areas. Although companies use risk assessments to evaluate how a conflict could affect the economy, political institutions, natural resources, their own business operations, etc., they do not necessarily focus on water systems. For many investors and companies, the focus instead has been on understanding and limiting their own impacts on water systems so as to ease or at least not exacerbate conflict.

To better understand how impacts on water systems will affect operations in high-risk or conflict-affected areas, companies will need to bolster the following factors in their risk assessments: an analysis of the water system's operating environment, how the company uses water (directly and indirectly) and the source of that water. The following section describes some issues companies may wish to consider in order to better understand business risks.

Analysis of the Operating Environment

An analysis of the operating environment should include an evaluation of the nature of the conflict, including its geographic extent in relation to the company's direct and indirect operations, i.e., whether the conflict is widespread or confined to a certain area. It should also include an assessment of the intensity of the conflict, the values involved (as described in the section on The Evolving Nature of Conflict), as well as government behavior and actions. Although many companies already do this as part of their business risk analysis before making significant investments in a conflict-affected or high risk area, they typically do not isolate what this operating environment may mean for water systems. Companies may consider conducting this analysis bearing in mind the framework on conflict's impacts on water systems in order to assess their risks more fully.

In addition, companies should evaluate government behavior and actions for an indication of the control that the government has over governance, particularly within the water sector. Government behavior and actions may hinder or encourage business operations through the impositions of rules and decrees, e.g., curfews, sanctions, redistribution of resources, or effective communication with companies to stimulate trust in government actions.⁴

Typically, a more violent, widespread conflict will present more risk to both water systems and business operations. For example, during major outbreaks of military combat, such as during the first Gulf War, water-related infrastructure was directly targeted by NATO allied forces. Likewise, during the 2011 Libyan Arab Spring, the water system in Tripoli was targeted by Muammar Gaddafi's forces following the regime's fall. This was also true during the Angolan Civil War where reservoir pumping stations were targeted by rebels in an attempt to shut down vital water supplies. In these operating environments, the physical risks can be so severe that companies cease operations entirely, as happened with a large beverage company in Angola. The

⁴ These areas of business risks are adapted from a study by Berman in 2000 that sought to understand what areas are of particular importance or concern to companies operating in conflict-affected areas.

destruction of the reservoir's pumping station disrupted crucial water supplies necessary for the company's operations causing it to shut-down operations (Based on interviews).⁵

In contrast is a subsidiary of a large food and beverage company that operates in the Occupied Palestinian Territories, an area of political instability, occupation, and heightened tension but not prolonged, continuous armed conflict. The challenges this company faces, including water scarcity, impediments to movement of people and goods required for water sector development, and reliance on Israel for water resources, are not insurmountable and their operations continue. In response to the underdeveloped water sector, the subsidiary implements water efficiency guidelines in line with the parent company's global practices while also working with local communities and governments to build water infrastructure required for their use and that of local communities.

Water Use in Business Operations

An assessment of the company's water use would include evaluating the water intensity of a company's direct operations and/or other segments of its supply chain; the method of water service delivery, e.g., self-supplied a public or private utility, or a commercial vendor; and the nature of a company's water use, e.g., for processing, cooling, or production.

Understanding how a company uses water will provide an indication of whether and how the deterioration of a water system affects its operations. For example, although the mining sector uses large volumes of water during extraction, processing, and cooling, the water does not need to be of high quality. In addition, many extractive companies operate in remote locations that rely on self-supplied water systems and therefore may not face as significant an impact as other industries that rely on municipal supply. However, any reductions in water quality could negatively impact the health of individuals working for the mining company, thereby affecting its human capital. In contrast, the food and beverage sector generally faces more significant risks in conflict-affected areas because they require large volumes of high-quality water often provided by publicly-supplied water systems. This aspect exposes a company to more kinds of water system-related business risk, including, for example, regulatory risks associated with the deterioration of the institutional capacity to manage water systems.

Case Examples of Business Response

Company responses to water-related risks can have a range of results, from exacerbating local conflict situations to positively addressing risks for the benefit of the company and the local community. Several case examples highlight this range. These different case examples point to how companies have confronted water-related issues in high-risk and conflict-affected areas. In some cases, companies have responded in a manner that addresses sources of conflicts while also providing increased access to water for communities. In others, the company's response to water-related issues may have caused conflicts to persist or intensify. Company names have been omitted from these examples.

⁵ Likewise, both Eni and BP, oil and gas producers with operations in Libya, ceased operations due to the direct outbreak of conflict. Since the end of the conflict, both have restarted operations. <http://www.libya-businessnews.com/2012/04/30/eni-profits-soar-42-as-libya-output-resumes/>, <http://www.bbc.co.uk/news/business-18256587>

Large Food and Beverage Company in the Occupied Palestinian Territories

The subsidiary of a large food and beverage company faces a challenging environment where occupation has resulted in decreased investments in the water sector. In response to this problem, the subsidiary improved the water efficiency of its bottling plant and worked with local residents and government in the surrounding community to establish an independent wastewater treatment plant that would provide a reliable source of water to its plant, the local community, and to farmers.

Mining Operations in Peru and Papua New Guinea

A large mining company's operations in Peru and in Papua New Guinea highlight how companies may proactively respond to water issues in conflict-affected or high-risk areas. Peru faces significant water problems as it tries to balance economic development with environmental protection. As one report notes, "Peru is [both] South America's most water-stressed country" and highly vulnerable to climate change (Bebbington and Williams, 2008). At the same time, it is quickly expanding its extractives sector which is predominantly located in the Andean highlands near the headwaters of river systems supplying water to most of the country. Tensions are high as local communities protest the potential pollution of water resources, and a series of conflicts between local communities and companies have resulted in open protests and deaths.⁶ It is in this climate that the mining company in question operates an open-pit gold and silver mine. Located on the property of an indigenous community, some believe that the mine has caused severe environmental impacts, including polluting water downstream of the mine with cadmium, iron, and nickel. In response to these concerns, the company initiated a community outreach program, inviting community members to participate in a water monitoring program on two rivers near the mine. Community members were trained to sample water, submit the samples for analysis, and interpret the results. Overall, the results revealed that mine's operations met acceptable water quality guidelines.

In Papua New Guinea (PNG), the company also operates an open-pit gold mine in an area of major political instability with high levels of crime and violence. Violence occurs almost nightly at the mine, as illegal miners organize daring, violent raids on the mine's open pit, underground tunnels, or stockpile areas, often clashing with mine security personnel. The mine is also located in the PNG highlands, which are covered by dense rainforests with a high potential for landslides. Generally, water systems in PNG are very limited due to the harsh terrain and where they do exist, they are dilapidated or non-operational due to lack of maintenance and skilled workers (Kalmbach).⁷

The mine has been accused of being a major source of water pollution due to the daily discharge of 16,000 tons of liquid tailings into the nearby river which then flows into one of PNG's largest and most important river systems. Recognizing the reputational risks this entails, the company's website provides detailed information on its operations and environmental impact, including independently reviewed annual environmental reports, a detailed explanation of why it can only

⁶ This was particularly true in the Department of Piura where Monterrico Metals was operating in Ayabac and Huancabamba. Protests broke out during this time that led to the deaths of two farmers. Please see Williams and Bebbington 2008 for more information.

⁷ More information about Papua New Guinea's water sector may be found here:
<http://www.cardnoacil.com/Documents/ServicesInPNG.pdf>

dispose of liquid tailings in the nearby river, and the measures it takes to limit the impacts of discharging tailings into the river.

Liberia

Following the Liberian civil war, a large steel and mining company entered the country in 2006 to rebuild the mining sector. During this process, it made significant investments to develop ports, railways, roads, transmission lines, as well as key community development projects. These projects include the construction of water wells and toilets in a number of communities in the areas where the company is beginning its mine operations. The company has also committed to detailed social and environmental impact assessments, investment in local community capacity-building initiatives (including in education), and proactive stakeholder consultations with local communities and civil society.

Niger Delta, Nigeria

Oil operations in the Niger Delta are one of the most well-known cases of poor water and environmental management practices that have exacerbated a pre-existing conflict. Oil exploration in the Delta has been ongoing for the past half century and has resulted in increased pollution from gas flaring, oil spills, and deforestation that polluted local water systems and adversely impacted the health, well-being, and livelihoods of the local population. In response, local communities have demanded greater profit sharing and remediation of negative impacts caused by the operations. In the early 1990s, relations deteriorated to such a degree that outright violence between government security forces protecting the operations and the local communities contributed to an unstable, violent, and insecure environment. In response to the outbreaks in violence and protests, in 1993, a large energy and petrochemical company ceased major operations.

A UNEP report commissioned by the Nigerian government in August 2011 concluded that it could take 30 years for the area to recover from oil spills that have contaminated major water resources. The UNEP report also found that “Control and maintenance of oilfield infrastructure ... has been and remains inadequate: the [company’s] own procedures have not been applied, creating public health and safety issues” (UNEP 2011).⁸ In this particular example, company operations in the area affected local water systems exacerbating instability that then affected the company, its infrastructure, and operations.

Conclusions and Areas for Further Evaluation

Conflict can affect water systems through impacts on water resources directly, as well as on the planning, construction, operation, and management of the water system. This paper sets forth a framework for understanding these impacts, organizing them into four categories: (1) natural resources; (2) physical infrastructure; (3) human capital; and (4) socio-political and financial systems.

Evidence suggests impacts on water systems can, in turn, affect business operations in conflict-affected and high-risk areas. Despite these risks, companies by and large have not yet considered water-related business risks separately from overall risk in these areas. One company

⁸ More information from the UNEP report can be found at <http://www.unep.org/newscentre/default.aspx?DocumentID=2649&ArticleID=8827>.

interviewed for this paper noted that their policy is to automatically shut down operations during periods of heavy violence, and thus any interruption in water supply would potentially go unnoticed. More generally, identifying business risks associated with impacts to water systems can be difficult, as it is not easy to separate water from the broader risks associated with operating in conflict regions. As a result, justification for a water-specific risk assessment may hinge on the nature and scope of the conflict and the size and strategic importance of business operations in the region.

However, we note that, prior to this work, a framework had not existed to understand risks to the water system in conflict-affected and high-risk areas, and therefore companies may not have had the tools to incorporate these potential risks into their own assessments. Additional work is needed to determine the nature and extent of water-related impacts to businesses operating in these areas, and the analytical tools needed to accurately characterize and quantify them in order to facilitate responsible company response strategies, where appropriate.

Applicability of the Framework to Particular Regions and/or Sectors

Additional research is needed to test whether the framework put forward in this paper is appropriate and useful for companies trying to understand risks to water systems in conflict-affected and high-risk areas. This effort should also attempt to make an explicit, direct connection between risks to the water system and impacts to business. Further, although this paper touches upon potential business practices that could help identify and address these risks, a more thorough examination of these practices is warranted.

Certain “geographically bound” industry sectors, such as the oil and gas and mining industries, might be more likely to continue operations in conflict-affected or high-risk areas. Future research efforts might seek to focus on these sectors. Further research can also focus on the experiences of local companies or subsidiaries of multinational companies operating in conflict-affected or high-risk areas. This could provide a better understanding of the “on-the-ground” difficulties that companies face, how applicable the framework may be for understanding local water system risks, what these risks mean for their operations, and how companies can respond responsibly.

The Relevance of Emerging Corporate Water Stewardship Practice and Tools

Additional research might also explore the potential for existing corporate water-risk assessment tools and water stewardship response initiatives to account for the unique water challenges that occur in conflict-affected and high-risk areas. The emerging field of corporate water stewardship does not presently account for specific problems in high-risk and conflict areas and therefore does not adequately delineate conflict-sensitive business practices related to water in such circumstances.⁹ Future research would entail an examination of the degree to which emerging corporate water stewardship approaches can be tailored to address the unique circumstances in conflict areas. Emerging corporate water stewardship models stand to offer a consistent manner for companies to respond to these conditions by allowing them to better understand how they manage their internal and value chain impacts and how they may engage external stakeholders

⁹ Corporate water stewardship broadly includes, “actions on the part of companies who seek to improve the efficiency and cleanliness of their internal operations and in their supply chain, while also facilitating the sustainable management of shared freshwater resources through collaboration with other businesses, governments, NGOs, communities, and others” (WWF International 2012).

(such as through community engagement or public sector individuals) to promote better water management and governance.¹⁰

The application of existing corporate water risk assessment tools in conflict areas should also be evaluated. For instance, the Water Risk Filter Tool developed by WWF International and DEG Invest has further broken down the three water risks categories (physical, regulatory, and reputational) discussed in this paper into “company risks” and “basin risks” (WWF International 2012). This approach offers a promising starting point for enabling companies to undertake basin-level assessments in conflict regions, and to better understand their relevant operating environments.

Further, the framework presented in this paper offers companies a potential diagnostic tool for evaluating the particular impacts that conflict has on water systems and business operations in the region. We believe the framework can be used in conjunction with the WWF-DEG Tool. For example, the Water Risk Filter Tool characterizes basin-level physical risks such as threats to ecosystems, which is consistent with the potential impacts that conflict may have on natural resources as identified in this paper’s framework. Further exploration of the potential interoperability of these diagnostic tools is warranted.

Integrated Risk Evaluation Models

Risk evaluation models for other utilities that share characteristics with the water sector may offer further insights into evaluating business risk in conflict-affected and high-risk areas. The structure of electricity systems, for example, is similar to that of water systems. Likewise, a company’s demand for electricity is similar to demand for water, e.g., most companies require a reliable supply of both electricity and water, although there are also storage opportunities available for each. Combining risk assessments for water and energy may prove useful for understanding business-related risks in conflict-affected and high-risk areas.

¹⁰ Further information about “company risks” and “basin risks” may be found at: <http://waterriskfilter.panda.org/MitigationTools.aspx>

Appendix A: Definitions of Political and Security Risks

The following is taken from the work published by Control Risks (2012).

Definitions of Political risk:

- *Insignificant:* The environment for business is favourable and likely to remain so. Government policy is stable and the economy is secure. Business faces no legal or regulatory disadvantages. There are no significant non-state threats to operations.
- *Low:* Business can operate with few problems. Political institutions are stable but there is some possibility of negative policy change. Legal guarantees are strong but business may face some regulatory or judicial insecurity. Non-state actors may occasionally hamper operations.
- *Medium:* Foreign business is likely to face some disruption from state or non-state actors OR long-term investment security cannot be guaranteed. There is a risk for business of exposure to some or all of the following: corruption; strong and hostile lobby groups; absence of adequate legal guarantees; restrictions on imports or exports; weak political institutions; and capricious policymaking. In some Medium risk countries there is a latent threat of military or other illegal intervention.
- *High:* Business is possible but conditions are difficult or likely to become so in the near future. Political institutions effectively do not function, the regulatory framework is poor and judicial decisions are arbitrary. There is little security for investments. Business may be exposed to the following risks: economic and political conditions may become rapidly unstable; international sanctions are possible; non-state actors actively target business; or there is a risk of contract repudiation or re-negotiation by state actors.
- *Extreme:* Conditions are hostile to/untenable for business. There is no investment security. The following conditions may apply: the economy has collapsed; law and order has broken down and state bodies have ceased to function; there is a state of war or civil war; non-state actors cause suspension of operations; or the state is actively hostile to foreign business and expropriation of assets is likely.

Definitions of Security risk:

- *Insignificant:* Assets and personnel are not at risk except from isolated incidents or petty crime. Levels of violent crime are low, the authorities provide effective security and there is virtually no political violence.
- *Low:* Assets are generally secure and the authorities provide adequate security. Companies and personnel face only infrequent exposure to violence from terrorists or criminals; companies are unlikely to be systematically targeted for asset theft
- *Medium:* There is a reasonable possibility of security problems affecting companies, but there is no sustained threat directed specifically against foreign companies. Targeted crime or violence poses some risk to foreign assets and personnel OR they are at reasonable risk from violence by terrorists or unrest. State security is inadequate.

- *High:* There is a probability that foreign companies will face security problems; special measures are required. Assets and personnel are at constant risk from violence or theft by state or non-state actors OR there is a high risk of collateral damage from terrorism or other violence. State protection is very limited.
- *Extreme:* The severity of security risks to assets or personnel is likely to make business operations untenable. There is no law and order; conditions may verge on war or civil war. Foreign companies must strongly consider withdrawal.

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